Appendix B
Wildfire Risk Assessment (OES)

2023

WILDFIRE RISK ASSESSMENT

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Acronyms and Abbreviations

Acronyms	Full Name
AOI	Area of Interest
CAL FIRE	California Department of Forestry and Fire Protection
CwNVC	Conditional Weighted Net Value Change
CWPP	Community Wildfire Protection Plan
DNC	Do Not Condition
EA	Exposure Analysis
EwNVC	Expected Weighted Net Value Change
FOA	Fire Occurrence Area
FHSZ	Fire Hazard Severity Zone
FZ	Forecast Zone
HR	Hour
HVRA	High-Value Resources and Assets
IFTDSS	Interagency Fuel Treatment Decision Support System
LBF	Landscape Base File
LBP	Landscape Burn Probability
MPH	Miles Per Hour
NEU	Nevada-Yuba-Placer Unit (CAL FIRE)
QWRA	Quantitative Risk Assessment
RAWS	Remote Automated Weather Station
RF	Response Function
RI	Relative Importance
TAC	Technical Advisory Committee

WFDSS	Wildland Fire Decision Support System
WHA	Wildfire Hazard Assessment
WRA	Wildfire Risk Assessment

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Final Wildfire Risk Assessment

1. Overview

A Wildfire Risk Assessment (WRA) was conducted for the County of Nevada using Interagency Fuel Treatment Decision Support System (IFTDSS) fire behavior modeling software. The WRA was comprised of two wildfire models within IFTDSS, the Wildfire Hazard Assessment (WHA) and the Wildfire Risk Assessment. The WHA modeled wildfire hazards based on the existing conditions in the County and ran a comparative analysis to identify the highest-priority hazard areas. The WRA modeled wildfire risk based on the identified High Value Resources and Assets (HVRA) at risk, susceptibility to wildfire impact, and severity of impact. The WHA was both a stand-alone model and a component of the WRA. The model results from the WHA and the WRA were used to inform, identify, and support wildfire planning documents aimed at reducing wildfire risk in Nevada County. These models were used to understand the current wildfire hazard and wildfire risk in Nevada County from a landscape-level perspective to identify priority treatment locations. They were not intended to be used for insurance purposes, tactical decision-making, fire season predictions, or regulatory requirements.

NOTE: At this time IFTDSS and most fire modeling software are not capable of simulating how fire burns structures or developed areas. This is due to the high variability in how structures burn. Further, structures typically burn in wildfires due to house-to-house spread or firebrands, neither of which can be modeled using fuel-based fire behavior modeling software (such as IFTDSS and the majority of fire modeling software). However, fire science does recognize that structures burn at a high intensity and are at significant risk from wildfire. It is recognized that structures are not only a risk from wildfire but also contribute to the fuel landscape and are considered fuel and therefore contribute to wildfire hazard in addition to wildfire risk. This modeling limitation is acknowledged and taken into account when determining priority locations for fuel treatments.

1.1 Interagency Fuel Treatment Decision Support System

IFTDSS is a web-based application designed to model potential fire behavior for fuel treatment planning. IFTDSS is overseen by the Wildland Fire Management Research, Development, & Application in partnership with the Department of the Interior and the U.S. Forest Service. The focus of IFTDSS is strategic planning at the landscape scale for fuel treatment. There are three fire behavior models available through IFTDSS: Landscape Fire Behavior, Minimum Travel Time Fire Spread, and Landscape Burn Probability (LBP). Landscape Fire Behavior is identical to the Basic Fire Behavior tool in the Wildland Fire Decision Support System (WFDSS) and is driven by FlamMap. It can be used to model basic fire behavior under fixed conditions. Minimum Travel Time Fire Spread is consistent with the Short-Term Fire Behavior Tool in WFDSS and can be used to simulate fire spread and behavior based on user-specific ignitions and optional barriers. The LBP quantifies the relative likelihood and intensity of a fire occurring under specific conditions. These outputs can be used independently for hazard analysis or be incorporated into the

Quantitative Wildland Fire Risk Assessment (QWRA) for wildfire risk analysis. See Figure 1 for a walk-through of the different purposes/questions the three models were suited to addressing. (IFTDSS, n.d.-b).

Landscape Fire Behavior	MTT Fire Spread	Landscape Burn Probability
How effective are my proposed fuel treatments at altering fire behavior?		
Which areas on my landscape are more likely to experience crown fire versus surface fire?	When will fire likely impact an area?	Which areas on the landscape are more likely to burn than others?
Which areas have the fastest spreading fuels?	How quickly can I expect fire to move across my landscape?	How likely are fires on my ownership immediately adjacent ownerships and inholdings?
Where in my burn unit might flame lengths and rate of spread exceed capability of proposed holding resources?	What are the expected rates of spread or fireline intensity due to fire from a given ignition over the burned area?	Which areas will burn with the highest intensity and severity?
	Did my treatments change the spread of fire? Slow it down or keep it out to allow for better ingress/egress?	Which areas on this landscape would benefit from treatments with objectives of reducing fire intensity in areas that are most likely to burn?

Figure 1: IFTDSS Model Selection Summary/Walk Through. Reprinted from IFTDSS Help Center, n.d. https://iftdss.firenet.gov/firenetHelp/help/pageHelp_pdf/fbmodelcompare.pdf

92% of Nevada County is classified by CAL FIRE as being either a High or Very High Fire Hazard Severity Zone (CAL FIRE, 2022). Because the majority of the County landscape has a high or very high hazard this presented a challenge when determining how to prioritize different parts of the landscape. For Nevada County's fire modeling needs the LBP was selected. As described above the LBP was able to not only determine the landscape hazard but also determine the prioritization of the hazard across the landscape. This was highly applicable to Nevada County since the majority of the County has a high or very high fire hazard. The LBP results informed the decision-making for treatment types, locations, and prioritization in our high fire hazard landscape. Further, the LBP was able to be directly integrated into the QWRA to determine what values in the County were at-risk of wildfire. Due to its ability to prioritize fire hazards, be integrated with risk analysis, and be adaptive to High-Value Resources and Assets (HVRA) at risk, it lent itself to planning processes including the Nevada County Community Wildfire Protection Plan update.

1.2 Forecast Zones

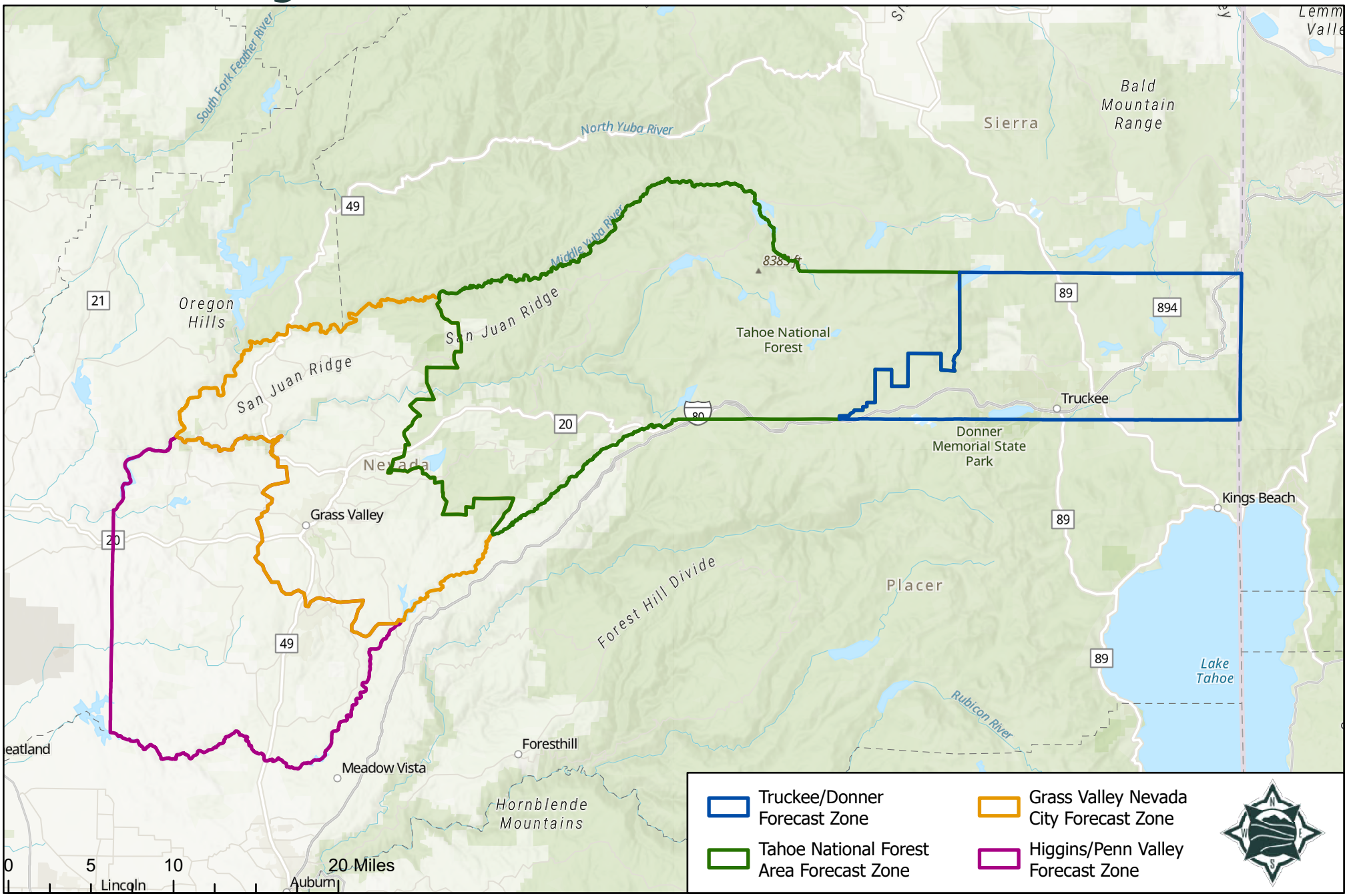
Forecast zones (FZ), sometimes known as Areas of Interest (AOI) or Fire Occurrence Areas (FOA), could be selected when there was considerable variability in topography, climate, fuels, and other similar fire characteristics on a given landscape. By dividing an analysis area into smaller FZs it allowed for a more localized fire model. Analysis at the FZ scale better-captured fire weather influences and better-informed planning decisions related to fire management. Given

that there was a considerable difference in topography, climate, fuels, and community makeup across Nevada County, the County was divided into four FZs (Figure 2). The WHA and WRA were run for each forecast zone. The selection of the forecast zones was based on the fire environment, local weather patterns, fire history, community boundaries, and expertise from the Technical Advisory Committee (TAC). The four forecast zones were:

1. Higgins/Penn Valley (143,740 acres)
2. Grass Valley/Nevada City (134,593 acres)
3. Tahoe National Forest Area (263,159 acres)
4. Truckee/Donner (108,453 acres)

Fire Modeling Forecast Zones

Figure 2



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1.3 Technical Advisory Committee

A Technical Advisory Committee (TAC) was created to provide input for the entirety of the WRA process. The TAC advised the methodology of the WHA and the WRA and provided ground-truthing and technical expertise. The TAC was comprised of personnel from fire agencies with fire behavior modeling expertise and fire behavior knowledge specific to Nevada County. There were three layers of the TAC with varying levels of responsibility. The first layer consisted of the Nevada County Office of Emergency Services and the California Department of Forestry and Fire Protection (CAL FIRE) Assistant Chief for the North Division Operations and the CAL FIRE Regional Unit Forester for the Nevada-Yuba-Placer (NEU) Unit. The second layer of the TAC consisted of the three CAL FIRE NEU battalion chiefs who serve Nevada County. The third layer of the TAC was the fire chiefs of the fire protection districts in Nevada County. See Table 1 for a full list of the TAC members and Figure 3 for the TAC Organizational Structure.

TABLE 1: TAC MEMBERS

Name	Title, Organization
Craig Griesbach	Director, Nevada County Office of Emergency Services
Paul Cummings	Program Manager, Nevada County Office of Emergency Services
Alex Keeble-Toll	Senior Administrative Analyst, Nevada County Office of Emergency Services
Alessandra Zambrano	County Wildfire Coordinator, Nevada County Office of Emergency Services
Landon Haack	Assistant Chief North Division Operation, CAL FIRE
Steve Garcia	Regional Unit Forester, CAL FIRE
Sean Ryan	Battalion Chief, CAL FIRE
Jason Flores	Fire Chief, North San Juan Fire Protection District
Tom Browning	Deputy Chief, North San Juan Fire Protection District
Eric Horntvedt	Wildfire Prevention Manager, Truckee Fire Protection District
Dillion Sheedy	Forester, Truckee Fire Protection District
Jason Robitaille	Fire Chief, Nevada County Consolidated Fire District
Mark Buttron	Fire Chief, Grass Valley Fire Department
Sam Goodspeed	Fire Chief, Nevada City Fire Department
Joel Tam	Fire Chief, Higgins Fire District
Rita Clipperton	U.S. Forest Service Tahoe National Forest

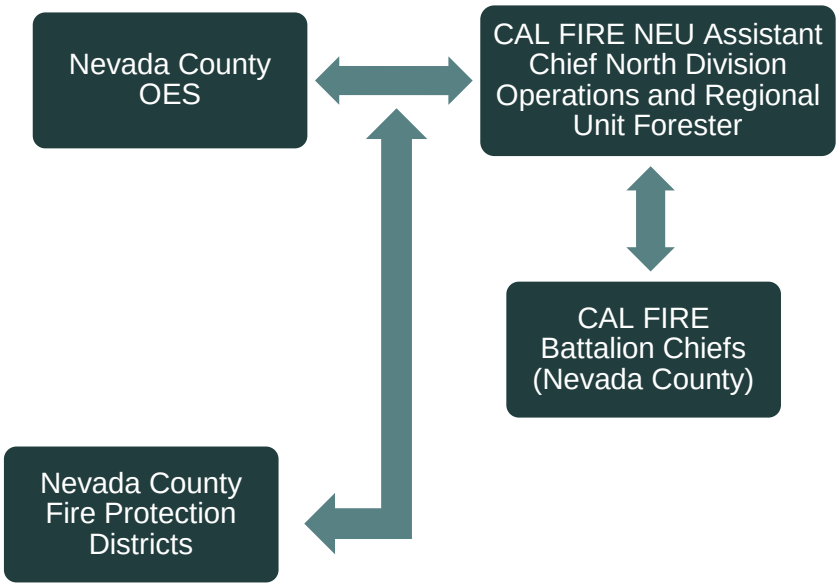

Figure 3: TAC Organizational Structure

The first layer of the TAC convened three times throughout the WHA/WRA process, see Table 2 for TAC meeting dates. The second layer of the TAC convened twice during the WRA process. The WHA was completed in June of 2023 and the WRA was completed in December of 2023**.** The draft results were circulated with the TAC for review.

TABLE 2: TAC MEETING DATES

Meeting Date	TAC Layer
February 23, 2023	First Layer
April 11, 2023	First Layer
June 19, 2023	All TAC Layers
October 10, 2023	First Layer
December 12, 2023	All TAC Layers

2. Wildfire Hazard Assessment

To assess the wildfire hazard, the Landscape Burn Probability (LBP) was performed in IFTDSS to produce the Integrated Hazard. Wildfire hazard was defined as the potential fire behavior on a landscape based on the fuel, topography, and weather. The LBP quantified the relative likelihood of ignition at a specific point and intensity of a fire occurring under a fixed set of weather and fuel moisture conditions. The LBP was a necessary component of the WRA but can also stand alone. The LBP was chosen over other fire behavior models for its ability to not only determine the landscape-scale fire hazard but also prioritize the fire hazard results.

The LBP combined two fire behavior model results – burn probability and conditional flame length into a single model output, the Integrated Hazard. The Integrated Hazard differed from other hazard modeling methods, such as the CAL FIRE Fire Hazard Severity Zones (FHSZ), in that it not only determined what the landscape fire hazard was but also compared the landscape fire hazard against itself. By comparing the hazard across the landscape, the LBP was able to prioritize certain areas of hazardous conditions over others. The LBP was run for each Forecast Zones (FZ) under two different fire scenarios: (1) fuel-driven, and (2) wind-driven fire.

NOTE: The WHA was not intended to replace or change the fire hazard severity zones (FHSZ). It was strategic to use in a landscape such as Nevada County where the majority of the landscape is considered to be a high or very high fire hazard and it was necessary to determine the hazard priority to inform treatments (CAL FIRE, 2022). The LBP is not a regulatory determination and cannot be used for insurance purposes. The LBP is a tool for wildfire planning and mitigation on a landscape scale.

2.1 Methodology

The following describes the methodology used to run the WHA.

2.1.1 Landscape Base File

The first step of the WHA was to create the Landscape Base File (LBF). The LBF consisted of eight distinct data layers representing topography (elevation, slope, and aspect) and vegetation/fuels (fuel model, canopy cover, stand height, canopy base height, and canopy bulk density). The data were embedded in IFTDSS but were sourced through the 2022 LANDFIRE. LANDFIRE is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and the U.S. Department of Interior. LANDFIRE provided landscape-scale geospatial products that support fire modeling, such as geospatial fuel data. LANDFIRE 2022 includes adjustments to disturbance areas recorded in 2021 and 2022. This included adjustments to vegetation and fuel disturbance areas identified through the LANDFIRE remote sensing of the landscape change process and the first application of the “zero to one”. The “zero to one” rule allowed for LANDFIRE to more accurately and more rapidly map fuels in disturbed areas and was designed to represent the effects of disturbance on fuels for the growing season immediately following the disturbance (LANDFIRE, 2022). A LBF was created for each FZ.

2.1.2 Fire Model Inputs

Required inputs for the LBP included:

- Wind speed, miles per hour (mph)
- Wind direction (azimuth)
- 1-hour (hr), 10-hr, and 100-hr fuel moisture
- Herbaceous and woody fuel moisture
- Wind option (gridded, uphill, or downhill)
- Foliar moisture content
- Fuel moisture conditioning
- Ignitions
- Burn period length
- Spotting probability

Wind speed, wind direction, and fuel moisture required additional analysis to determine the inputs. All other inputs were options embedded with IFTDSS.

Weather Analysis and Fire Model Scenario Development

Using FireFamily Plus (version 5.0) and Remote Automated Weather Stations (RAWS) the weather inputs and fire scenarios were developed. The two fire scenarios were **Fuel-Driven Fire** and **Wind-Driven Fire.** In Nevada County, the first half of the fire season tends to be dominated by fuel-driven fires. In a fuel-driven scenario, the main factors influencing fire growth were fuel

(type, loading, and condition) and topography. During this period winds tend to come from the southwest, were less than 10 mph, and align with significant topography such as canyons. As summer transitions into fall, the County can experience significant wind events from the north/northeast with high windspeeds that result in wind-driven fires. In wind-driven fires, the wind was the main factor contributing to fire growth. Note, in the Truckee/Donner FZ wind-driven (northeasterly wind events), are less common due to snow/precipitation at that time of year. However, with climate change, less precipitation is predicted to fall in Eastern County and wind events are predicted to increase. Using FireFamily Plus the 97th percentile (worst-case scenario) conditions were determined for both the Wind-Driven and Fuel-Driven fire scenarios. The two weather scenarios are described below:

- **Fuel-Driven Fire:** Weather inputs were critical fire weather conditions (97th percentile) but with prevailing wind direction and diurnal (daily) wind speeds. Fuel and topography were the primary drivers of fire behavior and fire growth was predominantly driven by fuel type, density, condition, and moisture. Wind speeds in these types of fires tended to be lower, and the terrain had a significant influence on fire behavior. Such conditions could occur at any time of the year but were at critical condition in summer.

- **Wind-Driven Fire:** Weather inputs were critical fire weather conditions (97th percentile) but with strong downslope winds from the north/northeast bringing low relative humidity, warm air, and high wind speeds (based on FireFamily Plus analysis). Fire under these conditions was expected to be driven by extreme wind speed and wind gusts and resulted in rapid-fire growth, extreme rates of spread, long-range spotting, and extreme fire behavior. Such conditions typically occurred in late summer/early fall.

Multiple RAWS were selected for each FZ based on similar climatology, elevation, and weather patterns in order to better determine fire weather patterns. Note that some RAWS stations were outside the County but were in locations where there were similar climatology, elevation, and weather patterns. The following Remote Automated Weather Station (RAWS) were used for each forecast zone:

- **Higgins/Penn Valley**
  - Reader Ranch RAWS
  - Secret Town RAWS
  - Pilot Hill RAWS
- **Grass Valley/Nevada City**
  - Bangor RAWS
  - Lincoln RAWS
  - Pilot Hill RAWS
- **Tahoe National Forest Area**
  - White Cloud RAWS
  - Secret Town RAWS
  - Foresthill/Seed Orchard RAWS
- **Truckee/Donner**
  - Dog Valley RAWS

- Tahoe Donner RAWS
- Stampede RAWS

Weather inputs were analyzed over 10 years. Fuel-Driven and Wind-Driven scenarios were developed for each FZ. To better inform wind-driven behavior, fire history was also analyzed. Weather inputs were analyzed from May through August for Fuel-Driven fires. Fire season in the County started as early as May and during this time frame, winds were less likely to be a major fire influence. Weather inputs and the selection of RAWS stations were reviewed by the TAC for consistency with other fire modeling efforts and best-practices. Weather inputs were also compared with recommendations from the National Weather Service in Sacramento and Reno.

2.1.3 Other Model Inputs

Weather and fuel moisture inputs from FireFamily Plus were used (See Table 3). Other model input options were selected from the pre-loaded options in IFTDSS. Fuel moisture was set to “do not condition” for all scenarios because the fuel moisture was known from the FireFamily Plus analysis. The Scott/Reinhardt (2001) crown fire model method was selected for all scenarios as it better predicts the likelihood of crown fire transition with subsequent crown fire behavior.

LBP included spotting as part of the modeling process, but it does not generate outputs for spotting. Spotting helped inform fire spread in the LBP. In IFTDSS spotting only occurred in trees where there was an active or passive crown fire. The spotting probability input controls how many pixels where a crown fire was initiated and resulted in launching embers. Spotting probability could be from 0% to 100%. One-hundred percent (100%) spotting assumed that all points on the landscape where a crown fire was initiated would launch an ember and 0% spotting essentially disabled the feature. IFTDSS recommends a 20% spotting probability (default setting). For the Fuel Driven fire scenario, the spotting probability was set to 20% and raised to 60% for the Wind-Driven fire scenario. The spotting probability was raised for the Wind-Driven scenario since spotting significantly contributes to fire growth.

Ignitions were set to random for all scenarios. IFTDSS modeled a minimum of 1,000 fires per analysis and added ignitions until at least 98% of the burnable areas in the LBF burned. Unlike the Landscape Fire Behavior model, the LBP simulated fire spreading into nearby pixels from random ignitions. Burn period length was described as the duration of worst-case fire growth in hours. The burn period was set to 10 hours in the Wind-Driven scenarios because they typically occur in a shorter burn window. The burn period for the Fuel-Driven scenarios was increased to 12 hours, the maximum value in IFDTSS, because these types of fires were not limited by wind and could burn for significantly longer periods of time.

Specific values and model inputs for each fire model scenario in each FZ were evaluated by the TAC.

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TABLE 3: MODEL INPUTS

Model Inputs	Higgins/Penn Valley FZ		Grass Valley/Nevada City		Tahoe National Forest Area		Truckee/Donner	
	Fuel-Driven	Wind-Driven	Fuel-Driven	Wind-Driven	Fuel-Driven	Wind-Driven	Fuel-Driven	Wind-Driven
1-hr Fuel Moisture	2	3	3	3	3	3	3	4
10-hr Fuel Moisture	3	4	4	5	5	5	4	5
100-hr Fuel Moisture	5	6	6	8	6	7	6	7
Woody Fuel Moisture	60	60	60	60	60	60	60	60
Herbaceous Fuel Moisture	30*	30*	30*	30*	30*	30*	30*	30*
Wind Type	Gridded	Downslope	Gridded	Downslope	Gridded	Downslope	Gridded	Downslope
Wind Speed (mph)	5	17	6	20	6	22	10	12
Wind Direction (Azimuth)	225	20	202	45	220	67	210	45
Crown Fire Model	Scott/Reinhart	Scott/Reinhart	Scott/Reinhart	Scott/Reinhart	Scott/Reinhart	Scott/Reinhart	Scott/Reinhart	Scott/Reinhart
Foliar Moisture Content	100	100	100	100	100	100	100	100
Fuel Moisture Conditioning	DNC**	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Ignitions	Random	Random	Random	Random	Random	Random	Random	Random
Burn Period (Hours)	12	10	12	10	12	10	12	10
Spotting Probability (%)	20	60	20	60	20	60	20	60

*Value in FireFamily Plus was lower than the minimum value in IFTDSS
**Do not condition

2.1.4 Burn Probability

Burn Probability was the likelihood that a given location in the model would burn based on the model inputs used. Burn probability was related to the size of fires that could occur on a given landscape and was relative to the size of the landscape. Burn Probability was calculated as follows (IFTDSS, n.d.-a):

- Burn Probability = # times burned / total number of ignitions

The modeling results for Burn Probability were displayed with seven distinct classes. The first two classes represented pixels that did not burn: The other five classes were based on the maximum value of Burn Probability for the model run

1. **Non-Burnable** – pixels had a non-burnable fuel model and cannot burn.
2. **Burnable but Not Burned** – pixels had burnable fuels but did not burn (e.g., a fire never reached the pixel, or a fire started within the pixel, but it was unable to burn out of the pixel because the fire spread rate was too slow).
3. **Lowest** - 0-20% of maximum
4. **Lower** - 20-40% of maximum
5. **Middle** - 40-60% of maximum
6. **Higher** - 60-80% of maximum
7. **Highest** - 80-100% of maximum

The classes were not evenly distributed across the landscape but were distributed in relation to the analysis maximum. Because of this, the analysis maximum differed in each analysis area. The analysis maximum was the highest burn probability for the analysis area. The remaining classes were based on a percentage of the analysis maximum for the analysis area. IFTDSS determined the highest burn probability within the analysis area and then compared the burn probability of each pixel against the maximum Burn Probability to determine priority locations. Therefore, results can be compared within each forecast zone (FZ) but the FZs cannot be compared to each other. Burn Probability was produced for each FZ under the two fire scenarios. The final output for Burn Probability displays the prioritized burn probability for the area.

NOTE*:* While Burn Probability considers the likelihood of ignition it does not consider ignition factors that influence wildfire risk, such as proximity to developed areas, proximity to roadways, or utility infrastructure. Burn Probability looks at the likelihood that the fuel in any given pixel will burn based on the model inputs.

2.1.5 Conditional Flame Length

The Conditional Flame Length was an estimate of the mean flame length for all the fires that burn on any given point on the landscape during the model run. This value was typically lower than basic flame length values generated from a traditional fire behavior model because conditional flame length accounted for heading, flanking, and backing fires. Flanking or backing fires typically had lower values than heading fire, thus the Conditional Flame Length value was lower as it was

the mean of these three fire types. The Conditional Flame Length also calculated the mean of all fires that occurred on a single pixel versus a singular model run. It considered not only the mean flame length of the three flame types but also the probability of a fire at a given intensity in a given location. The Conditional Flame Length was calculated as follows (where FLPi was the probability of fire at a given intensity and FLi was the mid-point of the given intensity level) (IFTDSS, n.d.-c).

- Conditional Flame Length = $\sum_{i=1}^{n} FLP_i * FL_i$

The modeling results for Conditional Flame Length were displayed with eight distinct classes. The first two classes represented pixels that did not burn: The remaining 6 classes matched those of the fire intensity levels:

1. **Non-Burnable** – pixels had a non-burnable fuel model and cannot burn.
2. **Burnable but Not Burned** – pixels had burnable fuels but did not burn (e.g., a fire never reached the pixel, or a fire started within the pixel, but it was unable to burn out of the pixel because the fire spread rate was too slow).
3. **Conditional Flame Length >0-2 ft**
4. **Conditional Flame Length >2-4 ft**
5. **Conditional Flame Length >4-6 ft**
6. **Conditional Flame Length >6-8 ft**
7. **Conditional Flame Length >8-12 ft**
8. **Conditional Flame Length >12 ft**

The final result displayed for Conditional Flame Length was the sum of the mean flame length for all fires on a given pixel and the probability of that fire intensity occurring. Conditional Flame Length was run for each FZ under each fire scenario.

2.1.6 Integrated Fire Hazard

Integrated Hazard was calculated in IFTDSS using the LBP model and was the final step in the WHA. This model evaluated the results from the Burn Probability (probability of a fire occurring at a specific point under a specified set of conditions) and Conditional Flame Length (intensity of a fire at a specific point given that a fire occurs) (See Figure 4).

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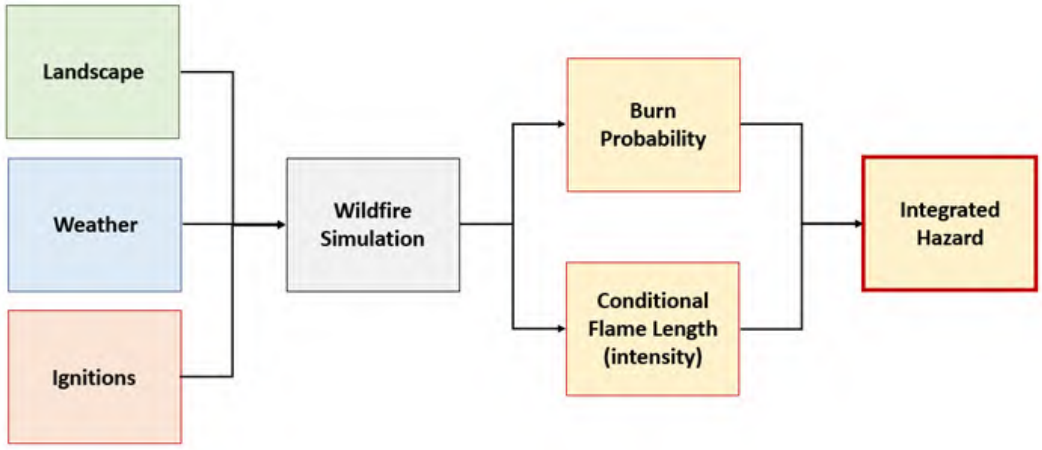


Figure 4: Integrated Hazard Model Process. Retrieved from IFTDSS Help Center, n.d., https://iftdss.firenet.gov/firenetHelp/help/pageHelp_pdf/inthazard.pdf

IFTDSS Integrated Hazard had seven distinct classes. For each pixel, an Integrated Hazard value was assigned based on the Burn Probability and Conditional Flame Length Class (Figure 5). The first two classes were for pixels that did not burn, and the remaining five hazard classes were for pixels that did burn:

1. Non-Burnable
2. Burnable but Not Burned
3. Lowest Hazard
4. Lower Hazard
5. Middle Hazard
6. Higher Hazard
7. Highest Hazard

Integrated Hazard determined the landscape hazard and determined the priority of the fire hazard within the analysis area. In order to, better communicate the IFTDSS results the labels for the Integrated Hazard results were changed for clarity. This did not alter the data. The seven class labels were changed to the following:

1. **Non-Burnable**
2. **Burnable but Not Burned**
3. **Lowest Priority Hazard**
4. **Lower Priority Hazard**
5. **Moderate Priority Hazard**
6. **Higher Priority Hazard**
7. **Very High Priority Hazard**

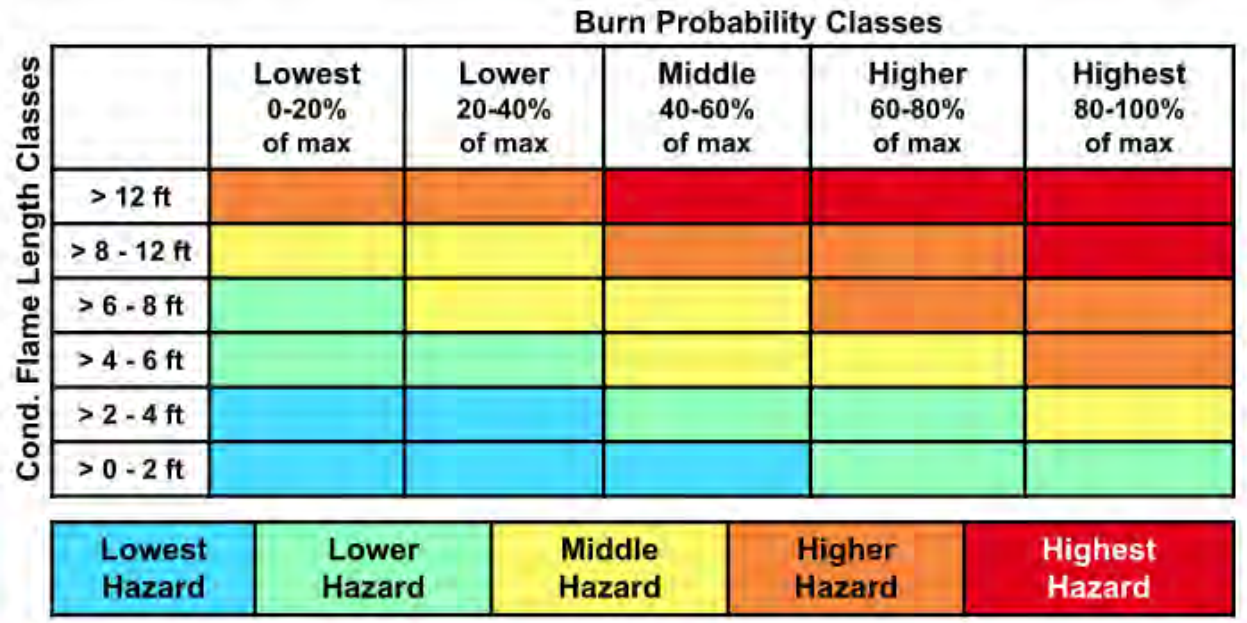


Figure 5: Burn Probability Classes based on the Burn Probability and Conditional Flame Length Classes. Retrieved from IFTDSS Help Center, n.d., https://iftdss.firenet.gov/firenetHelp/help/pageHelp_pdf/inthazard.pdf

Integrated Hazard incorporated Burn Probability and therefore had similar limitations. Like, Burn Probability, the Integrated Hazard ran a comparative analysis and was influenced by the analysis area maximum. Therefore, the Integrated Hazard of analysis could not be compared to another analysis. However, because the Integrated Hazard was also affected by the analysis maximum of an area not only determined the hazard on the landscape but then compared the landscape against itself. This allowed for the prioritization of hazardous areas. For instance, one area on the landscape may have had an Integrated Hazard classification of a Lower Hazard because as compared to other areas within the analysis area it had a lower hazard priority. This was due to other areas on the landscape that had a higher Conditional Flame Length and/or Burn Probability, therefore resulting in a higher priority hazard classification. However, this did not mean that the fire hazard was low or non-existent. The Integrated Hazard was run for each (FZ) under each fire scenario.

2.2 Wildfire Hazard Assessment Results

The following section discusses the Integrated Hazard results for all of Nevada County and each FZ. Further information can be found in Appendix A, IFTDSS reports. The results from the conditional flame length and probability were incorporated into the Integrated Hazard (Figures 6 and 7). The intermediate results from Conditional Flame Length and Burn Probability can be found in Appendix B and Appendix C.

NOTE: All structures and developed areas were classified as non-burnable. At this time IFTDSS and most fire modeling software are not capable of simulating how fire burns structures or developed areas. This is due to the high variability in how structures burn. Further, structures typically burn in fires due to house-to-house spread or firebrands neither of which can be modeled using fuel-based fire behavior modeling software (such as IFTDSS and the majority of fire modeling software). However, fire science does recognize that structures burn at a high intensity and are at significant risk from wildfire. It is recognized that structures are not only a risk from wildfire but can also contribute to the fuel landscape and are considered fuel. This modeling limitation is acknowledged and was taken into account when determining priority locations for fuel treatments.

2.2.1 Integrated Hazard Results – County Scale

92% of Nevada County is classified by CAL FIRE as being either a High or Very High Fire Hazard Severity Zone (CAL FIRE, 2022). Because the majority of the County landscape has a high or very high hazard this presented a challenge when determining how to prioritize different parts of the landscape for hazardous fuel treatment. As described above the Landscape Burn Probability (LBP) is able to not only determine the landscape hazard but also determine the prioritization of the hazard across the landscape through comparative analysis and determine hazard prioritization. This was done for both fire scenarios, (1) fuel-driven and (2) wind-driven, for each forecast zone (FZ). The analysis is broken down to FZ to account for differences in fire environments, topography, fuel types, and community identity. Because the hazard prioritization process relies on comparing each pixel against the analysis maximum (the highest value in the model extent) the forecast zones cannot be compared against each other. However, trends can be identified and discussed at the County scale.

Fuel-Driven Scenario

Each FZ has pixels classified as either Non-Burnable or Burnable but Not Burned. Non-Burnable classification occurs where structures or man-made materials exist. As previously discussed,' IFTDSS and most fire modeling software are not capable of simulating how fire burns structures or developed areas. However, fire science does recognize that structures burn at a high intensity and are at significant risk from wildfire. The majority of Non-Burnable classifications occur in the Grass Valley/Nevada City and Truckee/Donner FZ which is consistent with development patterns. Burnable but Not Burned classification occur where the pixel had burnable fuels but did not burn (e.g., a fire never reached the pixel, or a fire started within the pixel, but it was unable to burn out of the pixel because the fire spread rate was too slow). This tends to be intermixed with the

developed areas where residential vegetation is likely present. In the Higgins/Penn Valley FZ the majority of the burnable pixels are classified as either Lowest or Lower Priority Hazard and the remaining are classified as either Moderate, High, or Very High Priority Hazard. In the Grass Valley/Nevada City FZ, less than half of the burnable pixels are in the lower classifications and the majority of burnable pixels were classified as either Moderate, High, or Very High Priority Hazard. The Tahoe National Forest Area FZ has 45% of the burnable pixels in the lower priority classifications and 43% in the Moderate, High, or Very High classification. Finally, for the Truckee/Donner FZ 47% of the burnable pixels are in the Lowest or Lower classification and the remaining are in the Moderate, High, or Very High Classification. While High and Very High Hazard prioritization has fewer pixels overall, these pixels tend to occur in concentrated areas along significant topographic features, river drainages, and ridgelines. See Figure 6 and Table 4.

TABLE 4: INTEGRATED HAZARD RESULTS - FUEL-DRIVEN FIRE SCENARIO

Integrated Hazard Class	Higgins/Penn Valley (Acres/%)	Grass Valley/Nevada City (Acres/%)	Tahoe National Forest Area (Acres/%)	Truckee/Donner (Acres/%)
Non-Burnable	12,280 (9%)	16,000 (12%)	25,251 (11%)	17,246 (16%)
Burnable but Not Burned	2,884 (2%)	3,080 (2%)	3,906 (2%)	1,761 (2%)
Lowest Priority Hazard	58,648 (36%)	21,753 (16%)	65,224 (28%)	25,379 (23%)
Lower Priority Hazard	47,404 (29%)	29,635 (22%)	39,701 (17%)	25,727 (24%)
Moderate Priority Hazard	28,096 (17%)	37,263 (27%)	47,256 (20%)	25,997 (24%)
High Priority Hazard	6,813 (5%)	18,350 (13%)	30,554 (13%)	10,940 (10%)
Very High Priority Hazard	2,485 (2%)	10,144 (7%)	22,997 (10%)	1,356 (1%)

Wind-Driven Scenario

The number of pixels classified as Non-Burnable in the wind-driven scenario remains the same. There is minimal change in the pixels classified as Burnable but Not Burned. The overall classification distribution is similar to the Fuel-Driven scenario with the majority of burnable pixels classified as either Lower, Moderate, or Middle Priority Hazard. There are some changes in the distribution of burnable pixels in each FZ. In the Higgins/Penn Valley FZ there is a slight decrease in the number of pixels classified as either Lower Priority Hazard and an increase in the number of burnable pixels classified as High Priority Hazard. In the Grass Valley/Nevada City FZ, there is

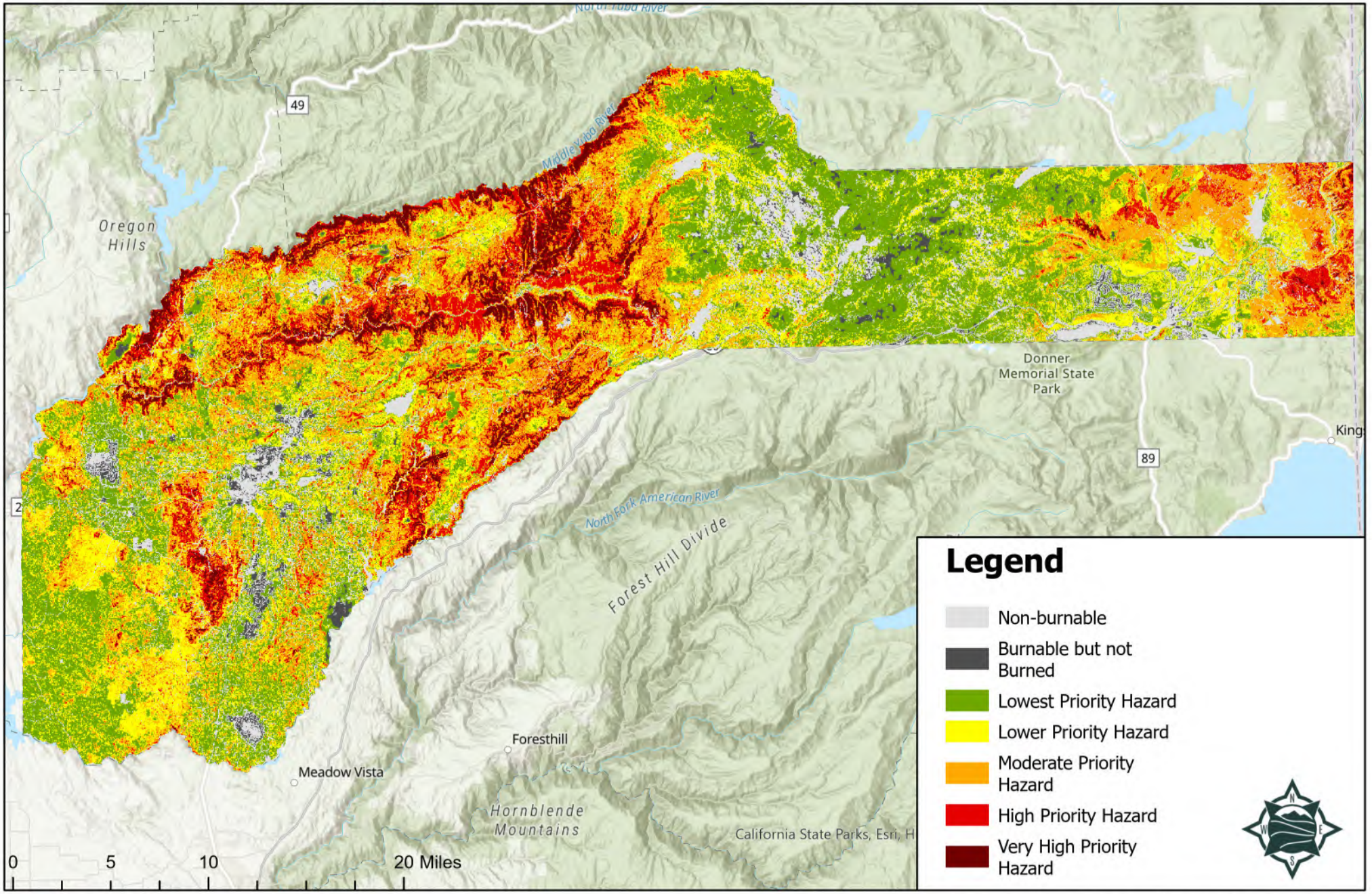
an increase in the Lowest Priority Hazard. This is also true in the Tahoe National Forest Area FZ. In the Truckee/Donner FZ there is an increase in the pixels classified as either Lower Priority Hazard. The percentage of pixels in Very High Priority Hazard is minimal in Higgin/Penn Valley FZ. However, all other FZs have a decrease in Very High Priority Hazard in the wind scenario when compared to the fuel scenario. across all three FZs. In the wind-driven scenario, the distribution of the High and Very High Priority Hazard classifications is less concentrated and more distributed across the landscape. There is also less concentration of High and Very High Hazard areas along the topographic features. Lowest Priority Hazard classification occurrences tend to be in similar geographic areas as they did in the Fuel-Driven scenario. See Figure 7 and Table 5.

TABLE 5: INTEGRATED HAZARD RESULTS - WIND-DRIVEN FIRE SCENARIO

Integrated Hazard Class	Higgins/Penn Valley (Acres/%)	Grass Valley/Nevada City (Acres/%)	Tahoe National Forest Area (Acres/%)	Truckee/Donner (Acres/%)
Non-Burnable	12,280 (9%)	16,000 (12%)	25,251 (11%)	17,246 (16%)
Burnable but Not Burned	2,656 (2%)	3,283 (2%)	2,348 (1%)	1,586 (1%)
Lowest Priority Hazard	31,150 (22%)	26,686 (20%)	75,610 (32%)	33,865 (31%)
Lower Priority Hazard	45,014 (31%)	29,778 (22%)	57,968 (25%)	28,049 (26%)
Moderate Priority Hazard	39,459 (27%)	30,550 (22%)	36,412 (16%)	22,359 (21%)
High Priority Hazard	11,058 (8%)	24,689 (18%)	30,668 (13%)	5,194 (5%)
Very High Priority Hazard	2,180 (2%)	5,238 (4%)	6,612 (3%)	107 (0.06%)

Nevada County Integrated Hazard: Fuel-Driven Fire Scenario

Figure 6



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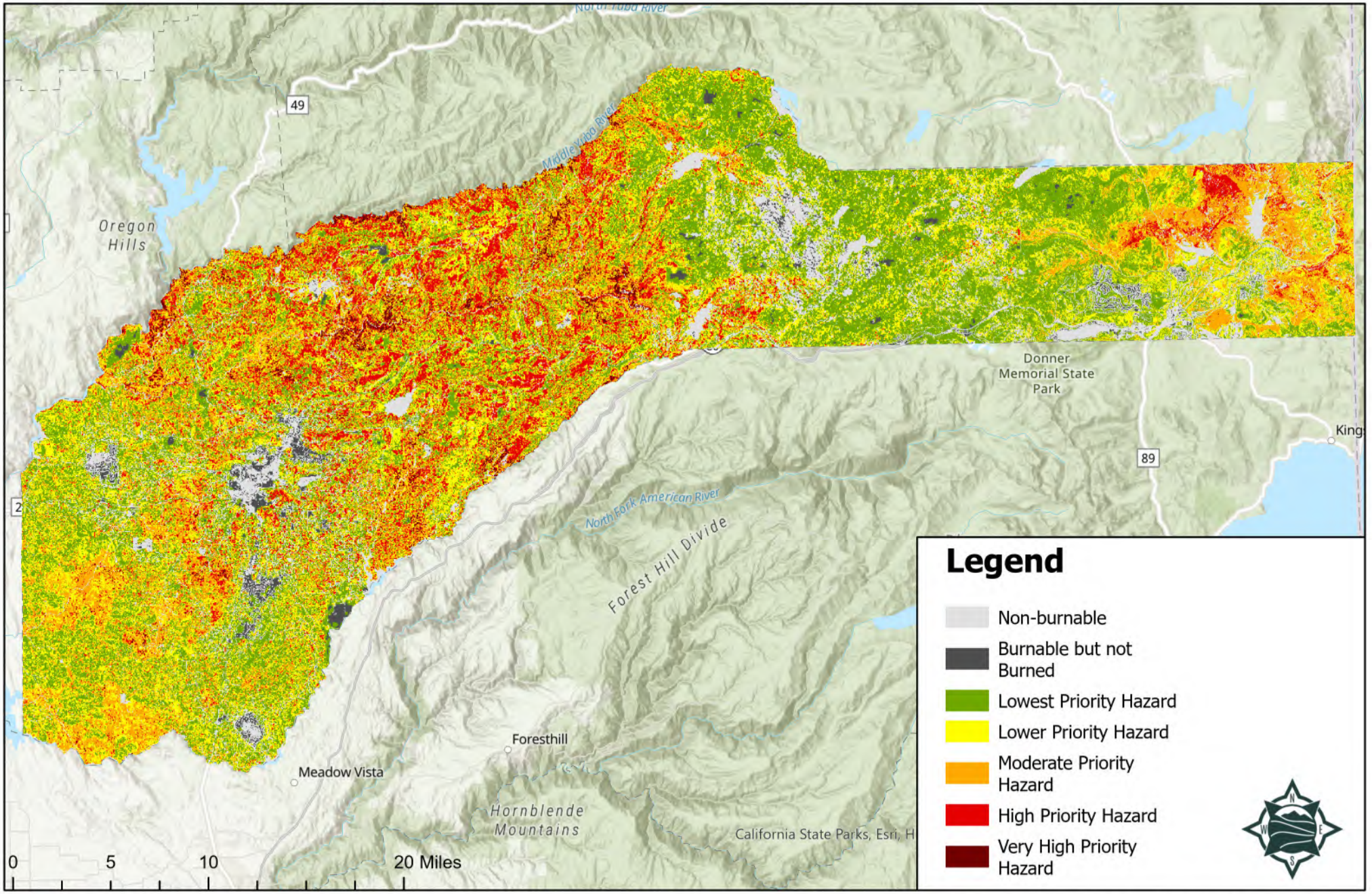
Nevada County Integrated Hazard: Wind-Driven Fire Scenario

Figure 7



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2.2.2 Integrated Hazard Results – Forecast Zone Scale

As discussed in Section 2.1, the Landscape Burn Probability (LBP) determines the landscape hazard and determines the prioritization of the hazard through comparative analysis. Hazard prioritization was conducted by comparing each pixel within the analysis area (Forecast Zone (FZ)) against the analysis maximum (the highest value within the FZ). This means that the prioritization is determined by comparing each pixel to the worst-case scenario within the FZ. As described above, the FZs cannot be compared against each other but results within the respective FZ can be. The following describes the Integrated Hazard Results based on the FZ scale. See Tables 6-9 and Figures 8-15.

Higgins/Penn Valley

In the fuel-driven scenario and the wind-driven scenario, the same number of pixels are classified as Non-Burnable and Burnable but Not Burned which is expected. In the fuel-driven scenario, 65% of the pixels are classified as either Lowest or Lower Priority Hazard. Whereas in the wind-driven scenario, 53% of the pixels are classified as either Lowest or Lower Priority Hazard. In both scenarios, there are more pixels classified as Moderate Priority Hazard than there are classified as High or Very High Priority Hazard. In the fuel-driven scenario, 7% of pixels are classified as High or Very High Priority Hazards and occur in concentrated areas. In the wind-driven scenario, 10% of pixels that are classified as High or Very High Priority Hazard but they are less concentrated and more distributed across the FZ. (Table 6 and Figures 8-9).

TABLE 6: INTEGRATED HAZARD RESULTS – HIGGINS/PENN VALLEY

Integrated Hazard Class	Fuel-Driven Scenario (Acres/%)	Wind-Driven Scenario (Acres/%)
Non-Burnable	12,280 (9%)	12,280 (9%)
Burnable but Not Burned	2,884 (2%)	2,656 (2%)
Lowest Priority Hazard	58,648 (36%)	31,150 (22%)
Lower Priority Hazard	47,404 (29%)	45,014 (31%)
Moderate Priority Hazard	28,096 (17%)	39,459 (27%)
High Priority Hazard	6,813 (5%)	11,058 (8%)
Very High Priority Hazard	2,485 (2%)	2,180 (2%)

Grass Valley/Nevada City

Pixels classified as Non-Burnable and Burnable but Not Burned are consistent across both fuel-driven and wind-driven scenarios. Of the burnable pixels in the fuel-driven scenario, 38% are

classified as Lower and Lowest Priority and in the wind-driven scenario, 42% of pixels are classified as Lower and Lowest Priority Hazard. In the fuel-driven scenario, the majority (47%) of pixels are either Moderate (27%), High (13%), or Very High Priority Hazard (7%). The locations of the High and Very High Priory Hazard pixels in the fuel-driven scenario are very concentrated and grouped in canyon areas. In the wind-driven scenario, 44% of pixels are either Moderate (22%), High (18%), or Very High (4%) Priority Hazard. These pixels also tend to be more distributed across the forecast zone and less concentrated. (Table 7 and Figures 8-15)

TABLE 7: INTEGRATED HAZARD RESULTS – GRASS VALLEY/NEVADA CITY

Integrated Hazard Class	Fuel-Driven Scenario (Acres/%)	Wind-Driven Scenario (Acres/%)
Non-Burnable	16,000 (12%)	16,000 (12%)
Burnable but Not Burned	3,080 (2%)	3,283 (2%)
Lowest Priority Hazard	21,753 (16%)	26,686 (20%)
Lower Priority Hazard	29,635 (22%)	29,778 (22%)
Moderate Priority Hazard	37,263 (27%)	30,550 (22%)
High Priority Hazard	18,350 (13%)	24,689 (18%)
Very High Priority Hazard	10,144 (7%)	5,238 (4%)

Tahoe National Forest Area

The Tahoe National Forest Area is the largest FZ with the least population. Thirteen percent (13%) of the area is either Non-Burnable or Burnable but Not Burned in both the fuel-driven and wind-driven scenarios. In the fuel-driven scenario, 45% of the area is the Lower and Lowest Priority hazard and 43% of pixels are in the Moderate (20%), High (13%), or Very High Priority Hazard (10%) classification. In the wind-driven scenario, the majority of pixels (57%) are in the Lowest and Lower Priority Hazard Classification whereas 32% were either Moderate (16%), High (13%), or Very High Priority (3%) Hazard. Both scenarios have 13% of pixels classified as Moderate Priority Hazard. However, in the fuel-driven scenario, 10% of pixels are Very High Priority Hazards and occur in concentrated groups whereas in the wind-driven scenario, only 3% of pixels are Very High Priority Hazard and only occur in smaller clusters. (Table 8 and Figures 12-13).

TABLE 8: INTEGRATED HAZARD RESULTS – TAHOE NATIONAL FOREST AREA

Final Wildfire Risk Assessment

Integrated Hazard Class	Fuel-Driven Scenario (Acres/%)	Wind-Driven Scenario (Acres/%)
Non-Burnable	25,251 (11%)	25,251 (11%)
Burnable but Not Burned	3,906 (2%)	2,348 (1%)
Lowest Priority Hazard	65,224 (28%)	75,610 (32%)
Lower Priority Hazard	39,701 (17%)	57,968 (25%)
Moderate Priority Hazard	47,256 (20%)	36,412 (16%)
High Priority Hazard	30,554 (13%)	30,668 (13%)
Very High Priority Hazard	22,997 (10%)	6,612 (3%)

Truckee/Donner

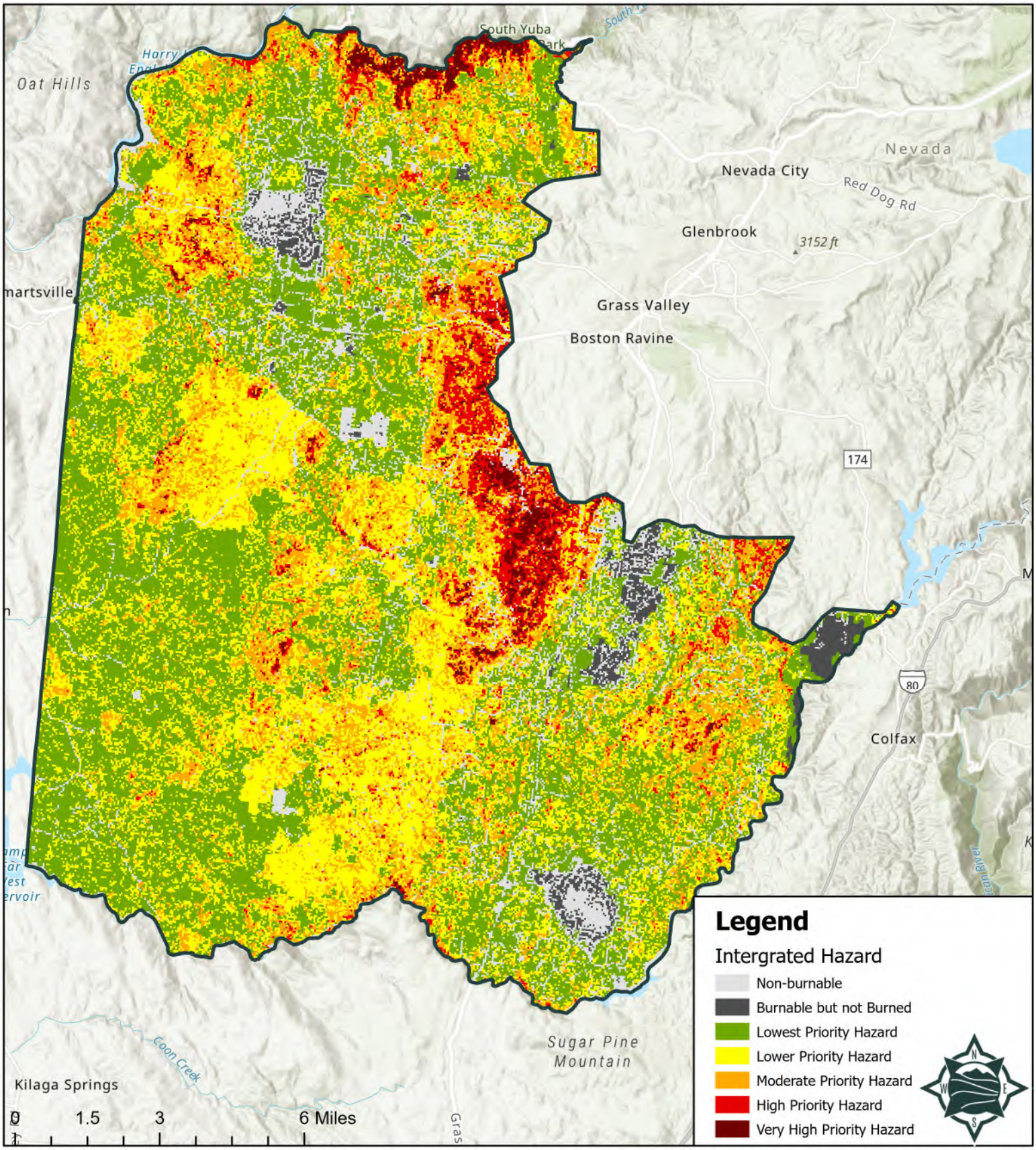
The Truckee/Donner FZ encapsulates the majority of communities in Eastern Nevada County. The percentage of pixels that are classified as Non-Burnable (16%) and Burnable but Not Burned (2%) is consistent between the fuel-driven and wind-driven scenarios. In the fuel-driven scenario 47% of pixels are classified as either Lowest or Lower Priority Hazard and 35% are Moderate (24%), High (10%), or Very High (1%) Priority Hazard. In the wind-driven scenario, 57% of the burnable pixels are classified as Lowest and Lower Priority Hazard. There are more pixels in the Lowest and Lower Priority Hazard classification in the wind-driven scenario than in the fuel-driven scenario. In the wind-driven scenario, 26% of the burnable pixels are either Moderate (21%), High (5%), or Very High (0.06%) Priority Hazard classification which is less than in the fuel-driven scenario. Both scenarios have higher priority hazard classifications that tend to concentrate along significant topographic features and are more concentrated in the fuel-driven than in the wind-driven scenario. (Table 9 and Figures 14-15).

TABLE 9: INTEGRATED HAZARD RESULTS – TRUCKEE/DONNER

Integrated Hazard Class	Fuel-Driven Scenario (Acres/%)	Wind-Driven Scenario (Acres/%)
Non-Burnable	17,246 (16%)	17,246 (16%)
Burnable but Not Burned	1,761 (2%)	1,586 (2%)
Lowest Priority Hazard	25,379 (23%)	33,865 (31%)
Lower Priority Hazard	25,727 (24%)	28,049 (26%)
Moderate Priority Hazard	25,997 (24%)	22,359 (21%)
High Priority Hazard	10,940 (10%)	5,194 (5%)
Very High Priority Hazard	1,356 (1%)	107 (0.06%)

Higgins/Penn Valley Forecast Zone Integrated Hazard: Fuel-Driven Scenario

CWPP Appendix B Figure 8



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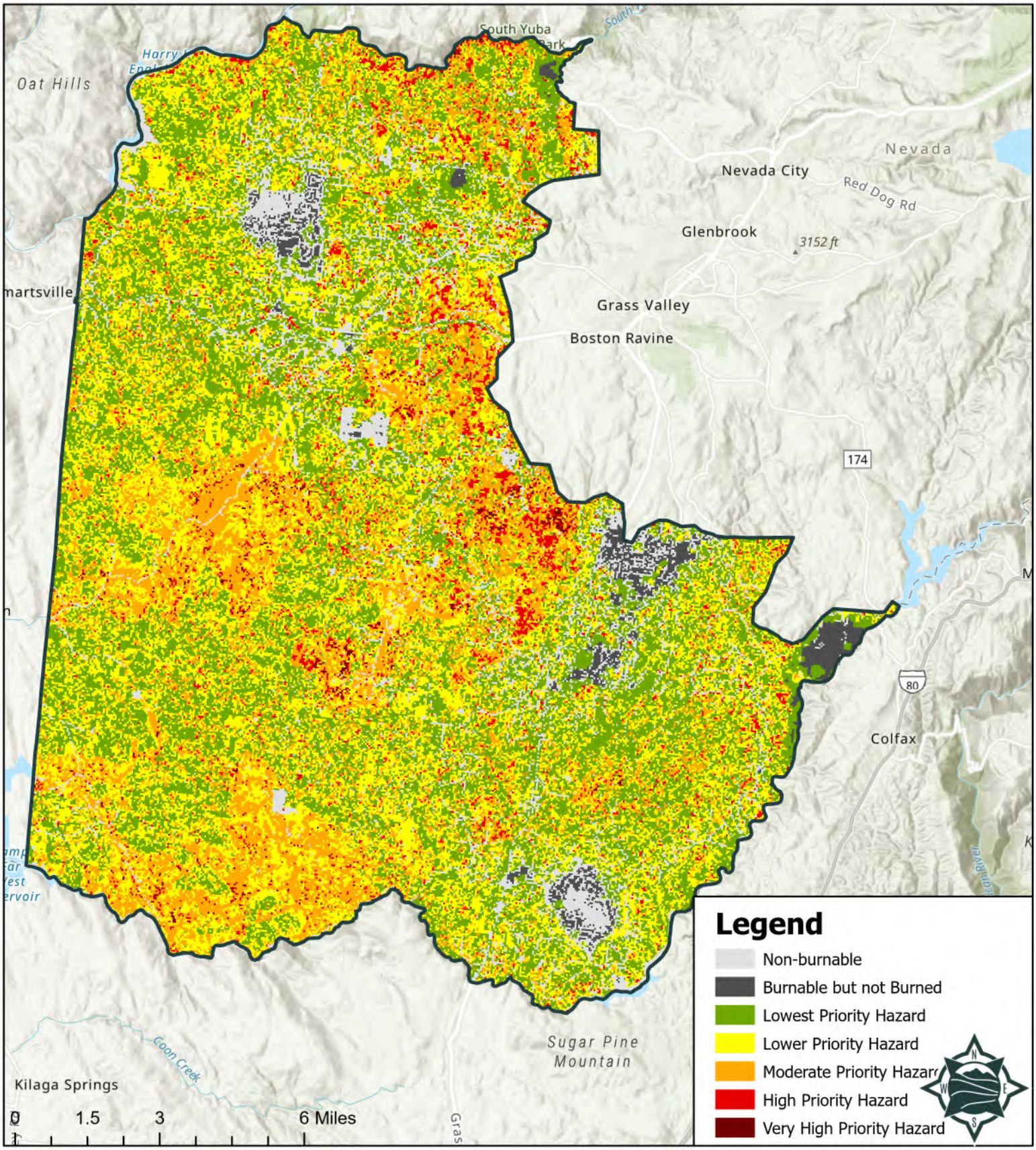
Higgins/Penn Valley Forecast Zone Integrated Hazard: Wind-Driven Scenario

CWPP Appendix B

Figure 9



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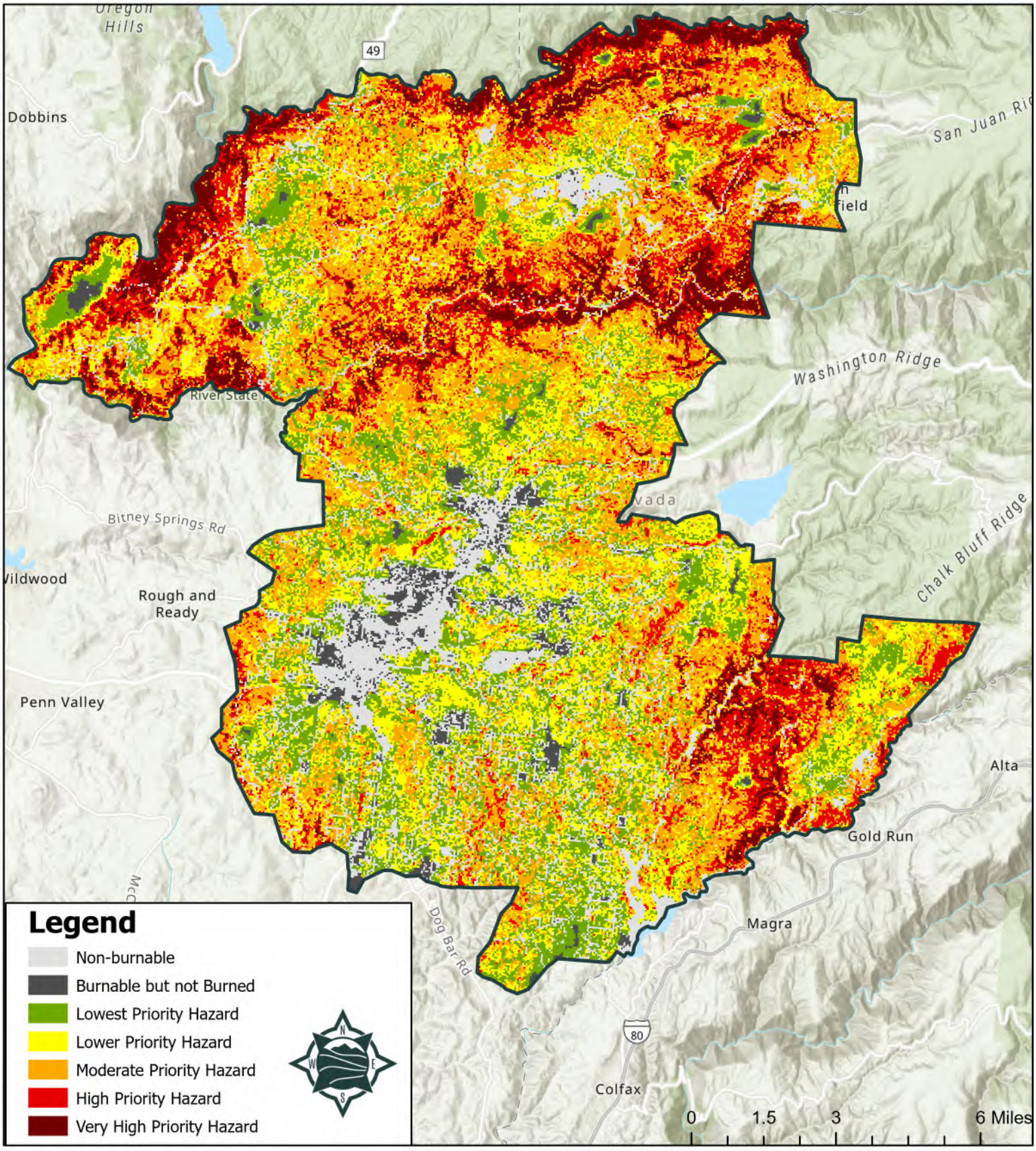
Grass Valley/Nevada City Forecast Zone Integrated Hazard: Fuel-Driven Scenario

CWPP Appendix B

Figure 10



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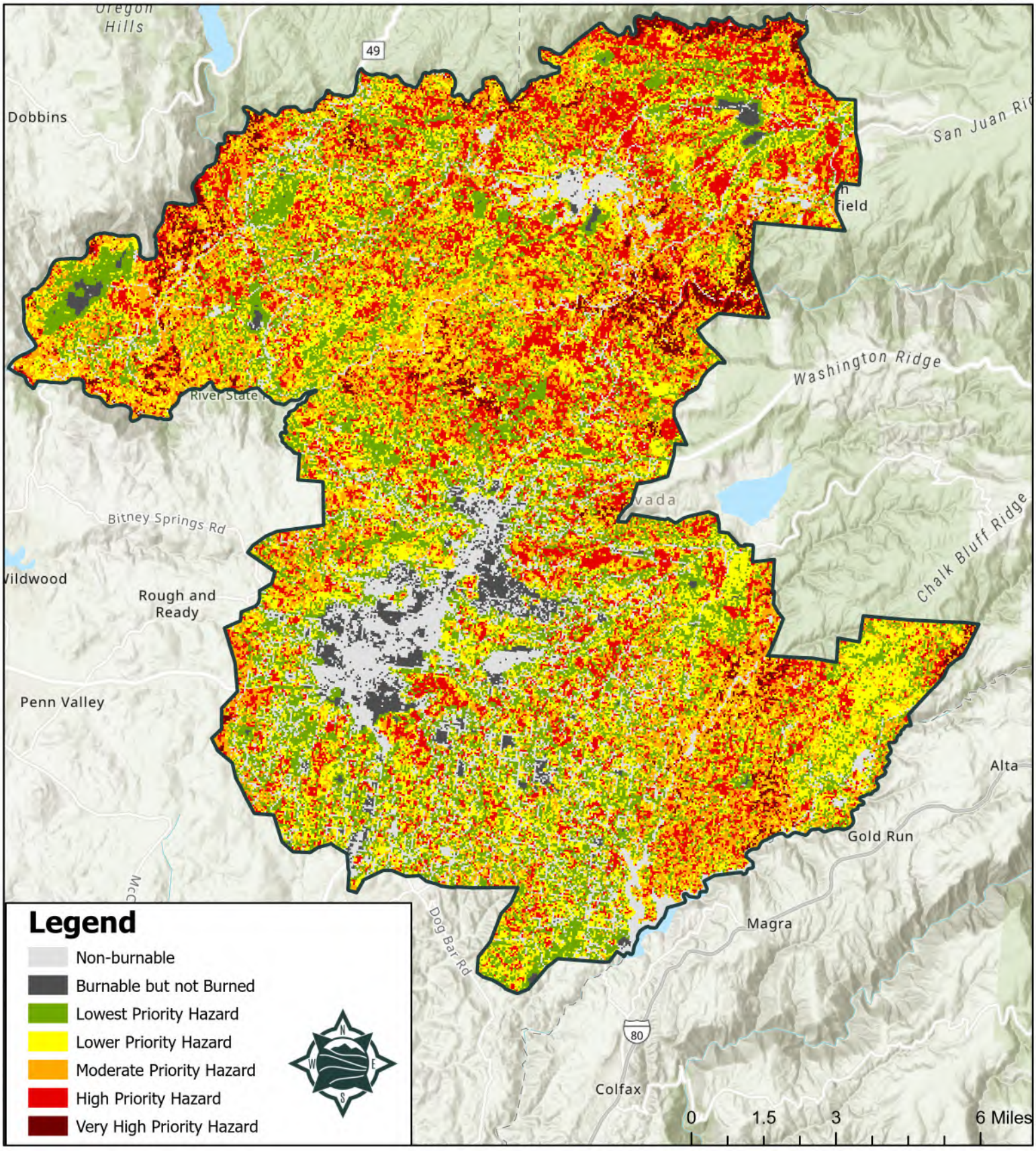
Grass Valley/Nevada City Forecast Zone Integrated Hazard: Wind-Driven Scenario

CWPP Appendix B

Figure 11



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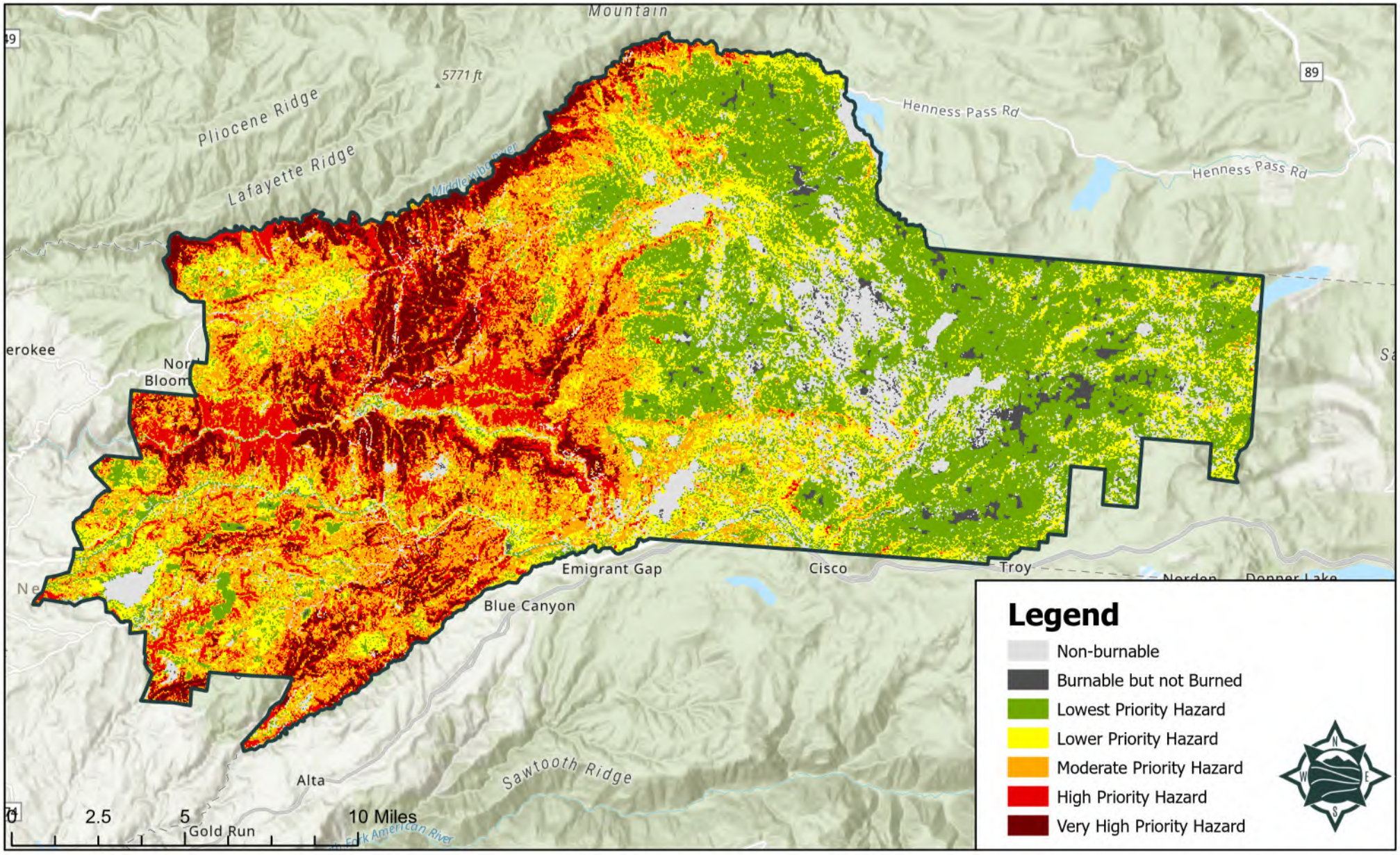
Tahoe National Area Forecast Zone Integrated Hazard: Fuel-Driven Scenario

Figure 12



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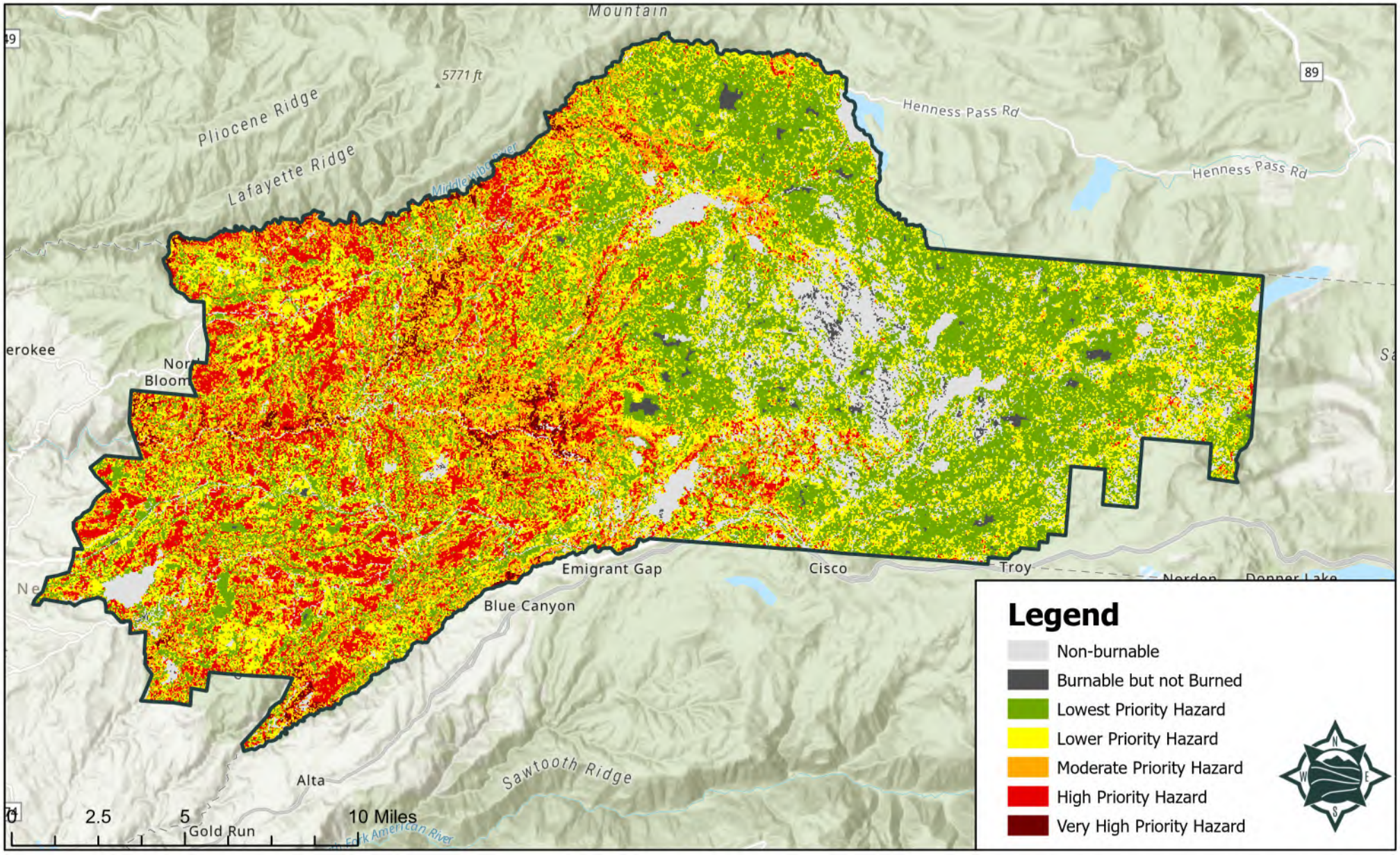
Tahoe National Area Forecast Zone Integrated Hazard: Wind-Driven Scenario

CWPP Appendix B

Figure 13



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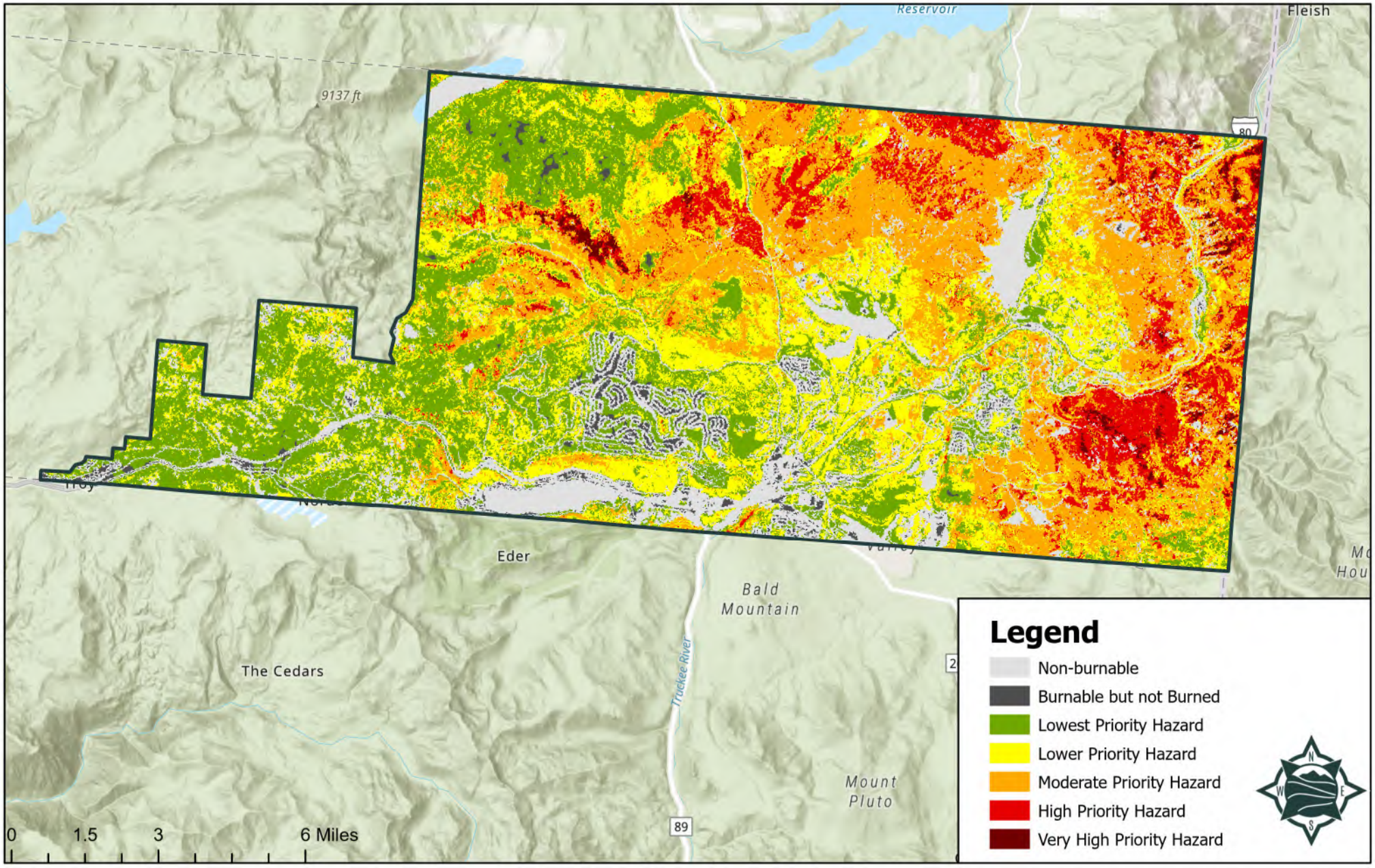
Truckee/Donner Forecast Zone Integrated Hazard: Fuel-Driven Scenario

Figure 14



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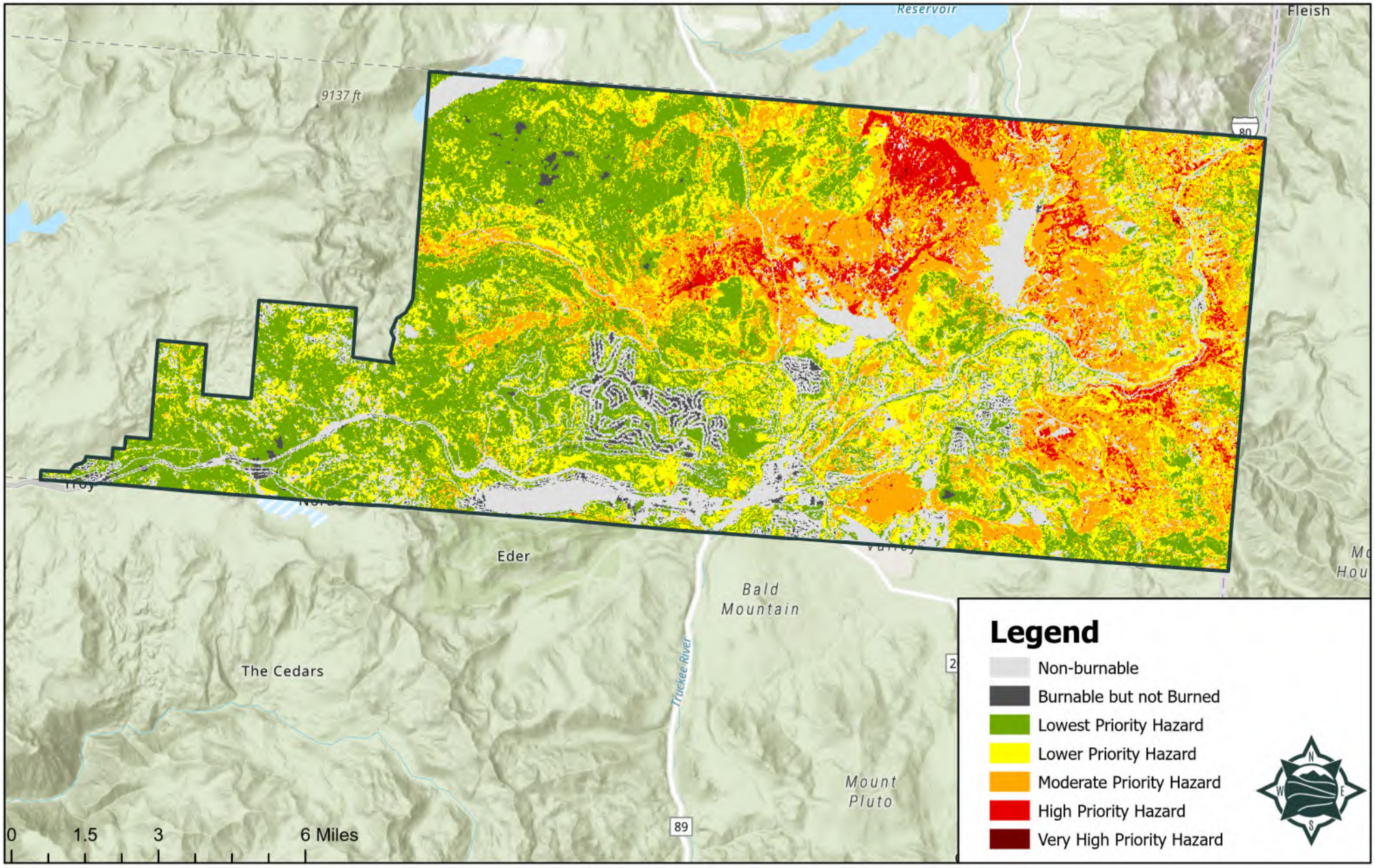
Truckee/Donner Forecast Zone Integrated Hazard: Wind-Driven Scenario

CWPP Appendix B Figure 15



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2.3 Integrated Hazard Results Discussion

2.3.1 Integrated Hazard Discussion – County Scale

Fuel-Driven Scenario

Though the majority of pixels in each Forecast Zone (FZ), except for Grass Valley/Nevada City, are classified as either the Lowest, Lower, or Moderate Priority Hazard it is important to note that the purpose of the LBP is not to determine the "wildfire hazard level" but to determine priority hazard areas in Nevada County. Over 92% of Nevada County is either High or Very High FHSZ per CAL FIRE (CAL FIRE 2022). The Landscape Burn Probability (LBP) gives insight and allows for the identification of hazard priority on landscapes such as Nevada County, where the overall fire hazard is already determined to be very high. While areas may be classified as lower priority hazard classifications this does not mean that the actual fire hazard is low, it just means that as compared to other areas on the landscape the hazard priority is lower. In a fuel-driven fire, the main drivers of fire growth and intensity tend to be topography and fuel. This trend is consistent across the County under the fuel-driven modeling scenario. Areas of highest hazard priority tend to occur in significant drainages and along ridgelines. In the Higgins/Penn Valley FZ, Very High Priority Hazard areas are found in the Wolf Mountain area, Woodpecker Ravine, and the south side of the South Yuba River Canyon. In the Grass Valley/ Nevada City FZ, the Highest Priority Hazard areas are concentrated in the Middle Yuba River Canyon, South Yuba River Canyon, and the Greenhorn Creek drainage. In the Tahoe National Forest Area FZ, the Highest Priority Hazard areas are consistent with the Middle and South Yuba River canyons as well as the Bear River Canyon and Steephollow Creek drainage. In the Truckee/Donner FZ, the Highest Priority Hazard areas are concentrated along the Sagehen Hill ridgeline and in the Truckee River Canyon along the California and Nevada border. At the County scale, the Middle Yuba River Canyon and the South Yuba River Canyon consistently has the highest concentration of Highest Priority Hazard areas (Figure 6). This is important because the number of pixels in the High or Very High Priority Hazard where these pixels occurred is very crucial. As discussed above they are concentrated along significant topographic features across the County which can produce extreme fire behavior.

Wind-Driven Scenario

In the wind-driven scenario, there is a lot less alignment between significant topographic features and the High or Very High Priority Hazard classification. This is because fuel-driven fires tend to occur under diurnal conditions with a southwest wind direction and result in a wind-topography alignment. However, the wind-driven fire season in Nevada County tends to occur with a wind direction from the northeast. As a result, there is less wind-topography alignment and less concentration of extreme fire behavior along topographic features. In the wind-driven scenario, there is also more distribution of the High and Very High Priority classifications across the landscape. In the Higgins/Penn Valley FZ the Highest Hazard classification shifts to occurring in the McCourtney area and Highway 49 where previous wind-driven fires have occurred. In the Grass Valley/Nevada City FZ, the High and Very High Priority Hazard are more evenly distributed across the analysis area. The Tahoe National Forest Area FZ has the Highest Priority Hazard

generally in the same locations as the fuel-driven scenario, but they are less concentrated in the canyons. There are still concentrated areas of the Highest Priority Hazard along the Middle and South Yuba River Canyon. In the Truckee/Donner FZ, the Highest Priority Hazard areas are in the Russell Valley area between Prosser and Boca Reservoirs. The difference in hazard prioritization in the wind scenario is consistent with the difference in fire behavior that would occur. This emphasizes the complex nature of the fire hazard in Nevada County and that both fuel-driven and wind-driven fires need to be accounted for (Figure 7).

2.3.2 Integrated Hazard Discussion – Forecast Zone Scale

The purpose of the Landscape Burn Probability (LBP) is to give insight into base conditions and to prioritize the wildfire hazard in Nevada County. It is important to note that while areas may be classified as lower priority hazard classifications this does not mean that the actual fire hazard is low, it just means that as compared to other areas on the landscape the hazard priority is lower. Overall, the results within each Forecast Zone (FZ) are consistent with the expected differences between a fuels-driven and wind-driven fire; in the fuels-driven scenario the highest hazard follows the topography of the landscape and in the wind-driven scenario the results have significantly less topographic wind alignment and are more distributed across the landscape.

Higgins/Penn Valley

The Integrated Hazard results for Higgins/Penn Valley FZ are very similar in terms of number of pixels in each classification. The main difference between the two scenarios is related to where the High and Very High Priority Hazard classified pixels are located and how concentrated they are in those locations.

In the Higgins/Penn Valley FZ there are differences in the hazard priority between the fuel-driven and wind-driven scenario. In the fuel-driven scenario, the results tend to follow the location of the High and Very High Hazard Priority classified pixels, are in very concentrated groups, and follow the topography of the FZ. The High and Very High Priority Hazard pixels are mostly grouped along the border of the South Yuba River, west of Grass Valley, and in the Wolf Mountain area. Other locations with clusters of High and Very High Priority Hazard pixels are west of Lake Wildwood, around McCourtney Road, and in the Woodpecker Ravine area. The remainder of the landscape tends to be Lower or Lowest Priority Hazard and occur in flatter areas of the FZ. This is consistent with what would be expected in a fuel-driven fire scenario. (Figure 8).

The wind-driven scenario results in more distribution amongst the priority hazard classifications. As compared to the fuel-driven scenario there is a 10% increase in pixels classified as Moderate Priority Hazard. The main difference in the wind-driven scenario is that the hazard priority classifications are more distributed across the landscape and do not concentrate on the significant topographic features as compared to the fuel-driven scenario. The most concentrated areas of High and Highest Priority Hazard are west of Alta Sierra and along Highway 20. This change in hazard priority is consistent with a wind-driven scenario, where wind can influence fire growth and overcome the influence of topography. (Figure 9).

Grass Valley/Nevada City

In the Grass Valley/Nevada City FZ the Integrated Hazard results has marked differences between the fuel-driven and wind-driven scenarios. Overall, the hazard priority is slightly higher in the fuel-driven scenario which is dominated by the steep river canyons. However, the wind-driven scenario has a greater distribution of priority hazard occurrences across the FZ.

The fuel-driven scenario has slightly more pixels classified as Very High Priority Hazard and at the upper end of the Priority Hazard Classifications. The Moderate, High, and Very High Priority Hazard classified pixels are generally in the river canyons. Specifically, they are concentrated in the Middle Yuba River Canyon, the South Yuba River Canyon, the Bear River Canyon, and Greenhorn Creek. The Very High Priority Hazard classified pixels also tend to be in the steepest areas of the canyons. This is consistent with the fire environment in the FZ as the daily wind direction (southwest) flows through the river canyons and creating topographic wind alignment. As a result, the extreme topographic nature of the canyons combines with the topographic wind alignment drives the results so that the highest priority hazard areas occur in the steep river canyons as compared to other areas in the FZ. (Figure 10).

In the wind-driven scenario, there is an increase in burnable pixels classified as High Priority Hazard and a decrease in pixels classified as Moderate or Very High Priority Hazard. There is also a decrease in the concentration of these pixels in the river canyons. Pixels that are High and Very High Priority Hazard were still within the river canyons but in smaller groups. As a result, the distribution of these pixels is more even across the FZ. One notable difference is that there are more High Priority Hazard pixels occurring closer to the developed areas of Grass Valley and Nevada City than there are in the fuel-driven scenario. This is likely due to the fact that in the fuel-driven scenario the location of the High and Very High Priority Hazard pixels is dominated by extreme topography but in the wind-driven scenario, the northeast wind direction results in less topographic wind alignment and less wind funneling through the river canyons allowing for more spread-out hazard results. (Figure 11).

Tahoe National Forest Area

The Integrated Hazard Results for the Tahoe National Forest Area FZ has an over 11% difference in pixels classified as Moderate, High, or Very High Priority Hazard between the two scenarios. The fuel-driven scenario has more burnable pixels in the Moderate, High, or Very High Priority Hazard classifications than the wind-driven scenario.

In the fuel-driven scenario the pixels that are classified as Moderate, High, or Very High Priority Hazard are heavily concentrated in the Middle and South Yuba River Canyons as well as in the Steephollow Creek drainage and Bear River Canyon. There are also groupings of Moderate, High, or Very High Priority Hazard classified pixels east of Scotts Flat Reservoir. The eastern half of the FZ is dominated by pixels in the Lower and Lowest Priority Hazard categories. These distributions are consistent with the fire environment in the FZ. The fire environment in the western half of the FZ is characterized by heavy timber fuels, with steep topographic features, and topographic wind alignment through the drainages. In comparison, the fire environment in the eastern half of the FZ has several reservoirs and meadows and is overall a less topographically extreme landscape

until Donner Pass. Overall, this scenario is extremely dominated by topographic features, which drove the distribution of the priority hazard classifications to favor the river canyons and drainages, consistent with the fire environment in the FZ. (Figure 12).

The wind-driven scenario follows a similar pattern as the fuel-driven scenario. The western half of the FZ is where the majority of pixels classified as either Moderate, High, or Very High Priority Hazard Classification are located. The main difference is that there is a reduction in the Very High Priority Hazard classification in the wind-driven scenario. There are still some groupings of High and Very High Priority Hazard classified pixels in the drainages but generally, the pixels classified as High Priority are more distributed in the FZ. These pixels tend to occur along the top of ridgelines rather than in the steep drainages, which is consistent with the northeastern wind direction. Like the fuel-driven scenario, the western half of the FZ is dominated by the Lower and Lowest Priority Hazard Classification. Again, this is consistent with the landscape as this area of the FZ contains headwaters and meadow areas. Overall, the distribution of the hazard is consistent with the wind-driven scenario, and it is expected that there would be fewer occurrences of the Very High Priority Hazard and less concentration in the river canyons. (Figure 13).

Truckee/Donner

In the Truckee/Donner FZ under both fire scenarios the majority of burnable pixels in the Moderate, High, or Very High Priority Hazard classification are in the eastern half of the FZ (east of Donner Summit). In both scenarios, the majority of areas classified as Lower and Lowest Priority Hazard are concentrated in the western half of the FZ, west of Donner Summit. Overall, there is a reduction in Very High Priority Hazard and High Priority Hazard Classification in the wind-driven scenario as compared to the fuel-driven scenario.

In the fuel-driven scenario the western half of the FZ is dominated by Lower and Lowest Priority Hazards. This area is west of Donner Summit; this is consistent with the fire environment. By contrast, the majority of the pixels classified as Very High Priority Hazard are above Sagehen Creek, Carpenter Valley, North Fork Prosser Creek, and Independence Creek along the ridgelines. Other areas where the Very High Priority Hazard classification is concentrated were along ridgelines of the Truckee Canyon and Casey Canyon in the Martis Fire burn area. The Martis Fire occurred in 2001 and the fuel loading has returned to the pre-fire state and there has been timber to shrub conversion. This is consistent with the hazard priority classification in the Martis Fire footprint. Concentrations of pixels classified as Moderate and High Priority Hazards are found in the Proser and Boca Reservoir area and along the Highway 89 corridor. These groupings of High and Very High Priority Hazard classifications are consistent with the topography and fuel in the FZ. (Figure 14).

In the wind-driven scenario, the priority classification follow the same pattern as the fuel-driven scenario. The majority of fuels in the Lower and Lowest Priority Hazard classification are west of Donner Summit and areas classified as either Moderate, High, or Very High Priority hazard east of Donner Summit. Overall, there is a reduction in the pixels classified as either Moderate, High, or Very High Priority Hazard. The locations of these pixels are generally in the same areas as the fuel-driven scenario. There are changes in how the pixels are concentrated and distributed but

they tend to occur by the Highway 89 Corridor, Highway 80 Corridor, Prosser Reservoir, Boca Reservoir, and in the Martis Fire area. This is consistent with the northeast wind direction in this scenario. (Figure 15).

2.4 Wildfire Hazard Assessment Model Limitations

All models have limitations. As discussed throughout this document all structures and developed areas were classified as non-burnable and much of the residential vegetation fell under the Burnable but Not Burned classification. At this time the Interagency Fuel Treatment Decision Support System (IFTDSS) and most fire modeling software were not capable of simulating how fire burns structures or developed areas due to the high variability in how structures burn. Further, structures typically burned in fires due to house-to-house spread or firebrands neither of which can be modeled using fuel-based fire behavior modeling software (such as IFTDSS and the majority of fire modeling software). It was recognized that structures were at risk from wildfire but could also contribute to the fuel landscape and were considered fuel and therefore contribute to both wildfire hazard and wildfire risk. It was also acknowledged that residential vegetation can present a fire hazard to a structure. This modeling limitation was taken into account when determining priority locations for fuel treatments.

The 2022 LANDFIRE product included disturbance fire areas that were remapped to pre-disturbance conditions between 2020-2021 and was considered to be reflective of 2023 conditions. This included adjustments to vegetation and fuel disturbance areas identified through the LANDFIRE remote sensing of the landscape change process (LANDFIRE, 2022). The new disturbance mapping process was designed to represent the effects of disturbance on the fuels for the first growing season after a fire. Within the County, fire scars were influencing the hazard classification, such as the Pleasant Fire Scar, River Fire Scar, and the Lowell Fire Scar. Consideration was given to these locations in that the vegetation that was likely to regrow in this area could be grass, invasive species, or shrub-type fuels and would potentially change fire behavior. The remapping aspect of LANDFIRE was relatively new and the methodology has changed to remote sensing. LANDFIRE was expected to continue to update their fuel maps and continue to remap disturbance areas further improving their product.

Finally, as discussed throughout the document the LBP determines hazard prioritization. It compares all the pixels within the analysis area against the maximum value. In Nevada County, 92% of the landscape was High or Very High Fire Hazard Severity Zone (FHSZ) per CAL FIRE and it could be difficult to determine where to begin work. The LBP analysis ranked the hazard in Nevada County against itself. However, this meant that the most extreme areas were influencing the other hazard areas. It is worth emphasizing that this does need to be considered when evaluating the results, especially in areas where the prioritization was determined to be Lowest or Lower as that priority classification does not mean that there was a low fire hazard. ***As discussed throughout the document, this means that in a comparative analysis of a high-hazard landscape when hazardous areas were compared to one another the results would indicate areas of higher and lower hazard priorities not areas of high and low hazard.***

3. Wildfire Risk Assessment

Following the hazard assessment, a Quantitative Wildfire Risk Assessment (QWRA) was conducted in the Interagency Fuel Treatment Decision Support System (IFTDSS) to evaluate wildfire risk across Nevada County. The QWRA aided in land management by characterizing the predicted effects of fire on defined values across a landscape. Results from the QWRA could be used to identify and prioritize potential fuel treatment areas based on what was determined as being valuable. The QWRA helped prioritize fuel treatments and management activities and accounted for the predicted benefits and threats from a fire on multiple, often, overlapping values across the landscape (IFTDSS, n.d.-b).

The QWRAs considered both the threats and benefits of wildfires. Some resources may have benefited from fire (e.g., fire-dependent plant species and landscapes that have departed from the historical fire regime) and others may have been threatened by fire (e.g., communities). The QWRAs first looked at the level of exposure of the High-Value Resources and Assets (HVRAs) to wildfire by comparing the burn probability, conditional flame length, and integrated hazards against the HVRAs within each Forecast Zone (FZ). It then calculated the likelihood of a fire occurring and the susceptibility of the HVRA to the potential intensity of a fire to determine risk. (Figure 16).

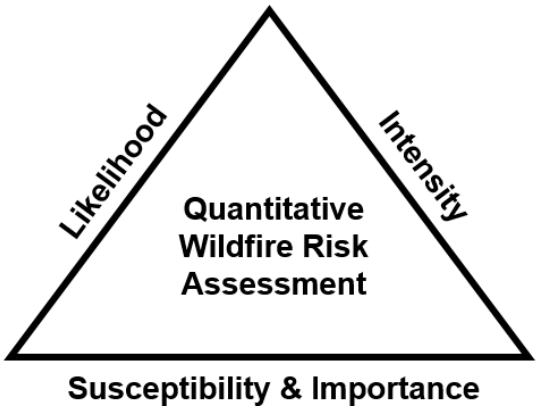

Figure 16. QWRA Risk Assessment Triangle. Retrieved from IFTDSS Help Center, n.d. https://iftdss.firenet.gov/firenetHelp/help/pageHelp_pdf/qwraabout.pdf

The QWRA process included landscape creation, LBP results, defining the HVRAs, exposure analysis, and risk analysis. (Figure 17).

Final Wildfire Risk Assessment

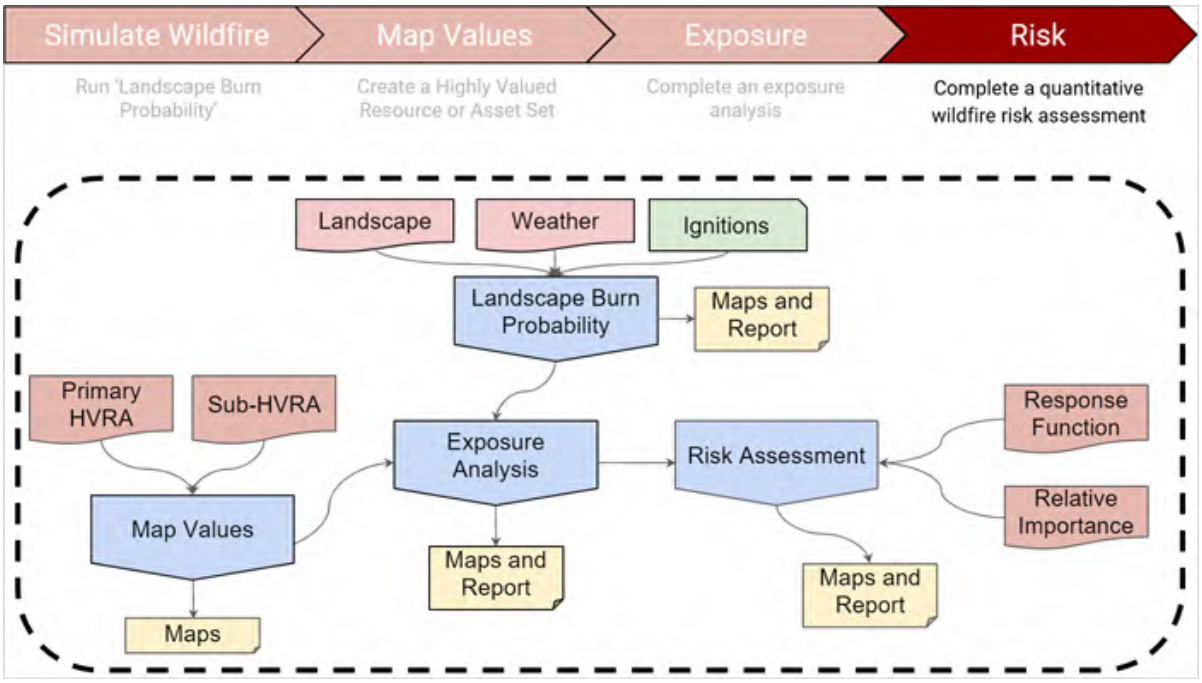

Figure 17: QWRA Modeling Process with Necessary Inputs and Final Outputs. Retrieved from IFTDSS Help Center, n.d., https://iftdss.firenet.gov/firenetHelp/help/pageHelp_pdf/qwraabout.pdf

The QWRA identified areas at high risk of wildfire impacts based on what the community of Nevada County determined to be a priority to protect from wildfire. HVRAs were determined through the use of the Technical Advisory Committee, feedback from stakeholders, and the Community Wildfire Protection Plan Survey (Appendix D). A QWRA was run separately for each forecast zone, each fire scenario, and each HVRA.

Note, that the QWRA was not intended to serve as a tactical suppression model. Further, the QWRA applied to planning efforts such as Community Wildfire Protection Plans (CWPP) based on its ability to be adaptable to what a community considers important and prioritization processes.

3.1 Methodology

The following describes the methodology used to run the QWRAs for Nevada County.

3.1.1 Identify High-Value Resources and Assets

The High-Value Resources and Assets (HVRA) at risk were values on the landscape that could be impacted by wildfire. Resources were naturally occurring, and assets were human-made. HVRAs could be influenced positively or negatively by fire. When assessing wildfire risk, the HVRAs' susceptibility to wildfire impacts was determined. The Interagency Fuel Treatment Decision Support System (IFTDSS) classified HVRAs into two categories, Primary-HVRAs and Sub-HVRAs. Primary-HVRAs were the overall categories that Sub-HVRAs were sorted into. Sub-HVRAs were the geospatial components of the Primary-HVRA. For example, if the Primary-HVRA was Power Infrastructure then the Sub-HVRA would be powerlines. Since HVRAs were considered “values” the HVRAs would differ from community to community as different communities would have different priorities for wildfire mitigation. Further, HVRAs allowed for the creation of consolidated spatial layers of values which can be used for risk assessments or to estimate the potential impact of a wildfire on a community (IFTDSS, n.d.-a).

The QWRA calculated the estimated benefit or loss of an HVRA to wildfire impacts based on the fire behavior modeling outputs. HVRAs used in a QWRA were limited to HVRAs of high value or high importance. Consideration was also given to the scope of the HVRAs and their appropriateness to the size of the analysis area. A limited scope of the HVRA ensured that the interpretation of the results was manageable and meaningful.

Recognizing that Nevada County has both a unique fire environment and rural challenges, the HVRAs were chosen in a way that tired to capture both factors. The HVRAs for the Nevada County CWPP needed to consider the location of the critical assets at risk but also the community values and Nevada County’s rural nature. The Primary and Sub-HVRAs were chosen based on both the critical assets needed for a community to effectively exist as well as assets and resources that define why people live in Nevada County. This ensured that the QWRA prioritized areas based on where it was strategic to implement risk reduction activities to ensure the survival of a community and based on the location of values that a community would consider necessary to thrive. The HVRAs that were selected also capture the unique rural challenges that Nevada County faces when it comes to wildfire. The list was limited to the HVRAs of the highest importance to ensure the analysis was meaningful and consideration was given to focus on larger categories that encapsulated multiple values into one.

The Primary and Sub-HVRAs used in the QWRA were selected based on management priorities for the County, input from stakeholders, results from the public survey, and recommendations made by the TAC. Nevada County Office of Emergency Services (OES) recognized that this was not an exhaustive list of every possible HVRA in Nevada County. However, it was an informative list that aided in creating Priority Project Area for multi-benefit wildfire risk reduction. The HVRA sets were customized to the County and used data from Nevada County, the State of California, and the Federal Government (public data). A total of four Primary-HVRAs were selected for modeling and

each Primary-HVRA also included up to 5 Sub-HVRAs. The HVRA list for Nevada County and an explanation of each HVRA is documented in Appendix E. The HVRAs are as follows:

Table 10: High Value Resources and Assets at Risk

Primary HVRA	Sub-HVRA
Community Lifelines	1. Communities 2. Vulnerable Populations 3. Critical Water Infrastructure 4. Critical Transportation Infrastructure 5. Critical Power and Communication Infrastructure
Community Health	1. Hospitals and Sheltering Facilities 2. Soil Vulnerability 3. High Potential for Wildfire Smoke 4. Hazardous Waste Sites 5. Solid Waste Infrastructure
Natural Resources	1. Watersheds 2. Outdoor Recreation 3. Oak Woodlands 4. Areas of High Climate Change Resilience 5. Significant Species
Economic Resources	1. Recreation 2. Historic and Cultural Districts 3. Government Buildings

High-Value Resources and Assets at Risk Prioritization

The QWRA analyzed, quantified, and prioritized the wildfire risk based on the susceptibility or response of the Primary and Sub-HVRAs to wildfire and the relative importance of the Sub-HVRAs to each other. This required that the Primary and Sub-HVRAs be prioritized and ranked against each other. The Primary-HVRAs were prioritized via outreach with the TAC, focus groups, stakeholders, and a public survey. This allowed the community to identify what was a priority to protect from wildfires. Public input was solicited in the form of a public survey that was shared through County social media, partner social media, the County Newsletter, the County Website, various media outlets, outreach events, and stakeholder mailing lists. The survey received 2,267 responses; further details on the survey and summary results are in Appendix D. More in-depth analysis of the survey results is included in the CWPP. There were also four virtual meetings, “Lunch and Learns”, that the public attended to learn about the CWPP process and take the survey. (Table 11). In total, 138 members of the public attended the CWPP Lunch and Learns.

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TABLE 11: COMMUNITY LUNCH AND LEARN MEETINGS

Forecast Zone	Lunch and Learn Date and Time	Attendance
Higgins/Penn Valley	August 15, 2023 at 12:00 pm	27
Grass Valley/Nevada City	August 16, 2023 at 12:00 pm	59
Tahoe National Forest Area	August 22, 2023 at 12:00 pm	17
Truckee/Donner	August 23, 2023 at 12:00 pm	35
Total:		**138**

The four Primary-HVRAs were ranked against each other to determine which overall category was the most important to protect from wildfire. Each Sub-HVRA within the Primary-HVRA was ranked against each other to determine the relative importance of the Sub-HVRAs. The Sub-HVRA of one Primary-HVRA was not compared to another Sub-HVRA of a different Primary-HVRA. For example, the Subs-HVRAs of Community Lifelines were only compared within the Community Lifelines category and were not compared to the Sub-HVRAs within the Natural Resources Primary-HVRA. The prioritization of the Sub-HVRAs required technical expertise and subject matter experience. This process was more complex than the prioritization of the Primary-HVRAs. For example, it would have required one to determine if critical power infrastructure was more important than critical water infrastructure. Therefore, the public only ranked the Primary-HVRAs through the CWPP survey, and the Sub-HVRAs were prioritized by the TAC, stakeholders, fire personnel, and focus groups. The TAC reviewed the final prioritization of the Sub-HVRAs.

Below was the final prioritization of the Primary and Sub-HVRAs. The ranking was listed in Table 12 in order of importance with 1 being the most important HVRA. Details on the HVRAs, the survey, and the summary results can be found in Appendix E and F.

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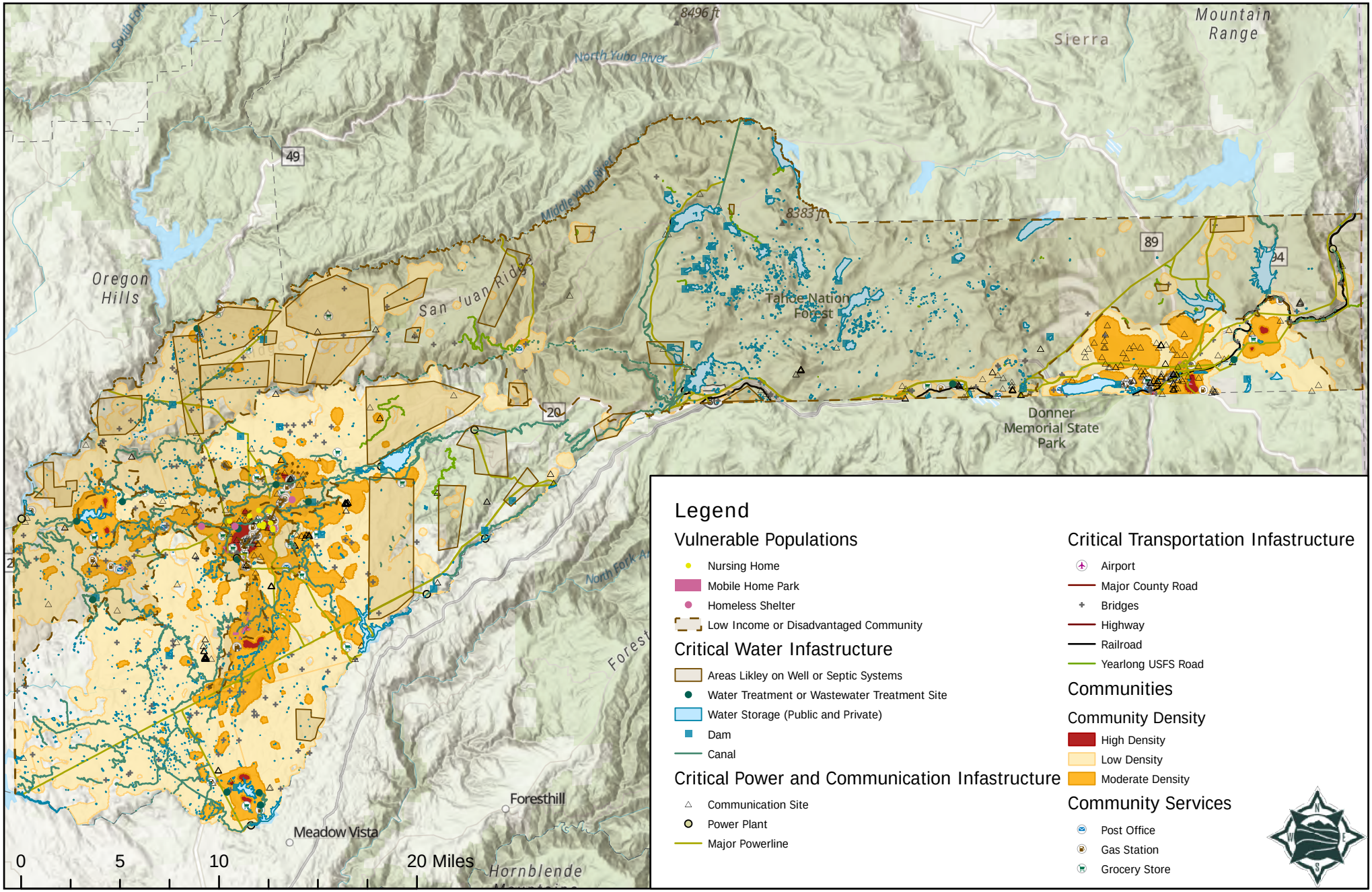
TABLE 11: PRIMARY AND SUB-HVRAS SELECTED IN ORDER OF IMPORTANCE FOR THE WILDFIRE RISK ASSESSMENT

Primary HVRA Order	Sub-HVRA Order
1. Community Lifelines	1. Communities 2. Critical Water Infrastructure, Critical Transportation Infrastructure, and Critical Power/Communication Infrastructure 3. Vulnerable Populations
2. Community Health	1. Hospital and Shelter Facilities 2. High Wildfire Smoke Potential 3. Soil Vulnerability and Solid Waste Management Facilities 4. Hazardous Waste Sites
3. Natural Resources	1. Watersheds 2. Outdoor Recreation Resources and Areas with high Climate Resilience 3. Significant Species 4. Oak Woodlands
4. Economic Resources	1. Government Buildings 2. Historic and Cultural Districts 3. Recreation Resources

With IFTDSS, the Primary and Sub HVRAs were intersected with the geographic landscape of each FZ to determine if and where the HVRAs were located in the FZ. Figures 18-21 depict the HVRAS across the County and within each FZ. Maps displaying the individual Sub-HVRAs are found in Appendix E.

Nevada County Primary High Value Resources and Assets at Risk: Community Lifelines

Figure 18



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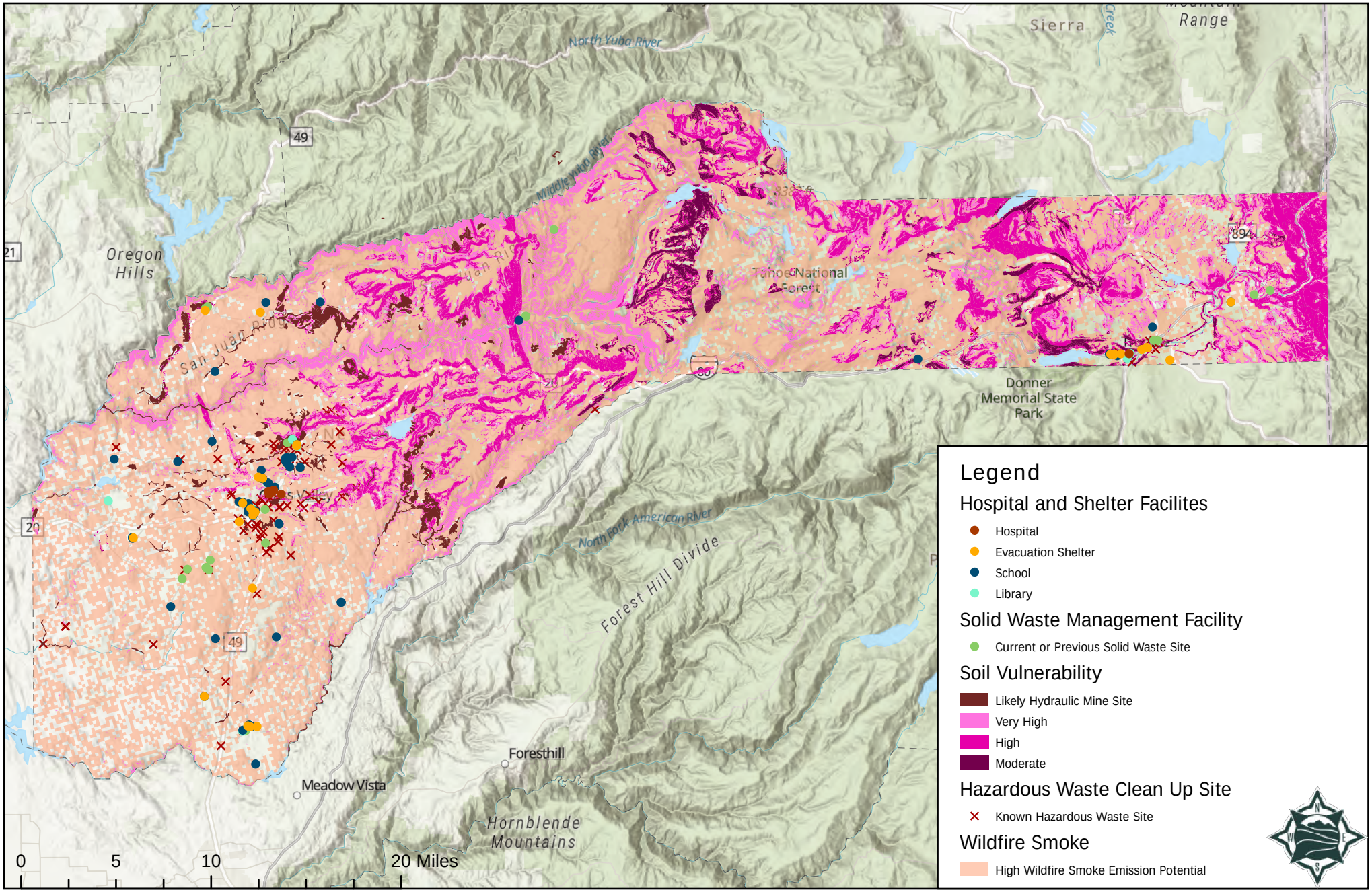
Nevada County Primary High Value Resources and Assets at Risk: Community Health

Figure 19



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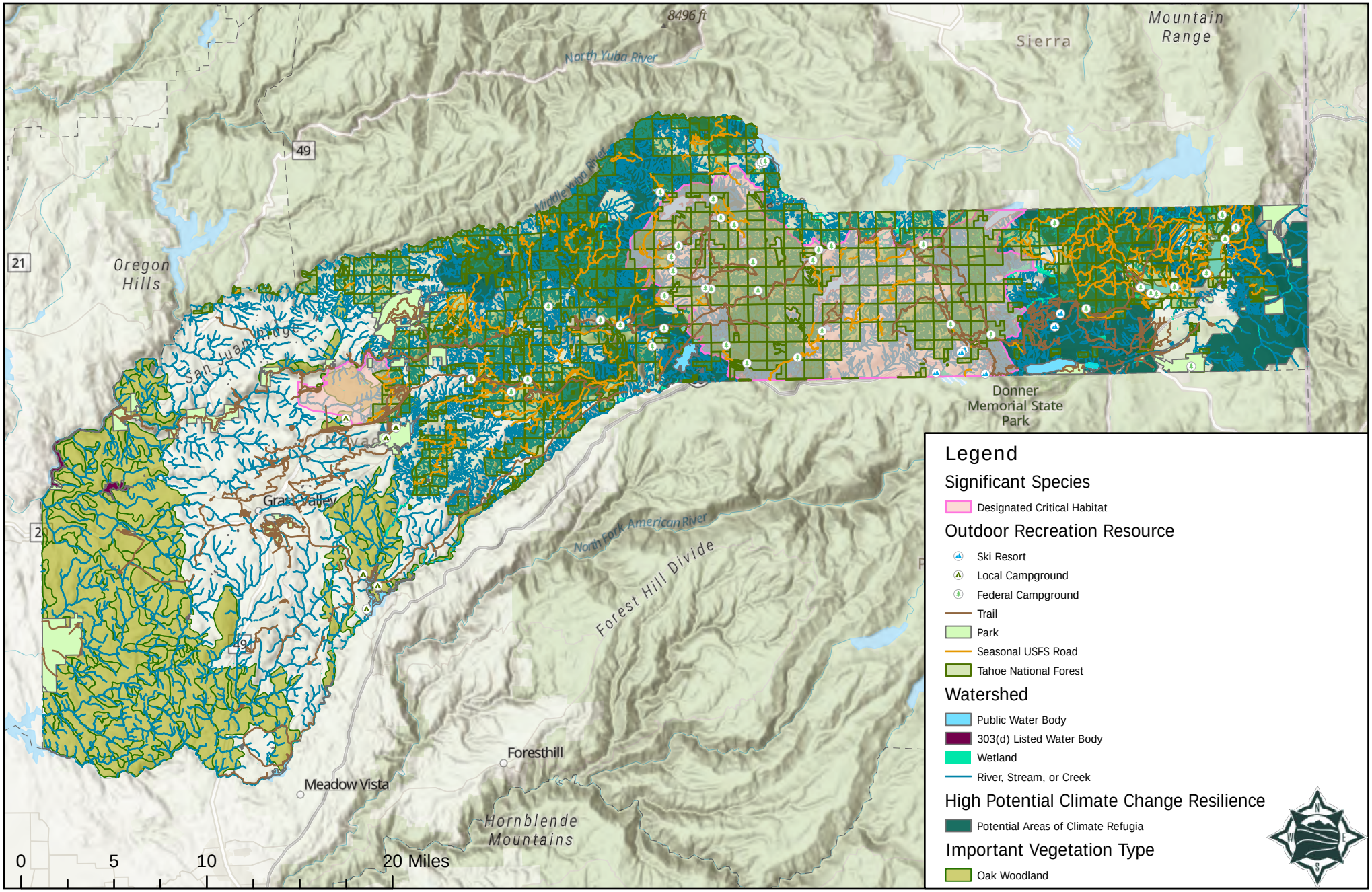
Nevada County Primary High Value Resources and Assets at Risk: Natural Resources

Figure 20



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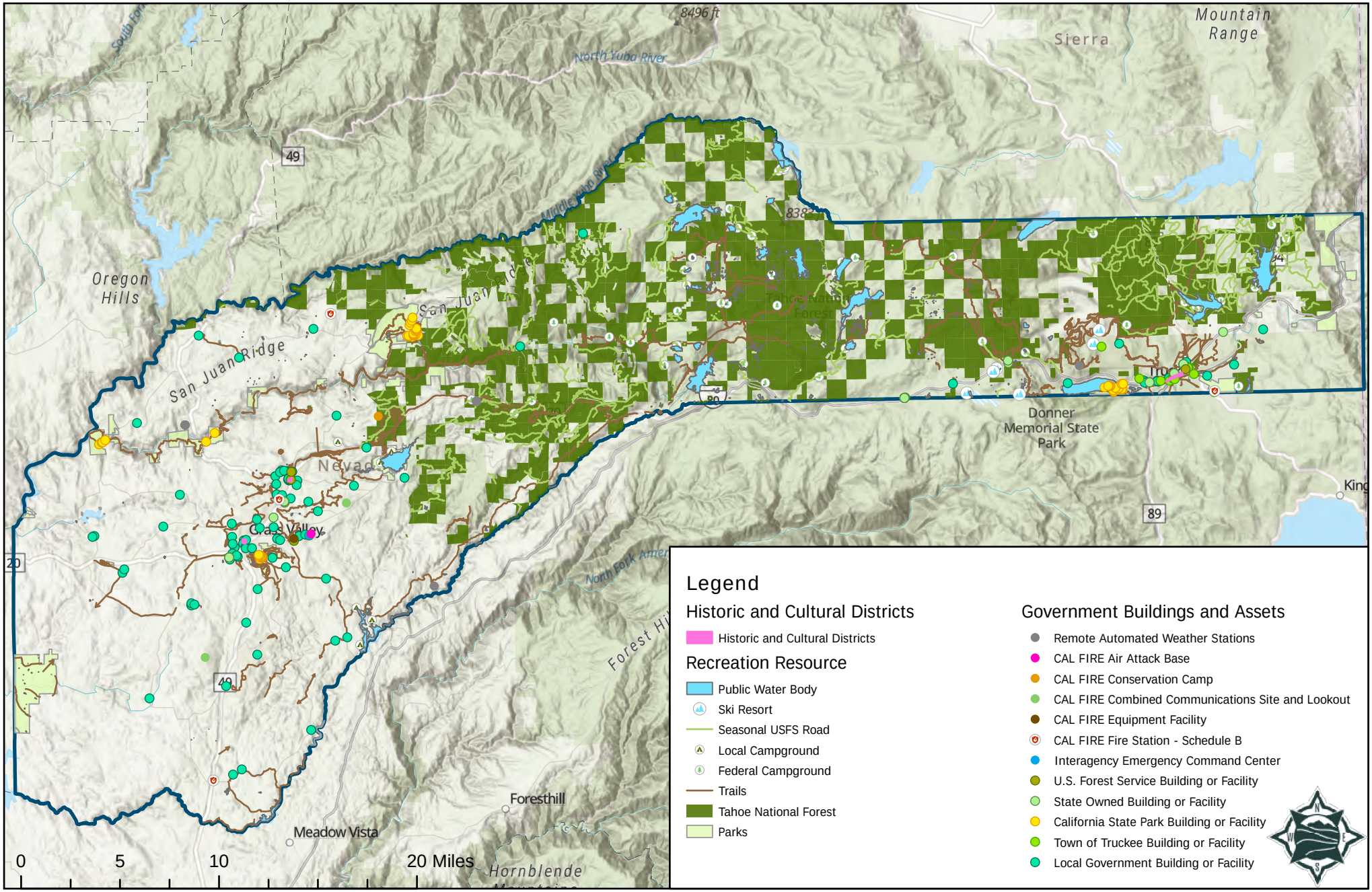
Nevada County Primary High Value Resources and Assets at Risk: Economic Resources

Figure 21



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3.1.2 Exposure Analysis

The Quantitative Wildfire Risk Assessment (QWRA) process was initiated by completing an Exposure Analysis (EA). The EA examined the intersection between the wildfire hazard and the HVRAs. The EA quantified the Landscape Burn Probability (LBP) model outputs and where they overlapped with the High-Value Resources and Assets (HVRAs) at risk. It compared the burn probability, conditional flame length, and integrated hazard against the HVRAs within each analysis area. The EA calculated the following for each HVRA which was incorporated into the QWRA:

- Mean Burn Probability
- Mean Conditional Flame Length
- Mean Integrated Hazard
- Mean Product of Burn Probability and Conditional Flame Length
- Relative Extent
- Expected Burn Area

The EA was run for each HVRA, in each Forecast Zone (FZ), under both fire scenarios (fuel-driven and wind-driven). In total, 32 EA were run. The results from the EA were directly embedded in the QWRA.

3.1.3 Quantitative Wildfire Risk Assessment

The QWRA was initiated by selecting the completed EA for each of the modeled HVRAs for each FZ and under each fire scenario. The EA contained all the necessary inputs from the LBP analysis and the HVRAs. The QWRA analyzed, quantified, and prioritized the wildfire risk based on the susceptibility or response of the Sub-HVRA to wildfire (Response Function) and the quantitative weight to differentiate the importance of the HVRAs (Relative Importance). Results from the HVRA Prioritization Outreach and TAC expertise were used to inform the Relative Importance of the HVRAs. Thirty-two (32) QWRAs were completed.

Outputs for the QWRA focused on the overall change in value (Net Value Change (NVC)), whether positive or negative on a given pixel in the analysis areas and factored in the LBP outputs and the HVRA locations. The Net Value Change (NVC) had two outputs - the Conditional Weighted NVC (CwNVC) and the Expected Weighted NVC (EwNVC).

3.1.4 Quantitative Wildfire Risk Assessment Model Inputs

The QWRA used the results from the Integrated Hazard and EA to determine risk. The QWRA required that the Response Function and Relative Importance were determined for each HVRA.

Response Function

Response Function (RF) was the susceptibility or response of an HVRA to wildfire. RF was represented by a value change from -100 to 100 based on fire intensity. A value of -100 indicates a strong loss and 100 indicates a strong benefit to that HVRA from wildfire. The RF was set for each Sub-HVRA based on the HVRA National Data set which contains pre-calculated RF (Dillon, 2020).

Relative Importance

Relative Importance (RI) helped prioritize HVRAs. RI could be set from 1 to 100 with 1 being the least important and 100 being the most important. RI was typically assigned to the Primary HVRA and then the Sub-HVRAs. For the purpose, of this modeling effort the RI for the Primary HVRA and Sub-HVRAs were determined by the Technical Advisory Committee (TAC) and the Public Survey (Table 11). The RI for the Primary-HVRA was used to identify the priority HVRAs that would be empoyed in the QWRA process. However, the Primary-HVRAs were not ranked against each other in the QWRA. A QWRA was run for each Primary-HVRA, for each FZ, under the two fire scenarios. Keeping the Primary-HVRAs separated allowed for more customized Project Priority Areas that recognized that not every project would want to or need to consider every Primary-HVRA. It also allowed the Project Priority Areas to be specific to the HVRAs in each FZ. Further, this allowed the results from the QWRA process to serve more stakeholders and be more dynamic for different stakeholder objectives.

As described in Section 3.1.1. RI of the Sub-HVRAs was determined by the TAC and the Public Survey. The RI and the relative extent (the number of pixels) of the Sub-HVRA were used to determine the overall importance of each Sub-HVRA. This helped to avoid overemphasizing Sub-HVRAs that covered a large area or masking the importance of a Sub-HVRA that had a smaller footprint.

3.1.5 Quantitative Wildfire Risk Assessment Model Outputs

Conditional Weighted Net Value Change

The Conditional Weighted Net Value Change (CwNVC) was an intermediate product of the QWRA and measured fire intensity, susceptibility, and importance. It analyzed the likely effects of fire on HVRAs based on the assumption that a fire would occur. The CwNVC was not used for the WRA as a final output as it was typically used in planning scenarios where the presence of fire was assumed, and the goal was to understand the anticipated threats and benefits of a fire (IFTDSS, n.d.-f). The CwNVC was required to determine the EwNVC. For example, the CwNVC could address a situation where a fire was expected to occur, and it was desirable to assess the impact of wildfire on HVRAs. The WRA was focused on analyzing the potential impact of fire but also considered the likelihood of occurrence and therefore the CwNVC was only appropriate to use as an intermediate step.

CwNVC was calculated using the following:

- The proportion of Flame Lengths (LBP output)
- Sub-HRVA
- Response Function
- Relative Importance
- Relative Extent

The CwNVC was calculated for every pixel in the analysis area and considered any overlapping HVRAs. Positive values were considered benefits and negative values were considered threats.

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Values of zero were neither a threat nor a benefit. A zero value occurred if no HVRAs were present, fire intensity was neutral, or the summation of the NVC was zero. The CwNVC classified the results as the following:

- Burnable but not burned
- Non-burnable
- Highest Threat (<-1)
- Higher Threat (-1 to -0.1)
- Middle Threat (-0.1 to -0.01)
- Lower Threat (-0.01 to -0.001)
- Lowest Threat (-0.001 to <0)
- No Benefit/No Threat (0)
- Lowest Benefit (>0 to 0.001)
- Lower Benefit (0.001 to 0.01)
- Middle Benefit (0.01 to 0.1)
- Higher Benefit (0.1 to 1)
- Highest Benefit (1)

Note, that the CwNCV was only used as an intermediate step and was not included in the results analysis. For transparency purposes, all results from the CwNVC are included in the IFTDSS Reports in Appendix A.

Expected Weighted Net Value Change

The Expected Weighted Net Value Change (EwNVC) analyzed the likelihood of a fire occurring and the effect on HVRAs. The EwNVC was a product of the CwNVC and Burn Probability (Figure 22). It determined the risk to the HVRA by intersecting the wildfire hazard with the likelihood of occurrence and the potential impact on the HVRA. Because the EwNVC was a product of the CwNVC and Burn Probability it is best used for planning scenarios where the likelihood of a fire occurring needs to be considered, such as the placement of fuel treatments, and therefore was selected to be the final product of the QWRA. EwNVC was used to determine areas for determining priority project locations. Further, because the EwNVC included Burn Probability it could only be compared within the analysis area and could not be compared to other analysis areas. The EwNVC also prioritized areas based on their likelihood to experience fire, the relative importance of the HVRA, and the susceptibility to wildfire impact. This was used to determine which areas of the landscape were at a greater threat from wildfire impact and compared that to the total analysis area. Therefore, an area could present a lower wildfire risk because as compared to the totality of the landscape it was less likely to be significantly impacted by wildfire. It was important to note that this did not negate the wildfire hazard or wildfire risk in that area as the goal of the analysis was to determine priority locations for treatment not to determine overall hazard or risk.

Final Wildfire Risk Assessment

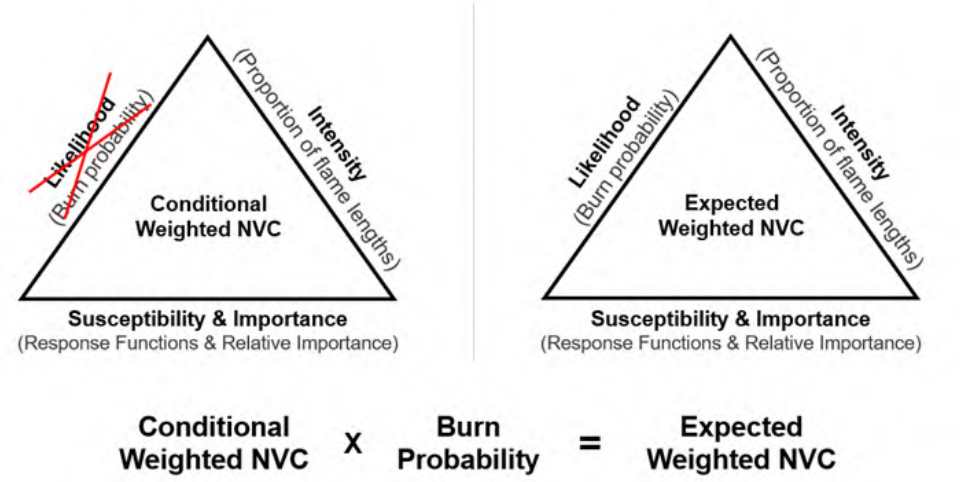


Figure 22: Conditional Weighted NVC versus Expected Weighted NVC. Retrieved from IFTDSS Help Center, n.d., https://iftdss.firenet.gov/firenetHelp/help/pageHelp_pdf/outputcondnvc.pdf

The expected weighted value was calculated based on the following:

- CwNVC
- Burn Probability (LBP output)
- The proportion of Flame Lengths (LBP output)
- Sub-HRVA maps
- Response Functions
- Relative Importance
- Relative Extent

The EwNVC results were classified in IFTDSS on a scale from Highest Threat to Highest Benefit. In IFTDSS the classification for risk was on a scale from Highest Threat to Highest Benefit. The highest Threat could also be referred to as the highest risk from wildfire impacts. The threat level indicates the susceptibility of the HVRA to negative wildfire impacts. Benefit indicated where an HVRA may benefit from exposure to wildfire. EwNVC ranged from -1 to +1 because it was a product of the CwNVC and Burn Probability. The EwNVC was calculated for every pixel and considered overlapping HVRAs. The EwNVC produced a 0 value either when no HVRAs were present, the fire was not intense enough to produce a significant impact, or the summation of the NVC was 0. EwNVC also included Non-Burnable pixels that had a Non-Burnable fuel model. Burnable but Not Burned were pixels that had burnable fuels but did not burn (e.g., a fire never reached the pixel, or a fire started within the pixel, but it was unable to burn out of the pixel because the fire spread rate was too slow). The following are the IFTDSS classifications for the EwNVC:

- Burnable but Not Burned
- Non-Burnable
- Highest Threat (<-1)
- Higher Threat (-1 to -0.1)
- Middle Threat (-0.1 to -0.01)

Final Wildfire Risk Assessment

- Lower Threat (-0.01 to -0.001)
- Lowest Threat (-0.001 to <0)
- No Benefit/No Threat (0)
- Lowest Benefit (>0 to 0.001)
- Lower Benefit (0.001 to 0.01)
- Middle Benefit (0.01 to 0.1)
- Higher Benefit (0.1 to 1)
- Highest Benefit (1)

In order to better communicate the IFTDSS results the labels for the EwNVC results were changed for clarity. This did not alter the data. The class labels were changed to the following:

- **Burnable but Not Burned**
- **Non-Burnable**
- **No Impact** (0)
- **Very High Priority Benefit (>0 to 0.001)**
- **High Priority Benefit (0.001 to 0.01)**
- **Moderate Priority Benefit (0.01 to 0.1)**
- **Lower Benefit (0.1 to 1)**
- **Lowest Benefit (1)**
- **Lowest Priority Risk (-0.001 to <0)**
- **Lower Priority Risk (-0.01 to -0.001)**
- **Moderate Priority Risk (-0.1 to -0.01)**
- **High Priority Risk (-1 to -0.1)**
- **Very Priority High Risk (<-1)**

The EwNVC was determined for each HVRA in each FZ under both fire modeling scenarios and each Primary-HVRA.

3.2 Results

The following describes the results of the Quantitative Wildfire Risk Assessment (QWRA) for each High Value Resource and Asset (HVRA) at risk in each Forecast Zone (FZ) under both fire scenarios. The maps for the results are displayed in Figures 22 through 61. The Interagency Fuels Treatment Decision Support System (IFTDSS) classifies wildfire risk on a scale from Highest Threat to Highest Benefit. This is converted to Very High Priority Benefit through Very High Priority Risk as described in Section 3.1.5. The results are derived from the Expected Weighted Net Value Change (EwNVC), which analyzes the likelihood of a fire occurring and the effect on an HVRA. As described in Section 3.1.5, the EwNVC intersects the wildfire hazard with the likelihood of occurrence and the potential impact on an HVRA and is best used for planning scenarios where the likelihood of a fire needs to be considered, such the placement of fuel treatments, and therefore was selected to be the output of the QWRA. The results from the EwNVC indicate which areas in the County are more likely to experience effects from wildfire and can potentially benefit from wildfire risk reduction activities. However, the final product of the overall Wildfire Risk Assessment (WRA) is the Project Priority Areas which is described in Section 4. The EwNVC is valuable in determining what is at risk in Nevada County and the delineation of the Project Priority Areas. The analysis of the EwNVC is separated into the County-scale and the FZ-scale. The QWRA prioritization includes the Burn Probability results from the Integrated Hazard, a process that relies on comparing each pixel against the analysis maximum (the highest value in the model extent). Therefore, like the Integrated Hazard results the FZs cannot be compared against each other. However, trends can be identified and discussed at the County-scale.

NOTE: All structures and developed areas are classified as non-burnable. Currently, IFTDSS and most fire modeling software are not capable of simulating how fire burns structures or developed areas. This is due to the high variability in how structures burn. Further, structures typically burn due to house-to-house spread or firebrands neither of which can be modeled using fuel-based fire behavior modeling software (such as IFTDSS and the majority of fire modeling software). However, fire science recognizes that structures burn at a high intensity and are at significant risk from wildfire. It is recognized that structures are not only a risk from wildfire but also contribute to the fuel landscape and are considered fuel. This modeling limitation is acknowledged and is taken into account when determining priority locations for fuel treatments.

3.2.1 Wildfire Risk Assessment Results – County Scale

Wildfire risk considers the intersection between the wildfire hazard, the likelihood of a fire occurring, and the vulnerability of the High-Value Resource and Asset (HVRA) at risk being impacted by a wildfire. Wildfire risk is also directly influenced by what a community considers to be important to protect from wildfire. The Quantitative Wildfire Risk Assessment (QWRA) is able to identify and prioritize potential fuel treatment areas based on what is determined as being valuable. Further, the QWRA accounts for the predicted benefits and threats from a fire on multiple, often, overlapping values across the landscape. This was done for both fire scenarios, (1) fuel-driven, and (2) wind-driven, for each forecast zone (FZ), and each primary HVRA.

Fuel-Driven Scenario

In the fuel-driven scenario, across each HVRA, 7% (70,777 acres) of the County are classified as Non-Burnable, and 1% (11,631 acres) of the County are considered Burnable but Not Burned. In the Community Lifelines risk assessment, 4% (41,474 acres) of the County experienced No Impact which was the lowest of all the Primary-HVRAs. The highest No Impact classification is in the Economic Resource risk assessment. In each Primary-HVRA risk assessment, the majority of pixels that are impacted by a potential wildfire are classified as being either High Priority or Very High Priority Risk and range from 4% to 21% of the burnable pixels. The Natural Resources Primary-HVRA risk assessment is the only risk assessment to indicate a potential benefit from a wildfire occurring. However, this benefit is less than the potential risk. Generally, where high levels of risk occurred is driven by where the HVRAs are located. (See Table 12 and Figures 22, 24, 26, and 28).

TABLE 12: NEVADA COUNTY RISK ASSESSMENT RESULTS – FUEL-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	70,777 (7%)	70,777 (7%)	70,777 (7%)	70,777 (7%)
Burnable but Not Burned	11,631 (1%)	11,631 (1%)	11,631 (1%)	11,631 (1%)
No Impact	41,474 (4%)	88,035 (8%)	180,013 (17%)	397,558 (37%)
Very High Priority Benefit	0 (0%)	0 (0%)	43 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	44,753 (4%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	5,912 (1%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	2 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	13 (0%)	0 (0%)
Lowest Priority Risk	216 (0%)	73 (0%)	52 (0%)	0 (0%)
Lower Priority Risk	15,157 (1%)	6,545 (1%)	7,156 (1%)	1,908 (0%)
Moderate Priority Risk	61,531 (6%)	38,172 (4%)	40,284 (4%)	13,803 (1%)
High Priority Risk	230,881 (21%)	178,852 (21%)	134,831 (12%)	46,973 (4%)
Very High Priority Risk	181,003 (17%)	229,221 (21%)	127,831 (12%)	93,854 (9%)

Wind-Driven Scenario

In the wind-driven scenario the number of acres classified as Non-Burnable, is the same as it is in the fuel-driven scenario. In the wind-driven scenario 1% (9,873 acres) are classified as Burnable but Not Burned. The Primary-HRVA with the least acres classified as No Impact is Community Lifelines Primary-HVRA and Economic Resources has the most acres classified as No Impact.

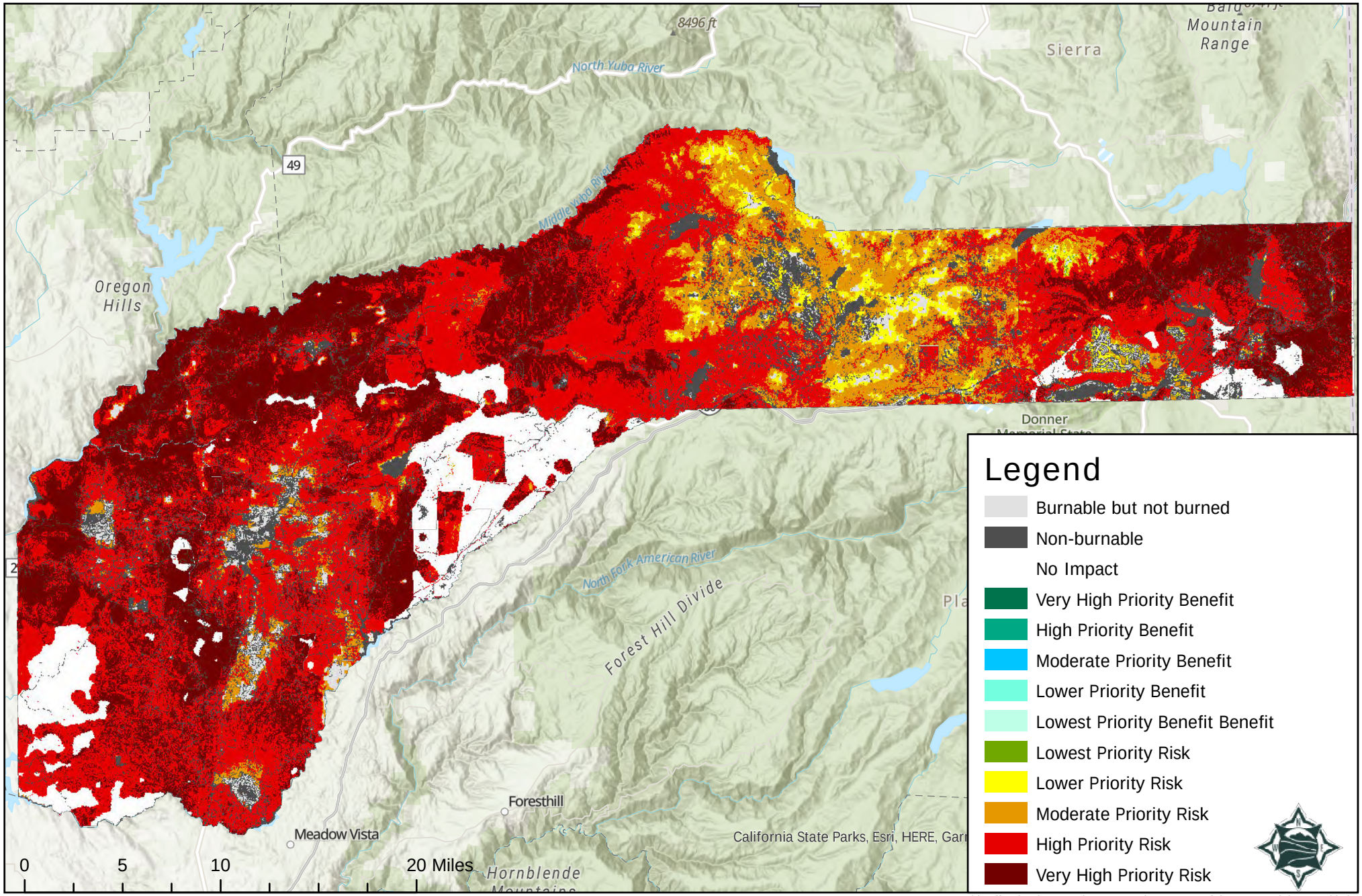
Final Wildfire Risk Assessment

Within each Primary-HVRA, the majority of pixels that are burnable are either classified as High or Very High Priority Risk and range from 6% to 22%. Again, the Primary-HVRA Natural Resources is the only Primary-HVRA to have areas classified as experiencing a potential benefit from wildfire. Once again where the High and Very High Priority Risk classifications occur is directly related to where the HVRAs are. (See Table 13 and Figures 23, 25, 27, and 29)

TABLE 13: NEVADA COUNTY RISK ASSESSMENT RESULTS – WIND-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	70,777 (7%)	70,777 (7%)	70,777 (7%)	70,777 (7%)
Burnable but Not Burned	9,873 (1%)	9,873 (1%)	9,873 (1%)	9,873 (1%)
No Impact	52,914 (5%)	88,823 (8%)	177,180 (16%)	384,472 (35%)
Very High Priority Benefit	0 (0%)	0 (0%)	1,338 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	26,173 (2%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	5,250 (0%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	28 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	135 (0%)	0 (0%)
Lowest Priority Risk	514 (0%)	67 (0%)	209 (0%)	0 (0%)
Lower Priority Risk	5,751 (1%)	2,020 (0%)	3,198 (0%)	537 (0%)
Moderate Priority Risk	68,996 (6%)	36,117 (3%)	45,425 (4%)	13,089 (1%)
High Priority Risk	240,863 (22%)	226,892 (21%)	174,228 (16%)	68,794 (6%)
Very High Priority Risk	171,403 (16%)	188,726 (17%)	109,990 (10%)	75,753 (7%)

Nevada County Wildfire Risk Assessment Results: Community Lifelines, Fuel-Driven Scenario Figure 22



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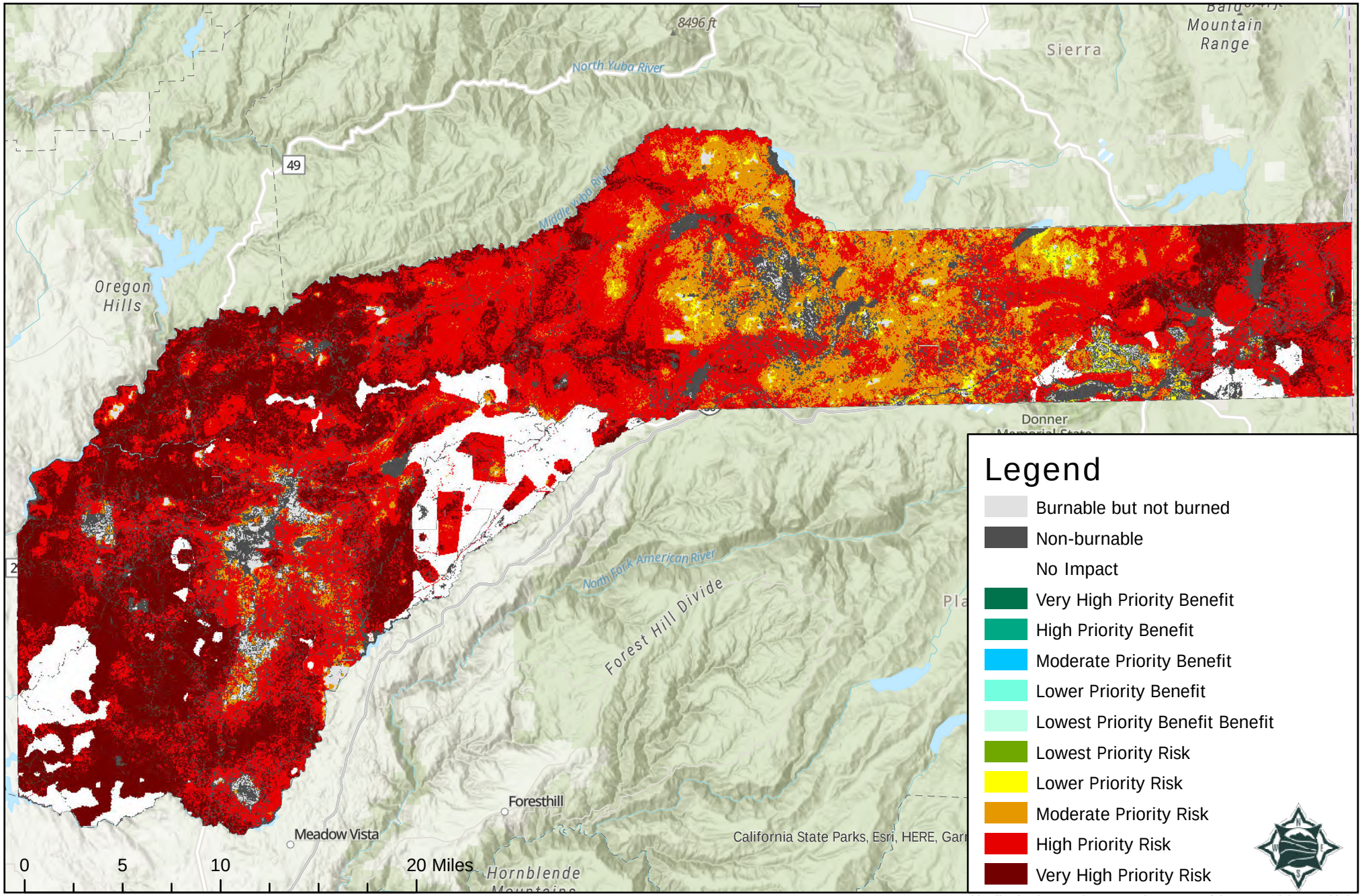
Nevada County Wildfire Risk Assessment Results: Community Lifelines, Wind-Driven Scenario

Figure 23



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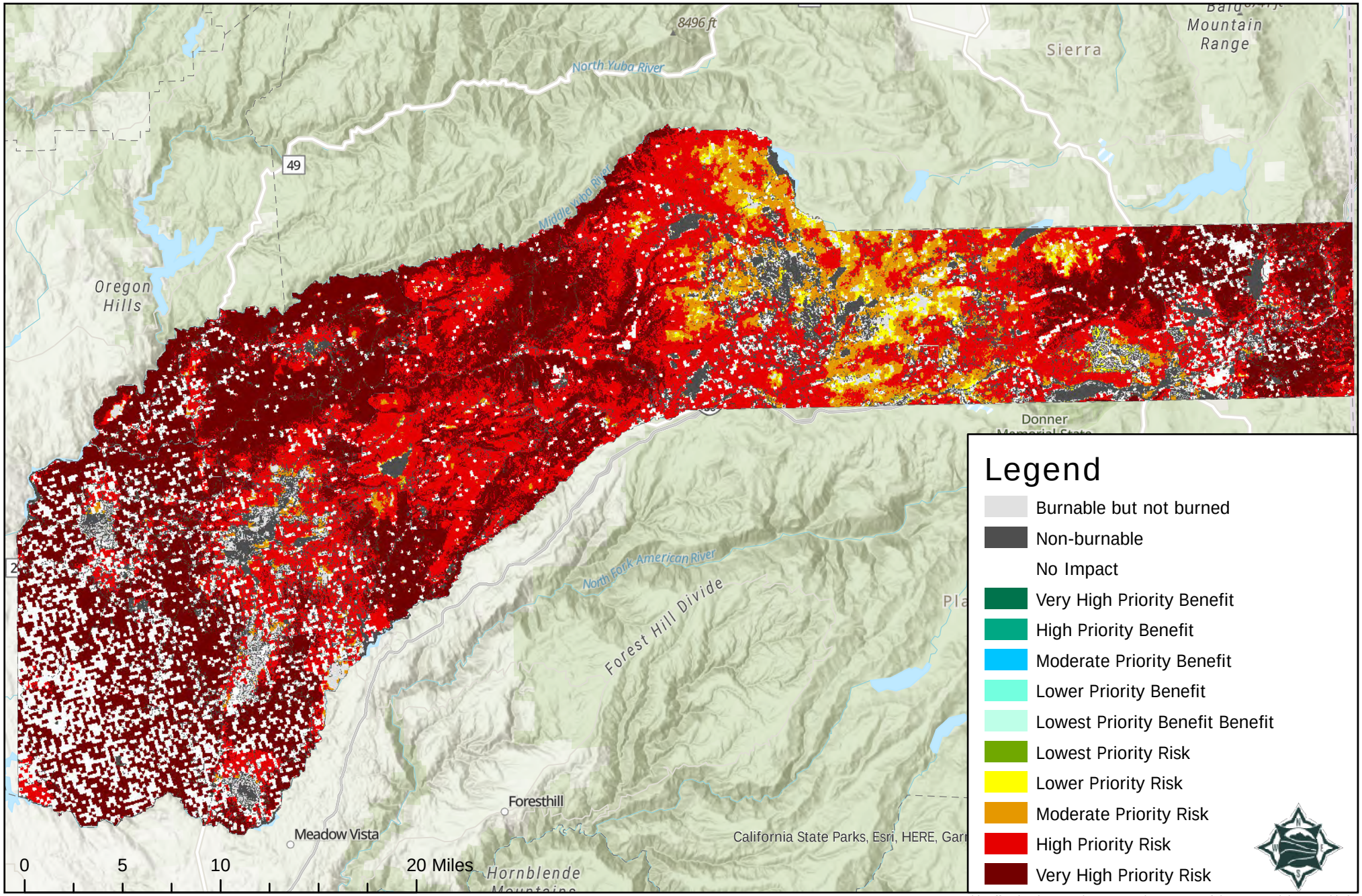
Nevada County Wildfire Risk Assessment Results: Community Health, Fuel-Driven Scenario

Figure 24



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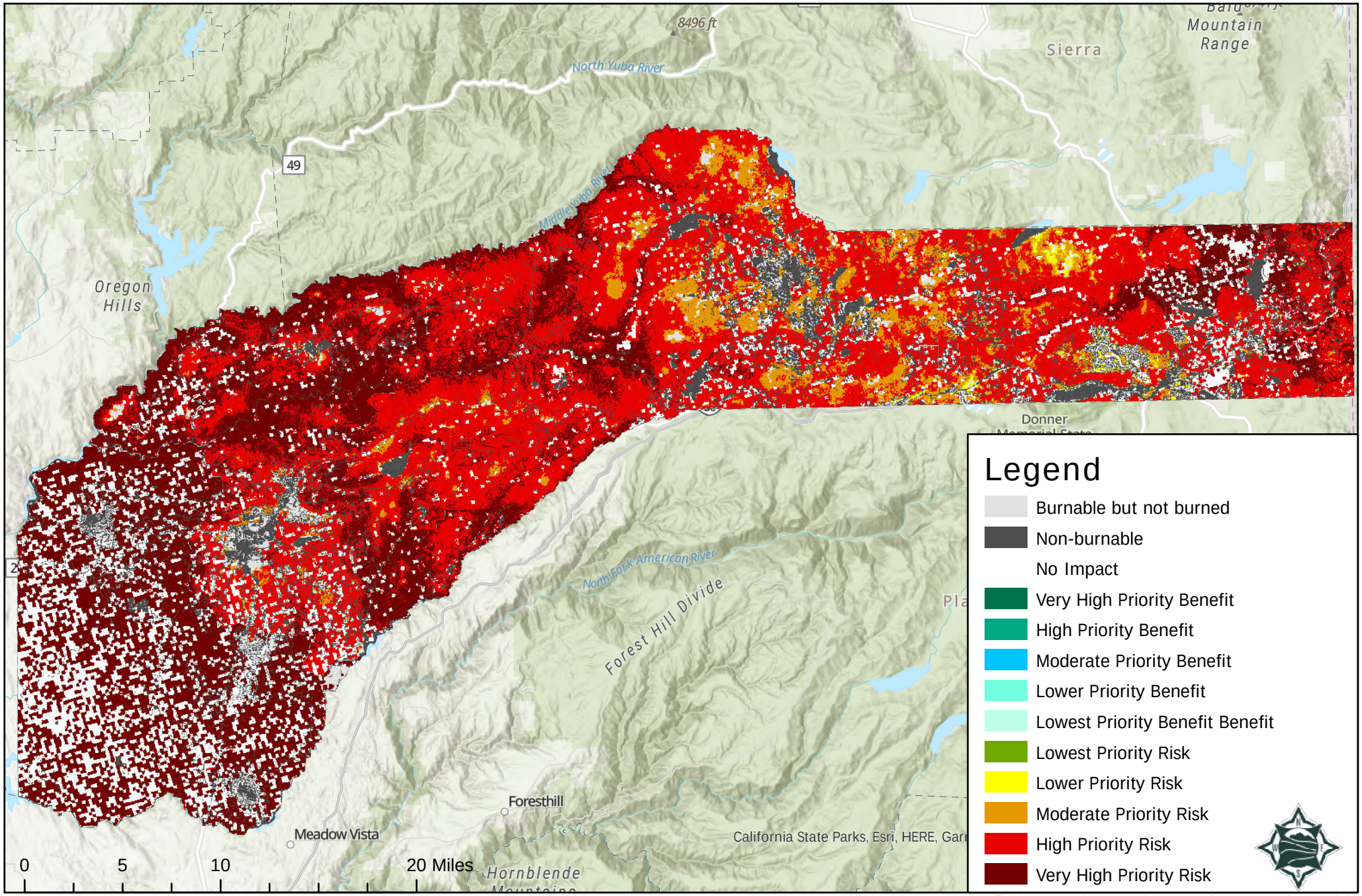
Nevada County Wildfire Risk Assessment Results: Community Health, Wind-Driven Scenario

Figure 25



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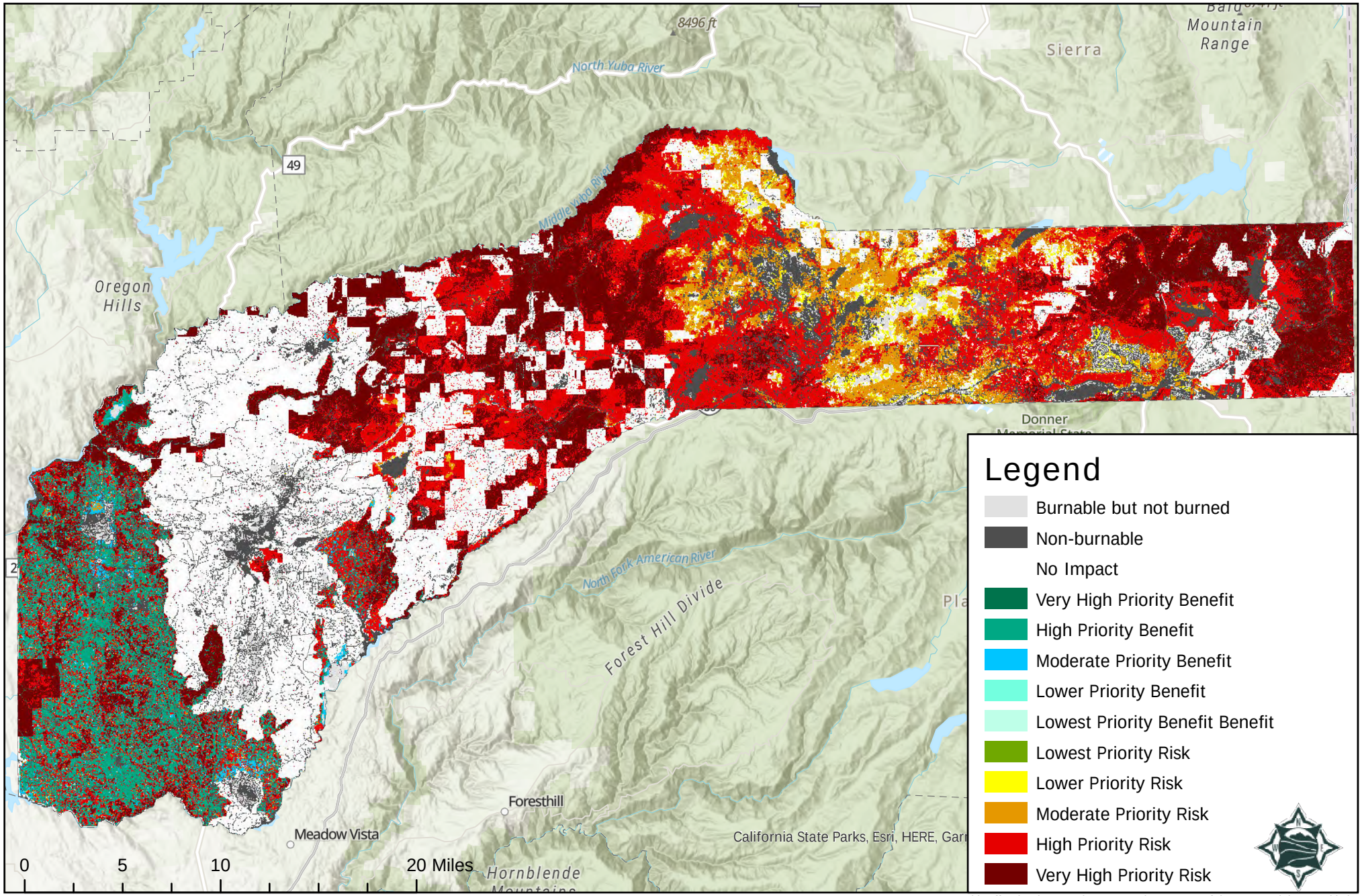
Nevada County Wildfire Risk Assessment Results: Natural Resources, Fuel-Driven Scenario

Figure 26



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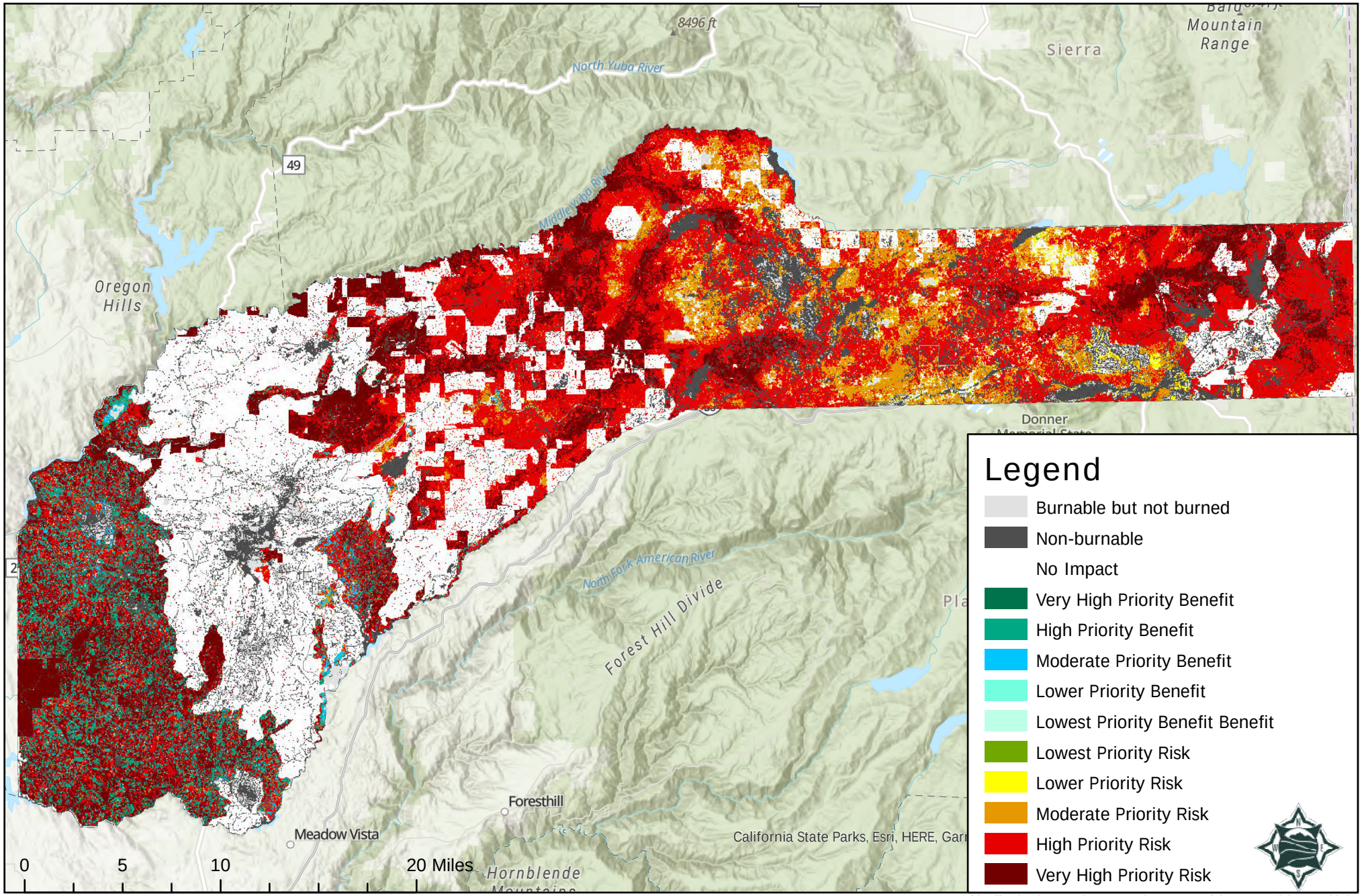
Nevada County Wildfire Risk Assessment Results: Natural Resources, Wind-Driven Scenario

Figure 27



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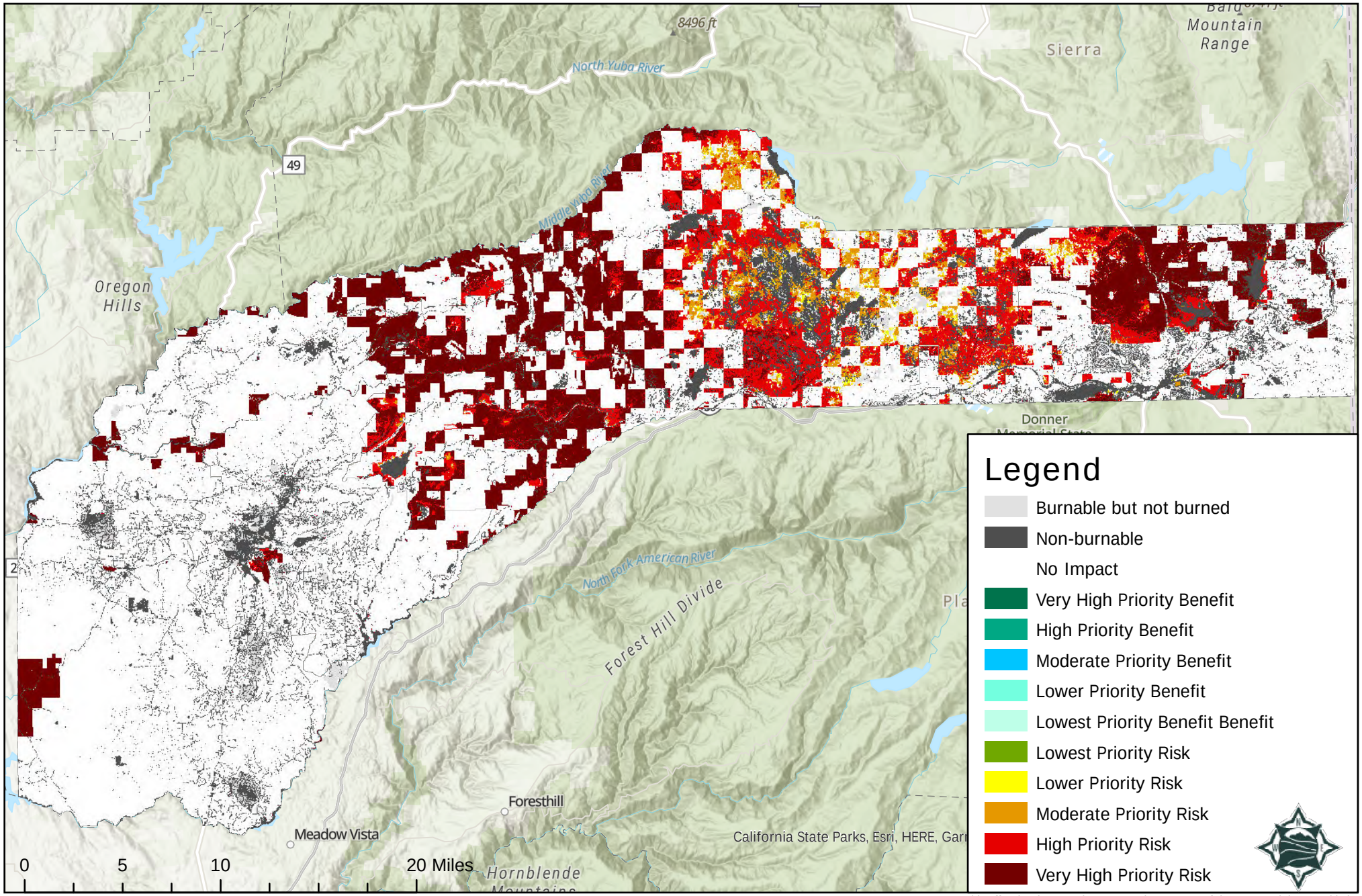
Nevada County Wildfire Risk Assessment Results: Economic Resources, Fuel-Driven Scenario

Figure 28



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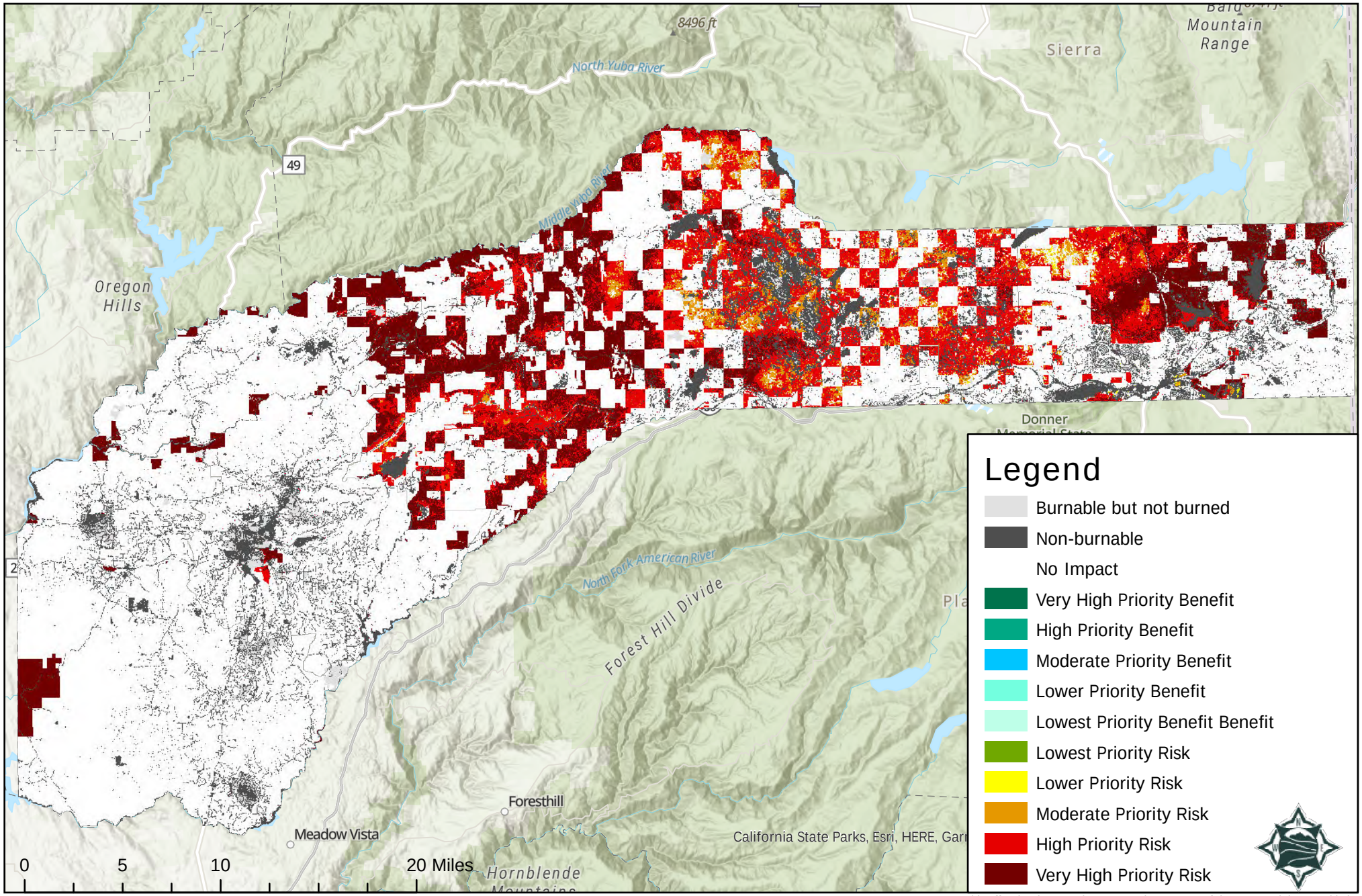
Nevada County Wildfire Risk Assessment Results: Economic Resources, Wind-Driven Scenario

Figure 29



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3.2.2 Wildfire Risk Assessment Results – Forecast Zone Scale

As previously mentioned, the Quantitative Wildfire Risk Assessment (QWRA) determines the risk of High-Value Resources and Assets (HVRAs) at risk being impacted by wildfire and prioritization of that risk. Prioritization is based on the likelihood of a fire occurring, the importance of the HVRA, and the resulting impact on the HVRA. As such, the results from one Forecast Zone (FZ) cannot be compared to another FZ, but results within the respective FZ can be. The following describes the risk assessment results by FZ. (See Tables 14-21 and Figures 30-61)

Higgins/Penn Valley

In the fuel-driven scenario, across all HVRAs, 9% (12,80 acres) are classified as Non-Burnable, and 2% (2,884 acres) are classified as Burnable but Not Burned. Pixels classified as No Impact range from 11% to 86%, with Community Lifelines has the least pixels classified as No Impact and Economic Resources has the most. Across each HVRA, the majority of burnable pixels are considered to be at risk from wildfire. In the Community Lifelines risk assessment, 76% of the pixels are classified as either High or Very High Priority Risk and tend to occur around communities. Fifty-six percent (56%) of the pixels in the Community Health risk assessment are either High or Very High Priority with 50% being classified as Very High Priority Risk. The Natural Resources risk assessment has 32% of pixels indicating potential Priority Benefit from wildfire and 34% as having a potential Priority Risk from wildfire. In the Economic Resources risk assessment, only 31% of the FZ is at risk from wildfire and with 3% classified as a Very High Priority Risk. (Table 14).

TABLE 14: HIGGINS/PENN VALLEY RISK ASSESSMENT RESULTS – FUEL-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	12,280 (9%)	12,280 (9%)	12,280 (9%)	12,280 (9%)
Burnable but Not Burned	2,884 (2%)	2,884 (2%)	2,884 (2%)	2,884 (2%)
No Impact	16,321 (11%)	47,779 (33%)	31,898 (22%)	123,655 (86%)
Very High Priority Benefit	0 (0%)	0 (0%)	43 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	42,178 (29%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	5,027 (3%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Risk	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lower Priority Risk	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Moderate Priority Risk	3,009 (2%)	577 (0%)	3,503 (2%)	0 (0%)
High Priority Risk	56,789 (39%)	9,012 (6%)	23,338 (16%)	28 (0%)
Very High Priority Risk	52,512 (37%)	71,264 (50%)	22,587 (16%)	4,951 (3%)

In the wind-driven scenario 9% (12,280 acres) of the FZ is classified as Non-Burnable across all four risk assessments and 2% (2,656 acres) are Burnable but Not Burned. Pixels classified as No Impact range from 11% to 86%. Seventy-seven percent (77%) of pixels in the Community Lifelines risk assessment are either High or Very High Priority Risk with 56% classified as Very High Priority Risk. Fifty-six percent (56%) of the burnable pixels in the Community Health risk assessment are

classified as either High of Very High Priority Risk. In the Natural Resources risk assessment, 17% of the burnable pixels are either High or Very High Priority Benefit and 46% are either High or Very High Priority Risk from wildfire. Finally, in the Economic Resources risk assessment, only 3% of burnable pixels are impacted and are classified as Very High Priority Risk. (Table 15).

TABLE 15: HIGGINS/PENN VALLEY RISK ASSESSMENT RESULTS – WIND-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	12,280 (9%)	12,280 (9%)	12,280 (9%)	12,280 (9%)
Burnable but Not Burned	2,656 (2%)	2,656 (2%)	2,656 (2%)	2,656 (2%)
No Impact	16,321 (11%)	48,010 (33%)	31,850 (22%)	123,964 (86%)
Very High Priority Benefit	0 (0%)	0 (0%)	1,338 (1%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	23,382 (16%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	3,262 (2%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	1 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	122 (0%)	0 (0%)
Lowest Priority Risk	0 (0%)	0 (0%)	115 (0%)	0 (0%)
Lower Priority Risk	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Moderate Priority Risk	0 (0%)	368 (0%)	2,703 (2%)	0 (0%)
High Priority Risk	32,230 (21%)	5,206 (4%)	24,969 (17%)	17 (0%)
Very High Priority Risk	80,309 (56%)	75,277 (52%)	41,120 (29%)	4,880` (3%)

Final Wildfire Risk Assessment

Grass Valley/Nevada City

In the fuel-driven scenario for the Grass Valley/Nevada City FZ 12% (16,00 acres) are considered Non-Burnable and 2% (3,808 acres) are classified as Burnable but Not Burned. Pixels classified as No Impact range from 5% to 78% in the fuel-driven scenario. In the Community Lifelines risk assessment, 77% of the burnable pixels are High or Very High Priority Risk. Seventy-five percent (75%) of the burnable pixels in the Community Health risk assessment are considered to be either High or Very High Priority Risk. In the Natural Resources risk assessment only 3% of the burnable pixels are found to have a potential priority benefit and of the 3% only 2% are classified as High Priority Benefit. However, 23% of the burnable pixels in the Natural Resources risk assessment are High or Very High Priority Risk. In the Economic Resources risk assessment, 8% of pixels are burnable and are classified as Very High Priority Risk. (Table 16).

TABLE 16: GRASS VALLEY/NEVADA CITY RISK ASSESSMENT RESULTS – FUEL-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	16,000 (12%)	16,000 (12%)	16,000 (12%)	16,000 (12%)
Burnable but Not Burned	3,808 (2%)	3,808 (2%)	3,808 (2%)	3,808 (2%)
No Impact	6,389 (5%)	13,011 (10%)	81,842 (60%)	106,387 (78%)
Very High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	2,575 (2%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	836 (1%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	2 (2%)	0 (0%)
Lowest Priority Risk	0 (0%)	0 (0%)	3 (0%)	0 (0%)
Lower Priority Risk	127 (0%)	43 (0%)	0 (0%)	0 (0%)
Moderate Priority Risk	4,682 (3%)	2,603 (2%)	526 (0%)	0 (0%)
High Priority Risk	46,714 (34%)	33,981 (25%)	8,901 (7%)	321 (0%)
Very High Priority Risk	59,233 (43%)	67,525 (50%)	22,459 (16%)	10,436 (8%)

The same number of pixels (12%) are classified as Non-Burnable in the wind-driven scenario as the fuel-driven scenario. Two-percent (2%) (3,283 acres) of the pixels in the FZ are Burnable but Not Burned in the wind-driven scenario. Pixels classified as No Impact range from 5% to 78%. Seventy-five percent (75%) of the burnable pixels in the Community Lifelines risk assessment are classified as High of Very High Priority Risk. In the Community Health risk assessment, 75% of

the pixels are either High or Very High Priority Risk. No pixels are considered to be Very High Priority Benefit in the Naturals Resources risk assessment but 2% are classified as High Priority Benefit. However, 22% of the burnable pixels are considered to be High of Very High Priority Risk. In the Economic Resources risk assessment, only 7% of pixels are considered burned and they are classified as Very High Priority Risk. (Table 17).

TABLE 17: GRASS VALLEY/NEVADA CITY RISK ASSESSMENT RESULTS – WIND-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	16,000 (12%)	16,000 (12%)	16,000 (12%)	16,000 (12%)
Burnable but Not Burned	3,283 (2%)	3,283 (2%)	3,283 (2%)	3,283 (2%)
No Impact	6,389 (5%)	13,011 (10%)	81,533 (60%)	106,427 (78%)
Very High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	2,461 (2%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	1,601 (1%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	12 (0%)	0 (0%)
Lowest Priority Risk	0 (0%)	0 (0%)	18 (0%)	0 (0%)
Lower Priority Risk	3 (0%)	0 (0%)	0 (0%)	0 (0%)
Moderate Priority Risk	5,011 (4%)	2,383 (2%)	1,209 (1%)	0 (0%)
High Priority Risk	52,117 (38%)	42,085 (31%)	9,445 (7%)	617 (0%)
Very High Priority Risk	53,421 (39%)	59,461 (44%)	20,662 (15%)	9,896 (7%)

Final Wildfire Risk Assessment

Tahoe National Forest Area

In the fuel-driven risk assessments for the Tahoe National Forest Area FZ, 11% (25,251 acres) are classified as Non-Burnable, and 2% (3906 acres) are classified as Burnable but Not Burned. Pixels that are considered to have No Impact range from 6% to 43%. In the fuel-driven scenario, Community Lifelines has 53% of the burnable pixels classified as either High of Very High Priority Risk. Sixty-seven percent (67%) of the burnable pixels in the Community Health risk assessment were classified as High or Very High Priority Risk. While there are no pixels classified as having a significant priority benefit (High or Very High) in the Natural Resources risk assessment for the fuel- driven scenario 49% are Moderate Priority Benefit. However, 51% of the burnable pixels are either a High Priority Risk or a Very High Priority Risk. Finally, 39% of the pixels in the Economic Resources Risk Assessment are classified as either High of Very High Priority Risk. (Table 18).

Final Wildfire Risk Assessment

TABLE 18: TAHOE NATIONAL FOREST AREA RISK ASSESSMENT RESULTS–FUEL-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	25,251 (11%)	25,251 (11%)	25,251 (11%)	25,251 (11%)
Burnable but Not Burned	3,906 (2%)	3,906 (2%)	3,906 (2%)	3,906 (2%)
No Impact	23,521 (10%)	14,540 (6%)	50,270 (21%)	99,924 (43%)
Very High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	49 (0%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	2 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Risk	0 (0%)	44 (0%)	0 (0%)	0 (0%)
Lower Priority Risk	12,894 (5%)	5,256 (2%)	5,544 (2%)	1,564 (1%)
Moderate Priority Risk	45,156 (19%)	29,852 (13%)	28,319 (12%)	12,375 (5%)
High Priority Risk	88,651 (38%)	102,203 (44%)	71,481 (30%)	36,238 (15%)
Very High Priority Risk	35,491 (15%)	53,818 (23%)	50,048 (21%)	55,612 (24%)

In the wind-driven scenario, the same number of pixels are classified as Non-Burnable as in the fuel-driven scenario. However, 1% (2348 acres) are classified as Burnable but Not Burned in the wind-driven scenario. In the Community Lifelines risk assessment, for the wind-driven scenario, 55% of the burnable pixels fell in either the High or Very High Priority Risk category. For Community Health, 71% of the burnable pixels are classified as either High or Very High Priority

Final Wildfire Risk Assessment

Risk. In the Natural Resources risk assessment, there is 0% of pixels to be considered as having a priority benefit from wildfire. However, 55% of the burnable pixels are High of Very High Priority Risk. Forty-one (41%) of the burnable pixels in the Economic Resources Risk Assessment are High or Very High Priority Risk. (Table 19).

TABLE 19: TAHOE NATIONAL FOREST RISK ASSESSMENT RESULTS–WIND-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	25,251 (11%)	25,251 (11%)	25,251 (11%)	25,251 (11%)
Burnable but Not Burned	2,348 (1%)	2,348 (1%)	2,348 (1%)	2,348 (1%)
No Impact	23,528 (10%)	14,949 (6%)	47,360 (20%)	99,286 (42%)
Very High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	24 (0%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	188 (0%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	27 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Risk	0 (0%)	0 (0%)	2 (0%)	0 (0%)
Lower Priority Risk	2,902 (1%)	222 (0%)	738 (0%)	0 (0%)
Moderate Priority Risk	51,834 (22%)	25,932 (11%)	30,345 (13%)	10,796 (5%)
High Priority Risk	107,119 (46%)	133,964 (57%)	94,375 (40%)	52,808 (22%)
Very High Priority Risk	21,888 (9%)	32,203 (14%)	34,211 (15%)	44,380 (19%)

Final Wildfire Risk Assessment

Truckee/Donner

For the Truckee/Donner FZ fuel-driven scenario, 16% (17,246 acres) are found to be Non-Burnable and 2% (1761 acres) are Burnable but Not Burned. The number of pixels considered to have No Impact range from 5% to 50%. Sixty-seven percent (67%) of the burnable pixels in the Community Lifelines risk assessment are classified as High or Very High Priority Risk in the fuel-driven scenario. Similarly, 65% of the burnable pixels in the Community Health risk assessment are also considered to be High or Very High Priority Risk. There are no pixels in the Natural Resources risk assessment to have a priority benefit from wildfire but 59% of the burnable pixels are either a High or Very High Priority Risk. Finally, for the Economic Resources risk assessment, 31% of the burnable pixels are either a High or Very High Priority Risk. (Table 20).

TABLE 20: TRUCKEE/DONNER RISK ASSESSMENT RESULTS – FUEL-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	17,246 (16%)	17,246 (16%)	17,246 (16%)	17,246 (16%)
Burnable but Not Burned	1,761 (2%)	1,761 (2%)	1,761 (2%)	1,761 (2%)
No Impact	5,870 (5%)	12,724 (12%)	16,003 (15%)	54,386 (50%)
Very High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Risk	216 (0%)	29 (0%)	0 (0%)	0 (0%)
Lower Priority Risk	2,134 (2%)	1,246 (1%)	1,612 (1%)	344 (0%)
Moderate Priority Risk	8,864 (8%)	5,140 (5%)	7,936 (7%)	1,428 (1%)
High Priority Risk	38,727 (36%)	33,656 (31%)	31,111 (29%)	10,386 (10%)
Very High Priority Risk	33,767 (31%)	36,604 (34%)	32,737 (30%)	22,855 (21%)

The wind-driven scenario has the same number of pixels (16%) classified as non-burnable in the Truckee/Donner forecast zone. One percent (1%) (1586 acres) are Burnable but Not Burned and the percentage of pixels in the No Impact category ranged from 5% to 51%. The percentage of pixels classified as High or Very High Priority Risk in the Community Lifelines risk assessment is 62%. And in the Community Health risk assessment the percentage is 61%. As with the fuel-

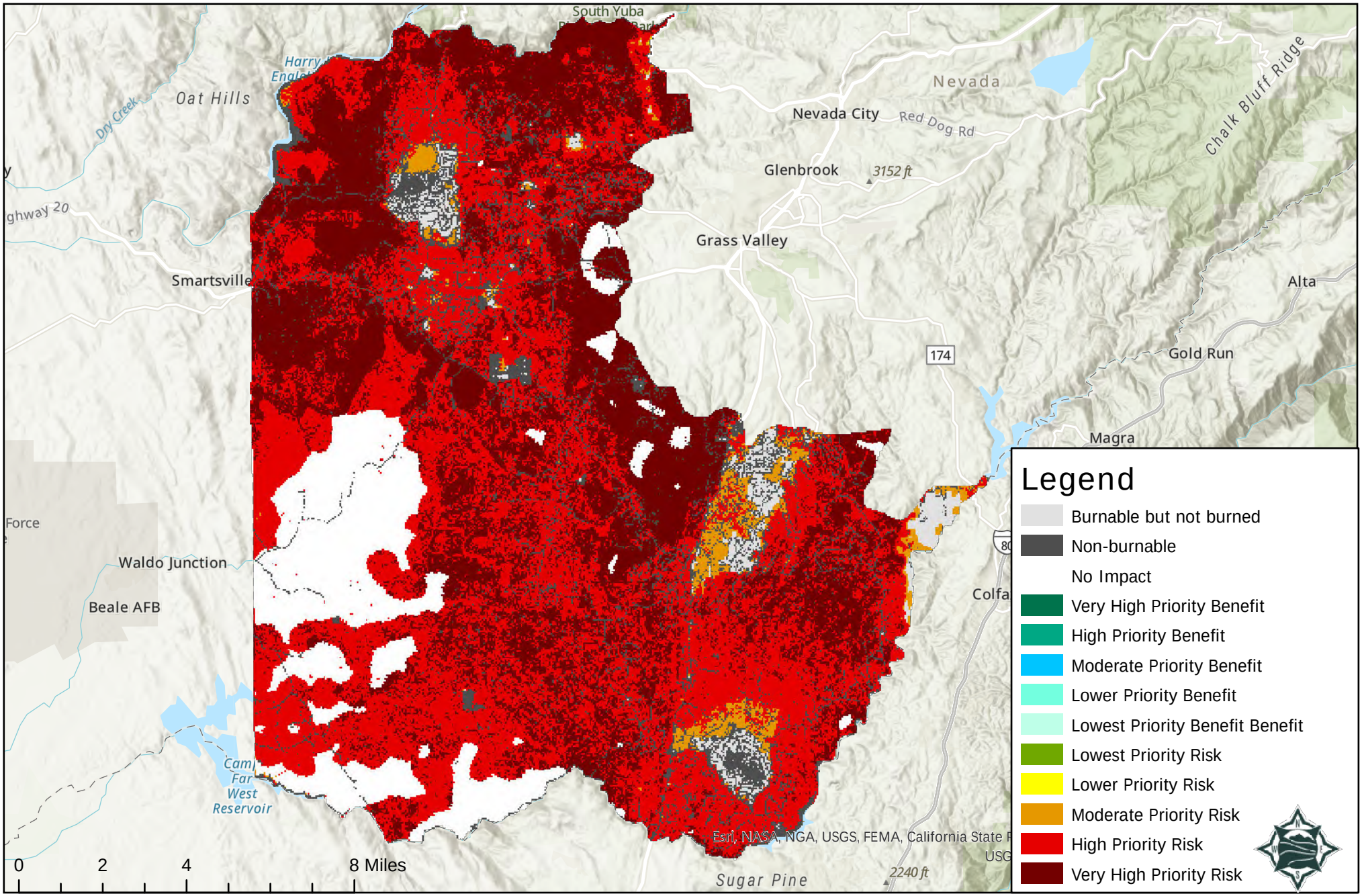
driven scenario, in the wind- driven scenario there are no pixels considered to have a priority benefit from wildfire in the natural resources risk assessment. However, 55% of the burnable pixels in the natural resources risk assessment are either High or Very High Priority Risk. In the economic resources risk assessment, 29% of the burnable pixels are classified as either High or Very High Priority Risk. (Table 21).

TABLE 21: TRUCKEE/DONNER RISK ASSESSMENT RESULTS – WIND-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	17,246 (16%)	17,246 (16%)	17,246 (16%)	17,246 (16%)
Burnable but Not Burned	1,586 (1%)	1,586 (1%)	1,586 (1%)	1,586 (1%)
No Impact	5,883 (5%)	12,853 (12%)	16,437 (15%)	54,795 (51%)
Very High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Risk	514 (0%)	67 (0%)	74 (0%)	0 (0%)
Lower Priority Risk	2,846 (3%)	1,798 (2%)	2,460 (2%)	537 (0%)
Moderate Priority Risk	13,5252 (12%)	7,796 (7%)	11,168 (10%)	2,293 (2%)
High Priority Risk	51,771 (48%)	5,289 (46%)	45,439 (42%)	15,352 (14%)
Very High Priority Risk	15,036 (14%)	16,771 (15%)	13,997 (13%)	16,597 (15%)

Higgins/Penn Valley Forecast Zone Wildfire Risk Assessment Results: Community Lifelines, Fuel-Driven Scenario

Figure 30



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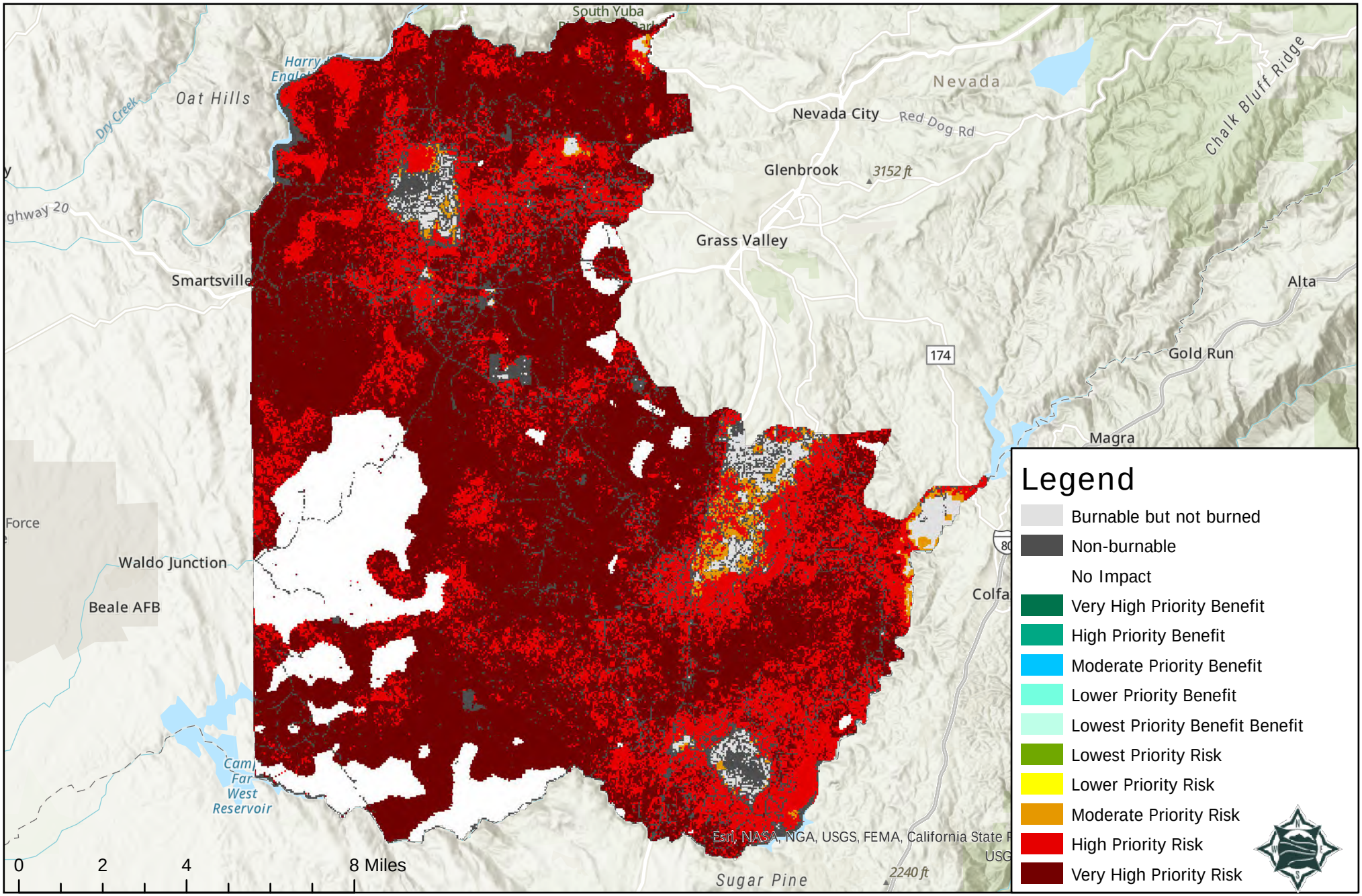

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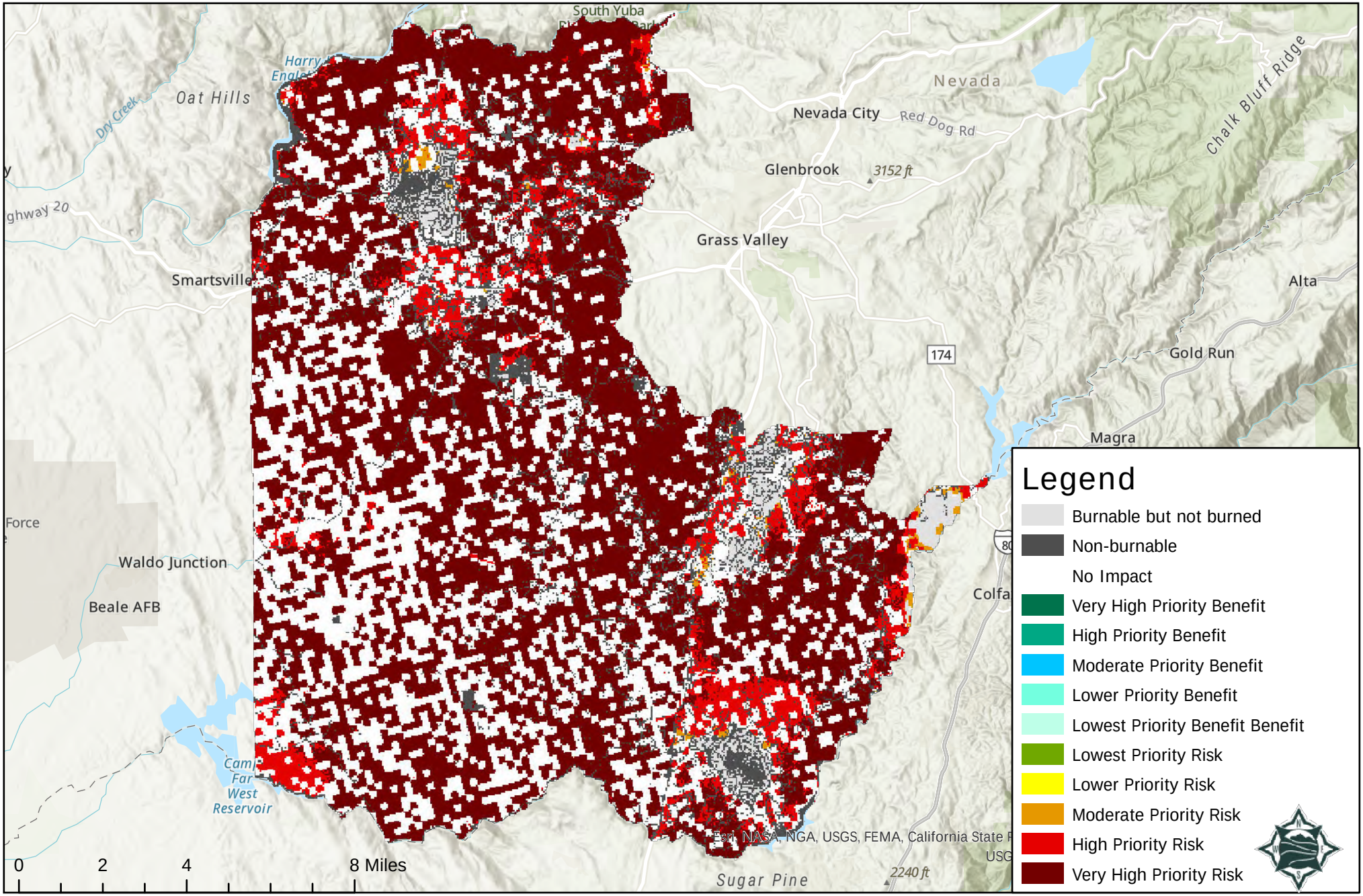
Higgins/Penn Valley Forecast Zone Wildfire Risk Assessment Results: Community Health, Fuel-Driven Scenario

CWPP Appendix B Figure 32



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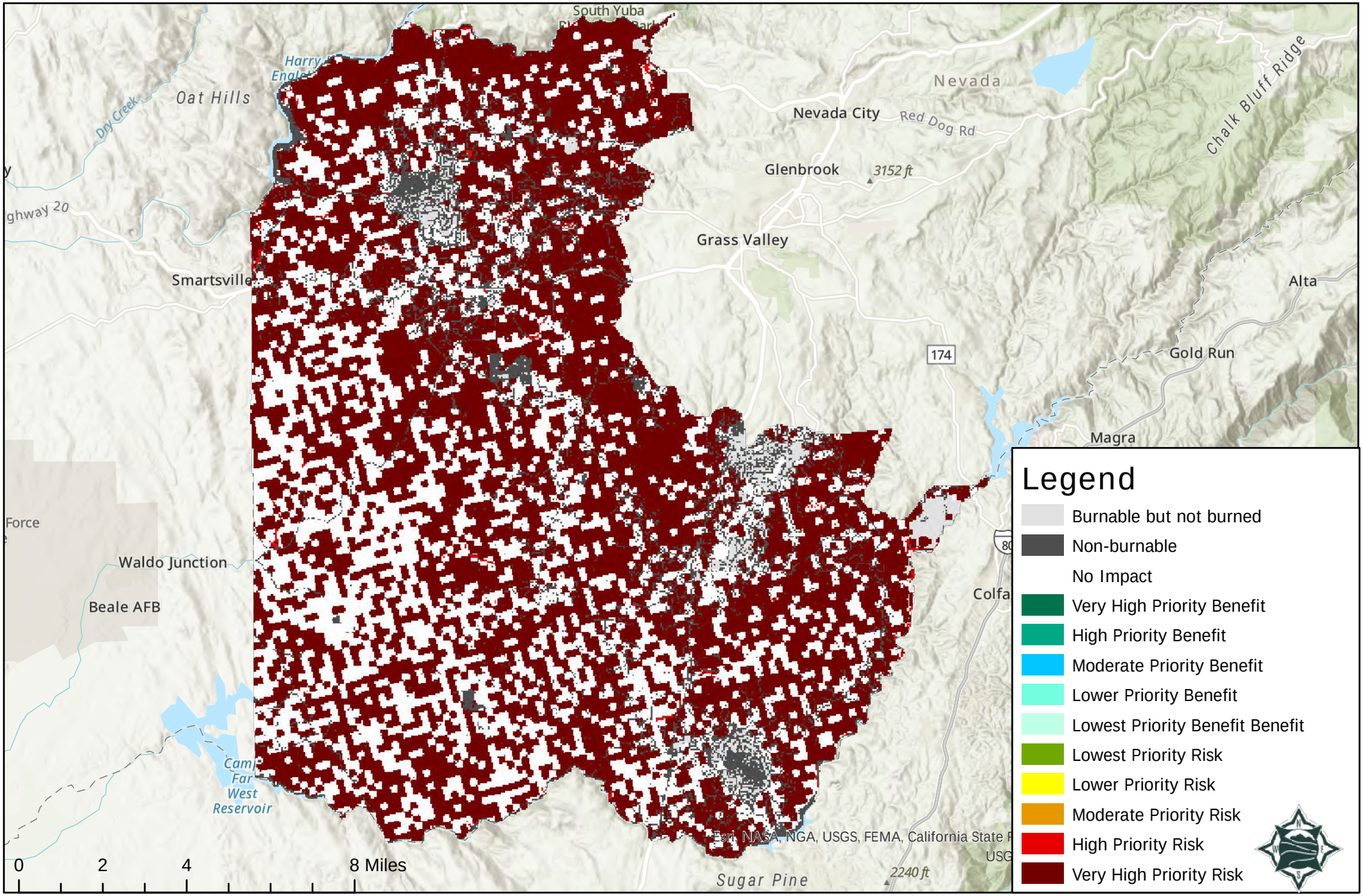
Higgins/Penn Valley Forecast Zone Wildfire Risk Assessment Results: Community Health, Wind-Driven Scenario

CWPP Appendix B Figure 33



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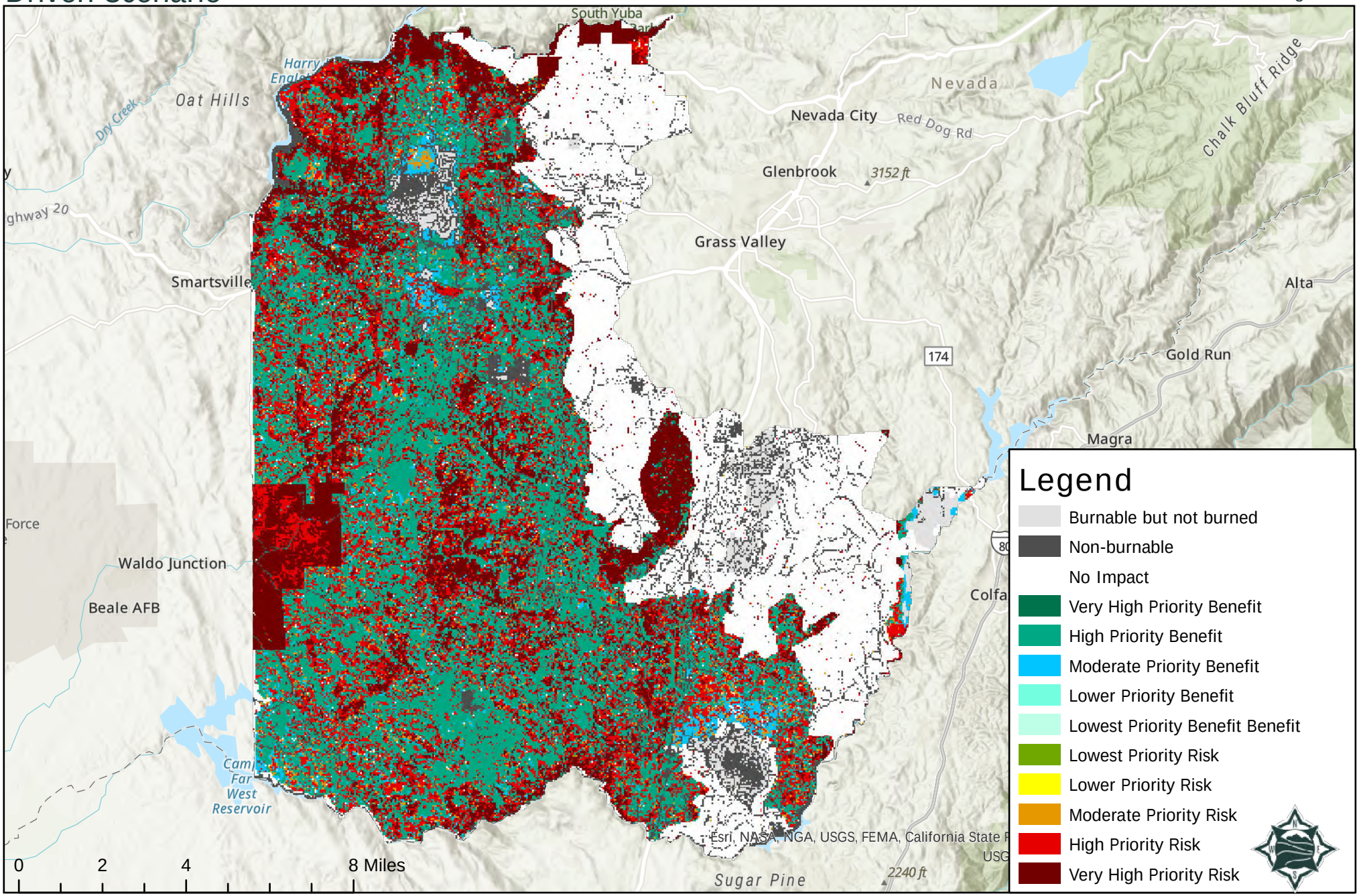

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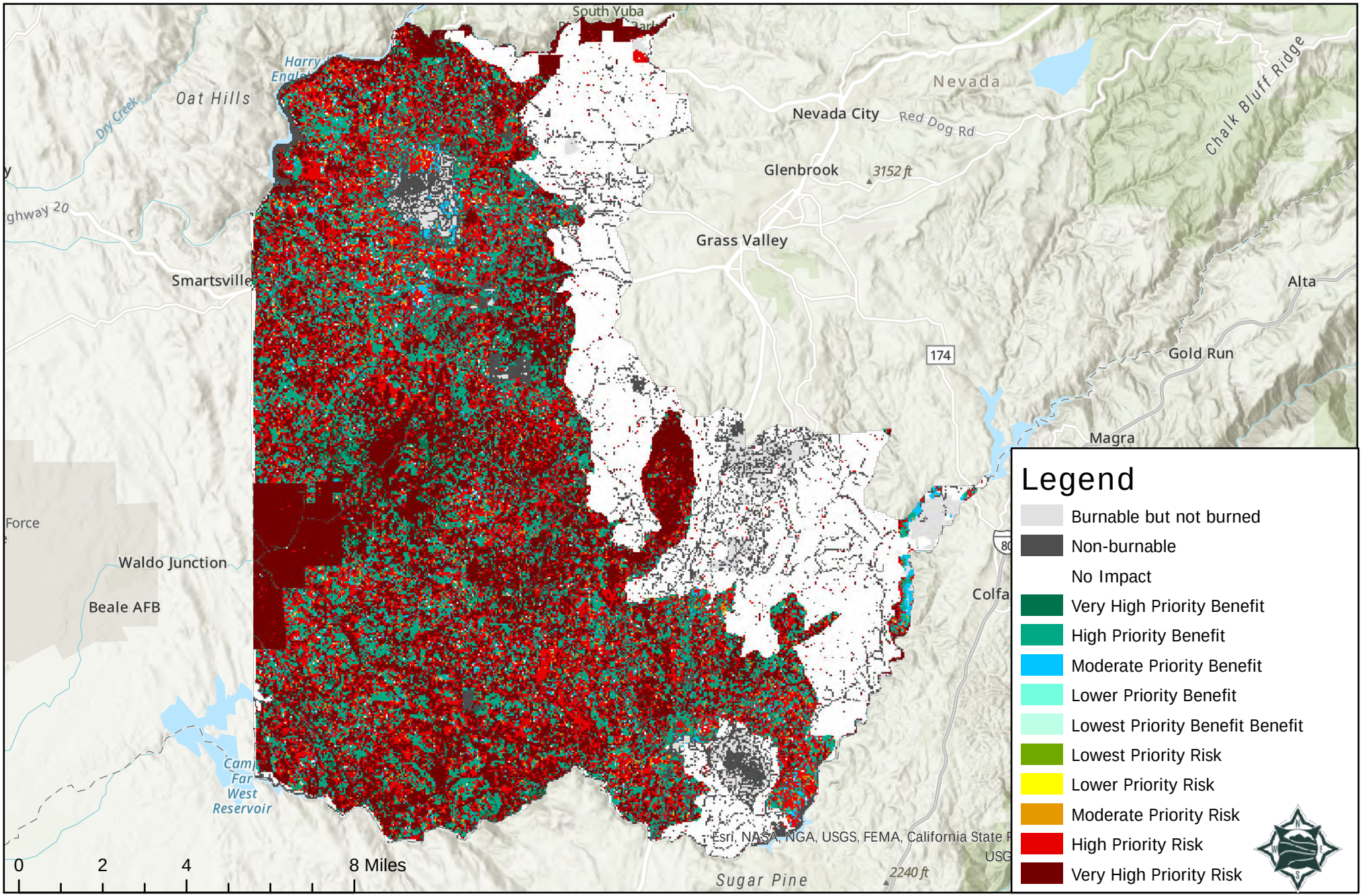
Higgins/Penn Valley Forecast Zone Wildfire Risk Assessment Results: Natural Resources, Wind-Driven Scenario



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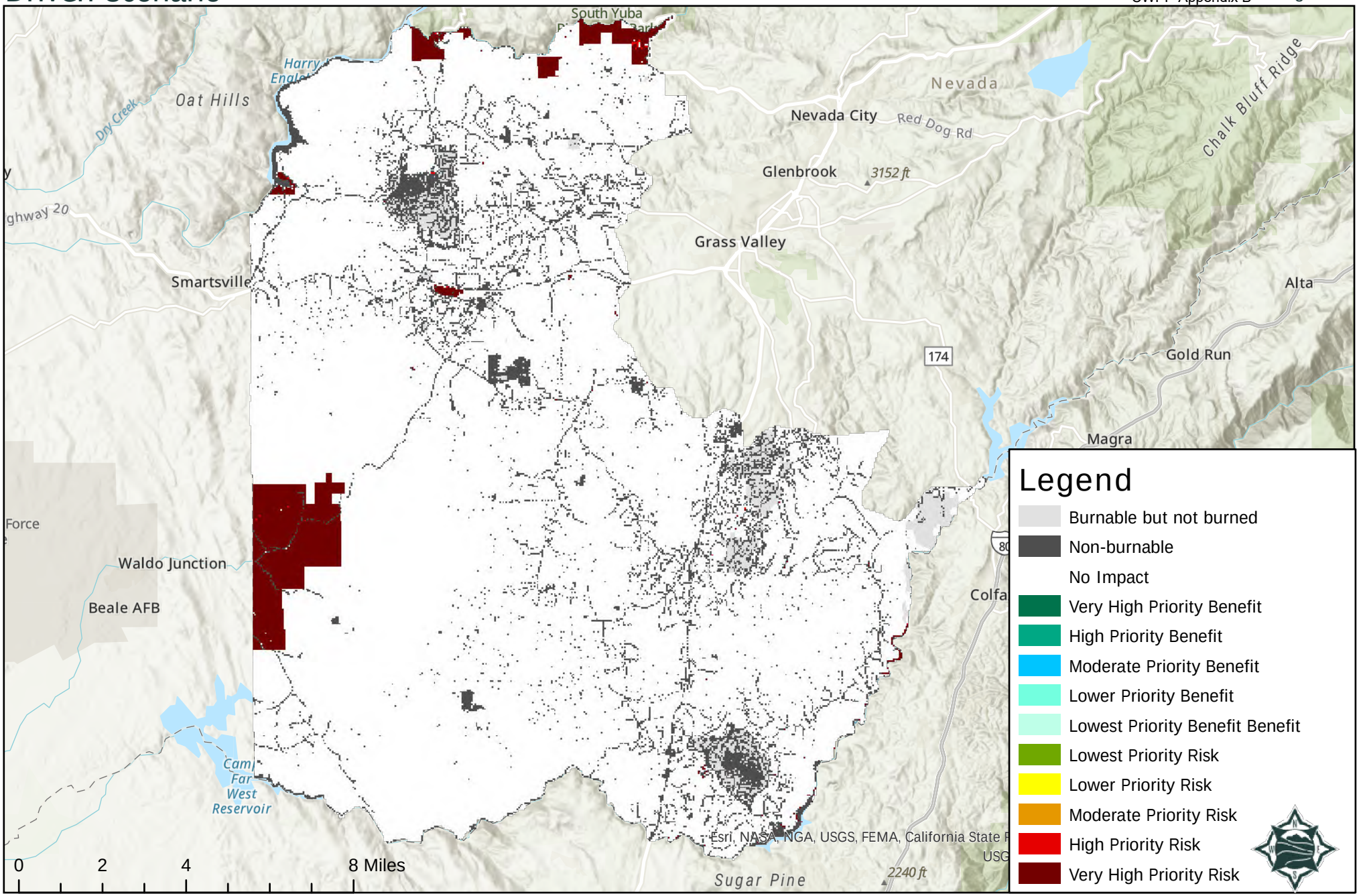
Higgins/Penn Valley Forecast Zone Wildfire Risk Assessment Results: Economic Resources, Fuel-Driven Scenario



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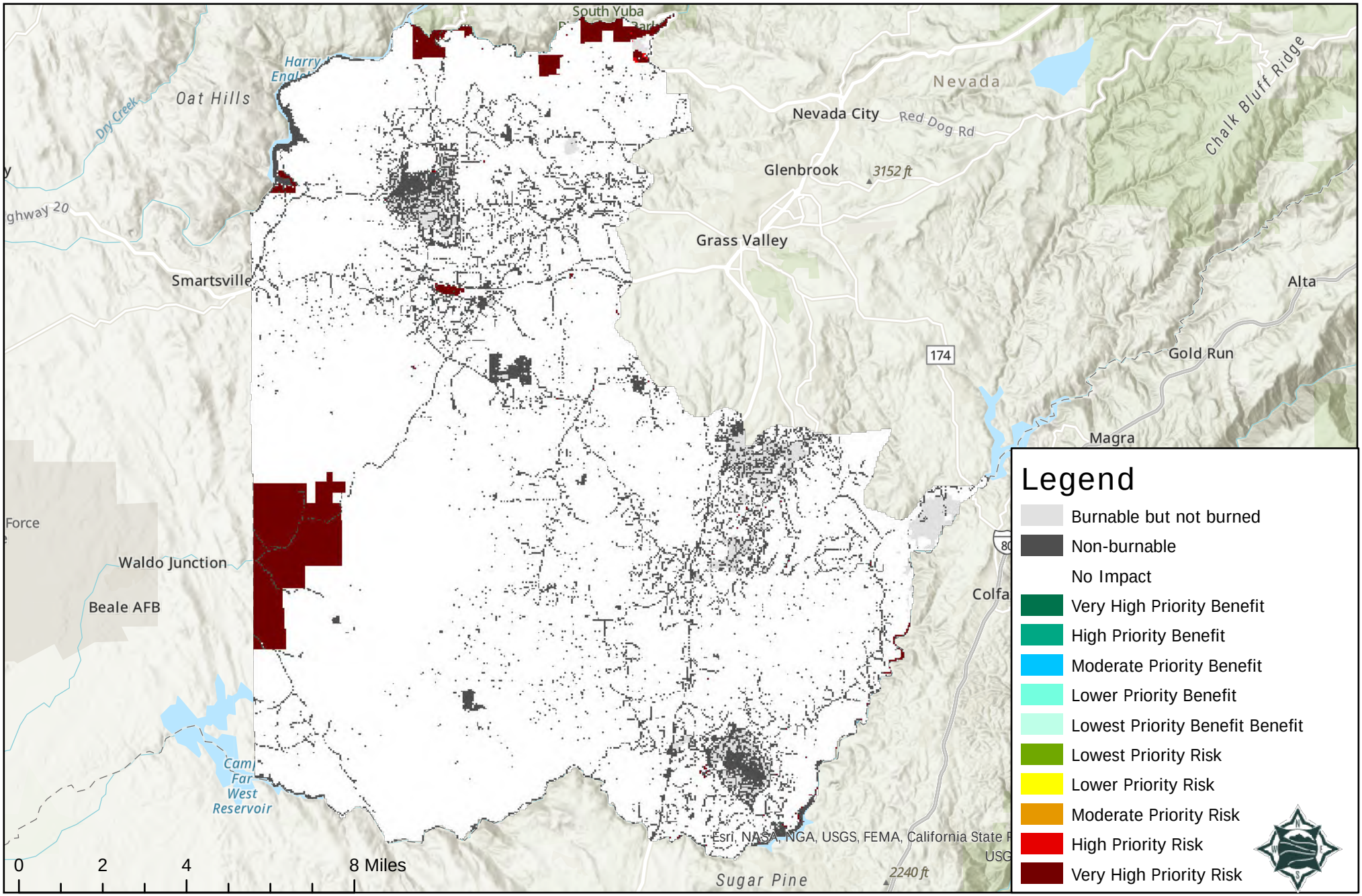
Higgins/Penn Valley Forecast Zone Wildfire Risk Assessment Results: Economic Resources, Wind-Driven Scenario

Figure 37



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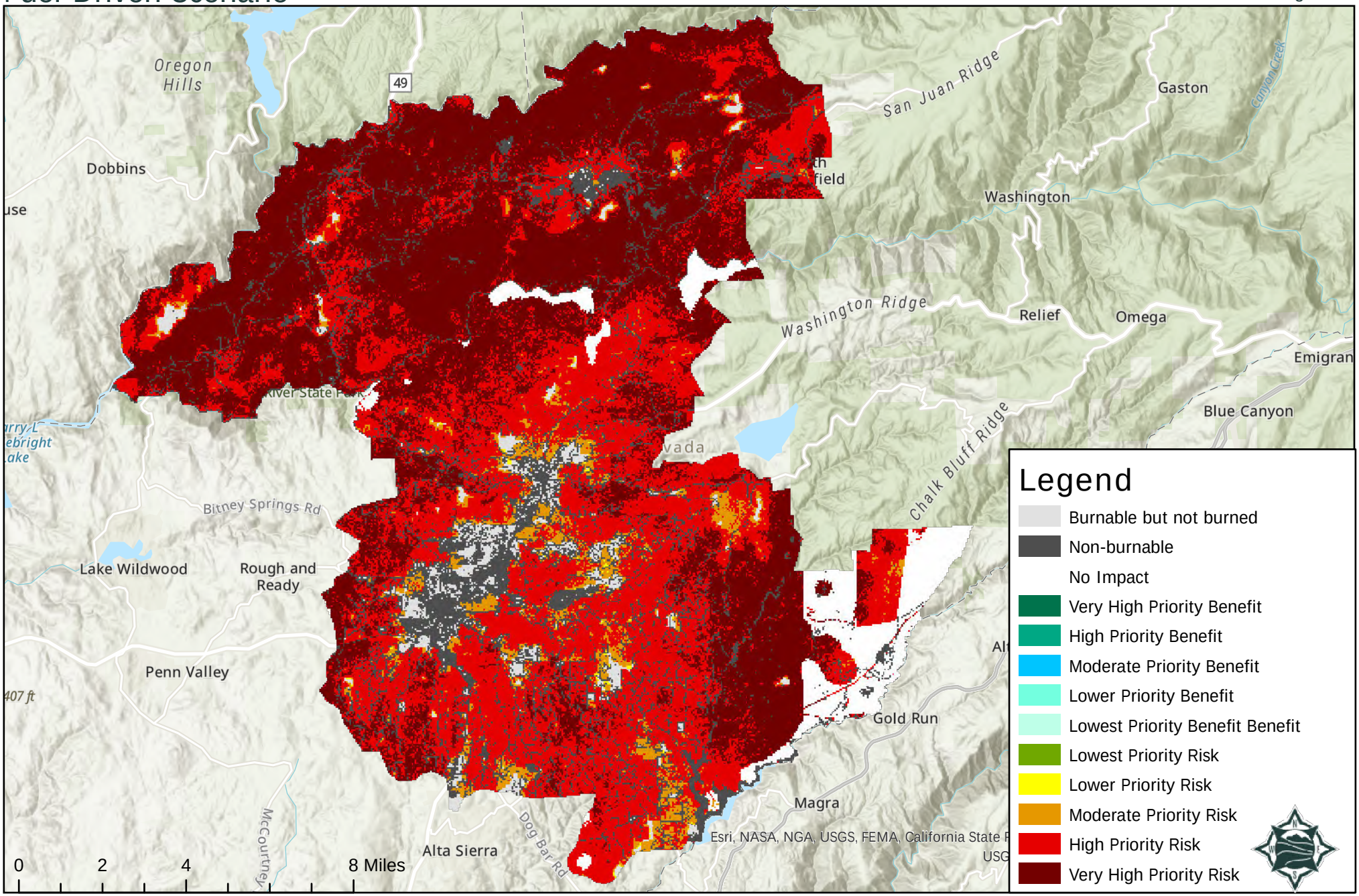
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Community Lifelines, Fuel-Driven Scenario



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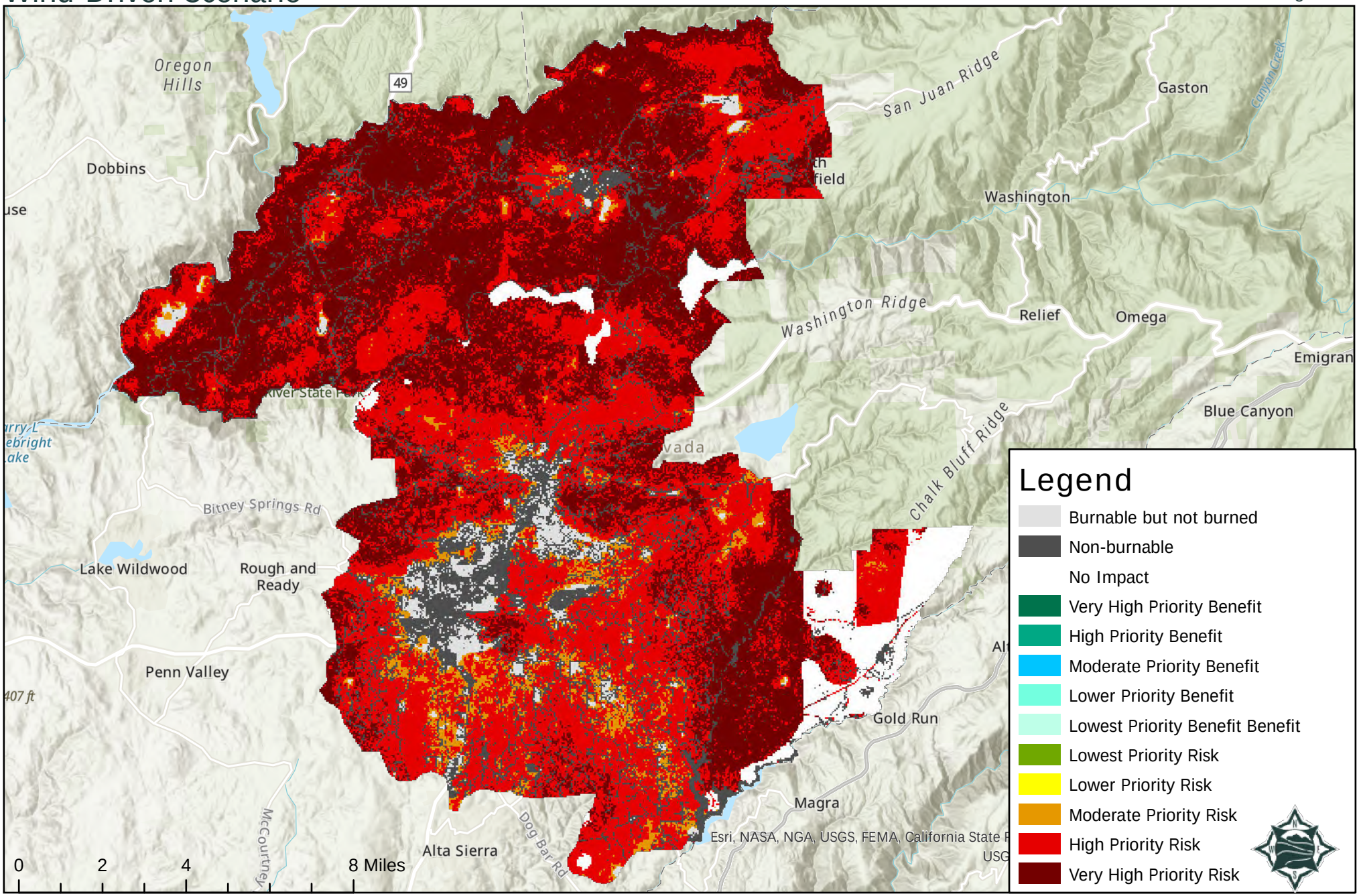
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Community Lifelines, Wind-Driven Scenario

CWPP Appendix B Figure 39



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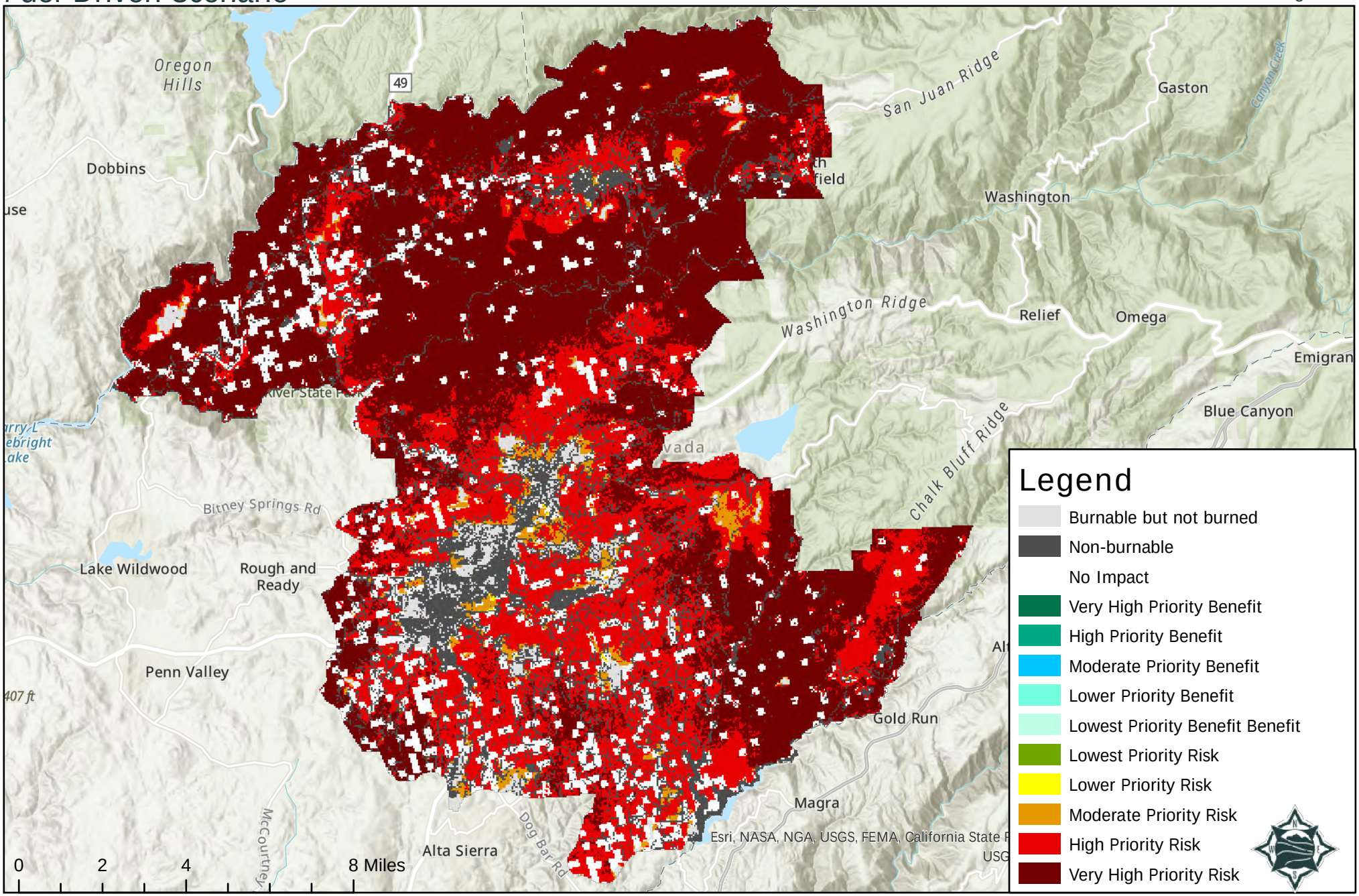
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Community Health, Fuel-Driven Scenario

CWPP Appendix B Figure 40



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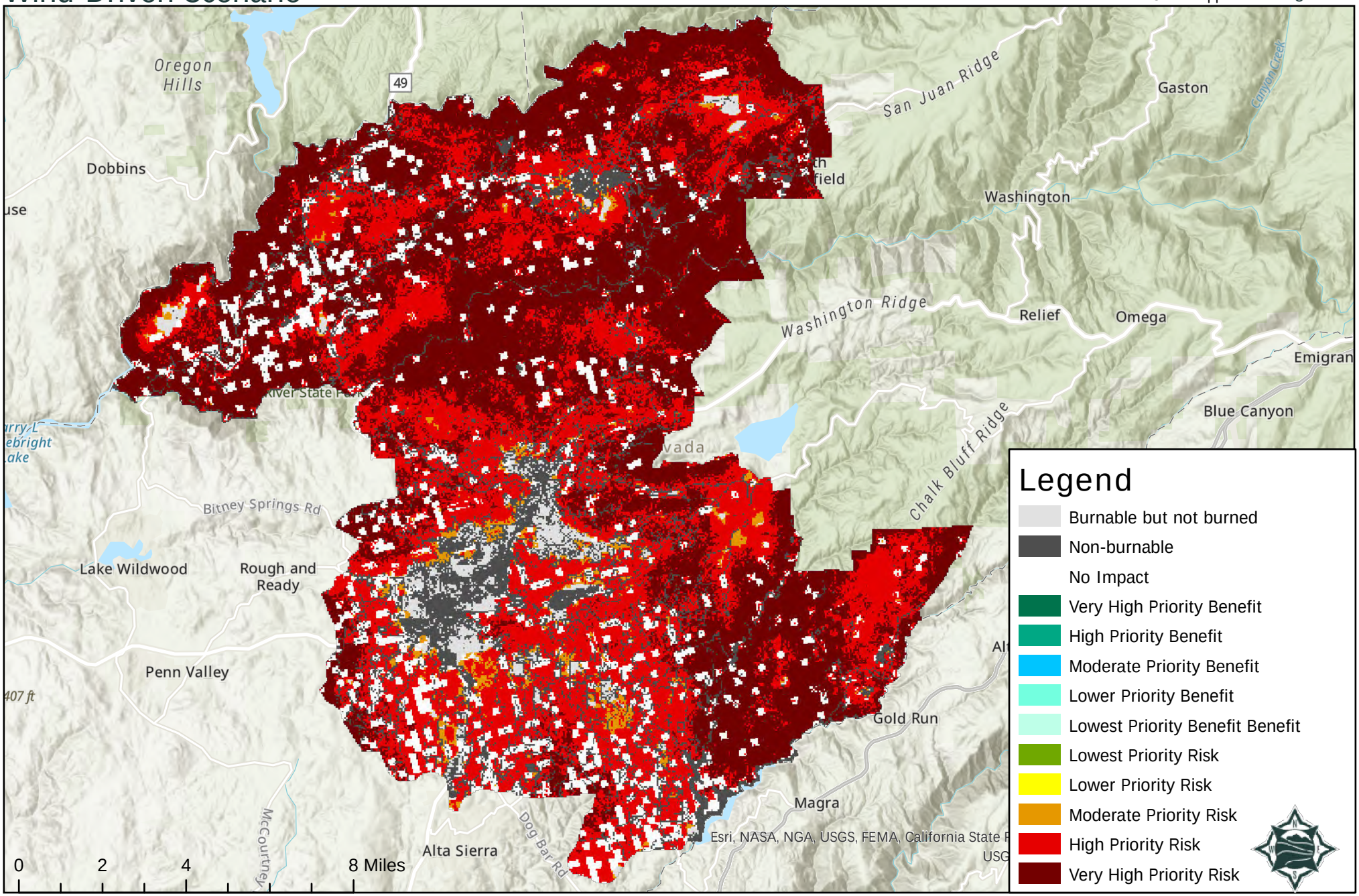
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Community Health, Wind-Driven Scenario

CWPP Appendix B Figure 41



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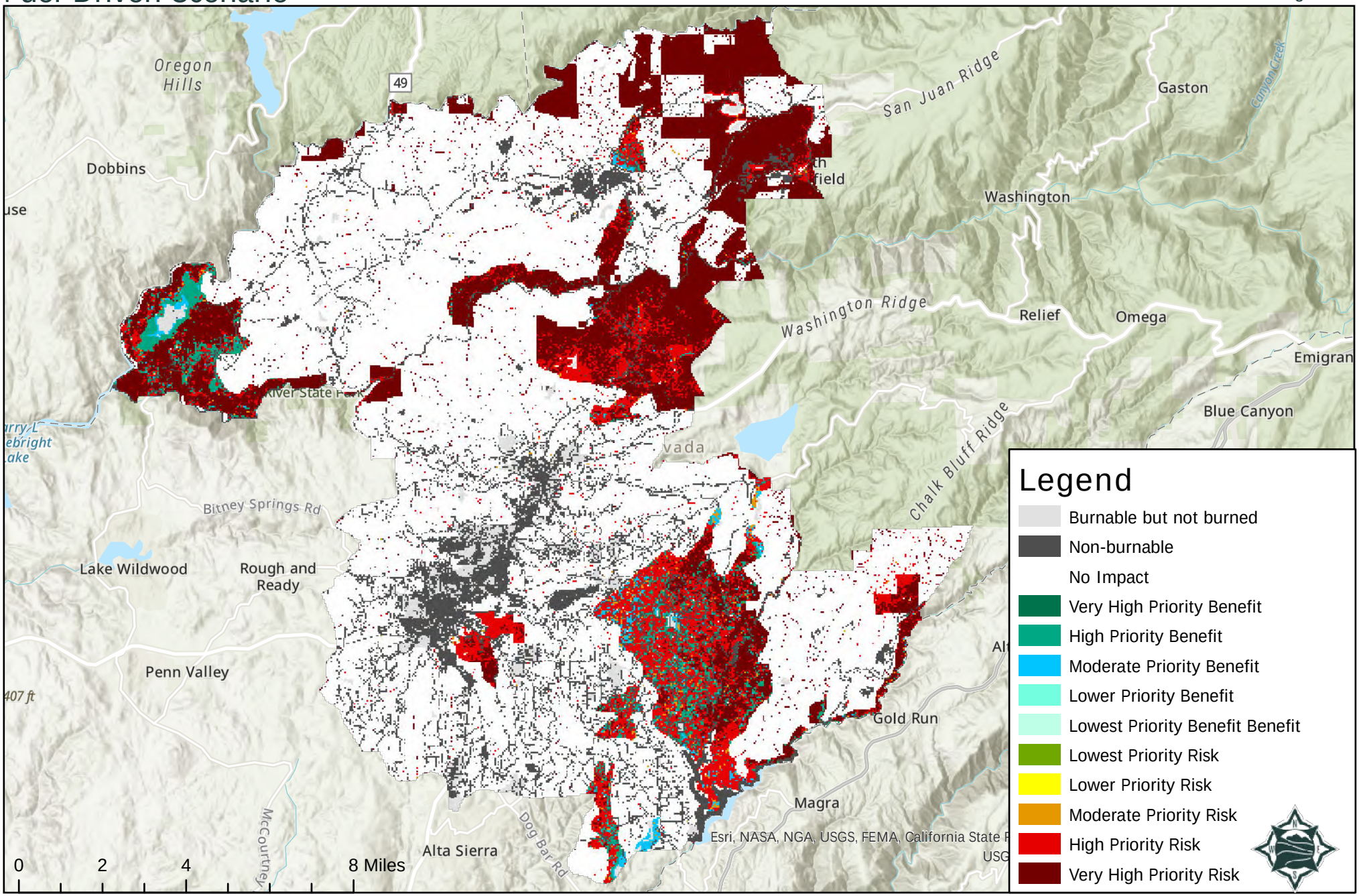
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Natural Resources, Fuel-Driven Scenario



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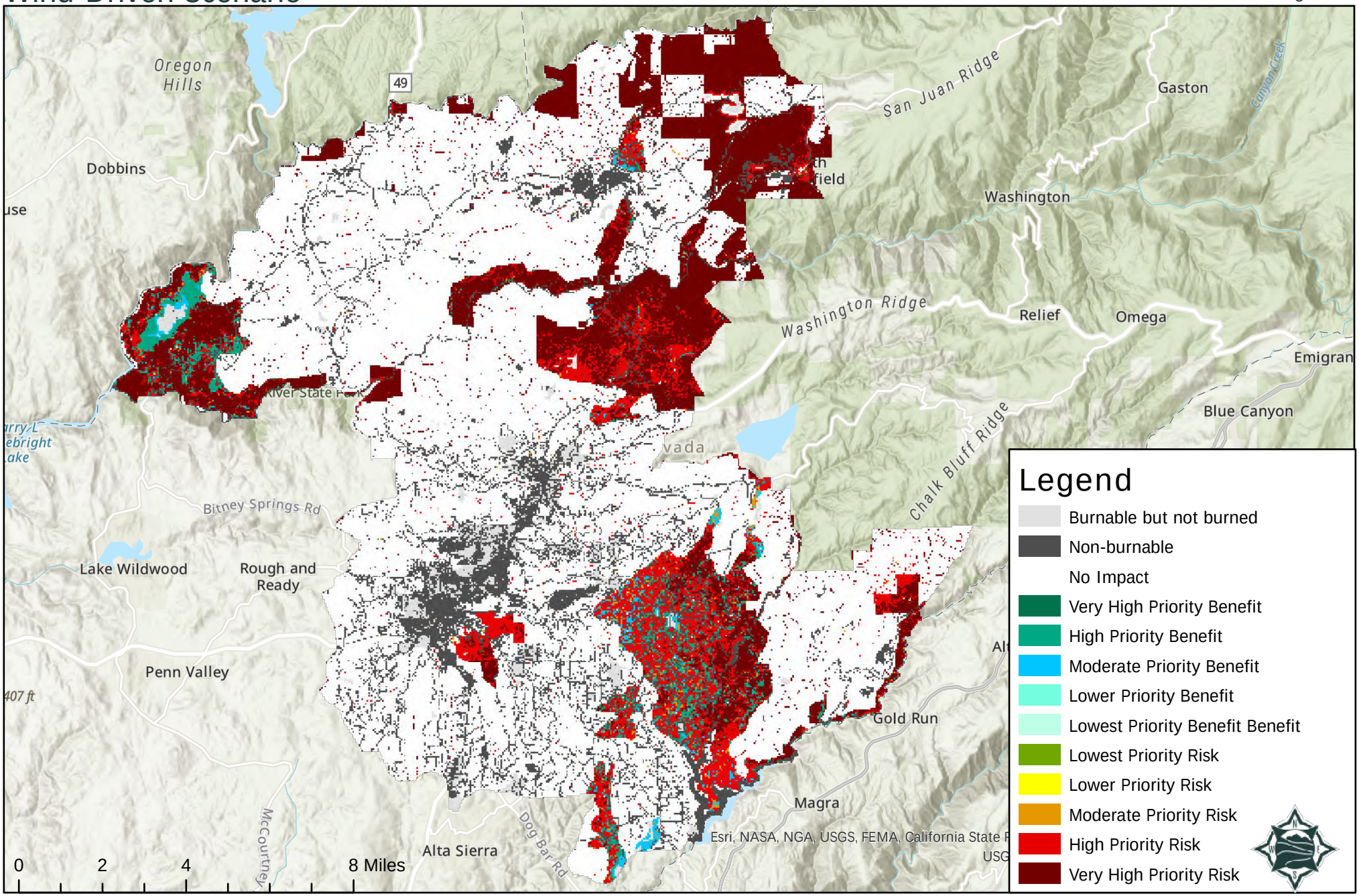
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Natural Resources, Wind-Driven Scenario

CWPP Appendix B Figure 43



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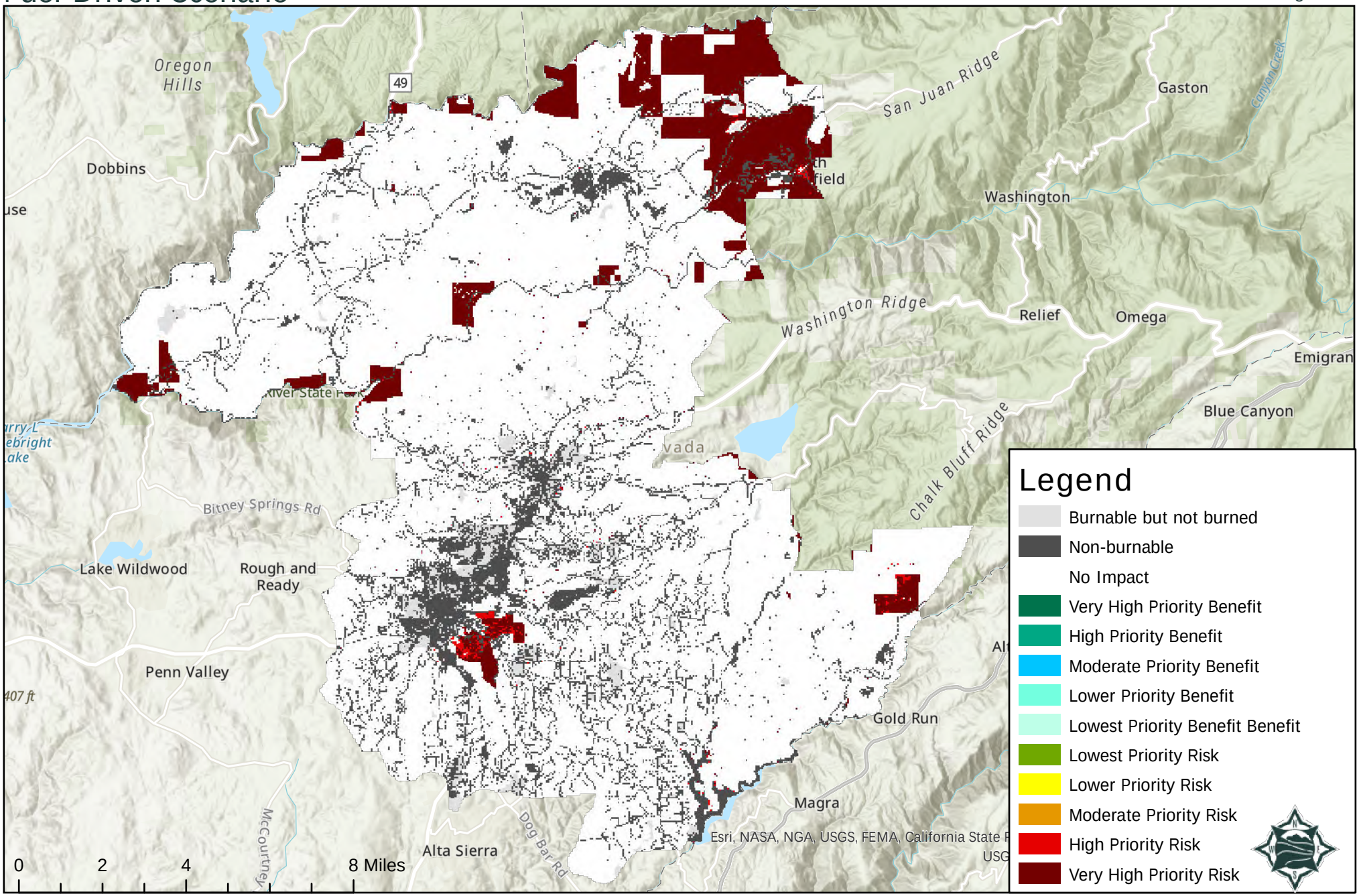
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Economic Resources, Fuel-Driven Scenario



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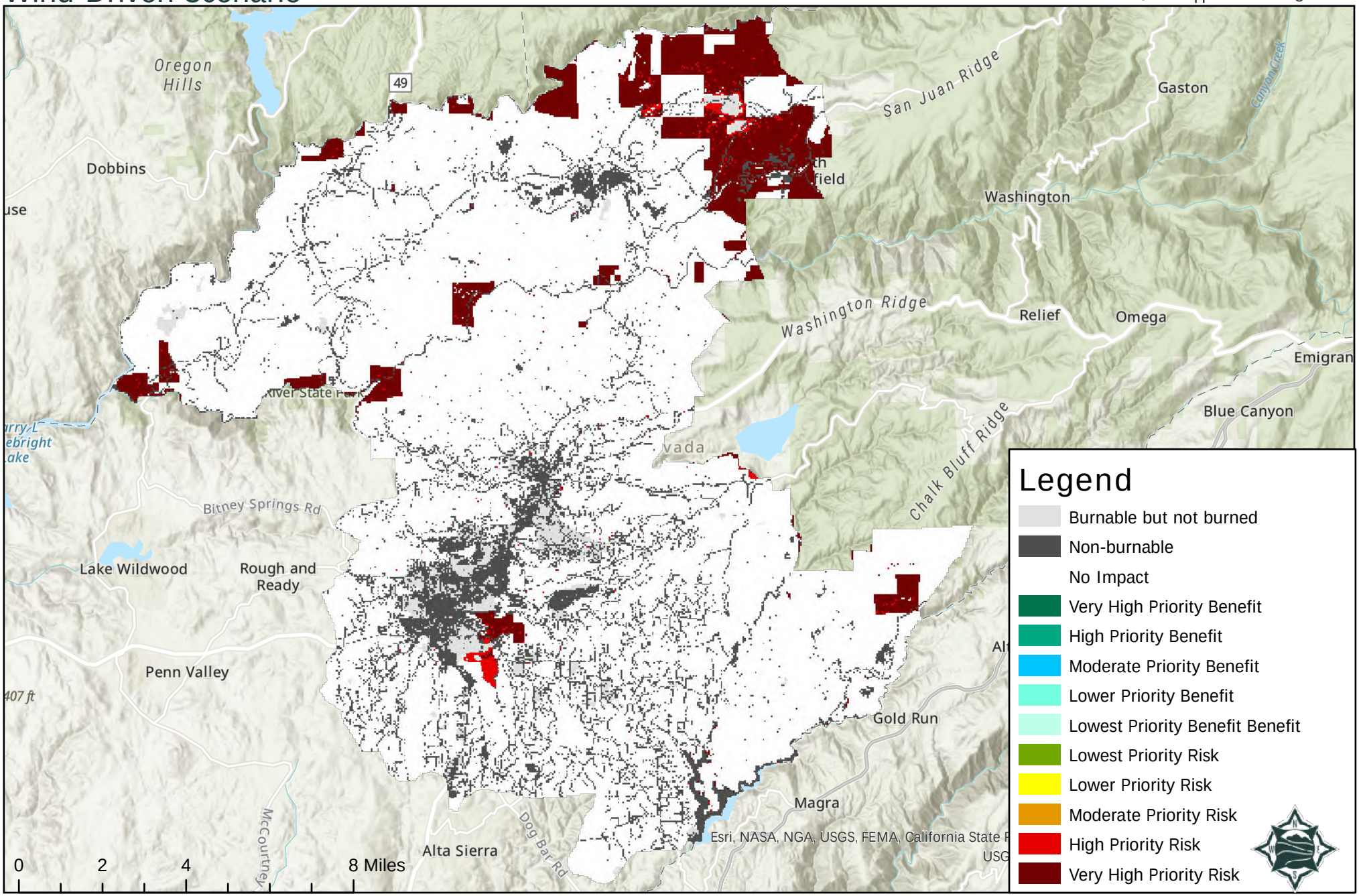
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Economic Resources, Wind-Driven Scenario

CWPP Appendix B Figure 45



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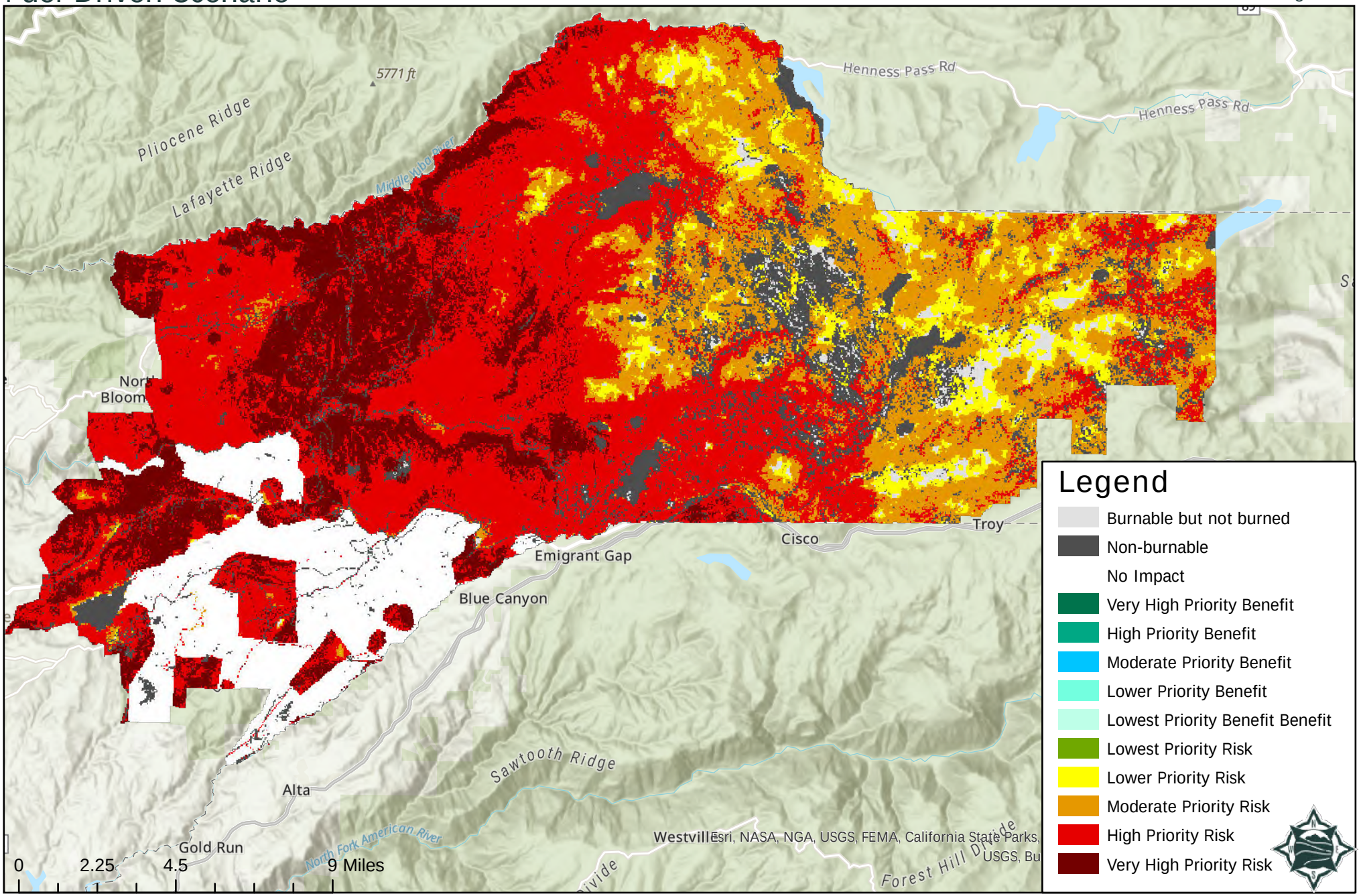
Tahoe National Forest Area Forecast Zone Wildfire Risk Assessment Results: Community Lifelines, Fuel-Driven Scenario

CWPP Appendix B

Figure 46



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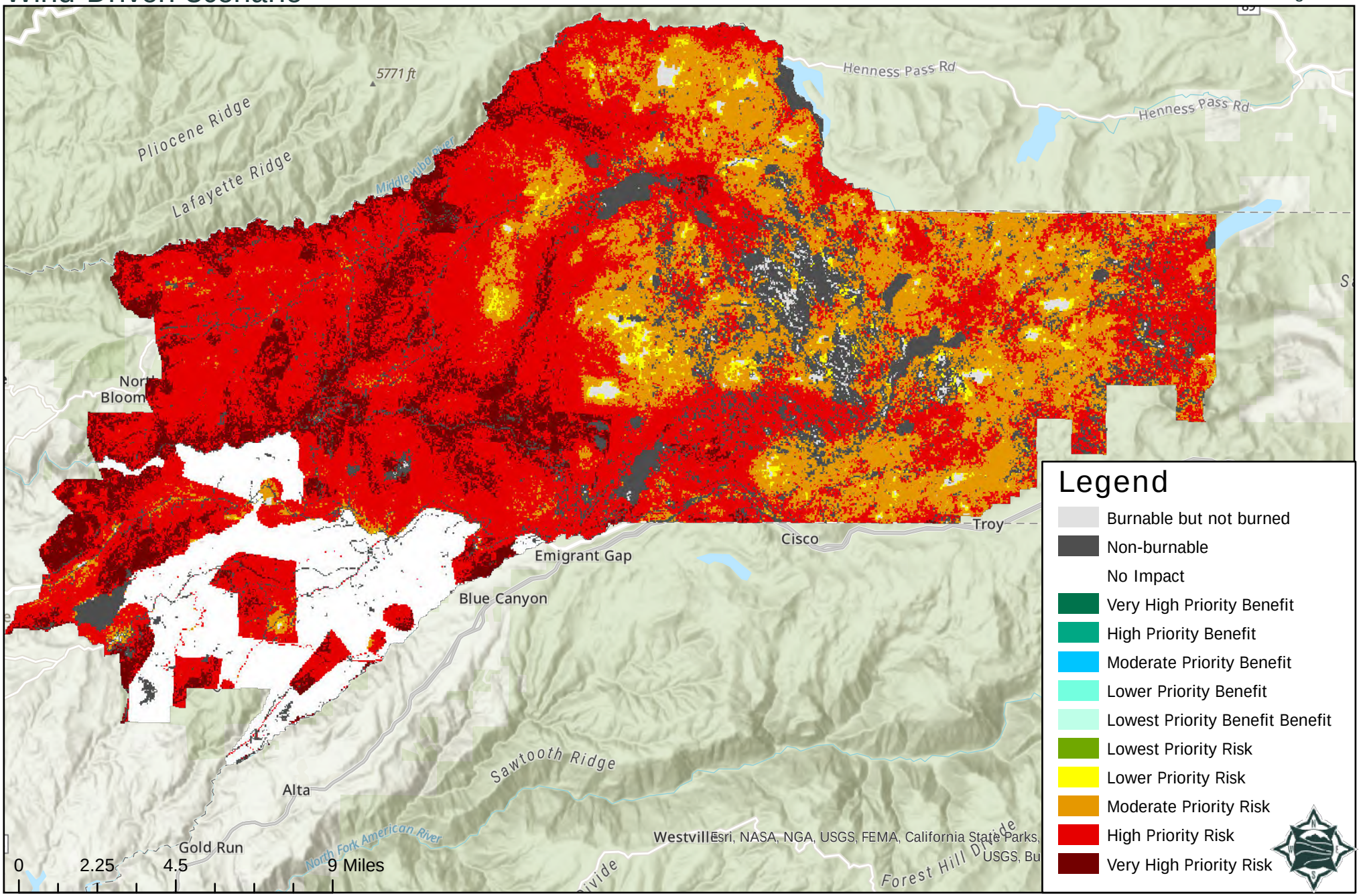
Tahoe National Forest Area Forecast Zone Wildfire Risk Assessment Results: Community Lifelines, Wind-Driven Scenario

CWPP Appendix B Figure 47



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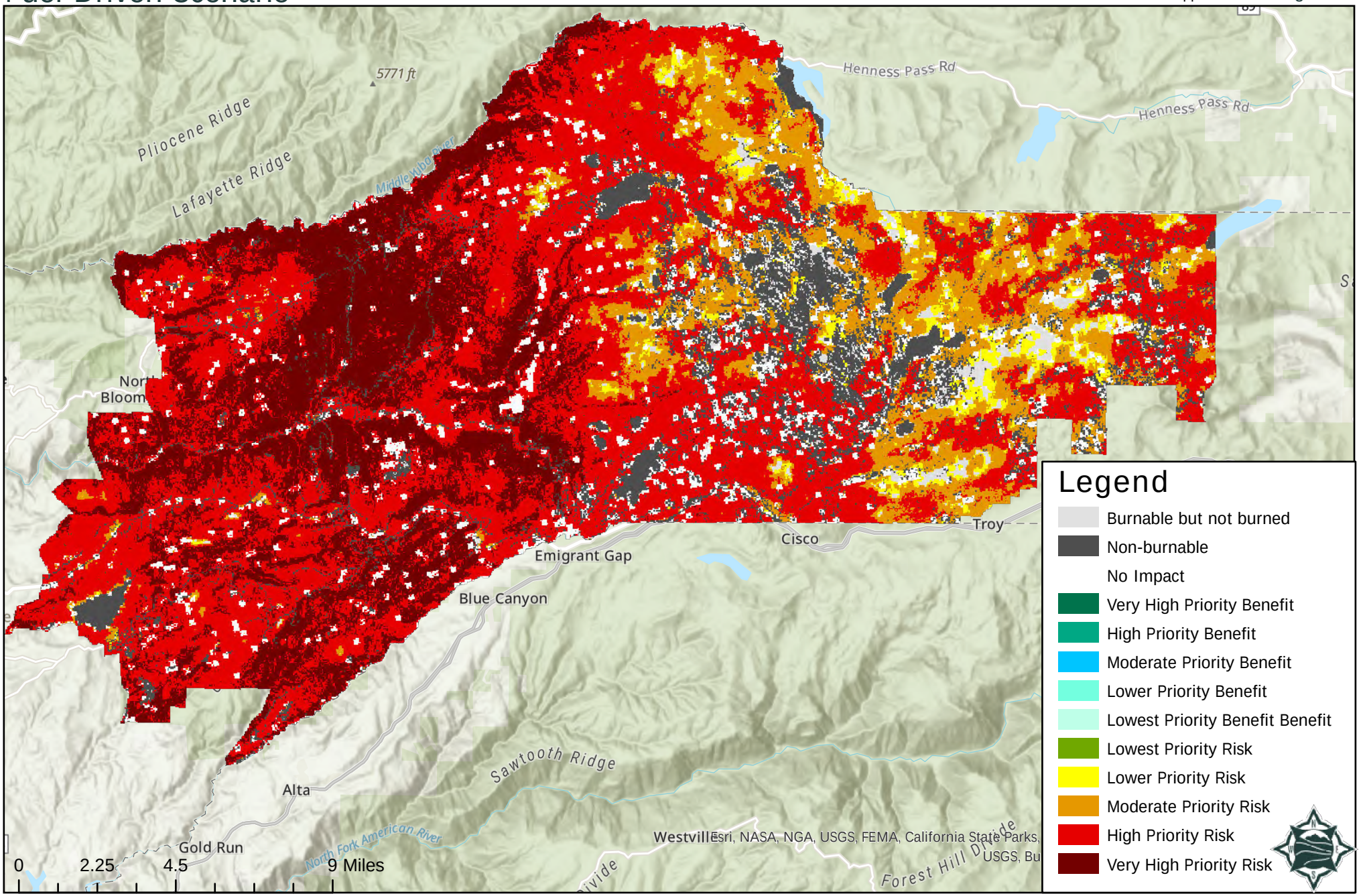
Tahoe National Forest Area Forecast Zone Wildfire Risk Assessment Results: Community Health, Fuel-Driven Scenario



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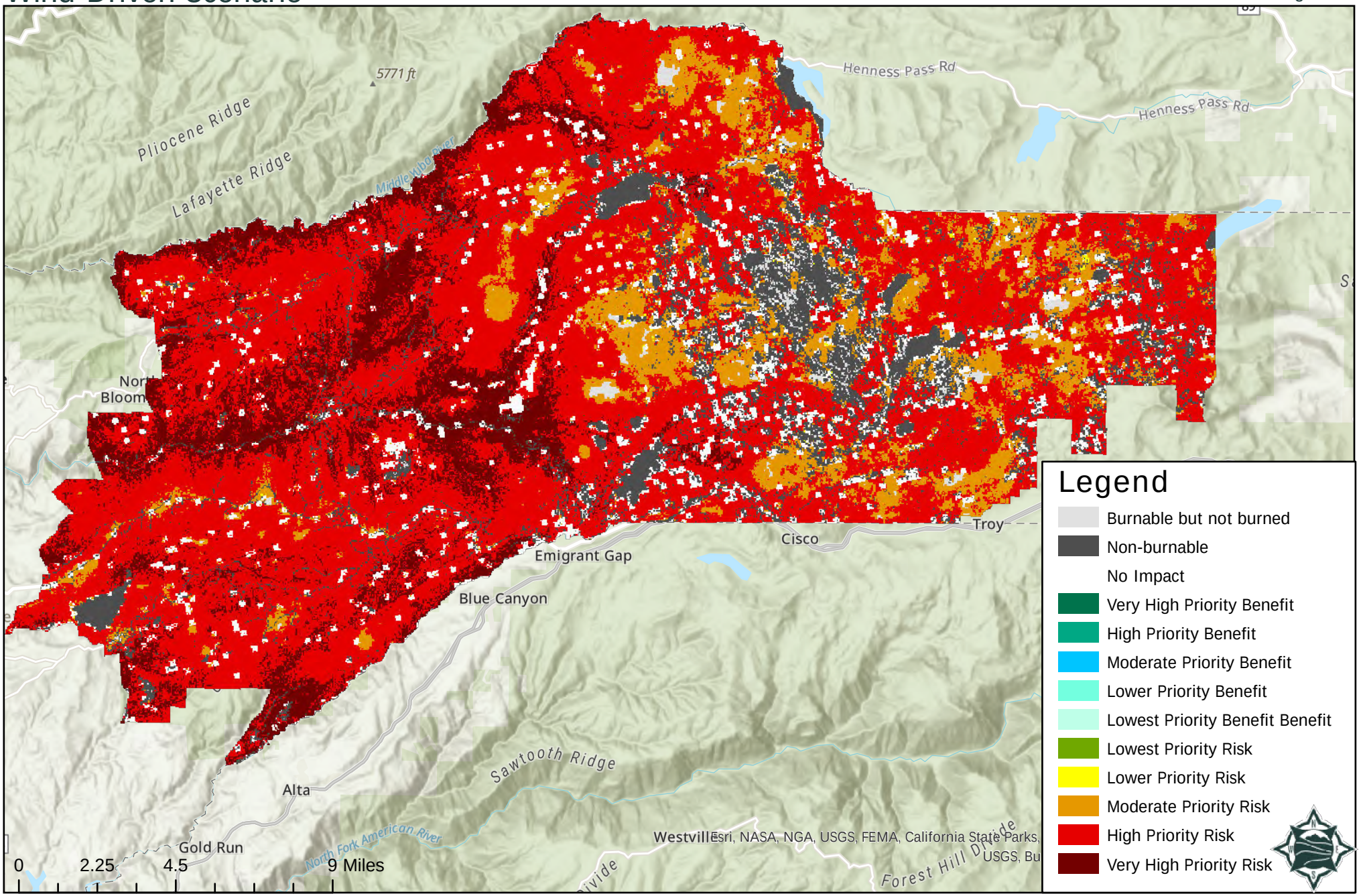
Tahoe National Forest Area Forecast Zone Wildfire Risk Assessment Results: Community Health, Wind-Driven Scenario

CWPP Appendix B Figure 49



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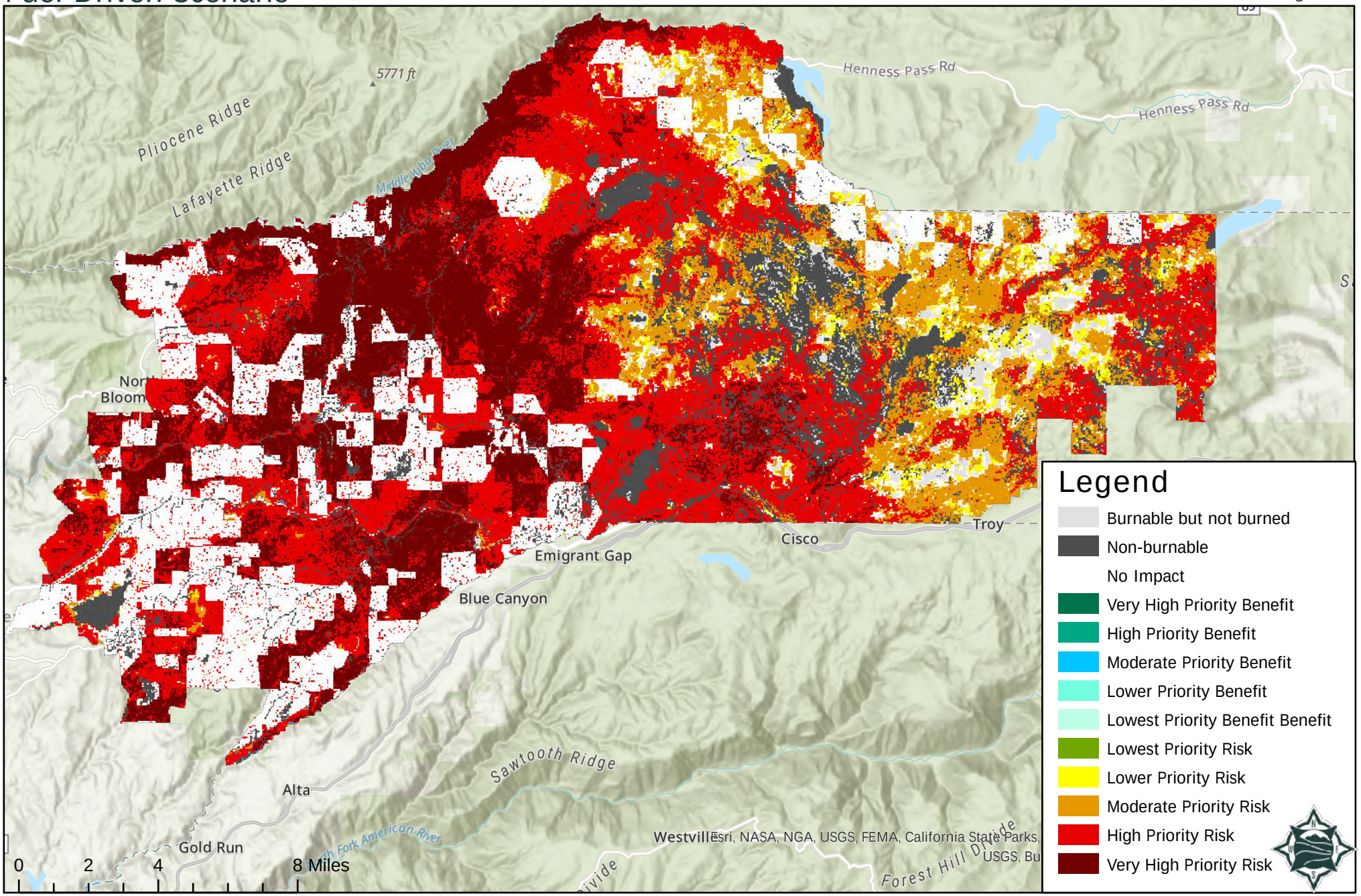
Tahoe National Forest Area Forecast Zone Wildfire Risk Assessment Results: Natural Resources, Fuel-Driven Scenario



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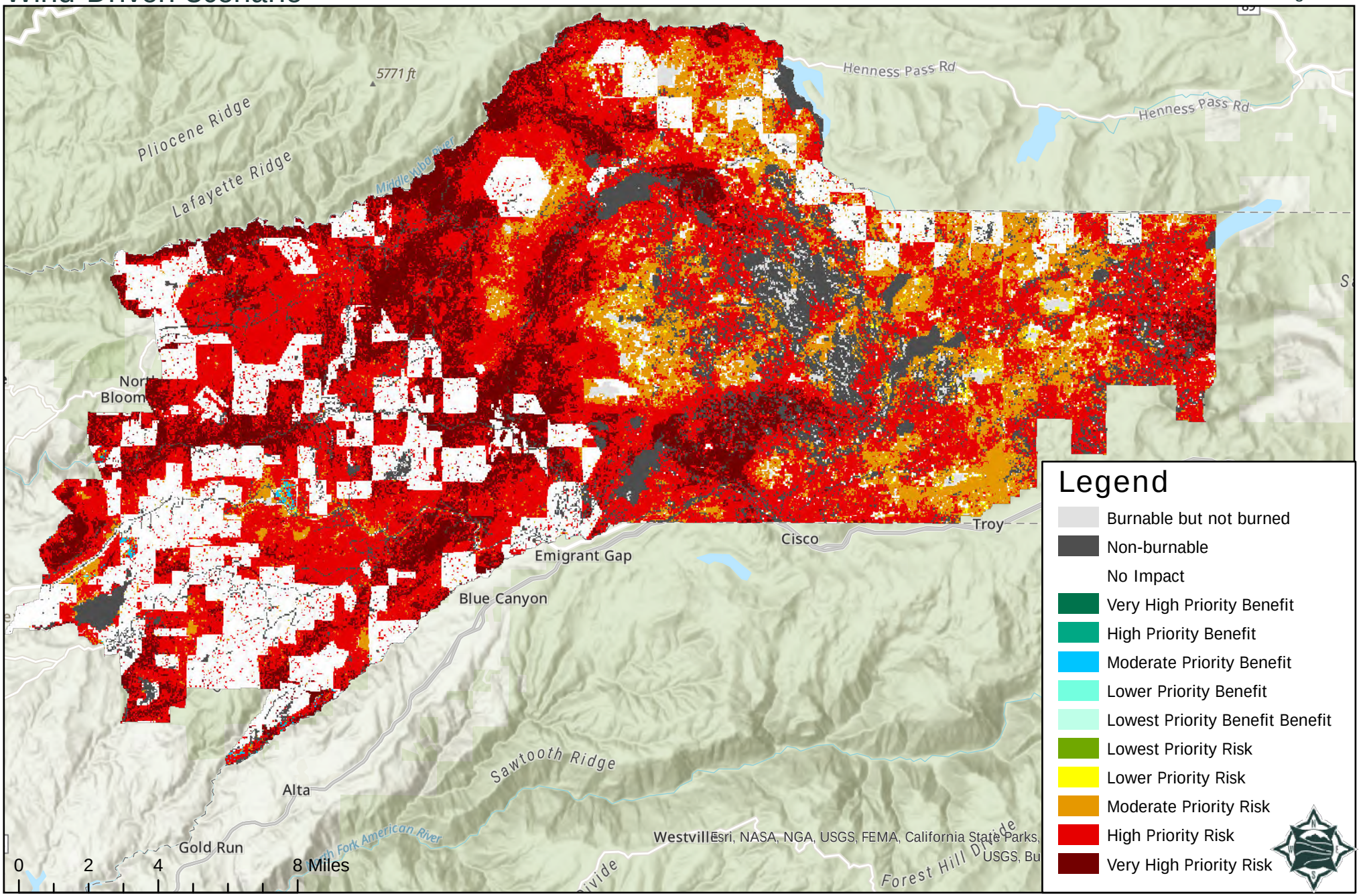
Tahoe National Forest Area Forecast Zone Wildfire Risk Assessment Results: Natural Resources, Wind-Driven Scenario

CWPP Appendix B

Figure 51



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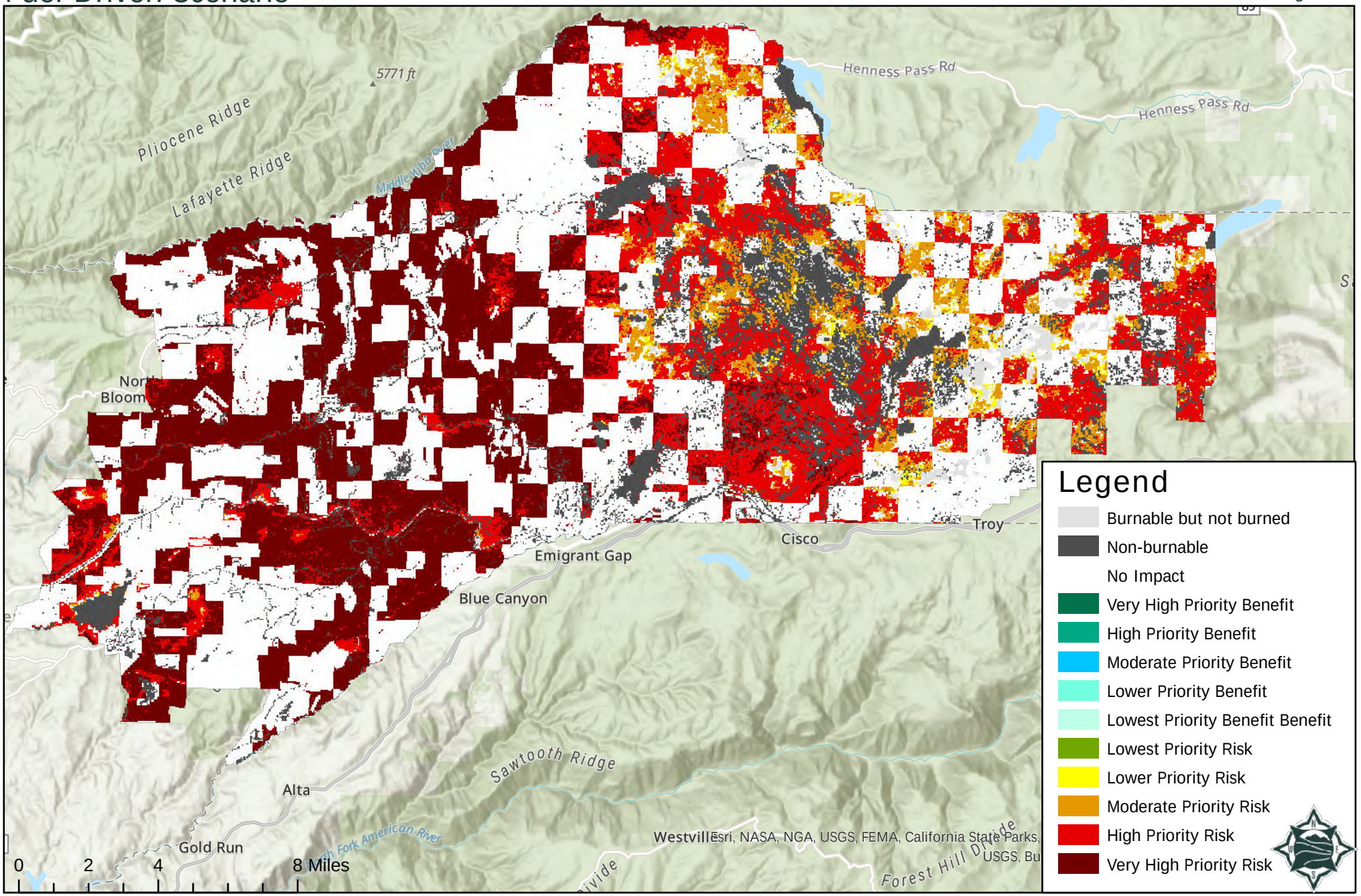
Tahoe National Forest Area Forecast Zone Wildfire Risk Assessment Results: Economic Resources, Fuel-Driven Scenario



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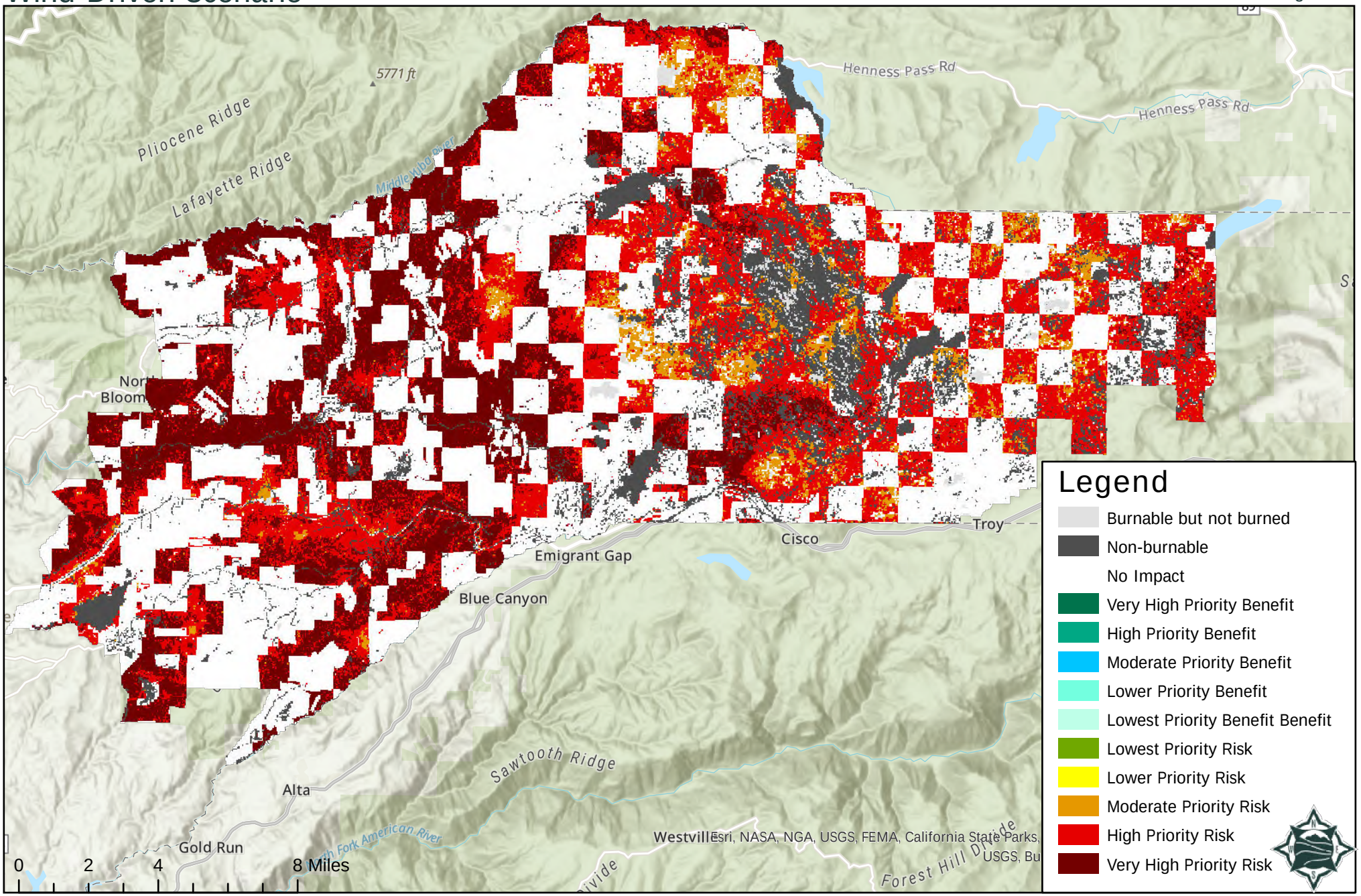
Tahoe National Forest Area Forecast Zone Wildfire Risk Assessment Results: Economic Resources, Wind-Driven Scenario



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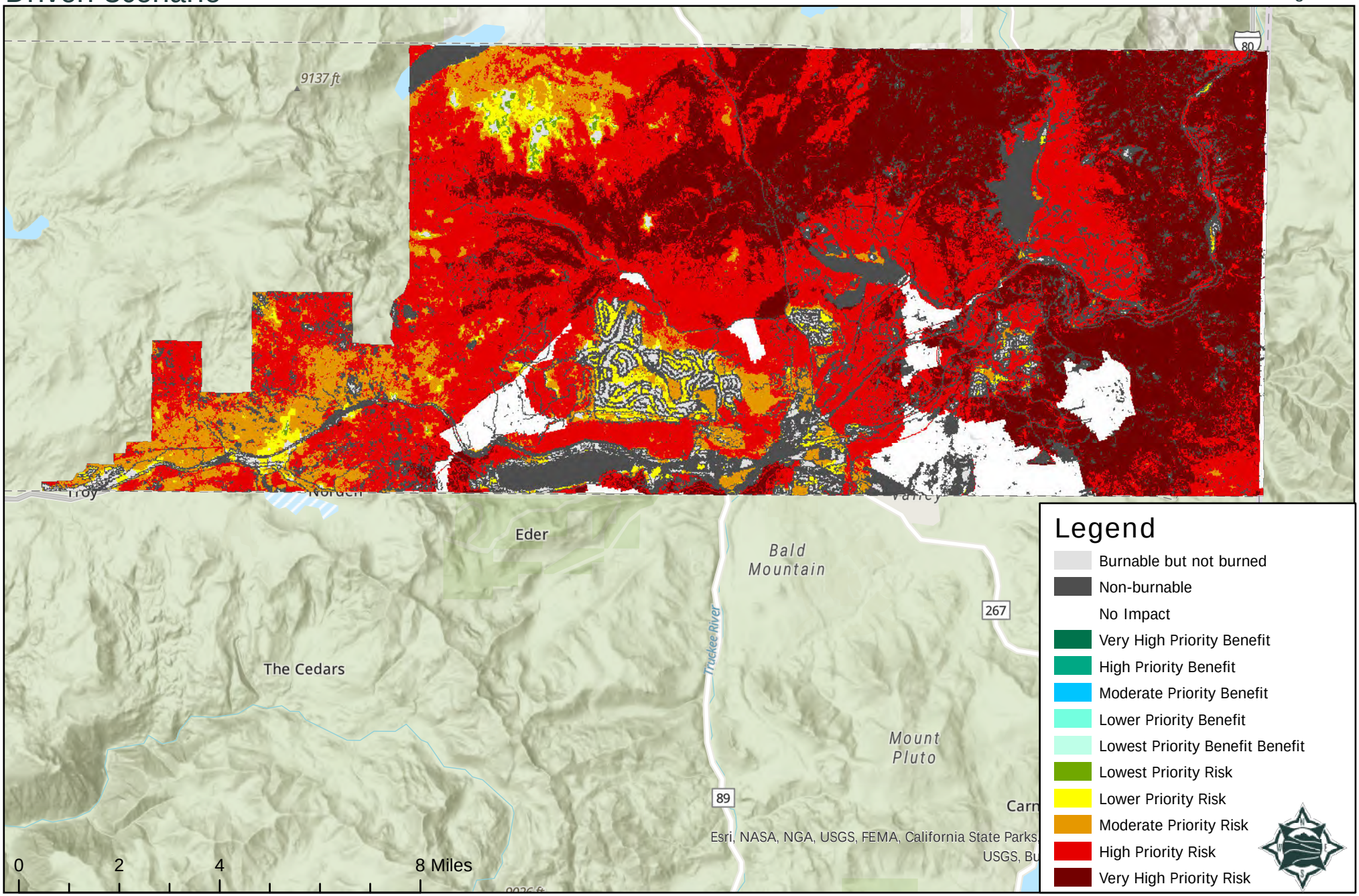
Truckee/Donner Forecast Zone Wildfire Risk Assessment Results: Community Lifelines, Fuel-Driven Scenario

CWPP Appendix B

Figure 54



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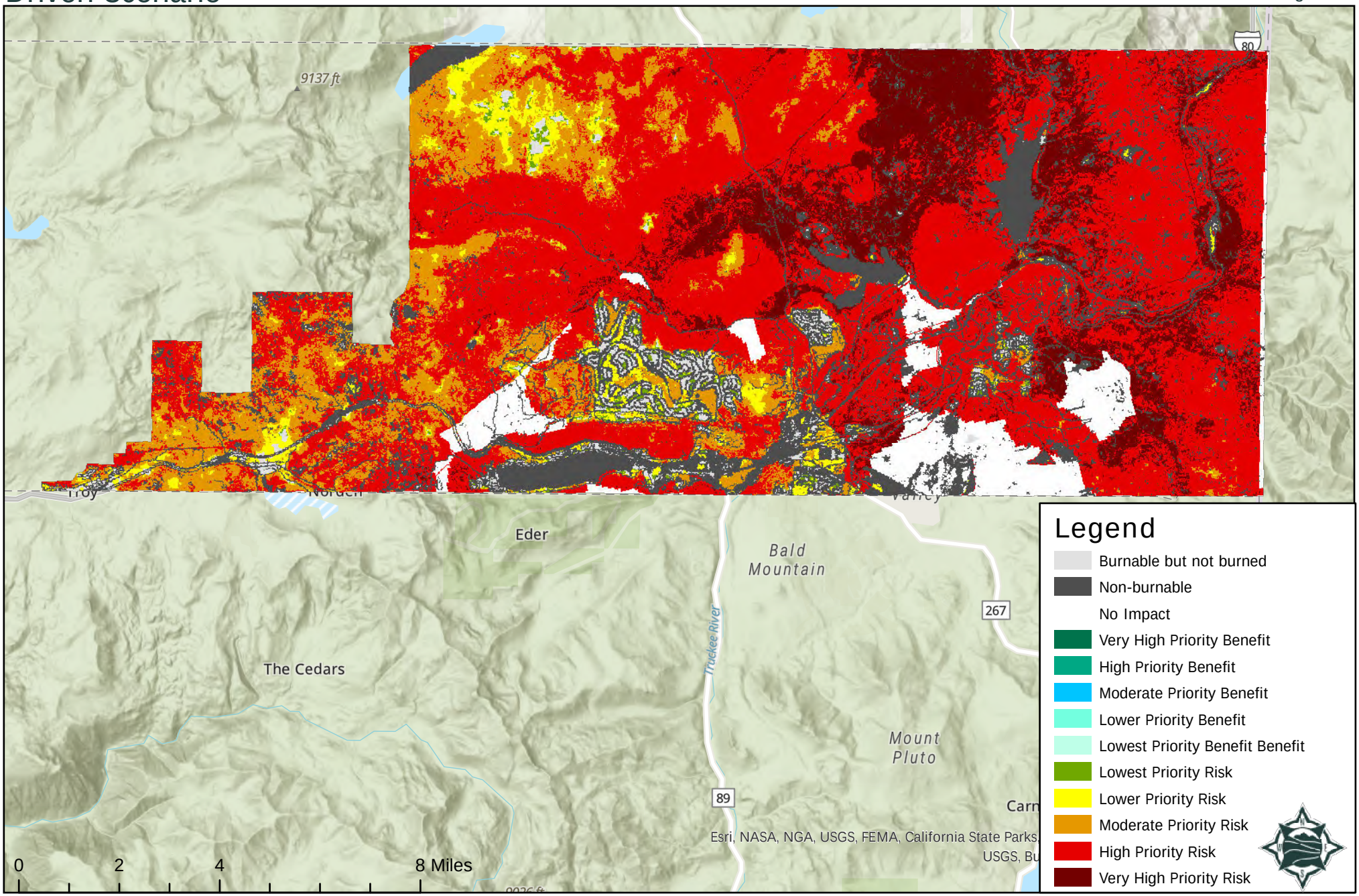
Truckee/Donner Forecast Zone Wildfire Risk Assessment Results: Community Lifelines, Wind-Driven Scenario

CWPP Appendix B

Figure 55



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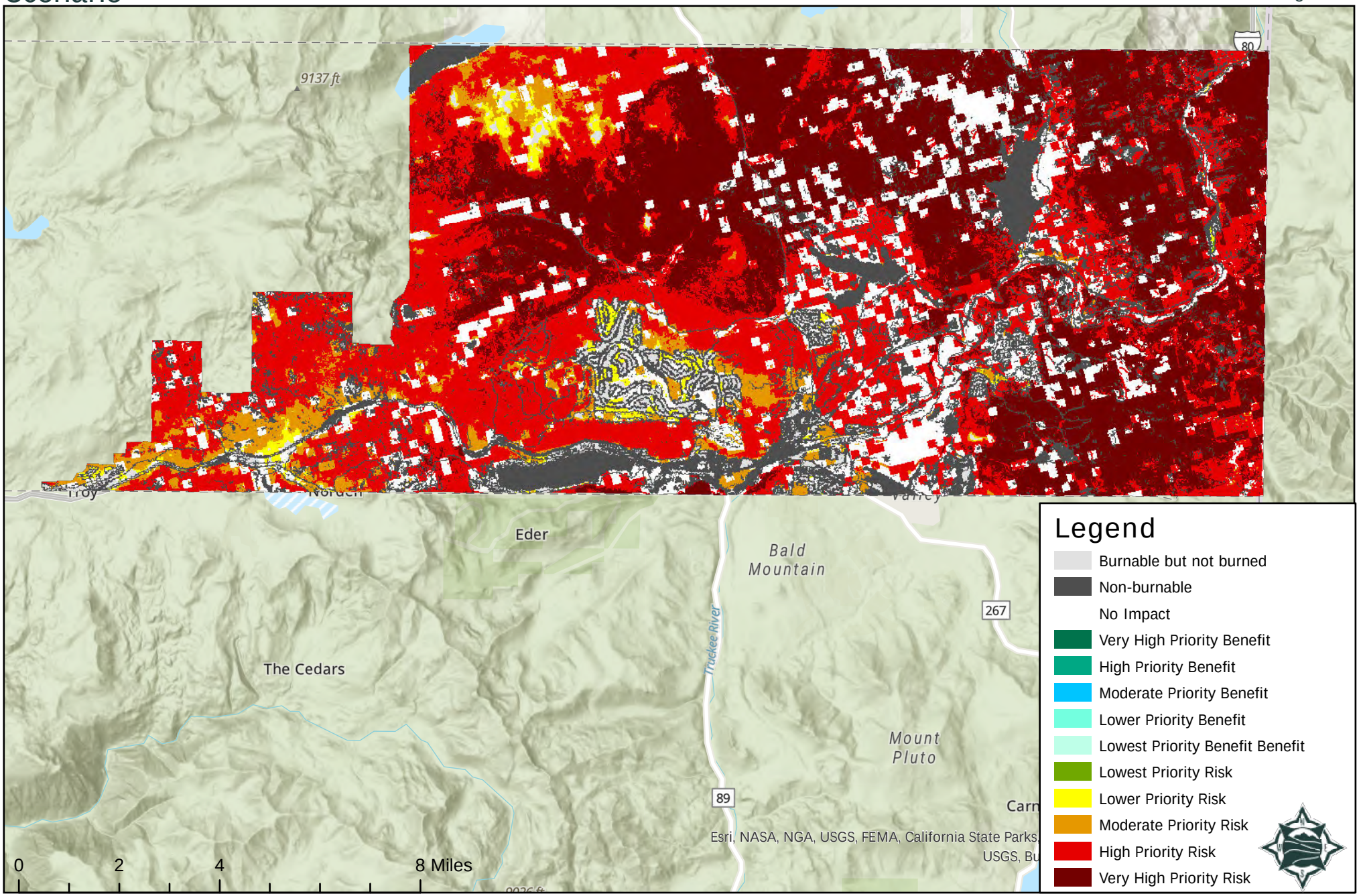
Truckee/Donner Forecast Zone Wildfire Risk Assessment Results: Community Health, Fuel-Driven Scenario

CWPP Appendix B Figure 56



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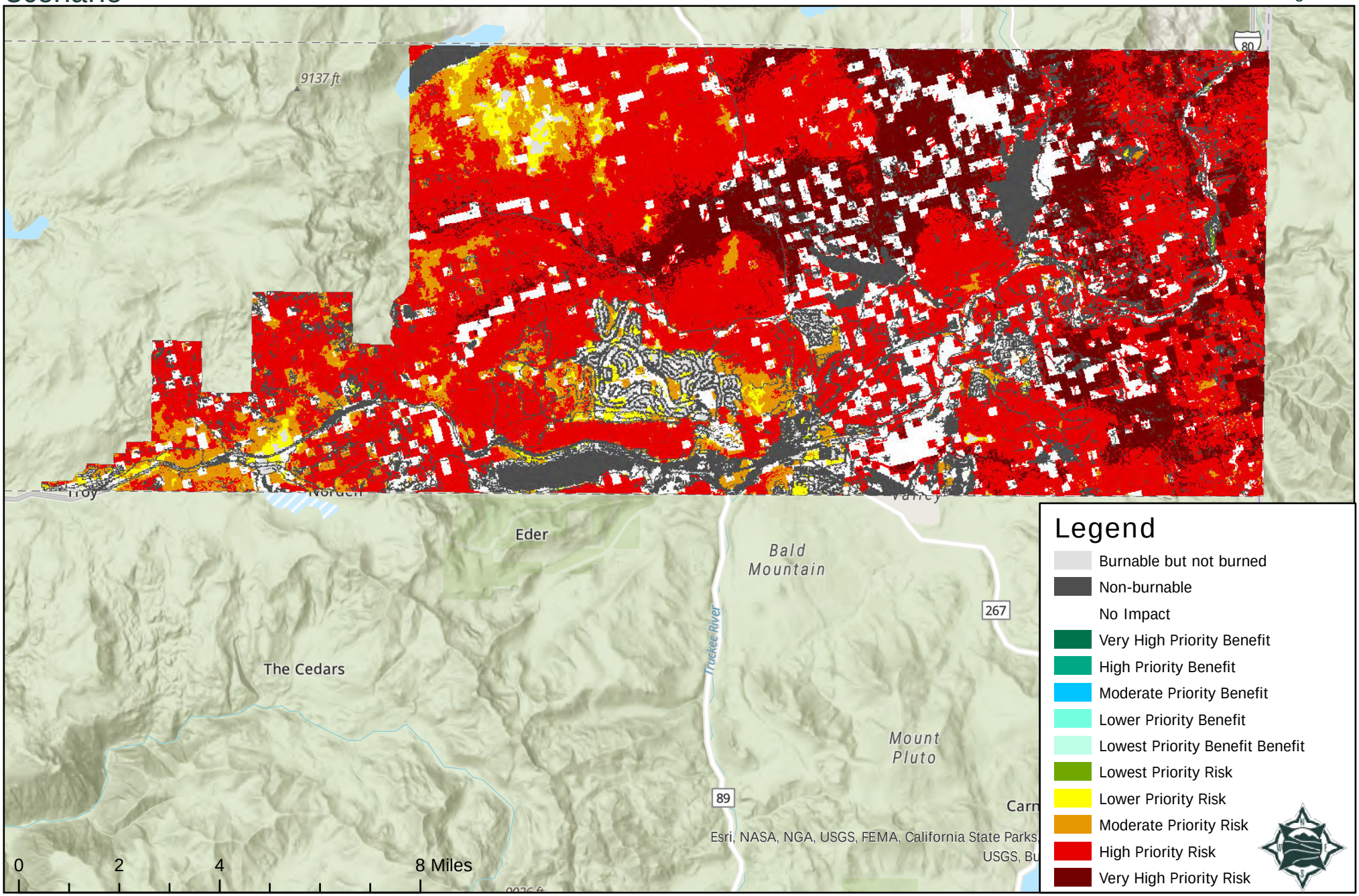
Truckee/Donner Forecast Zone Wildfire Risk Assessment Results: Community Health, Wind-Driven Scenario



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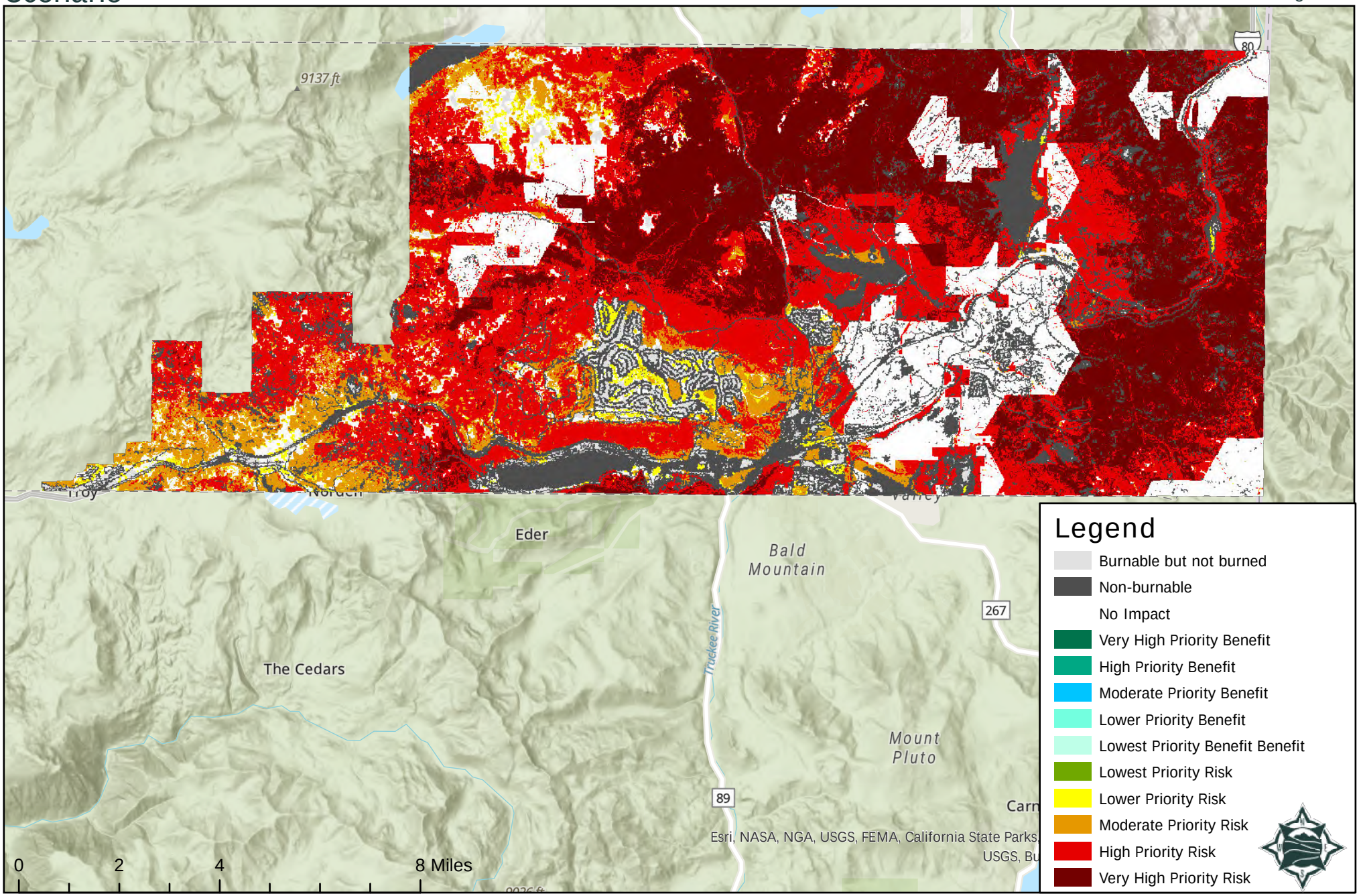
Truckee/Donner Forecast Zone Wildfire Risk Assessment Results: Natural Resources, Fuel-Driven Scenario

CWPP Appendix B

Figure 58



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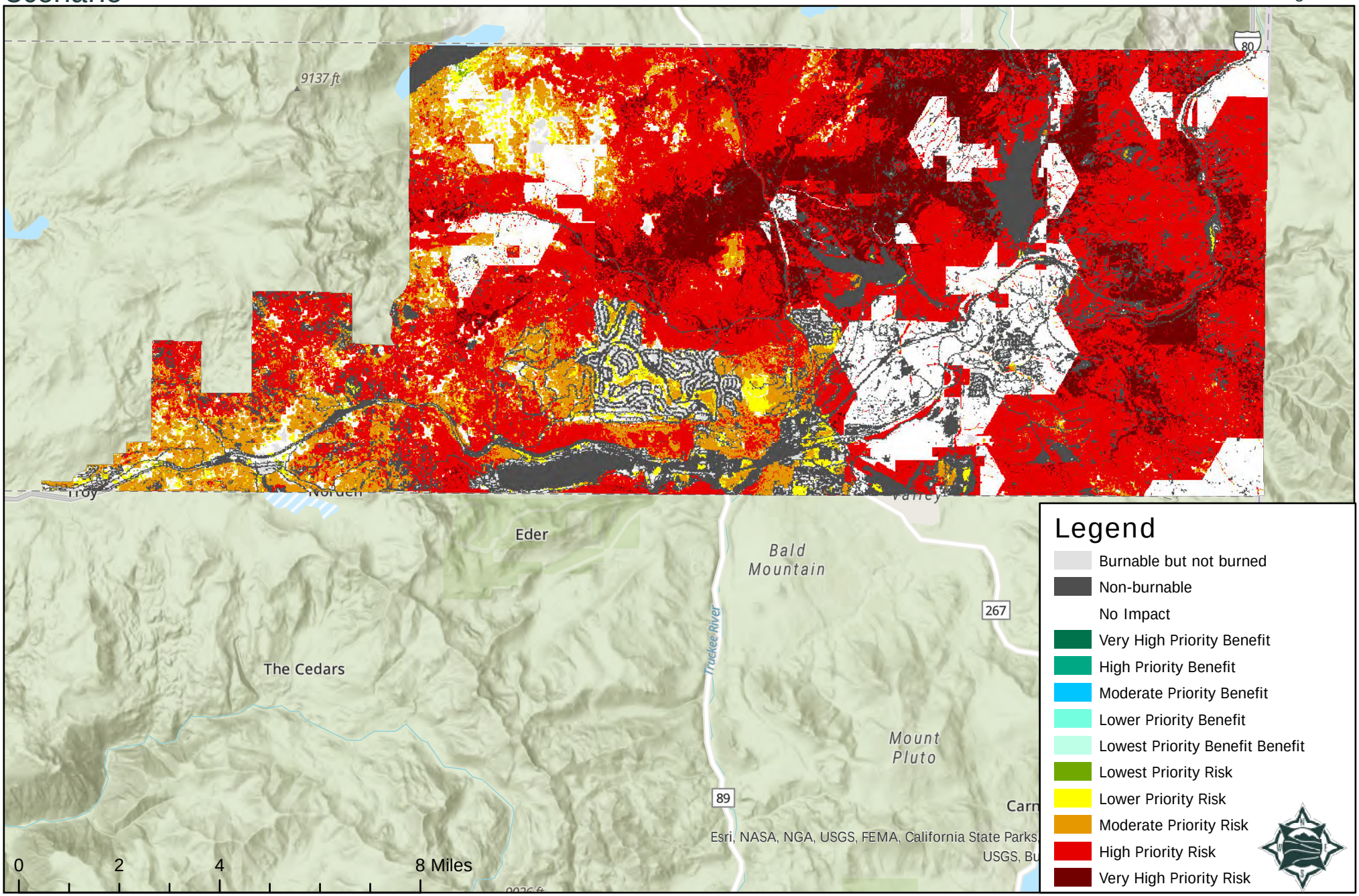
Truckee/Donner Forecast Zone Wildfire Risk Assessment Results: Natural Resources, Wind-Driven Scenario



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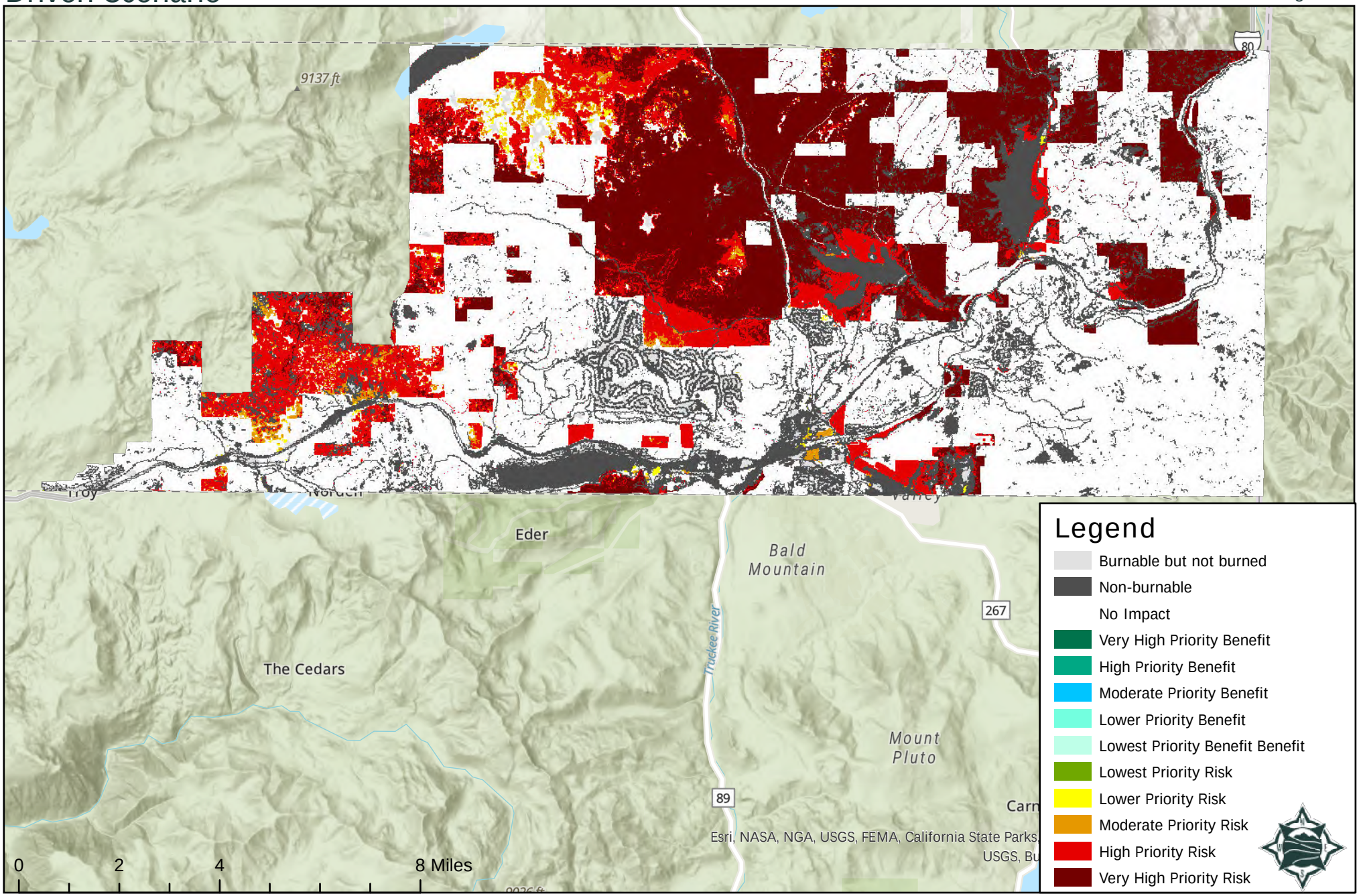
Truckee/Donner Forecast Zone Wildfire Risk Assessment Results: Economic Resources, Fuel-Driven Scenario

CWPP Appendix B

Figure 60



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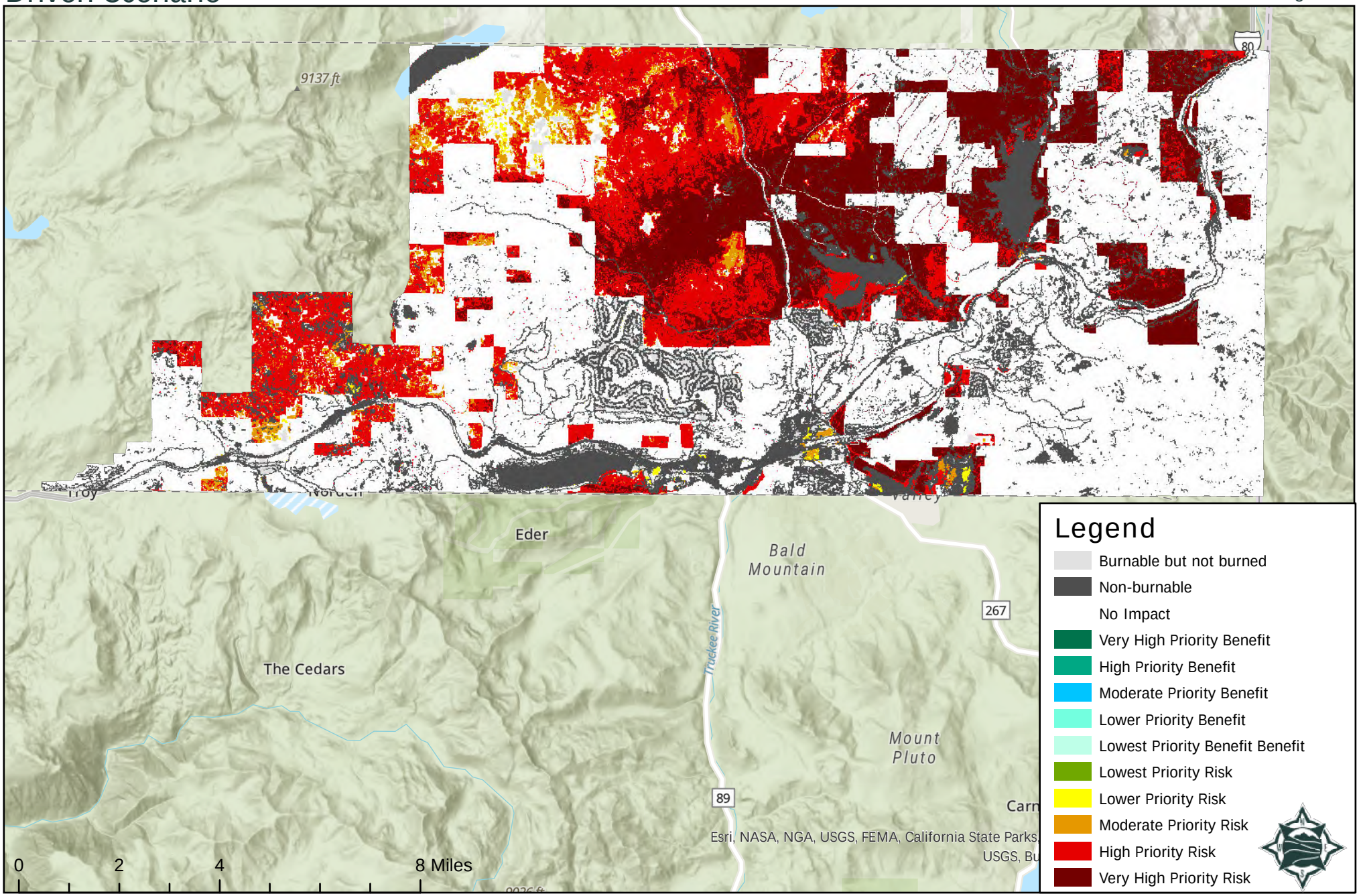
Truckee/Donner Forecast Zone Wildfire Risk Assessment Results: Economic Resources, Wind-Driven Scenario

CWPP Appendix B

Figure 61



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3.3 Wildfire Risk Assessment Discussion

The following is a discussion of the results from the Quantitative Wildfire Risk Assessment (QWRA) at both the County and Forecast Zone (FZ) scale. The results from the QWRA are not the final results of the wildfire risk modeling process. These results are used to create the Project Priority Areas which are the final result of the overall Wildfire Risk Assessment (WRA). The following sections provide context to how the Project Priority Areas were determined.

3.3.1 Wildfire Risk Assessment Discussion – County Scale

The results between the fuel-drive scenario and the wind-driven scenario for the County-scale Wildfire Risk Assessment are very similar. There are minimal differences in the number of pixels that are considered to be either High or Very High Priority in the two fire scenarios per the HVRA risk assessments. Further, the analysis focused on the combination of pixels that are classified as either High or Very High Priority Risk. By considering the High and Very High Priority Risk results together, the scope of the risk analysis is not overly narrow. This also allows for more areas to be considered for potential wildfire risk reduction activities. Further, where these pixels tend to occur is consistent between the two fire scenarios. When there is a change in the pixels classified as either High or Very High Priority Risk, they tend to merely swap classification meaning that High became Very High or vice versa. This is largely because the locations of High or Very High Priority Risk classification is driven by where the HVRAs are and the results from the Integrated Hazard. Because the locations of the HVRAs are static between the two scenarios, meaning that the HVRAs occurred in the same locations in both the fuel-driven scenario and the wind-driven scenario, this accounts for much of the similarity between the two results. Therefore, unlike the Integrated Hazard results, the risk assessment results are not as affected by the change in the fire scenarios.

In the fuel-driven and wind-driven Community Lifelines risk assessments, the High and Very High Priority Risks occur adjacent to the communities and in areas that are identified as Very High Priority Hazards in the Hazard Assessment (Section 3.2 and Section 3.3). The locations are generally consistent across the risk assessments per HVRA and FZ. For instance, the Community Health risk assessment, has pixels classified as High or Very High Priority Risk that are located around communities with some concentrated areas in the Higgins/Penn Valley FZ and in the Tahoe National Forest. This pattern is true in both the fuel-driven and wind-driven scenarios for Community Health. In the Natural Resources Risk assessment, there are some more notable changes in the distribution of the results. However, areas are generally shifting between being classified as High or Very High Priority Risk between the two scenarios. Because High and Very High Priority Risk are being considered together this is not considered to be significant.

The Economic Resource HVRA follows the same pattern as the other HVRAs. There is very little change in the number of pixels classified as High or Very High Priority Risk and minimal change in the location of these pixels. The main difference with the Economic Resources risk assessment is that the majority of the landscape is not impacted. This indicates that it is very difficult to meaningfully separate out Economic Resources from the related HVRA of Natural Resources in

a rural environment. In an urban environment there is typically a clear delineation between the community's economic epicenter and the wildland areas. However, this is not the case in Nevada County. In Nevada County, the economy is directly tied to the environment itself. The main driver of the economy in Nevada County is tourism especially recreation-based tourism that is directly tied to the natural environment. Meaning that the County's main economic resource is the environment itself. Therefore, it is not possible to separate economic resources in a meaningful way as they are components of all the HVRAs. Further, as a result, Economic Resources HVRA are very vulnerable to wildfire given that any impact on the other identified HVRAs also has the potential to impact the Economic Resources in Nevada County. For these reasons, the results from the Economic Resources risk assessments are not further analyzed in the WRA beyond the County scale discussion of the risk assessments.

3.3.2 Wildfire Risk Assessment Discussion – Forecast Zone Scale

Below is a discussion of the results from the risk assessments for each HVRA within each FZ. Note that because High Priority Risk areas and Very High Priority Risk areas are considered together, the results within each FZ follows the same trend at the County scale analysis. This means that overall, the results within each FZ are not significantly different between the two fire scenarios. This discussion is included to provide more context to the results at the FZ level and generally is limited to describing where these classifications occur and some differences and similarities within the results.

Higgins/Penn Valley

In the Higgins/Penn Valley FZ the results for the Community Lifelines pixels classified as either High Priority or Very High Priority Risk are adjacent to communities. For instance, the communities of Lake Wildwood and Alta Sierra in both scenarios has concentrations of High or Very High Priority Risk around them. There are some differences between the two scenarios in terms of what is classified as being High versus Very High Priority Risk. For instance, in the wind-driven scenario, there are more areas classified as Very High Priority Risk. However, because High and Very High Priority Risks are being considered together this is not a significant change (Figures 30 and 31). For the Community Health risk assessments, there is very little difference between the two results. Generally, any pixel that is found to be burnable is classified as High or Very High Priority Risk in both the wind-driven and fuel-driven scenarios. There is overlap in where these locations occur between the Community Lifelines results and the Community Health results (Figures 32 and 33). Within the Higgins/Penn Valley FZ, the Natural Resources risk assessment does indicate the potential for HVRAs to have a potential benefit from exposure to wildfire. Generally, the results indicate a potentially High or Very High Priority Benefit. This is largely due to the presence of oak woodlands within this FZ. The remainder of the pixels in the Natural Resources risk assessment tend to be classified as High or Very High Priority Risk. Areas considered to have a potential benefit from wildfire will still benefit from wildfire risk reduction activities. Wildfire risk reduction activities can potentially mimic the disturbance of a wildfire, or it can mean that that area will be more conducive to prescribed fire treatments. Therefore, these results are not excluded from helping to inform the location of the Project Priority Areas as it is

predicted to be beneficial to do work in wildfire risk reduction both in areas that are a high risk from wildfire and in areas that potentially can benefit from disturbance.

Grass Valley/Nevada City

The Grass Valley/Nevada City FZ is generally where the majority of communities in Nevada County are concentrated. Therefore, the results from the Community Lifelines risk assessment are more continuous in the FZ. Once again, the areas that are classified as either High or Very High Priority Risk tend to occur adjacent to communities. For example, this includes the communities in North San Juan and the wildland urban interface boundary around the cities of Grass Valley and Nevada City (Figures 38 and 39). This is true in both fire scenarios. As with Higgins/Penn Valley FZ, the results from the risk assessment for Community Health in the Grass Valley/Nevada City FZ follows a similar pattern to the Community Lifelines results. Meaning that there is overlap in the occurrence of either High or Very High Priority Risk areas between the two HVRAs. In the Community Health results, there are more pockets of areas classified as No Impact interspersed within those High and Very High Priority Risk areas. (Figures 40 and 14). The results from the Natural Resources risk assessment in the Grass Valley/Nevada City FZ are not as distributed across the FZ. Areas that are identified as either having a High Priority or Very High Priority Risk from wildfire or even a Very High Priority Benefit, tend to occur where there are concentrations of natural resources. This is expected given that the majority of Grass Valley/Nevada City is where the Community Lifelines and Community Health HVRAs are concentrated because of the amount of development in this FZ. (Figures 42 and 43).

Tahoe National Forest Area

As compared to the other FZs, the Tahoe National Forest Area FZ has the least number of developed communities. However, within the FZ are very critical Community Lifelines that are related to critical infrastructure. The location of pixels classified as either High Priority or Very High Priority Risk tend to occur west of the Emigrant Gap and around the South Yuba River drainage. This is consistent between the two fire scenarios. Generally, within the Tahoe National Forest FZ, the majority of people live west of Emigrant Gap therefore, it makes sense that this is where most of the High and Very High Priority Risk classifications are concentrated. This is true in both the fuel-driven and the wind-driven scenarios (Figures 46 and 47). The results from the Community Health risk assessment are consistent with the results from the Community Lifelines risk assessment. Meaning, that the majority of pixels classified as High Priority Risk or Very High Priority Risk are also concentrated in the South Yuba River drainage or west of Emigrant Gap. (Figures 48 and 49). Within the Tahoe National Forest Area FZ, is one of the largest natural resource concentrations within Nevada County as this FZ includes the majority of the Tahoe National Forest itself. Therefore, it is unsurprising that the results from the Natural Resources risk assessment have quite a bit of continuity within the FZ. (Figures 50 and 51).

Truckee/Donner

In the Truckee/Donner FZ, communities tend to occur in clusters throughout the FZ. These clusters tend to be west of Donner Summit, within the Truckee Area proper, up the Highway 89 corridor, and along Highway 80 to the state line. Generally, the results from the Community

Final Wildfire Risk Assessment

Lifelines risk assessment in both scenarios have a concentration of High Priority and Very High Priority Risk around these community clusters, especially in the WUI boundary. (Figures 54 and 55). As with the other FZs, the results from the Community Health risk assessments in both scenarios tend to follow the same pattern as the result from the Community Lifelines. One notable difference is that in the Community Health results, there are more areas of No Impact scattered throughout the High and Very High Priority Risk areas than there were in the Community Lifelines results. (Figures 56 and 57). Like the Tahoe National Forest Area FZ, the Truckee/Donner FZ has a high concentration of natural resources. A notable difference is that the Truckee/Donner FZ there is more community development dispersed within those natural resources. However, because there is a concentration of natural resources within this FZ the results from the Natural Resources risk assessment are fairly continuous. The results from the Natural Resources risk assessment also tend to occur within the same locations as the Community Lifelines and for the Community Health results. The results in the Truckee/Donner FZ illustrate how within a rural environment the HVRAs are incredibly intertwined and dependent on each other. (Figures 58 and 57).

3.4 Wildfire Risk Assessment Model Limitations

As with the Wildfire Hazard Assessment (WHA), the Wildfire Risk Assessment (WRA) had limitations. As discussed throughout this document, all structures and developed areas were classified as Non-Burnable and much of the residential vegetation fell under the Burnable but Not Burned classification. At the time of the analysis the Interagency Fuel Treatment Decision Support System (IFTDSS) and most fire modeling software are not capable of simulating how fire burns structures or developed areas due to the high variability in how structures burn. This limitation applied to the Quantitative Wildfire Risk Assessment (QWRA) process as well. As described in Section 2.4, structures typically burn in wildfires either from house-to-house spread or firebrands neither of which can be modeled using surface fuel-based fire behavior modeling software (such as IFTDSS and the majority of fire modeling software). It is recognized in this analysis that structures are at risk from wildfire therefore this is why community boundaries are included in the QWRA. While the QWRA is not able to simulate how an individual structure burned it is able to indicate where the greatest risk to Community Lifelines occur.

As described in Section 2.4 the 2022 LANDFIRE product includes disturbance fire areas that were remapped to pre-disturbance conditions between 2020-2021 and considered to reflect the conditions in 2023. This included adjustments to vegetation and fuel disturbance areas identified through the LANDFIRE remote sensing of the landscape change process (LANDFIRE, 2022). The influence of fire scars on the results was carried through to the QWRA as well. The remapping aspect of LANDFIRE was relatively new as of the analysis and the methodology has changed to remote sensing. LANDFIRE was expected to continue to update their fuel maps and continue to remap disturbance areas further improving their product. As future updates of the Wildfire Risk Assessment are created it is anticipated that the effect of fire scars will alter as LANDFIRE will likely capture regrowth on the burned areas.

As discussed, in Section 3.1 the WRA process determined risk prioritization. However, this prioritization depended on the likelihood of fire occurring, the susceptibility of the HVRA to the intensity of the fire, and the resulting impact on the HVRA. The prioritization process also included the Integrated Hazard and therefore included the comparative analysis of the Integrated Hazard as well. Meaning that part of the QWRA process was to also indicate which areas on the landscape were more at risk as they compared to other areas. This means that how pixels were categorized in the QWRA process also included how they compared against each other. It is worth emphasizing that this does need to be considered when evaluating the results, especially in areas where the prioritization is determined to be Lowest or Lower as that priority classification does not mean that there is no or low fire risk. ***As discussed throughout the document, this means that in a comparative analysis of a high-risk landscape when risky areas were compared to one another the results would indicate areas of higher and lower risk priorities not areas of high and low risk.***

Finally, as described above the QWRA was largely driven by the HVRAs as the modeling process identified what HVRAs were at risk and what was the level of the risk. Wildfire risk was therefore largely driven by what was a priority for wildfire risk reduction or a priority to protect from wildfire.

Because of this, the QWRA process could only predict risk where an HVRA existed. If there was no HVRA in an area of a landscape the QWRA process could not predict what the wildfire risk would be. In the QWRA process, this was referred to as No Benefit or No Risk by IFTDSS and No Impact by Nevada County. (Section 3.1.5). If a No Impact classification occurred in any of the risk assessments this indicated one of three things, (1) that there was no HVRA within the pixel, (2) the fire was not intense enough to impact the HVRA, or (3) the fire was not likely to have occurred. This was because the Expected Weighted Net Value Change (EwNVC) also considered the likelihood of the fire occurring and the potential impact on the HVRA. However, just because the pixels were classified as having No Impact, this does not mean there is no fire risk. It simply indicated that in that particular scenario and with that HVRA there was not a fire risk. This was why the identification of the HVRAs for the QWRA was very crucial. As a result, very careful consideration was given to the selected HVRAs for Nevada County to ensure that the HVRAs that were being identified captured what the community and stakeholders considered to be critical for community resilience and thus for wildfire protection.

4. Project Priority Areas

The main goal of the Wildfire Risk Assessment (WRA) was to use hazard and risk analysis to determine priority areas for wildfire risk reduction projects based on what the community determined to be valuable. This ensured that the WRA was not only identifying areas for strategic fuel reduction based on the wildfire hazard but strategically calling out areas to be prioritized for wildfire risk reduction that could provide multiple benefits to the community. By taking this approach Nevada County will be able to design more holistic wildfire projects and establish a landscape-level perspective of wildfire resiliency. This approach will also allow for greater diversity in the type of wildfire mitigation project that could be identified and for greater participation in wildfire risk reduction across the County.

4.1 Project Priority Areas Methodology

To determine the Project Priority Areas additional processing needed to be done on the results from the Quantitative Wildfire Risk Assessment (QWRA). The results from the QWRA were uploaded into ArcGIS Pro to see where there was overlap in high-priority values that were at high levels of risk from wildfire. This allowed for project prioritization that had multiple benefits.

As described in Section 3.3, the risk categories of High Priority and Very High Priority Risk were grouped for analysis. Further, it was also concluded that there was not a significant enough difference between the risk assessment under the fuel-driven and wind-driven scenarios. After the results were uploaded in ArcGIS Pro the High and Very High Priority Risk were extracted from each risk assessment for each Primary-High Value Resource and Asset (HVRA) at risk in each Forecast Zone (FZ) and under each fire scenario. Areas of High and Very High Priority Benefit were also extracted as wildfire risk reduction activities in these areas could potentially mimic the potential benefits from fire. These results were then combined based on Primary-HVRA and FZ. This meant that the results for the Primary-HVRA of Community Lifelines would include all the areas having either a High Priority Risk, Very High Priority Risk, High Priority Benefit, or Very High Priority Benefit within the respective FZ.

In order to identify areas within the County that were prioritized for multi-beneficial wildfire risk reduction activities the results from the risk assessments needed to be intersected. As described in Section 3.3, the results from the Economic Resources were no longer included in the WRA analysis. This was because it was not possible to meaningfully separate out Economic Resources in a rural environment due to their direct relationship to the natural environment. To reiterate, Nevada County's economy is largely dependent on tourism driven by outdoor recreation. Therefore, the analysis focused on the Primary-HVRAs of Community Lifelines, Community Health, and Natural Resources with the understanding that Economic Resources were directly integrated into the other HVRAs.

The Project Priority Areas needed to not only call out areas in the County that were at a high risk of wildfire from the perspective of multiple HVRAs so that risk reduction activities would then provide multiple benefits but also call out priority areas where work would increase wildfire resilience. How the HRVAs were intersected was informed by the public survey which had over 2,200 responses. In the public survey, the community of Nevada County indicated that the most important HVRAs were Community Lifelines, Community Health, and Natural Resources. The results from each Primary-HVRA per FZ were intersected. Areas where there was overlap between the three Primary-HVRAs were determined to be Project Priority Areas with the Highest Priority for wildfire risk reduction activities as they would provide the highest level of multi-benefits. Areas were only results from the Community Lifelines and Community Health risk assessments overlapped were determined to be Project Priority Areas of High Priority because while they would still provide multiple benefits for wildfire risk reduction activities they would be less than the highest level. Project Priority Areas delineates areas that were at a high level of risk from wildfire based on multiple HVRAs and therefore were prioritized for multi-benefit wildfire risk reduction activities.

Final Wildfire Risk Assessment

This process was completed for each risk assessment result for each Primary-HVRA within each FZ. Project Priority Areas were identified on both the County-scale and the FZ-scale.

4.2 Project Priority Areas Results

The following section describes the results from the Project Priority Areas analysis on both the County and Forecast Zone (FZ) Scale. The Project Priority Ares are geographic locations that are identified has having a high risk from wildfire and therefore prioritized for multi-benefit wildfire risk reduction activities. The Project Priorities Areas are divided into the Project Priority Areas with the Highest Priority and Project Priority Areas with High Priority.

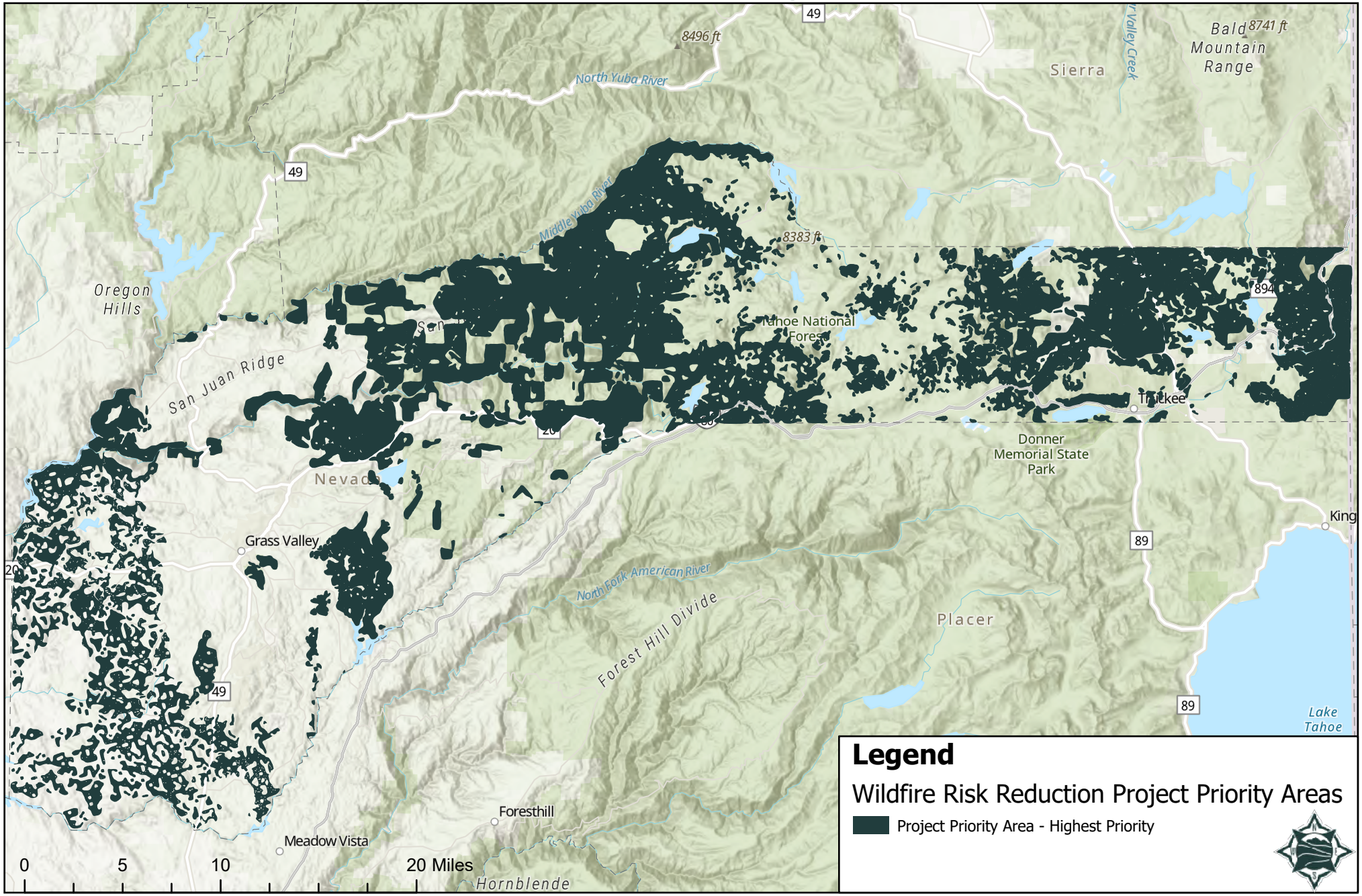
4.2.1 Project Priority Areas Results – County Scale

In Nevada County, 585,634 acres are identified to be within a Project Priority Area. This is 93% of the County's total area. However, there is an overlap between the Highest and High Priority Project Priority Areas. Specifically, all of the Highest Priority areas are also captured in the High Priority areas. When the overlap is eliminated only 359,144 acres, which is equivalent to the total acres in the High Priority category, are considered Project Priority Areas and are either Highest Priority, High Priority, or both. This equates to 59% of the County's total area. 226,490 acres are considered to be the Highest Priority and this is 36% of the total County Area. Accounting for the overlap, 132, 654 acres are exclusively classified as High Priority, which is 21% of the total County area. Across the County, the number of acres classified as Highest Priority is greater than the number of acres that are exclusively High Priority. (See Table 22 and Figures 62, 63, and 64).

TABLE 22: PROJECT PRIORITY AREAS IN NEVADA COUNTY

Project Priority Areas	Acres
Highest Priority (Community Lifelines, Community Health, and Natural Resources)	226,490
High Priority (Community Lifelines and Community Health)	359,144

Nevada County Project Priority Areas - Highest Priority



Legend

Wildfire Risk Reduction Project Priority Areas

Project Priority Area - Highest Priority

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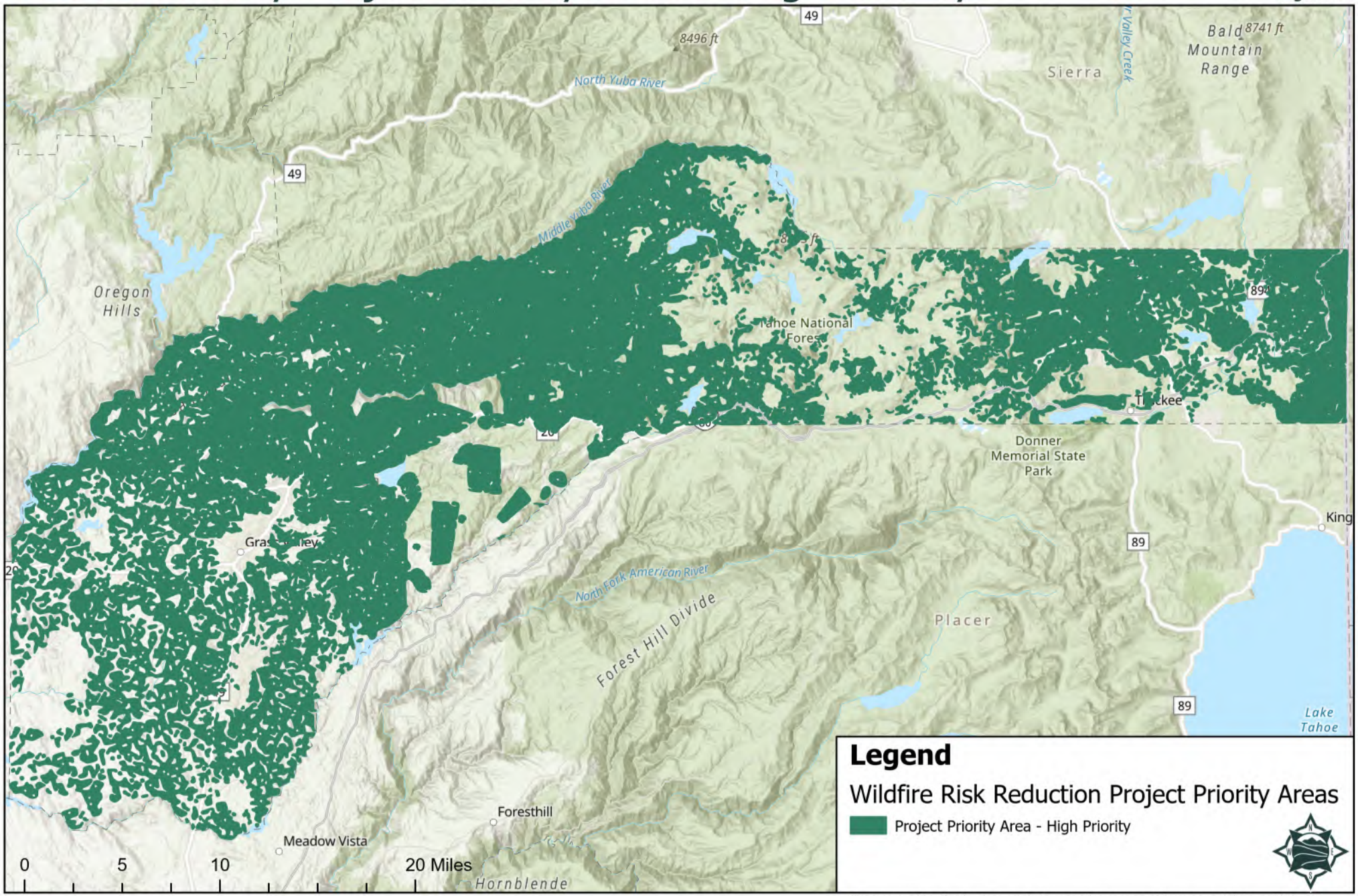
Nevada County Project Priority Areas - High Priority

Figure 63



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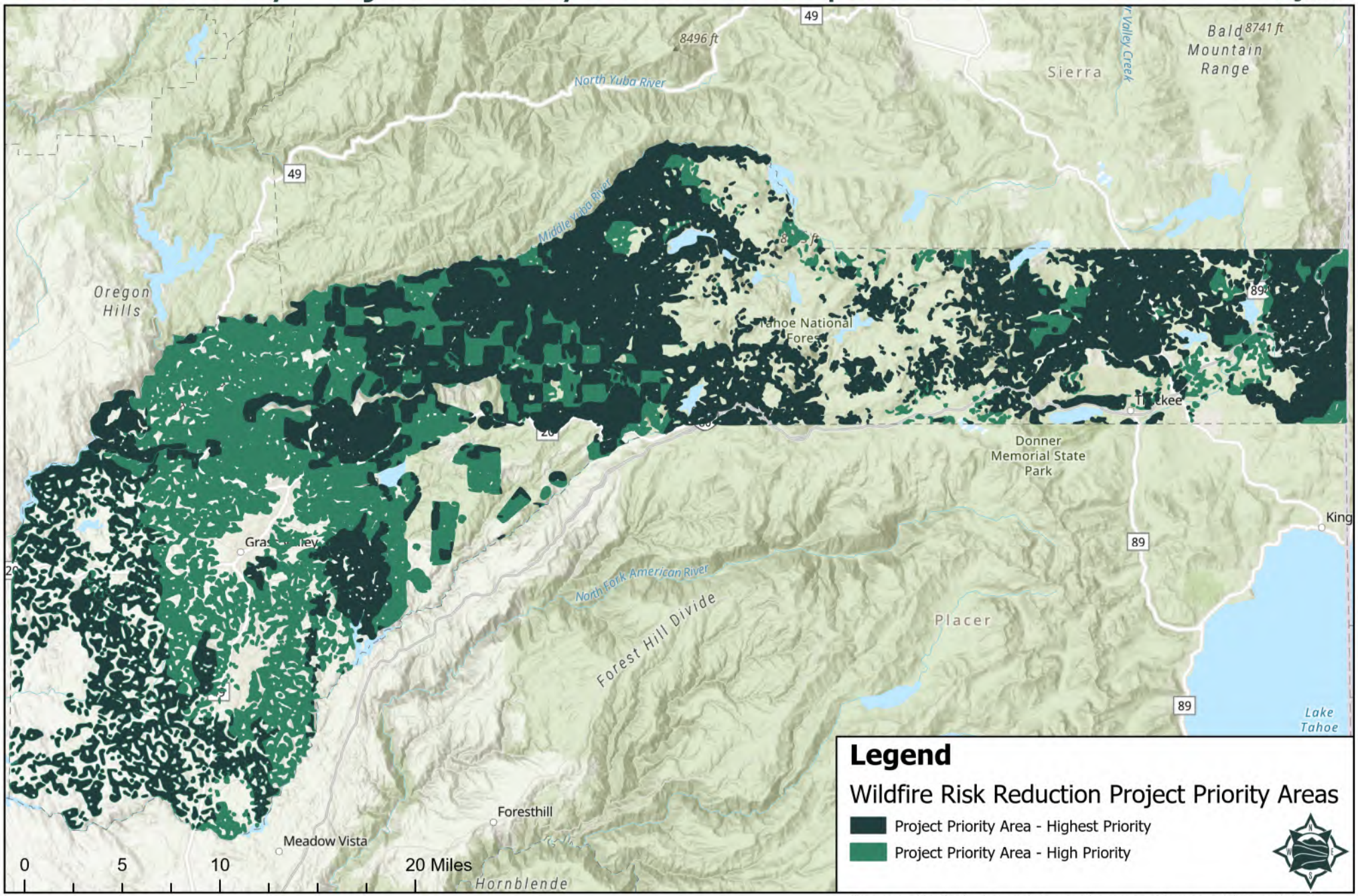
Nevada County Project Priority Areas - Comprehensive



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4.2.2 Project Priority Areas Results – Forecast Zone Scale

The following section describes the results from the Project Priority Area analysis at the Forecast Zone (FZ) level.

Higgins/Penn Valley

Within the Higgins/Penn Valley FZ, a total of 70,983 acres are identified to be a Project Priority of either Highest Priority, High Priority, or both. This is 49% of the total area within the FZ; 48,934 acres are identified to be the Highest Priority which is 34% of the total FZ area. Areas that are Highest Priority also overlap with the High Priority areas as they share inputs. Accounting for the overlap, 22,000 acres are exclusively considered to be High Priority and are also not identified as Highest Priority. This is 15% of the FZ's total area. There are more acres in Higgins/Penn Valley FZ that are classified as Highest Priority than there are acres that are exclusively within the High Priority category. (See Table 23 and Figures 65 and 66)

TABLE 23: PROJECT PRIORITY AREAS IN HIGGINS/PENN VALLEY

Project Priority Areas	Acres
Highest Priority (Community Lifelines, Community Health, and Natural Resources)	48,394
High Priority (Community Lifelines and Community Health)	70,983

Grass Valley/Nevada City

In the Grass Valley/Nevada City FZ, 95,588 acres are identified to be within a Project Priority Area; 71% of the total FZ area. Seventy-one percent (71%) of the FZ was either Highest Priority, High Priority, or both as there is overlap between the two categories. Within the FZ, 28,171 acres or 21% of total area are within the Highest Priority Category. Whereas, 67,417 acres are exclusively within the High Priority category and do not overlap with the Highest Priority category. This is 50% of the area in the FZ. For Grass Valley/Nevada City there are more acres within the exclusively High Priority category than there are in the Highest Priority category.

TABLE 24: PROJECT PRIORITY AREAS IN GRASS VALLEY/NEVADA CITY

Project Priority Areas	Acres
Highest Priority (Community Lifelines, Community Health, and Natural Resources)	28,171
High Priority (Community Lifelines and Community Health)	95,588

Tahoe National Forest Area

The Tahoe National Forest Area FZ has 129,800 acres identified within a Project Priority Area; 56% of the total FZ area. Fifty-six percent (56%) of the Tahoe National Forest FZ is either the Highest Priority, High Priority, or both. A total of 98,510 acres are within the Highest Priority

category which is 42% of the total FZ area. Only 31,290 acres are exclusively within the High Priority category. This is 13% of the FZ area. In the Tahoe National Forest Area FZ, there are more aces within the Highest Priority category than there are within the exclusively High Priority category.

TABLE 25: PROJECT PRIORITY AREAS IN TAHOE NATIONAL FOREST AREA

Project Priority Areas	Acres
Highest Priority (Community Lifelines, Community Health, and Natural Resources)	98,510
High Priority (Community Lifelines and Community Health)	129,800

Truckee/Donner

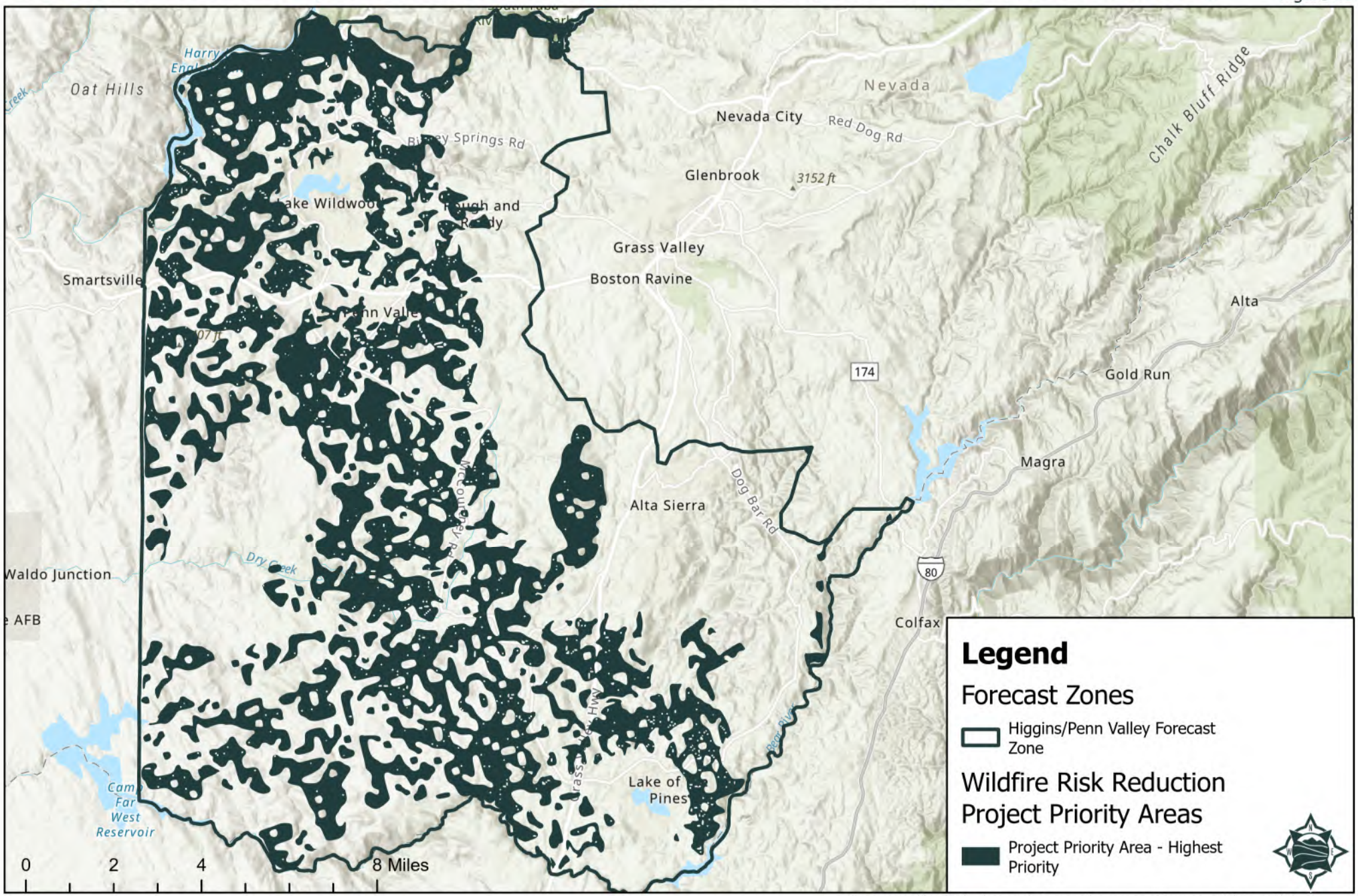
A total of 62,773 acres in the Truckee/Donner FZ are within a Project Priority Area. Fifty-eight percent (58%) of the Truckee/Donner FZ is either within the Highest Priority, High Priority, or both categories. The Highest Priority category has 51,415 acres within it which is 47% of the total FZ area. There are 11,358 acres exclusively with the High Priority category and have no overlap with the Highest Priority category. This is 10% of the total area within the FZ. In the Truckee/Donner FZ there are more pixels within the Highest Priority category than there are exclusively within the High Priority category.

TABLE 26: PROJECT PRIORITY AREAS IN TRUCKEE/DONNER

Project Priority Areas	Acres
Highest Priority (Community Lifelines, Community Health, and Natural Resources)	51,415
High Priority (Community Lifelines and Community Health)	62,773

Higgins/Penn Valley Forecast Zone Project Priority Areas - Highest Priority

Figure 65



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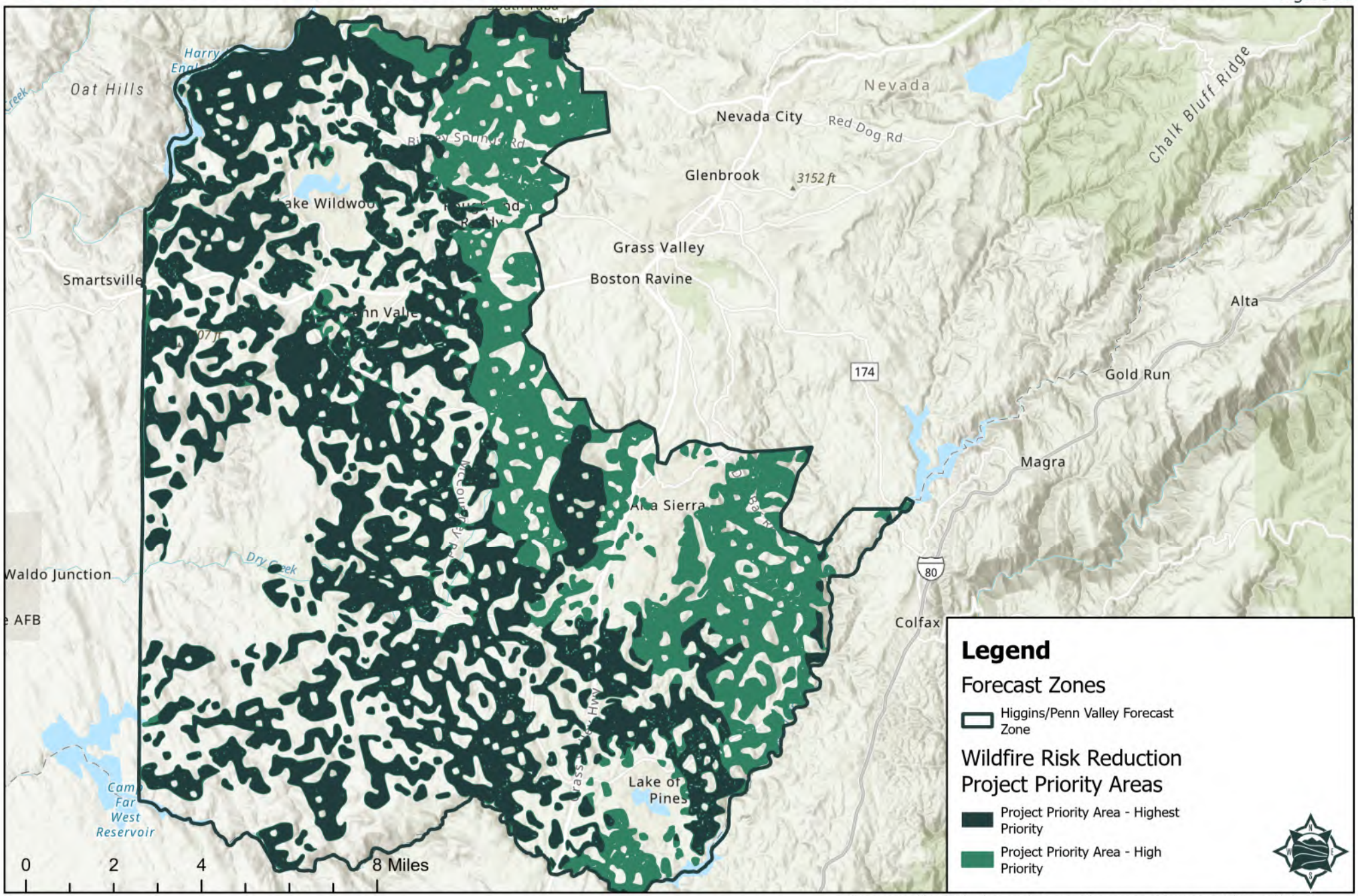
Higgins/Penn Valley Forecast Zone Project Priority Areas - Comprehensive

Figure 66



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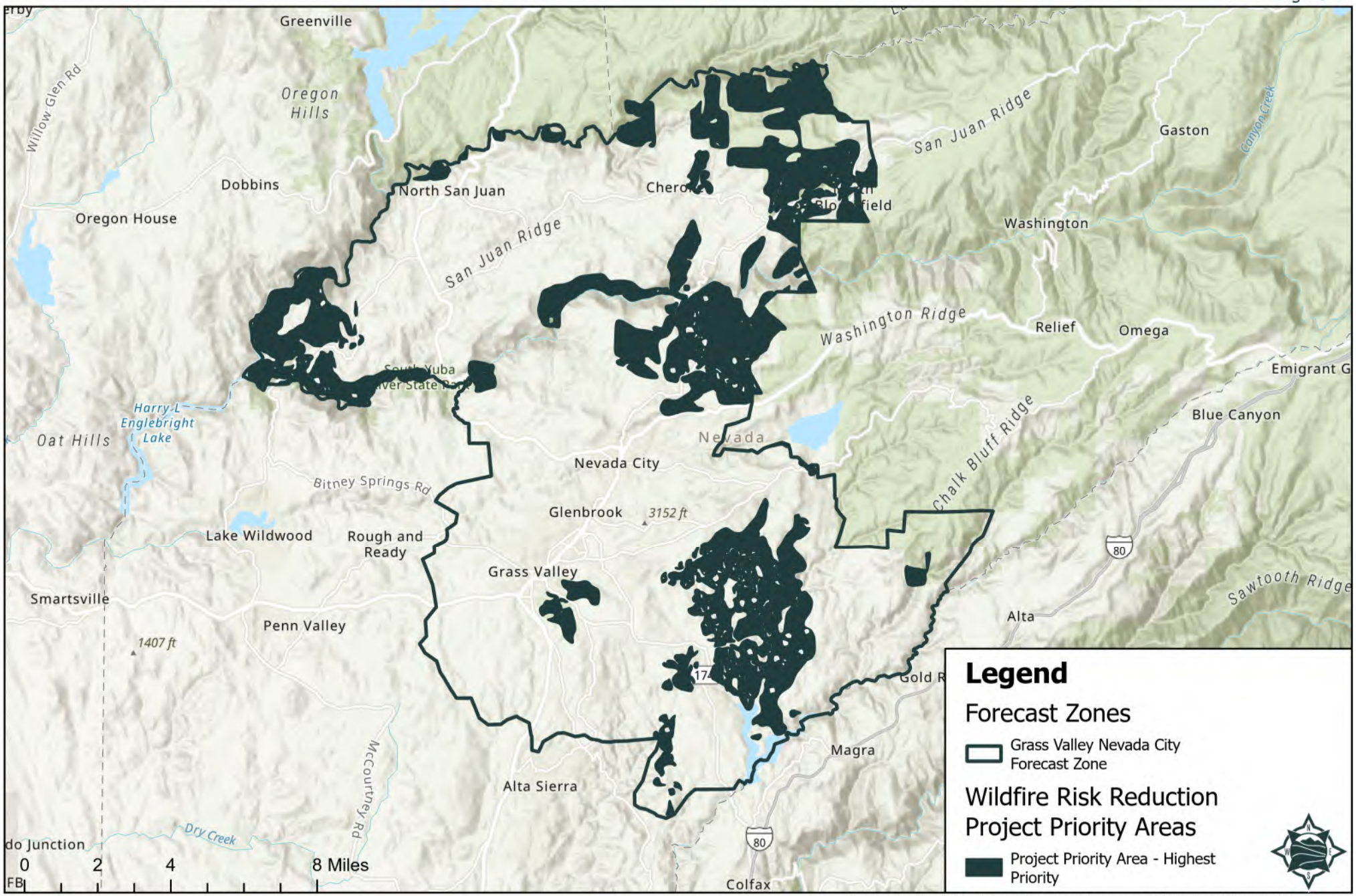
Grass Valley/Nevada City Forecast Zone Project Priority Areas - Highest Priority

Figure 67



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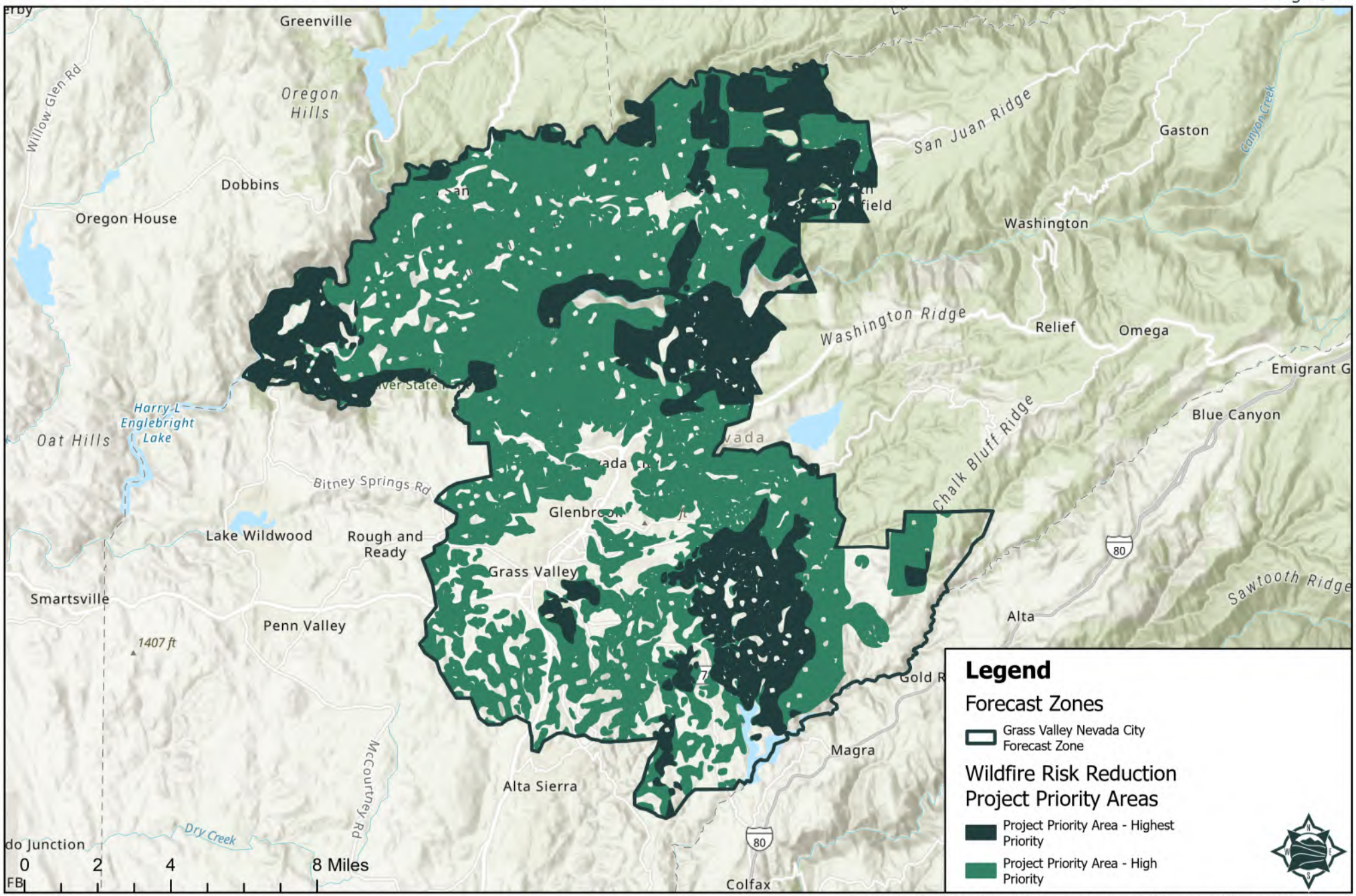
Grass Valley/Nevada City Forecast Zone Project Priority Areas - Comprehensive

Figure 68



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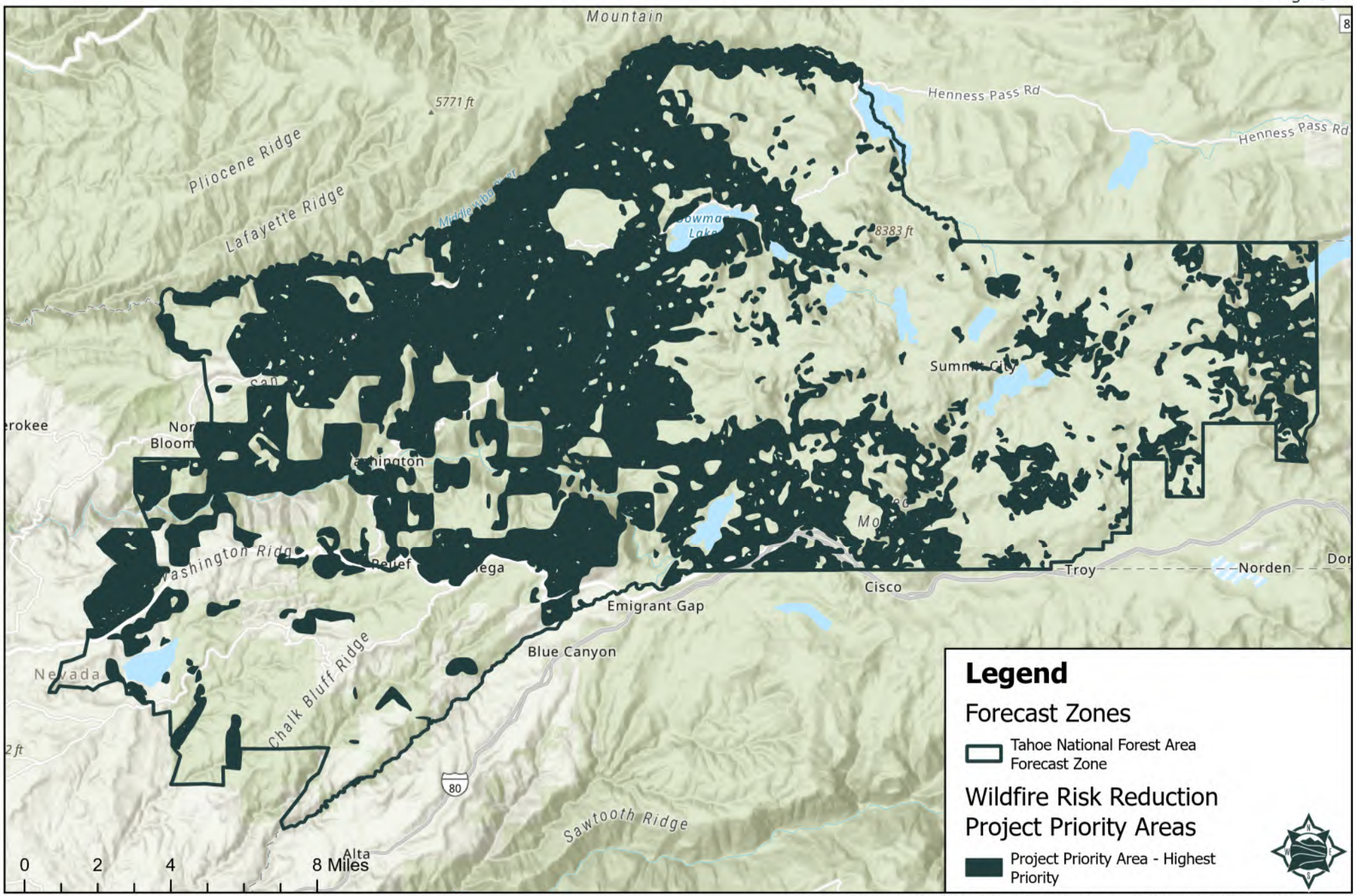
Tahoe National Forest Area Forecast Zone Project Priority Areas - Highest Priority

Figure 69



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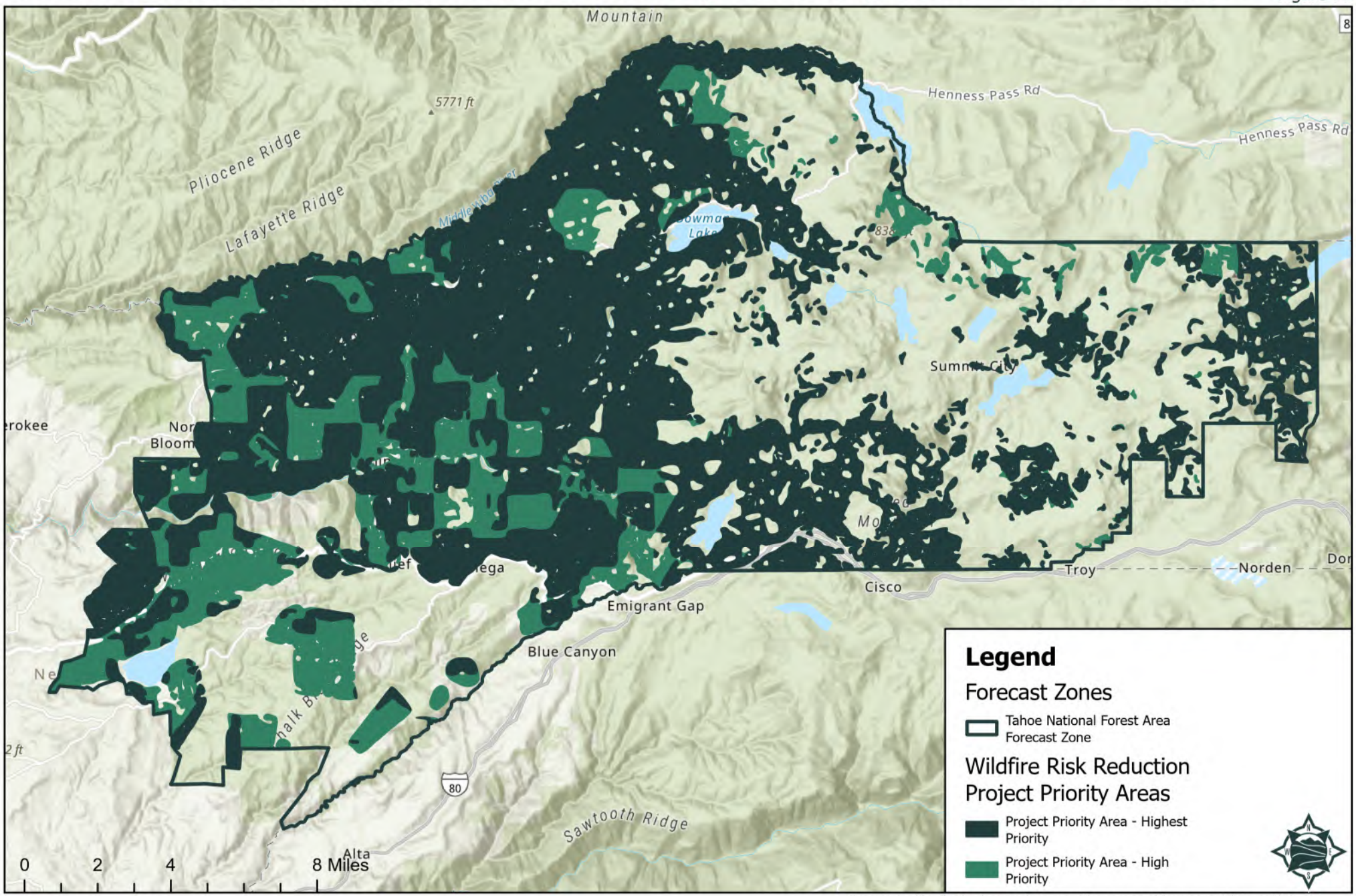
Tahoe National Forest Area Forecast Zone Project Priority Areas - Comprehensive

Figure 70



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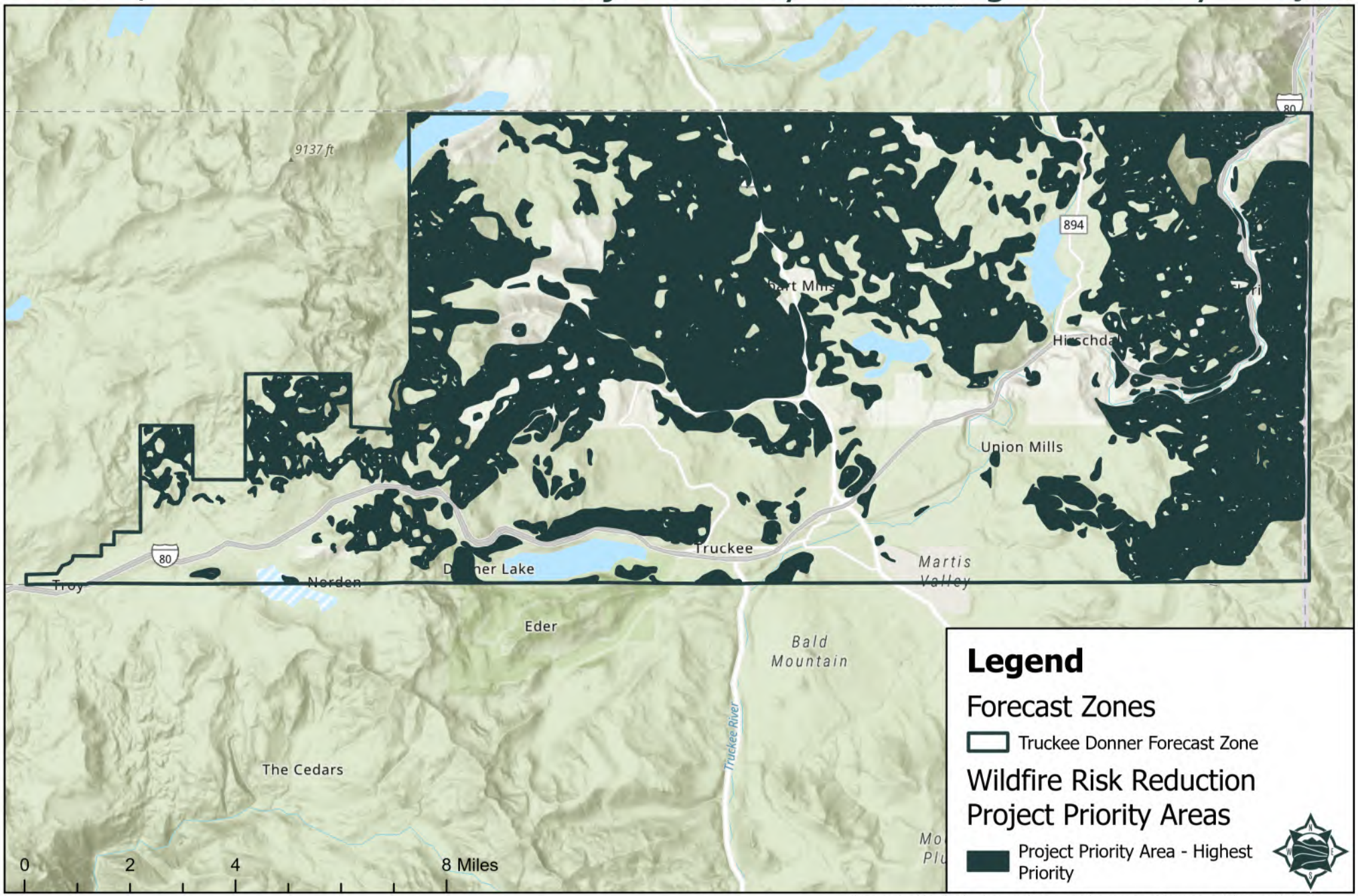
Truckee/Donner Forecast Zone Project Priority Areas - Highest Priority

Figure 71



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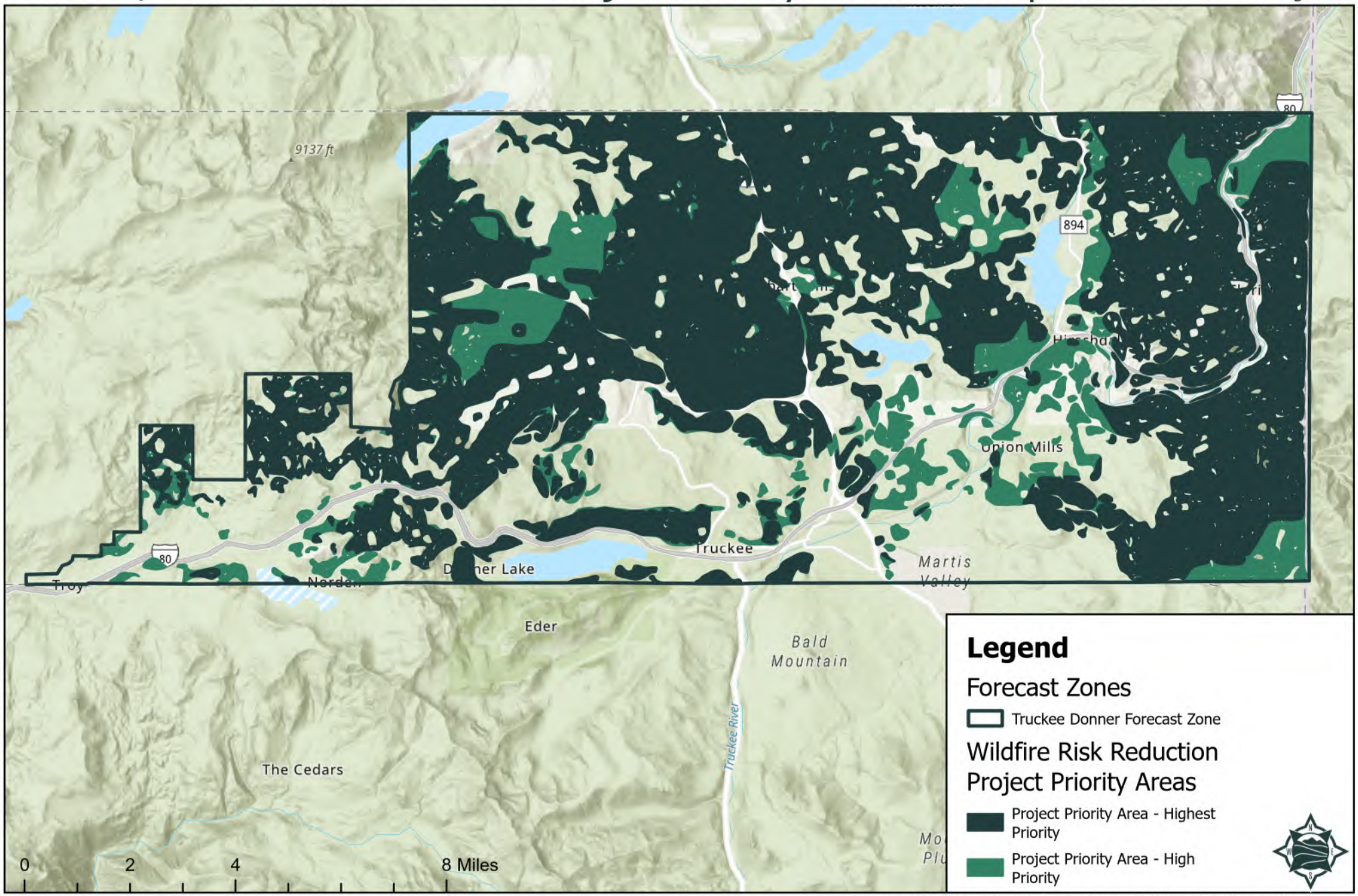
Truckee/Donner Forecast Zone Project Priority Areas - Comprehensive

Figure 72



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4.3 Project Priority Areas Discussion

The purpose of the Project Priority Areas is to identify areas in Nevada County that are at the highest risk from wildfire based on what the community considers to be important so that future wildfire risk reduction activities will have multi-benefits. This means that areas that are identified as a Project Priority Area have multiple High Resource and Assets (HVRAs) at risk that are at a high risk of wildfire impact. This analysis was done by intersecting the risk assessment results from the Community Lifelines, Community Health, and Natural Resources to determine Project Priority Areas of the Highest Priority. Project Priority Areas of High Priority were identified by intersecting the results from the risk assessments for Community Lifelines and Community Health. This was done for each Forecast Zone (FZ).

4.3.1 Project Priority Areas Discussion – County Scale

Within the County, 359,144 acres, 59% of the total County acreage is within a Project Priority Area. As described in Section 4.2, this number includes areas that overlap between the Highest and High Priority results. This is because Community Lifelines and Community Health HVRAs are within both analyses but only Natural Resources are included in the Highest Priority analysis. As a result, the Highest Priority category offers the most opportunity for multi-beneficial wildfire risk reduction projects. The division between Highest and High Priority allows for different Project Priority Areas that can fulfill multiple benefits but also do not limit the results. The High Priority analysis indicates that the acres within the Highest Priority areas are also within the High Priority areas. Therefore, much of the majority of the Project Prior Areas have the potential for wildfire risk reduction activities that can protect Community Lifelines, Community Health, and Natural Resources. The Highest Priority areas are generally concentrated in the southern section of the County, along the South Yuba River, and within the Tahoe National Forest. This is consistent with where the HRVAs are located as this is a major driver of the risk assessment results. The largest concentration of High Priority Areas that do not overlap with the Highest Priority areas is in the Grass Valley/Nevada City area. (Figures 62, 63, and 64).

4.3.2 Project Priority Areas Discussion – Forecast Zone Scale

Higgins/Penn Valley

In Higgins/Penn Valley FZ, the majority of acres identified as a Project Priority Areas are Highest Priority. These areas occur around the communities of Lake Wildwood, Penn Valley, Higgins Corner, and Lake of the Pines. One factor that potentially drove this concentration is that in Higgins/Penn Valley FZ the majority of the Oak Woodlands occur in this FZ, which is a Sub-HVRA of the Primary-HVRA Natural Resources. Areas that are exclusively considered to be a High Priority are Bitney Springs, Rough and Ready, Alta Sierra, and South of Lake of the Pines. (Figures 65 and 66).

Grass Valley/Nevada City

The Grass Valley/Nevada City FZ, is the only FZ where the number of acres identified as Highest Priority is less than the number of acres identified as only High Priority. This is consistent with the

fact that this FZ is where the majority of the HVRAs associated with Community Lifelines and Community Health are concentrated. Areas that are identified as having the Highest Priority are in French Corral, along the South Yuba River, North Bloomfield, Harmony Ridge/Round Mountain, and Greenhorn Creek. Many of the remaining areas within the FZ are identified as High Priority. For example, this includes the majority of North San Juan, the wildland urban interface (WUI) areas around Grass Valley and Nevada City, and the areas around Rollins Reservoir. (Figures 67 and 68).

Tahoe National Forest Area

The Tahoe National Fores Area FZ has more acres identified as Highest Priority than acres identified as exclusively High Priority. This is not surprising since the majority of this FZ is within the Tahoe National Forest, which is a major Natural Resource. As a result, the Highest Priority areas are generally within the Tahoe National Forest. Some specific locations of concentration are around Scotts Flat Reservoir, along the South Yuba River, and around Lake Spalding. Areas that are exclusively High Priority tend to occur around community clusters within the FZ such as Highway 20, Cascade Shores, Chalk Bluff, and Little Town of Washington. (Figures 69 and 70).

Truckee/Donner

In the Truckee/Donner FZ, the location of the Highest Priority is also largely driven by the existence of the Tahoe National Forest as well as the Humboldt-Toyabe National Forest. Areas that are identified to be the Highest Priority are around Donner Summit, north of Tahoe Donner, along the Highway 89 Corridor, and along the Truckee River. The areas that are in the High Priority classification mostly fill in the gaps within the Truckee/Donner FZ. Some clusters of these locations are around Norden, Sagehen Hill, Glenshire, and Hirschdale. (Figures 71 and 72).

5. Wildfire Risk Assessment Summary Conclusion

The Wildfire Risk Assessment (WRA) process is a crucial component for Nevada County to truly understand its risk from wildfire. The assessment included three major components (1) the Wildfire Hazard Assessment (WHA), (2) the Wildfire Risk Assessment, and (3) the Project Priority Analysis. Each component served a purpose in completing the overall WRA. All three components were also completed on both the County- scale and Forecast Zone (FZ) scale. This allows the results to not only provide insight at the landscape level as to wildfire risk but also at the community level. Throughout the process, there was careful consideration of the rural nature of Nevada County and the complexity of wildfire risk within the county.

The results from the WHA and the Wildfire Risk Assessment, while they were not the final products, were important steps in determining what areas should be prioritized for wildfire risk reduction activities. The WHA allowed for an analysis of the County that not only captured the wildfire hazard in the County but also prioritized the wildfire hazard across the landscape. This was crucial as 92% of Nevada County is considered to be either a High or Very High Fire Hazard Severity Zone by CAL FIRE (CAL FIRE, 2022). Therefore, it was essential to be able to determine how a high-hazard landscape compared against itself. These results were then used to inform the Wildfire Risk Assessment, which looked at the intersection between the high-hazard areas and the High Value Resources and Assets (HVRAs) at risk. This allowed the analysis to capture what in Nevada County was at risk from wildfire not only from a scientific perspective but also based on what the community considered to be important to protect from wildfire. The Wildfire Risk Assessment process shed light on areas in our county that are vulnerable to being impacted by wildfire based on what the community has identified as being critical to protect. Community Lifelines, Community Health, and Natural Resources emerged as the most important to protect from a community perspective. All of this information was used to delineate Project Priority Areas across the County.

The Project Priority Areas not only highlight where the most HVRAs were at high or very high risk from wildfire but also indicates where wildfire risk reduction activities can have multiple benefits. Project Priority Areas are divided into two categories, (1) Highest Priority, which captures Community Lifelines, Community Health, and Natural Resources, and (2) High Priority which captures Community Lifelines and Community Health. This allows for the Project Priority Areas to identify multiple levels of potential risk reduction activities. As a result, the overall WRA will allow for multiple beneficial wildfire risk reduction activities to be designed and undertaken across Nevada County in a way that not only addresses our wildfire risk but also addresses our community priorities and provide the opportunity for multiple parties or stakeholders to be able to participate in the creation of projects. In the future, it is anticipated that this analysis will be updated every three to four years in conjunction with the update to the community wildfire protection plan every five years.

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Appendix A

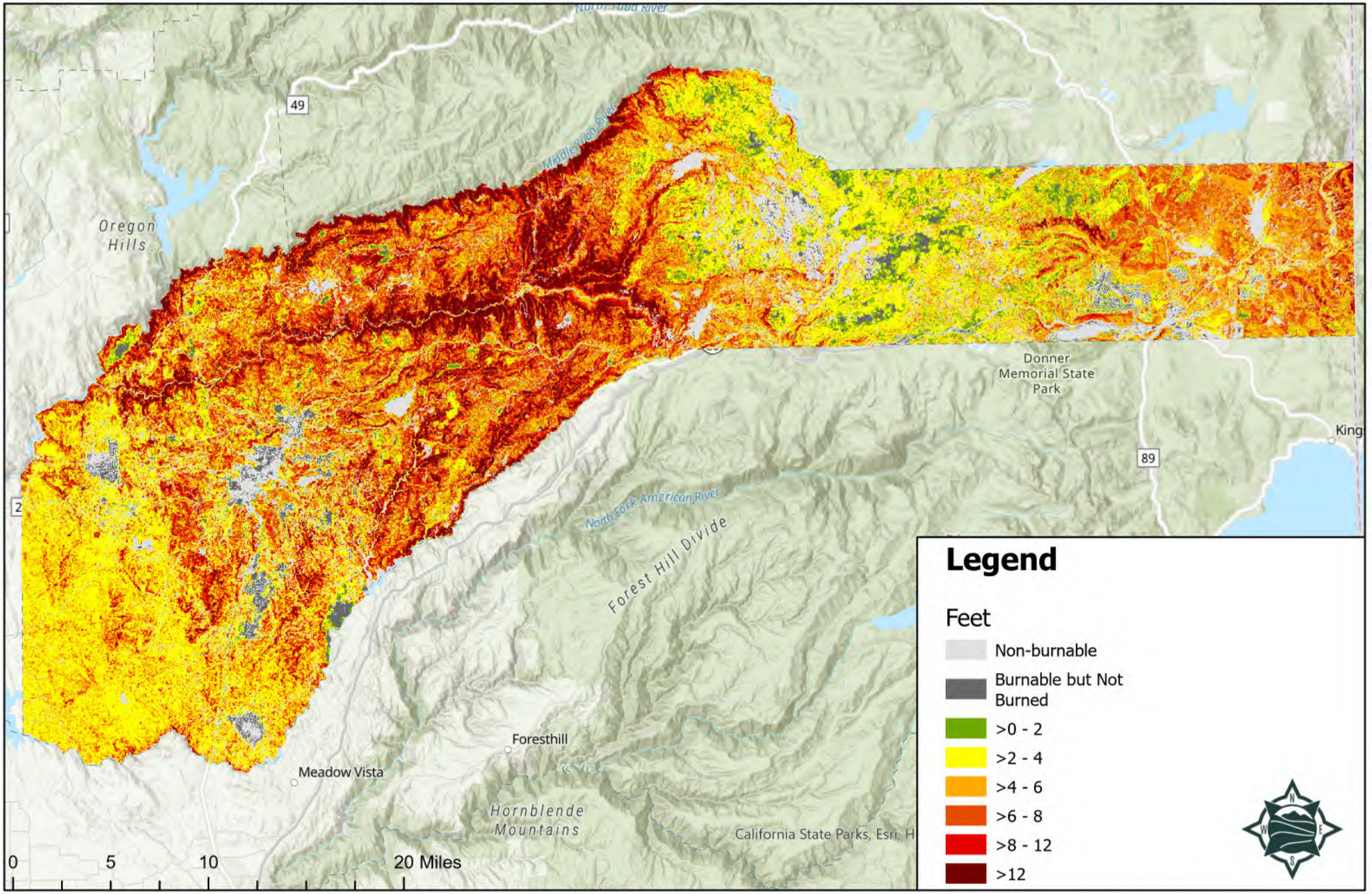
IFTDSS Reports

Upon Request

Appendix B

Conditional Flame Length

Nevada County Conditional Flame Length: Fuel-Driven Fire Scenario Appendix B



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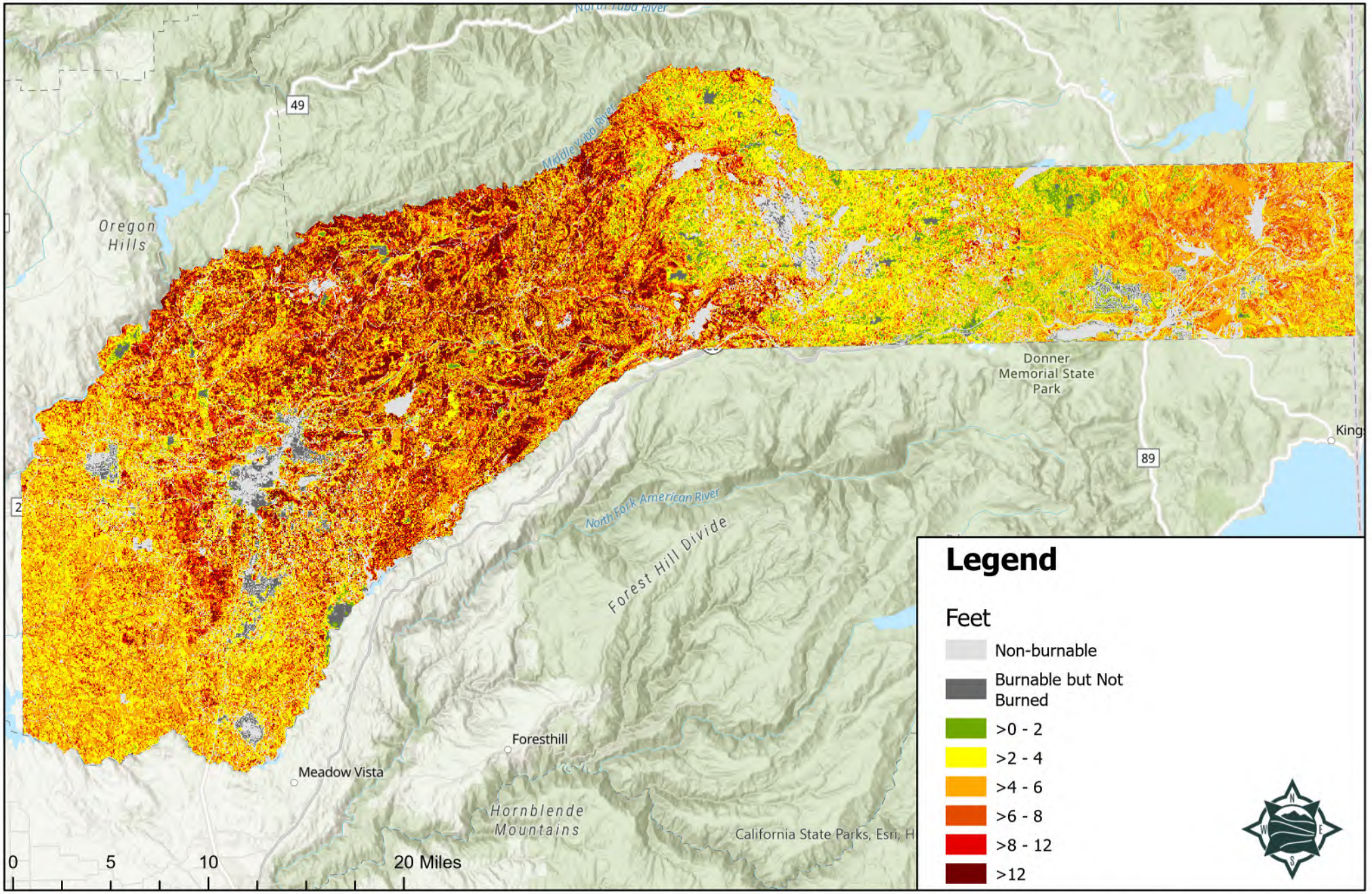
Nevada County Conditional Flame Length: Wind-Driven Fire Scenario Appendix B



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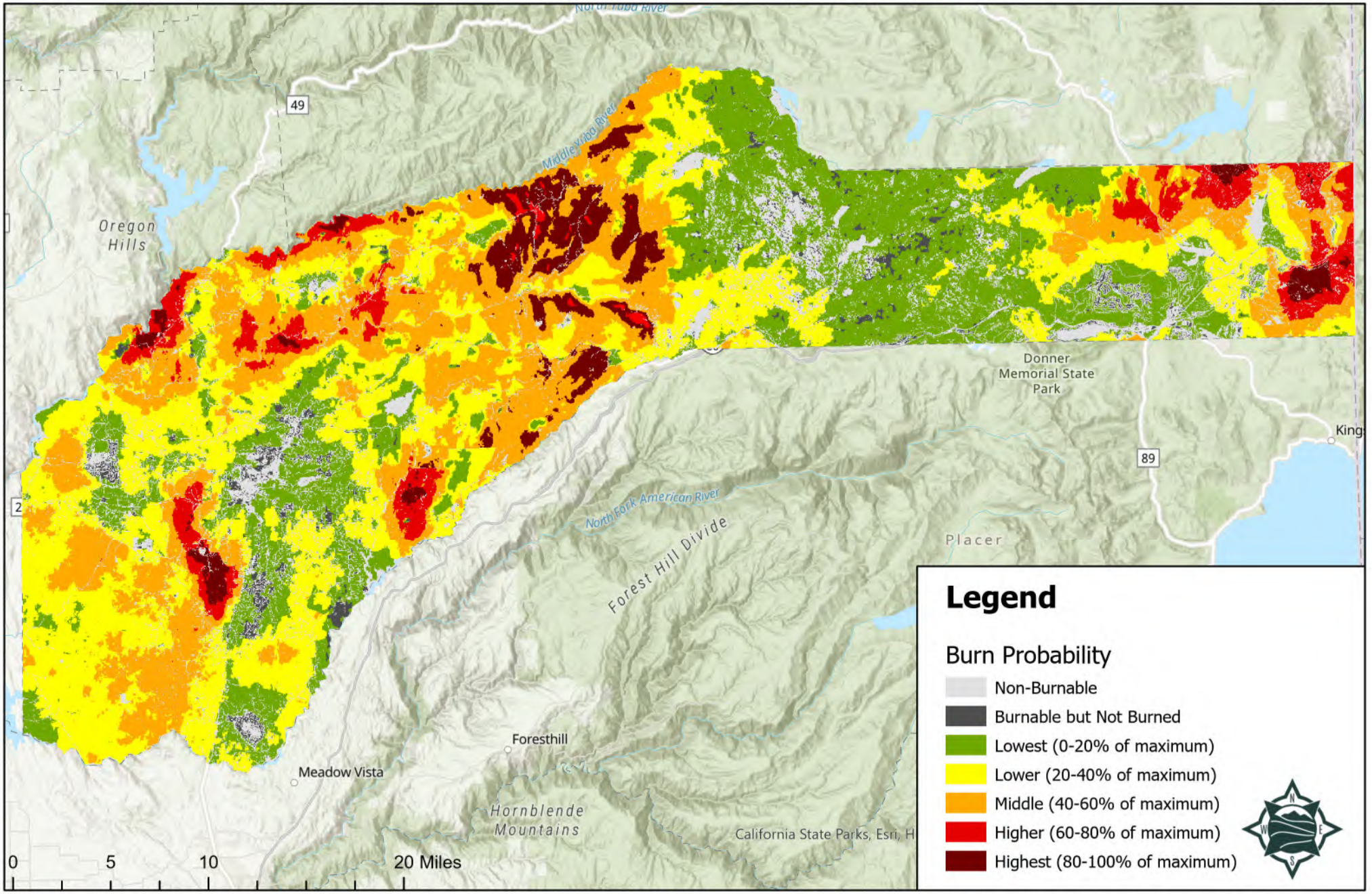
Appendix C

Burn Probability

Nevada County Burn Probability: Fuel-Driven Fire Scenario

Appendix C



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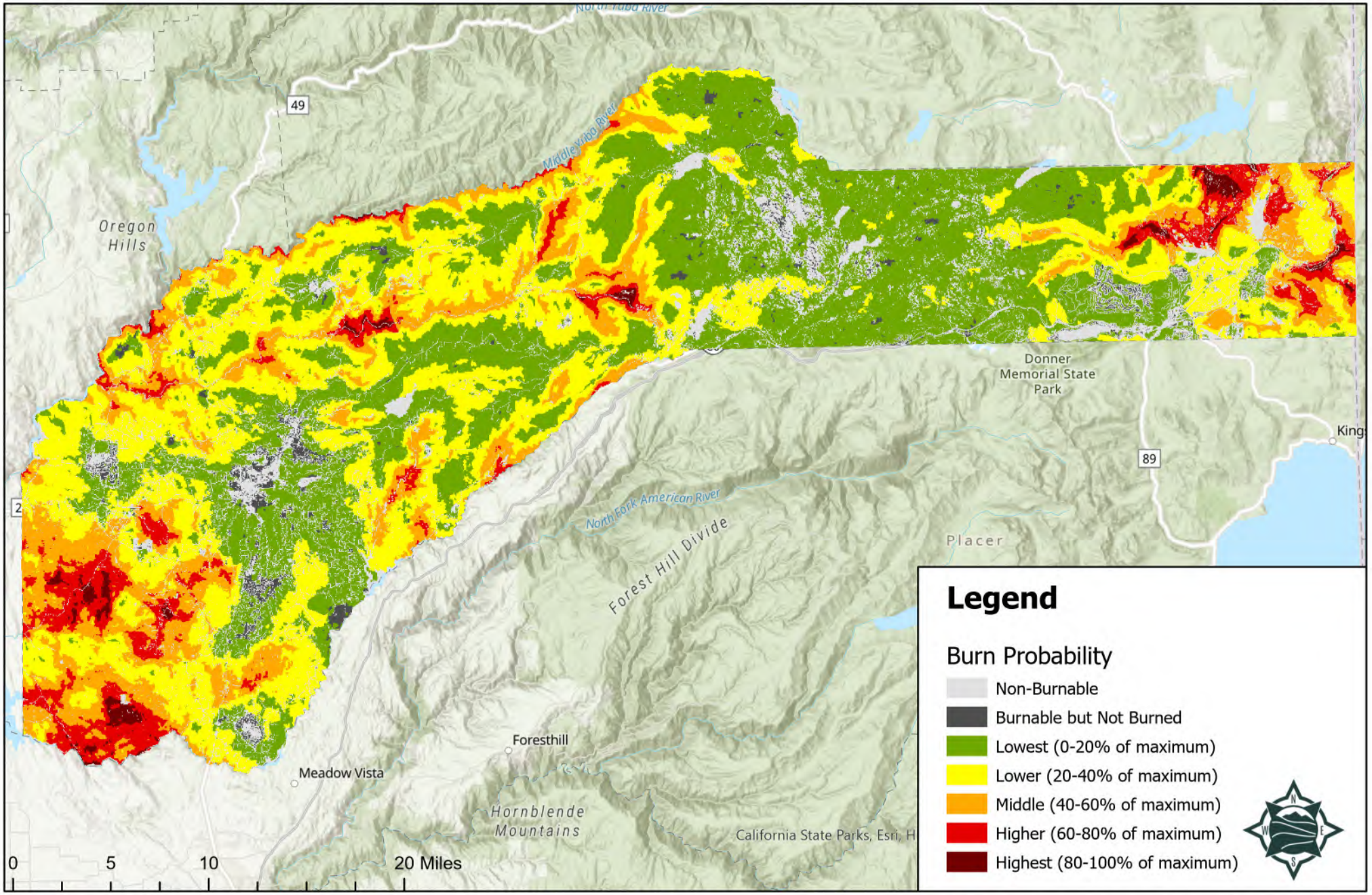
Nevada County Burn Probability: Wind-Driven Fire Scenario

Appendix C



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Appendix D

Wildfire Risk Assessment Survey

Community Wildfire Protection Plan Survey

Nevada County is updating its Community Wildfire Protection Plan (CWPP). The CWPP will become the road map for prioritizing wildfire risk reduction activities throughout the County. Public participation is an essential part of the CWPP process. This survey will help Nevada County better understand how wildfire risk impacts our communities and support the creation of a planning document that is designed by the community it is intended to serve.

*Required Question

1. Demographics

The following are demographic questions to help us understand the needs of different communities.

1.1 Do you currently live, work, or own property in Nevada County?*

a. Yes
b. No

1.2 Choose the Nevada County Zip Code where you live, work in, or own property.*

*If you **live and work in Nevada County** or **live and own property** in Nevada County please **choose the Nevada County Zip code for your primary residence**.*

- 95602
- 95712
- 95724
- 95728
- 95924
- 95945
- 95946
- 95949
- 95959
- 95960
- 95975
- 95977
- 95986
- 96111
- 96160
- 96161
- 96162

1.3 Choose the following that best describes you.*

a) Primary Homeowner
b) Secondary Homeowner
c) Renter
d) Undeveloped Property Owner
e) Business Owner
f) Workforce (Work in Nevada County but reside outside the County)

1.4 Chose the age group that best applies to you.

a) Under 18
b) 18-25
c) 26-35
d) 36-45
e) 46-55
f) 56-65
g) Older than 65

2. Nevada County Wildfire Risk

Wildfire risk is a combination of wildfire intensity, wildfire likelihood, and resource susceptibility to impact from wildfire. Wildfire risk helps us determine how vulnerable our High-Value Resources and Assets (HVRA) are to wildfire. An important step in determining wildfire risk is prioritizing HVRAs for wildfire protection. This allows the wildfire risk to be informed by what the community values. T**he following questions will help us understand how Nevada County as a whole is at risk from wildfire impacts**.

2.1 Rank the following High-Value Resources and Assets in order of importance to be protected from wildfire (with 1 being the most important and 4 being the least important)

☐ ***Community Lifelines*** (Communities, Critical Water Infrastructure, Critical Transportation Infrastructure, and Critical Power and Communication Infrastructure)

☐ ***Natural Resources*** (Outdoor Recreation Resources, Watersheds, Significant Species, Oak Woodlands, and Climate Resilience Areas)

☐ ***Economic Resources*** (Recreation, Historical and Cultural Districts, and Government Buildings)

☐ ***Community Health*** (Wildfire Smoke Potential, Soil Vulnerability, Hazardous Waste Sites, Hospital and Shelter Facilities, and Solid Waste Sites)

2.2 What do you think Nevada County's Wildfire Risk is?

a) No Risk
b) Low Risk
c) Moderate Risk
d) High Risk
e) Very High Risk

2.3 Please Choose the Top 3 Priorities for Nevada County.

a) Landscape Level Shaded Fuel Breaks
b) Roadside Vegetation Removal
c) Year-Round Green Waste
d) Evacuation Route Improvement
e) Enforcement of Fire Safety Laws
f) Home Hardening Incentives/Rebate Programs
g) Defensible Space Assistance
h) Wildfire Education Programs
i) Other_____

3. Personal Wildfire Risk

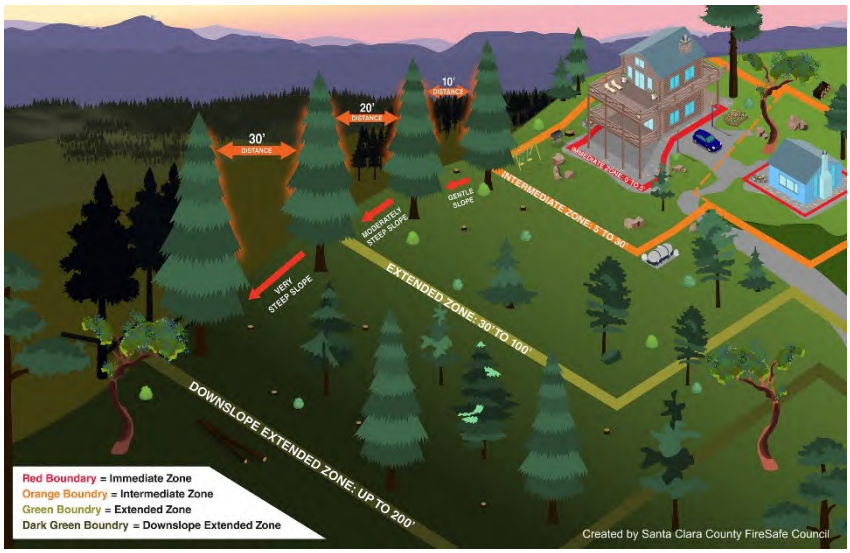
Personal wildfire risk is your individual risk to wildfire impacts. **Personal wildfire risk measures how vulnerable you or your personal assets are to being impacted by a wildfire.**

3.1 How would you rank your personal risk from Wildfire?

a) No Risk
b) Low Risk
c) Moderate Risk
d) High Risk
e) Very High Risk

3.2 How would you rank your home or property's defensible space on a scale from 1 to 5. (1 representing no defensible space and 5 representing fully compliant defensible space)

Defensible Space slows the spread of wildfire and creates a buffer zone to help firefighters and first responders safely defend your home. For more information please see the diagram below and please review Nevada County's Hazardous Vegetation Ordinance for defensible space requirements https://readynevadacounty.org/3004/Defensible-Space



a) 1 (No defensible space)
b) 2
c) 3
d) 4
e) 5 (Full Defensible Space)

3.3 What is the biggest challenge to lowering your personal wildfire risk? (Choose the top 3)

a) Access to financial resources
b) Cost of home hardening
c) Fuels reduction around your home or on your property
d) Removing flammable material from the first 5 feet of your home (Zone 0)
e) Hazardous fuel on neighboring properties
f) Removing dead trees
g) Cost of fuels reduction or defensible space
h) Functional needs or disabilities
i) Lack of information

j) Unsure what to do or where to start
k) Don't own your home or are not permitted to modify the exterior of your home
l) Unable to receive emergency alerts (no internet or cell service)
m) Unable to evacuate on your own
n) No time
o) Can't dispose of green waste
p) No challenges
q) Other:_____

4. Evacuation Willingness

The following questions will help us understand evacuation behaviors and be used to support the Nevada County Evacuation Study.

4.1 How many times have you been evacuated from wildfire in Nevada County?

a) Never been evacuated in Nevada County
b) 1 time
c) 2-3 times
d) More than 5 times
e) I choose not to evacuate (go to question 4.1.1)

4.1.1 ***Answer only If you chose "I choose not to evacuate" in question 4.1.*** What would make you more likely to evacuate during a wildfire?

a) Visible flames close to your home
b) Better evacuation information/access to information
c) Personal evacuation plan
d) Influence from friends and family
e) Nothing
f) Other

4.2 Please choose the option that best describes your evacuation behavior.

a) Leave as early as possible
b) Wait for more information
c) Leave only once the "Evacuation Order" is issued
d) Wait until smoke or the fire is visible
e) Wait until the sheriff or law enforcement comes
f) I choose not to evacuate

4.3 What are your main concerns with evacuating during a wildfire? (Choose 3)

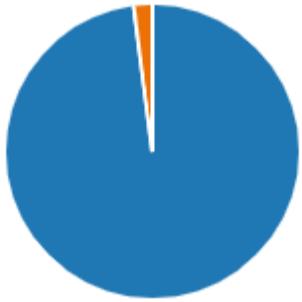
a) Getting out early
b) Knowing your zone
c) Traffic/accidents
d) Getting trapped on the road
e) Lack of reliable transportation
f) Losing your home or property
g) Pets/animal evacuation
h) Looting
i) When you can return home
j) Kids or family home alone
k) Where to go
l) Understanding evacuation alert and warning
m) Road condition (surface conditions)
n) Roadside vegetation
o) Visitors/tourist
p) Towing a trailer/fifth wheel or bringing a RV
q) Knowing what to bring
r) Other:_____
s) I choose not to evacuate

Nevada County Community Wildfire Protection Plan Survey

2267	31:17	Closed
Responses	Average time to complete	Status

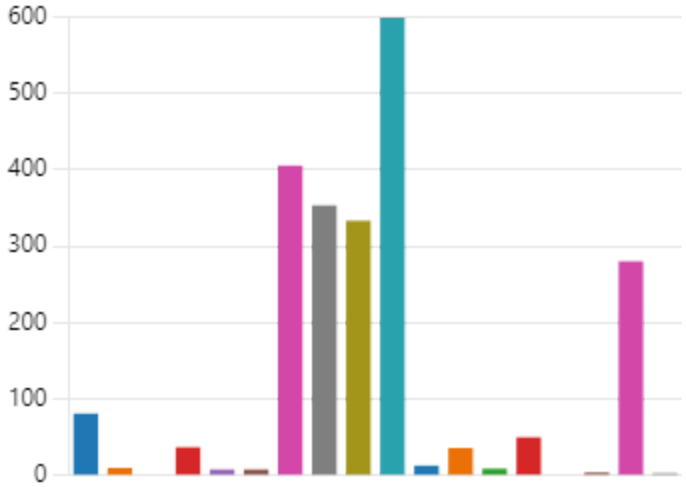
1. Do you currently live, work, or own property in Nevada County?

Yes	2220
No	47



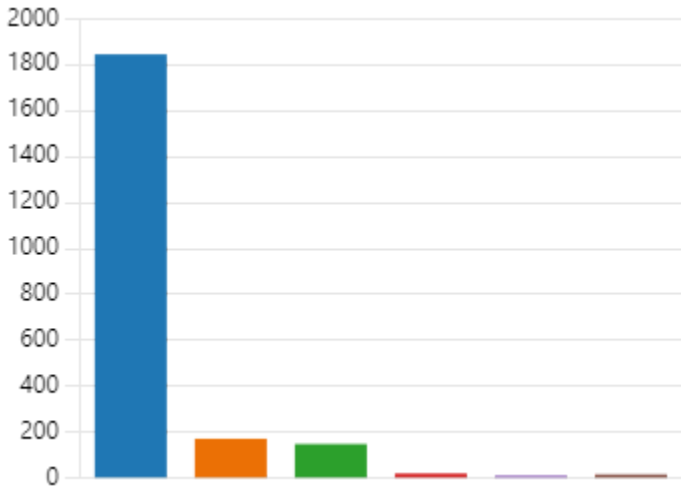
2. Choose the Nevada County Zip Code where you live, work in, or own property.

95602	81
95712	10
95724	0
95728	37
95924	8
95924	8
95945	405
95946	353
95949	333
95959	598
95960	13
95975	36
95977	9
95986	50
96111	0
96160	4
96161	280
96162	3



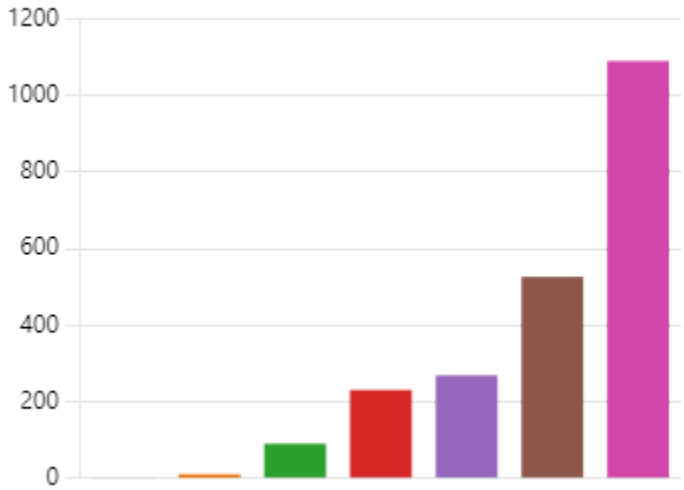
3. Choose the following that best describes you.

Primary Homeowner	1844
Secondary Homeowner	173
Renter	150
Undeveloped Property Owner	22
Business Owner	13
Workforce (Work in Nevada Cou...	18



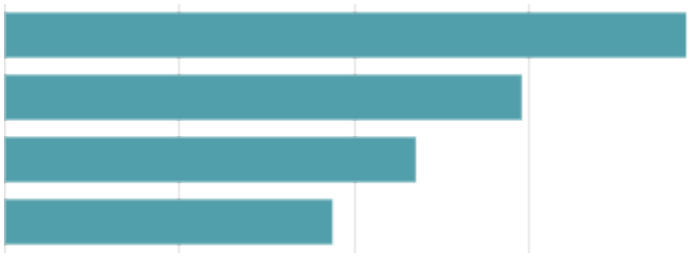
4. Chose the age group that best applies to you.

Under 18	3
18-25	11
26-35	91
36-45	231
46-55	269
56-65	526
Older than 65	1089



5. Rank the following High-Value Resources and Assets (HVRA) in order of importance to be protected from wildfire with the most important HVRA being at the top

1	***Community Lifelines*** (Commu...
2	***Community Health*** (Wildfire S...
3	***Natural Resources*** (Outdoor Re...
4	***Economic Resources*** (Recreatio...

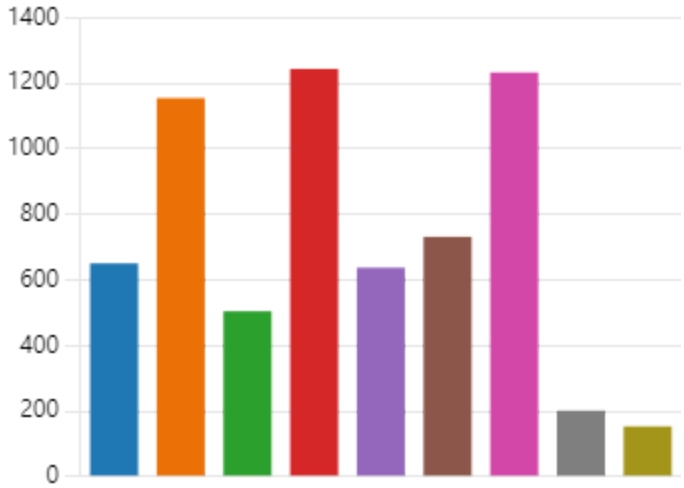


6. What do you think Nevada County's Wildfire Risk is?

No Risk	4
Low Risk	10
Moderate Risk	141
High Risk	852
Very High Risk	1210

7. Please Choose the Top 3 Priorities for Nevada County.

Landscape Level Shaded Fuel Br...	650
Roadside Vegetation Removal	1154
Year-Round Green Waste	504
Evacuation Route Improvement	1243
Enforcement of Fire Safety Laws	637
Home Hardening Incentives/Re...	731
Defensible Space Assistance	1232
Wildfire Education Programs	201
Other	153

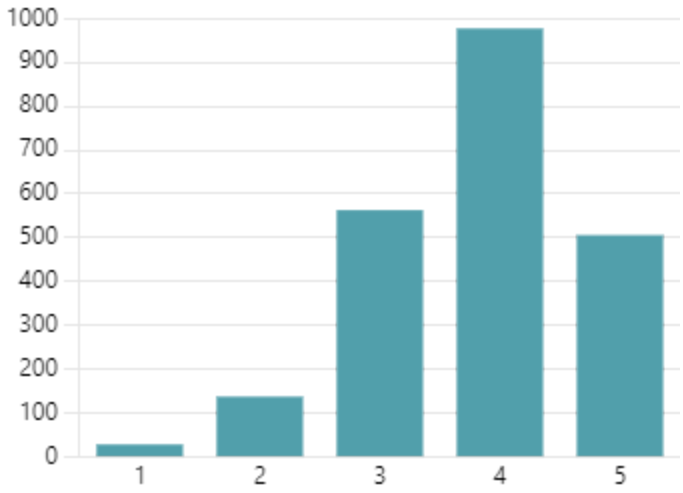


8. How would you rank your personal risk from Wildfire?

No Risk	14
Low Risk	173
Moderate Risk	825
High Risk	784
Very High Risk	421

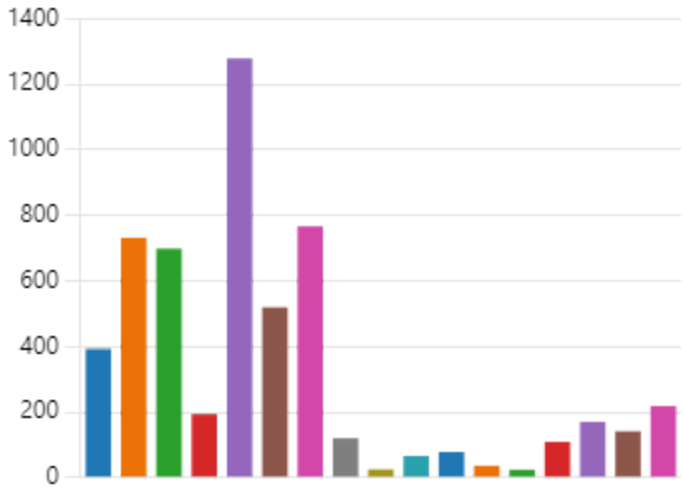
9. How would you rank your home or property's defensible space on a scale from 1 to 5? (1 representing no defensible space and 5 representing fully compliant defensible space)

3.81
Average Rating



10. What are the biggest challenges to lowering your personal wildfire risk? (Choose the top 3)

Access to Financial Resources	392
Cost of Home Hardening (https:...	731
Fuels Reduction Around your H...	698
Removing Flammable Materials ...	193
Hazardous Fuel (Vegetation) on ...	1278
Removing Dead Trees	519
Cost of Fuels Reduction/Defensi...	766
Functional Needs or Disabilties	120
Lack of Information	25
Unsure of What to Do or Where...	66
Don't Own your Home or Not P...	78
Unable to Receive Emergency Al...	36
Unable to Evacuate on your Own	24
No Time	109
Can't Dispose of Green Waste	170
No Challenges	141
Other	218

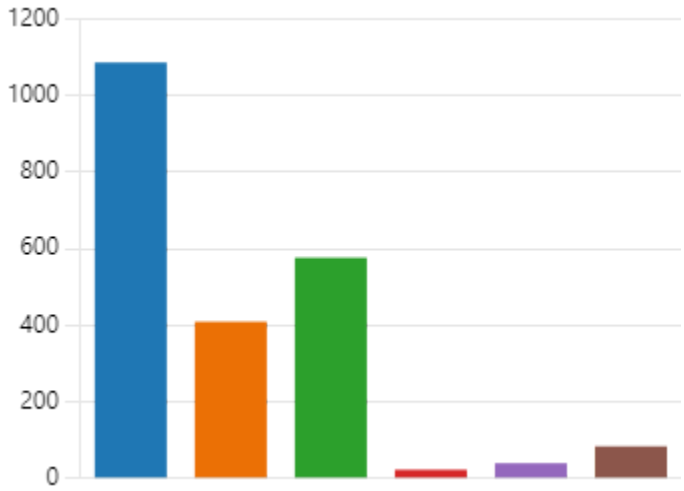


11. How many times have you been evacuated from wildfire in Nevada County?

Never Been Evacuated in Nevad...	1257
1 Time	644
2-3 Times	279
More than 5 Times	10
I Choose Not to Evacuate	27

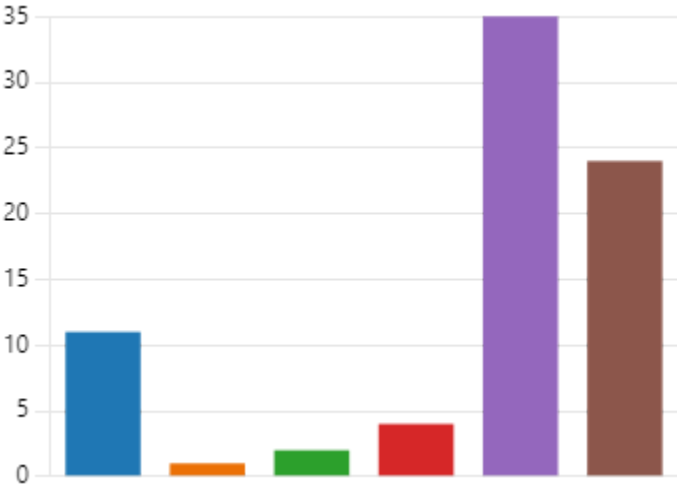
12. Please choose the option that best describes your evacuation behavior

Leave as Early as Possible	1085
Wait for More Information	409
Leave Only when an Evacuation ...	576
Wait Until Smoke or Fire is Visible	23
Wait Until the Sheriff or Law Enf...	40
I Choose Not Evacuate	84



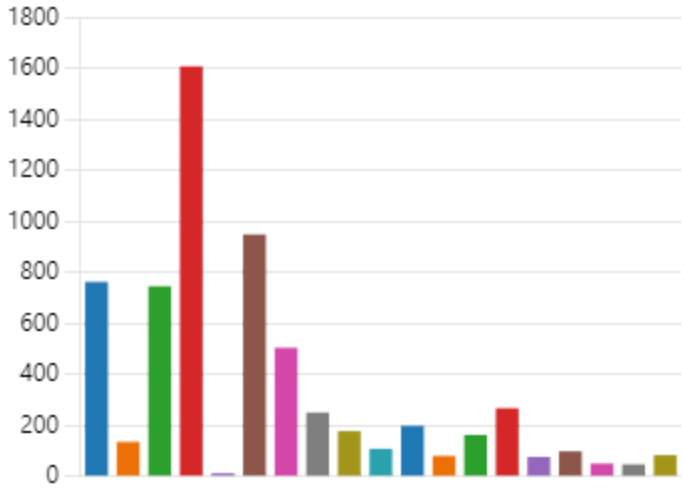
13. What would make you more likely to evacuate during a wildfire?

Visible Flames Close to your Ho...	11
Better Evacuation Information/A...	1
Personal Evacuation Plan	2
Influence From Friends and Fam...	4
Nothing	35
Other	24



14. What are your main concerns with evacuating during a wildfire? (Choose the Top 3)

Getting Out Early	763
Knowing Your Zone	136
Traffic/Accidents	746
Getting Trapped on the Road	1608
Lack of Reliable Transportaion	13
Losing your Home or Property	949
Evacuating Pets/Animals	505
Looting	251
When you can Return Home	178
Kids or Family Members Home ...	109
Where to Go	199
Understanding Evacuation Alert...	81
Road Conditions (Surface Condi...	163
Roadside Vegetation	268
Visitors/Tourists	77
Towing a Trailer/Fifth Wheel or ...	99
Knowing What to Bring	51
I Choose Not to Evacuate	48
Other	84



15. Comments

838
Responses

Latest Responses

Appendix E

High Value Resources and Assets at Risk

High-Value Resources and Assets at Risk

1. High-Value Resources and Assets at Risk Overview

High-Value Resources and Assets (HVRA) at risk are values on the landscape that can be impacted by wildfire. Resources are naturally occurring, and assets are human-made. HVRAs can be influenced positively or negatively by fire. When assessing wildfire risk, the HVRAs' susceptibility to wildfire impacts was determined. The Interagency Fuel Treatment Decision Support System (IFTDSS) classified HVRAs into two categories, Primary-HVRAs and Sub-HVRAs. Primary-HVRAs were the overall categories that Sub-HVRAs were sorted into. Sub-HVRAs were the geospatial components of the Primary-HVRA. For example, if the Primary-HVRA was Critical Power Infrastructure then the Sub-HVRA would be powerlines. Since HVRAs are considered “values” the HVRAs will differ from community to community as different communities would have different priorities for wildfire mitigation. Further, HVRAs allow for the creation of consolidated spatial layers of values which can be used for risk assessments or to estimate the potential impact of a wildfire on a community.

1.1 High-Value Resources and Wildfire Risk Assessments

HVRAs were an important component of wildfire risk assessments. In IFTDSS the process known as the Quantitative Wildfire Risk Assessment (QWRA) calculated the estimated benefit or loss of an HVRA to wildfire impacts based on the fire behavior modeling outputs. HVRAs used in a QWRA were limited to HVRAs of high value or high importance. The scope of the HVRAs should also be appropriate to the size of the analysis area. A limited scope of the HVRAs ensures that the interpretation of the results is manageable and meaningful.

In IFTDSS, HVRAs were identified using Map Values which was the process of creating HVRA sets that were used in the QWRA. HVRA sets were customized to the analysis area and used data from Nevada County, the State of California, and the Federal Government (public data). The Exposure Analysis (EA) in IFTDSS quantified the Landscape Burn Probability, or fire behavior modeling results where they overlapped with the HVRAs. This essentially compared the location of the HVRAs to burn probability, conditional flame length, and integrated fire hazard. The EA determined the likelihood and intensity of the fire based on where the HVRAs were located.

The QWRA can be used to inform land management decisions based on the predicted benefits or threats from wildlife on the HVRAs. QWRA is used to inform treatment prioritization, planning documents, and management activities. The QWRA establishes wildfire risk by taking into account how often fire occurs (likelihood), the intensity of the fire, and the effect on the HVRA

(susceptibility). Wildfire risk differs based on the HVRA. As such the QWRA helps determine strategic locations for fuel treatment based on what is of value, and what is a priority to protect. Further details on the methodology for the QWRA are described in the Wildfire Risk Assessment (WRA) and the Community Wildfire Protection Plan (CWPP).

2. Nevada County High-Value Resources

Recognizing that Nevada County both has a unique fire environment and rural challenges the HVRAs were chosen in a way that captured both factors. The HVRAs for the Nevada County CWPP need to consider the location of the critical assets at risk but also the community values and Nevada County's rural nature. The Primary and Sub-HVRAs were chosen based on both the critical assets needed for a community to effectively exist as well as assets and resources that define why people live in Nevada County. This ensured that the QWRA prioritized areas based on where it was strategic to implement risk reduction activities to facilitate the survival of a community and based on the location of values that a community would consider necessary to thrive. The HVRAs that were selected also capture the unique rural challenges that Nevada County faces when it comes to wildfire. The list was limited to the HVRAs of the highest importance to ensure the analysis was meaningful and consideration was given to focus on larger categories that encapsulated multiple values into one. The selection of the HVRAs was also informed by (1) a County-wide CWPP survey that captured the highest priority values based on the community perception, (2) through engagement with stakeholders, and (3) the Technical Advisory Committee for the Wildfire Risk Assessment. Nevada County Office of Emergency Services (OES) recognizes that this is not an exhaustive list of every possible HVRA in Nevada County. However, it is an informative list that aids in creating priorities project areas for multi-benefit wildfire risk reduction. For the CWPP four Primary-HVRAs were selected: (1) Community Lifelines, (2) Natural Resources, (3) Economic Resources, and (4) Community Health. See Table 1 for a description of the HVRAs.

2.1 Primary-HVRA: Community Lifelines

Community Lifelines are critical assets to a community. According to the Federal Emergency Management Agency (FEMA), Community Lifelines are the fundamental services of a community that enable all other aspects of society. Community Lifelines are considered to be the absolute necessities that have to be in place for a community to exist. When Community Lifelines are disrupted by a disaster such as a wildfire it can make it very difficult for a community to recover from a disaster. As such, Initial response efforts will often focus on protecting Community Lifelines. Essentially Community Lifelines are what make it possible to live within a community. Therefore, Community Lifelines was chosen as a Primary-HVRA. For the Nevada County CWPP, the Sub-HVRAs under Community Lifelines are: Communities, Vulnerable Populations, Critical Water Infrastructure, Critical Transportation Infrastructure, and Critical Power and Communication Infrastructure. See Table 1 for a description of the HVRAs.

2.1.1 Sub-HVRA: Communities

Communities were chosen to be the a Subs-HVRA as many agencies such as OES, have an obligation to protect life and property during the initial response of a disaster, including wildfire. The Communities Sub-HVRA is comprised of two main data sources that represent Nevada County communities' geographic locations and essential community services. Communities were organized based on population density which was determined using the Residentially Developed Populated Areas data. This data set was created by the Federal government to better capture community densities. The data used a combination of census population data and known structure data to determine density based on the location of structures and where people are known to live. There are three population density classes: low density (less than 0 to 28 people per square mile), medium density (greater than 28 to 250 people per square mile), and high density (greater than 250 people per square mile). This data set captures finer population data than traditional census data, especially in rural communities, such as Nevada County. The community services data is based on essential community services that if they are lost in a wildfire would make it difficult for a community to recover. This was added to the Sub-HVRA based on the recommendation from the Technical Advisory Committee (TAC) and their experience with communities recovering from wildfire losses. The community services layer includes information about post offices, grocery stores, and gas stations.

2.1.2 Sub-HVRA: Vulnerable Populations

Recognizing that certain factors can make communities more vulnerable to wildfire impacts, the Sub-HVRA of Vulnerable Populations is included in the Community Lifelines Primary-HVRA. Vulnerable populations are populations within Nevada County that are more vulnerable to wildfire impacts and or are more likely to have a harder time recovering from wildfire. Vulnerable populations include mobile home parks, State and Federally identified low-income and/or disadvantaged communities, homeless shelters, and nursing homes.

2.1.3 Sub-HVRA: Critical Water Infrastructure

Water quality and infrastructure were identified as crucial components of communities. If critical water infrastructure is lost to wildfire or significantly impacted it will be very difficult for a community to be able to rebuild. The Critical Water Infrastructure Sub-HVRA includes both man-made infrastructure and natural water resources that are essential to Nevada County. This includes canals, dams, water storage (private and public), likely locations of wells and septic systems, and wastewater treatment facilities. Wells and septic systems were added to Critical Waster Infrastructure recognizing that Nevada County is a rural residential community and a significant number of residents are not on a city or County water or wastewater systems.

2.1.4 Sub-HVRA: Critical Transportation Infrastructure

Transportation infrastructure was identified as a key component of Community Lifelines. If transportation infrastructure is lost or severely impacted by a wildfire it can make it very difficult for a community to be able to recover by reducing their ability to travel. Loss of transportation infrastructure can also result in geographic isolation of communities. Transportation infrastructure

is not only identified as a critical asset that could be lost from wildfire, it is also a potential source of wildfire ignition due to vehicles. Transportation infrastructure includes in the Critical Transportation Infrastructure HRVA are major roadways, highways, freeways, airports, bridges, railways, and year-long accessible U.S. Forest Service roads.

2.1.5 Sub-HVRA: Critical Power and Communication Infrastructure

The final Sub-HVRA included in the Community Lifelines Primary-HVRA is Critical Power and Communication Infrastructure. Nevada County has experienced impacts on both communication and power infrastructure during wildfires in the past. Prolonged power outages or loss of communication networks can make it very difficult for a community to be resilient from wildfires and other disaster events. Similar to transportation infrastructure, power infrastructure was identified as a potential ignition risk. Therefore, it is strategic to add it to the Community Lifelines Primary-HVRA. The Critical Power and Communication Infrastructure Sub-HVRA included substations, power plants, powerlines, and communication sites. The communication lines include communication tower points recognized by the Federal Communication Commission (FCC) such as AM/FM, cellular, FM, landlines, and TV.

2.2 Primary-HVRA: Natural Resources

In Nevada County, natural resources are both highly valued resources that can be impacted by a wildfire and a wildfire hazard. The majority of our vegetation has adapted in one way or another to exist in a fire-prone environment. However, historical management decisions and fire suppression have resulted in many of the natural resources in Nevada County being overloaded with fuel and presenting a fire hazard. Nevada County is also home to an abundance of natural resources that offer recreational amenities, significant species habitat, and support our watersheds. Further, the community often has a very strong identity tied to these natural resources, such as the South Yuba River. As such it is strategic to identify natural resources as a Primary-HRVA for the protection of these resources and the recognition of the fire hazard that some of them present. The Natural Resources Primary-HVRA includes the following Sub-HVRAs: outdoor recreation resources, watersheds, significant species, oak woodlands, and areas of high climate change resilience.

2.2.1 Sub-HVRA: Outdoor Recreation Resources

Nevada County is home to an abundance of natural resources and outdoor recreational resources that are unique to the landscape. This is partially due to the range of our landscape as it stretches from low-elevation grasslands to high Sierras. There is a wide variety of outdoor recreational resources in Nevada County. Recreational resources are not only a critical resource to protect from negative wildfire impacts but they can also present a wildfire risk. Recreational resources also can present opportunities for multi-beneficial wildfire risk reduction and wildfire hazard mitigation activities. The Outdoor Recreation Resources Sub-HVRA includes trails, parks, the Tahoe National Forest, campgrounds, seasonal U.S. Forest Service Roads, and ski resorts.

2.2.2 Sub-HVRA: Watersheds

Watersheds can be negatively impacted by wildfires which can also impact communities' ability to recover. Watersheds can be impacted by wildfire via sedimentation of water storage infrastructure after the fire, increased erosion, contamination, and degradation of water quality. Wildfire mitigation actions can also be designed to offer multi-beneficial actions that benefit the watershed and communities as well. The Sub-HVRA Watershed includes blue line streams, publicly accessible water bodies, wetlands, and Clean Water Action Act Section 303(D) listed water bodies.

2.2.3 Sub-HVRA: Significant Species

Significant species were identified as threatened or endangered species according to the California Department of Fish and Wildlife and/or the US Department of Fish and Wildlife. Significant species are more likely to be impacted by wildfire and are more vulnerable to negative wildfire impacts. Consideration needs to be given to the location of significant species when designing wildfire mitigation activities to ensure that the activities are not unintentionally impacting listed species. Further, wildfire risk reduction activities can provide habitat improvement when designed strategically. The Significant Species Sub-HVRA includes California and Federally listed endangered and or threatened species' critical habitat. Note this only includes animal species because state and federally-listed plant species are not publicly available.

2.2.4 Sub-HVRA: Oak Woodlands

Oak Woodlands were identified as a significant natural resource. Historically, oak woodlands have been negatively impacted by fire suppression which has resulted in an abundance of ladder and surface fuels encroaching in the oak woodlands. Oak woodlands are also home to many unique California species. Further, mitigation actions have to consider requirements for working within an oak woodland such as avoiding the drip line of the oak tree. The Sub-HVRA Oak Woodlands includes oak woodland areas in Nevada County that are identified by the California Department of Forestry and Fire.

2.2.5 Sub-HVRA: Areas of High Climate Change Resilience

Climate change was considered as the warming climate will likely impact wildfires. In 2017 the State of California did an assessment of climate resilience across the state. Climate resilience is the measure of sensitivity, adaptive capacity, the magnitude of exposure, and potential spatial disruption under climate change. Climate change resilience is considered to be the measure of the ability of an area to adapt and survive climate change. The State assessed climate resilience across different vegetation communities throughout California. A climate resiliency rank was assigned to the vegetation communities as part of the project which informed biological planning priority. Vegetation communities with a rank of four or five were considered to be highly resilient to climate change, indicating that they were more likely to be able to adapt to a warming climate. There is a benefit to protecting areas that are more likely to be able to survive climate change and making them more resilient to wildfire. The Sub-HVRA of Areas of High Climate Change Resiliency includes the state-ranked vegetative communities within Nevada County that scored

the highest rank of A4 or A5 indicating that they are the most likely areas to be able to adapt and survive a warming climate.

2.3 Primary-HVRA: Economic Resources

An important component of wildfire resilience is economic resources. Communities not only need to be able to physically survive a wildfire but they also need to be able to have their economic infrastructure in place so that the community can recover after a wildfire. In California, wildfire has significantly impacted economic resources which impact the community's ability to recover. This is seen in Paradise after the Camp Fire and in rural communities, such as Greenville, after the Dixie Fire. Therefore, it is important to include Economic Resources as a Primary-HVRA in the wildfire risk assessment. In Nevada County, many of our economic resources also double as natural resources, and the economy is tourist-driven and focused on outdoor recreation. The Sub-HRVA of Recreation is also included in economic resources because the potential loss of recreational infrastructure not only will impact natural resources but will also impact the local economy. Historic and cultural buildings as well as government buildings are also included as economic resources.

2.3.1 Sub-HVRA Recreation

Recreation was added as a Sub-HVRA to economic resources because it is a critical natural resource, a critical economic resource, and a wildfire risk in Nevada County. As previously described, in Nevada County many of our recreational resources are also our critical natural resources. However, they also can present a wildfire risk because of the vegetative conditions and the increased likelihood of ignition potential due to people recreating in wildland areas. Further, Nevada County has a tourist-based economy that focuses on outdoor recreation. Therefore, it is strategic for recreation to be identified as an economic resource as well. The Sub-HVRA of Recreation includes the same identified Sub-HVRA Recreational Resources in the Primary-HVRA Natural Resources with the addition of publicly accessible water bodies.

2.3.2 Sub-HVRA: Historic and Cultural Districts

Downtown Nevada City is classified as a historic district by the U.S. Department of the Interior. Downtown Grass Valley and Downtown Truckee are classified as cultural districts by the California Arts Council. These downtowns are popular tourist destinations and are economic epicenters of the respective cities. Further, many of the buildings within the historic and cultural districts predate any fire regulations and are very vulnerable to being impacted by a wildfire. Therefore, it is strategic to include them because of their important part of the economy and their increased vulnerability to wildfire. The Sub-HVRA of Historic and Cultural Districts includes the historic downtown Nevada City and the cultural districts of downtown Grass Valley and Truckee.

2.3.3 Sub-HVRA: Government Buildings

In Nevada County, one of the largest employers is government agencies. This includes local government agencies, state agencies, and federal agencies. Government agencies make up an important part of the Nevada County workforce and the Nevada County economy. The Sub-HVRA

of Government Buildings includes locally owned government buildings and assets owned by the City of Grass Valley, the City of Nevada City, the Town of Truckee, and Nevada County. This includes local fire departments and law enforcement. The Sub-HVRA also contains State government-owned buildings such as Caltrans, CAL FIRE, California Highway Patrol, California State Parks, and more. The federal government building buildings only include U.S Forest Service-owned buildings as there were no available data on Bureau of Land Management buildings in Nevada County.

2.4 Primary-HVRA: Community Health

The final Primary-HVRA that was included in the wildfire risk assessment is the Primary-HVRA of Community Health. Community health focuses on factors that impact the overall health of a community and are potentially impacted by a wildfire. These are assets that if they burn or are impacted by a wildfire will make it much harder for a community to exist or will significantly impact the overall health of a community. The Sub-HVRAs within Community Health are wildfire smoke emission potential, soil vulnerability, listed hazardous waste sites, hospitals and sheltering facilities, and solid waste management facilities.

2.4.1 Sub-HVRA: High Wildfire Smoke Emissions Potential

Wildfires directly impact air quality through emissions particularly fine particulate matter (PM) 2.5. Increased amounts of PM 2.5 in the atmosphere can have direct negative impacts on health. The United States Forest Service assessed the impacts on air quality from wildfires as part of the National Wildfire Risk Assessment in 2020. The assessment modeled the potential for increased PM 2.5 from wildfire smoke and was used to predict areas that if they were to burn would result in increased PM 2.5 in the air. The data did not include information on smoke dispersion or impacts on populations. The assessment focused on identifying areas with the potential to emit increased amounts of PM 2.5 if they were to burn in a wildfire. The original assessment summarizes air quality impacts into three emission potential classes: low PM 2.5 emission potential, moderate PM 2.5 emission potential, and high PM 2.5 emission potential. For the purpose of the wildfire risk assessment only areas that are most likely to emit high amounts of PM 2.5 emissions are included in the Sub-HVRA.

2.4.2 Sub-HRVA: Soil Vulnerability

Wildfires also impact soils. Wildfires can change the chemical composition of soils such as making them hydrophobic or can make them more vulnerable to erosion. This can have a compounded effect if a wildfire makes the soil more likely to experience significant erosion or landslides. Soils that are burned in a wildfire can be contaminated by chemicals from burning structures or other man-made materials. This can result in soil contamination that can impact water systems if increased erosion occurs post-fire. The Sub-HVRA Soil Vulnerability includes soils in Nevada County that are more likely to be vulnerable to erosion after a wildfire such as areas more vulnerable to landslides based on soil type and hydraulic mine scars.

2.4.3 Sub-HRVA: Listed Hazardous Waste Sites

Listed Hazardous Waste Sites are areas in Nevada County that have been identified by the California Department of Toxic Substances Control (DTSC) as hazardous waste sites. Because of the mining history in Nevada County, there are multiple hazardous waste sites across the County. Hazardous waste sites can present a challenge with wildfire because if they burn, they can result in increased contamination. The Sub-HVRA of Listed Hazardous Waste Sites includes all of the identified listed hazardous waste sites in Nevada County according to the Department of Toxic Substances Control.

2.4.4 Sub-HVRA: Hospital and Shelter Facilities

Hospital and sheltering facilities are critical pieces of infrastructure and while they are captured in the Sub-HVRA Communities they are identified a second time because they also contribute greatly to community health. When a wildfire happens, hospitalization rates often increase whether it's from the wildfire itself or wildfire smoke. Shelters are also crucial components of infrastructure as communities will need to utilize sheltering facilities during a wildfire evacuation. The Sub-HVRA of Hospital and Sheltering Facilities includes all of the hospitals within Nevada County, schools within Nevada County, official shelter sites, buildings that can potentially serve as a shelter, and libraries.

2.4.5 Sub-HVRA: Solid Waste Management Facilities

Solid waste management facilities are included in the Primary-HVRA of Community Health. Solid waste management facilities can present challenges when it comes to wildfires. If solid waste management facilities burn not only does the community not have the ability to dispose of their waste it can also present a hazardous condition that impacts community health. This was seen in the 2021 Alisal Fire when the solid waste management facility on the Gaviota Coast caught on fire. The Sub-HVRA of Solid Waste Management Facilities includes all of the identified solid waste management sites according to the State of California which also includes facilities that were no longer operating.

TABLE 1: HIGH-VALUE RESOURCES AND VALUES AT RISK

Primary-HVRA		
Community Lifelines		
Sub-HVRA	**Data Description**	**Additional Information**
Communities	Community densities (and essential community services)	Community densities include high, medium, and low density. essential community services include grocery stores, gas stations, and post offices

Vulnerable Populations	Populations with a higher vulnerability to wildfire	Vulnerable populations include mobile home parks, identified low-income or disadvantaged communities, homeless shelters, and nursing homes
Critical Water Infrastructure	Critical water infrastructure in Nevada County, including wastewater	Critical water infrastructure includes canals, dams, water storage, wells and septic systems, and water/wastewater treatment facilities
Critical Transportation Infrastructure	Critical transportation infrastructure in Nevada County	Critical transportation infrastructure includes major roads, highways and freeways, airports, bridges, railways, and year-round accessible USFS roads
Critical Power and Communication Infrastructure	Critical power infrastructure including power generation and communication facilities.	Critical power and communication infrastructure includes substations, power plants, transmission lines, and communication sites
Primary-HVRA		
Natural Resources		
Sub-HVRA		
Outdoor Recreation Resources	Outdoor recreation resources in Nevada County	Outdoor recreation resources include public trails, public parks, the Tahoe National Forest, campgrounds, seasonal USFS roads, and ski resorts
Watershed	Watershed features in Nevada County	Watersheds include blueline streams, public water bodies, wetlands, and Clean Water Act Section 303(D) listed water bodies
Significant Species	State and/or Federally listed endangered or threatened species	State and/or Federally listed endangered or threatened species critical habitat (wildlife).

Oak Woodlands	Oak woodlands in Nevada County	Oak woodlands in Nevada County
Areas of High Climate Change Resiliency	Areas in Nevada County that were more resilient to climate change impacts	Areas of Nevada County that are more likely to adapt to climate change and be resilient to climate impacts based on the State of California's Assessment on Terrestrial Climate Change Resilience
Primary-HVRA		
Economic Resources		
Sub-HVRA		
Recreation	Recreation resources in Nevada County	Recreational Resources in Nevada County identified in the Outdoor Recreation Sub-HVRA, plus public water bodies
Historic and Cultural Districts	Historic and Cultural Districts in Nevada County	Historic and Cultural Districts include historic downtown Nevada City and the cultural districts of downtown Grass Valley and downtown Truckee
Government Buildings	Government-owned buildings and facilities in Nevada County	Government buildings include government-owned buildings and facilities for local government, state agencies, and federal agencies in Nevada County.
Primary-HVRA		
Community Health		
Sub-HVRA		
High Wildfire Smoke Emissions Potential	Areas likely to emit wildfire smoke emissions	Areas in Nevada County that are likely to result in a significant increase in PM 2.5 if burned in a wildfire
Soil Vulnerability	Areas more vulnerable to erosion	Areas that have a higher potential for erosion and are

		more likely to have soil slippage after a fire including soil types vulnerable to landslides and hydraulic mine sites
Listed Hazardous Waste Sites	Listed hazardous waste sites in Nevada County	Listed hazardous waste sites in Nevada County according to the California Department of Toxic Substances Control (DTSC)
Hospital and Shelter Facilities	Hospital and shelter sites in Nevada County	Hospitals and shelter facilities including official shelter sites and potential sites such as schools, community centers, and libraries
Solid Waste Management Facilities	Sold waste management facilities in Nevada County	Identified solid waste management facilities in Nevada County including non-operable facilities

MEMORANDUM

Subject: Wildfire Risk Assessment 2024 Addendum
Date: September 2024
Attachment(s): None

1. Overview

The Wildfire Risk Assessment (WRA) was completed in December 2023 after a final review by the Technical Advisory Committee (TAC) and the CAL FIRE Nevada Placer Yuba (NEU) Unit Chief. To support the development of the Community Wildfire Protection Plan (CWPP) field assessments were completed by the CWPP consultants across the County to assess the fire environment and wildfire hazard. As a result of the CWPP field assessments, an additional wind-driven fire (revised wind-driven scenario) analysis was prepared to support the WRA. The revised wind-driven analysis includes a supplementary Landscape Burn Probability (LBP) model and a Quantitative Wildfire Risk Assessment (QWRA) model. The additional modeling analysis was used to update the Project Priority Areas and identify additional opportunities for wildfire risk reduction activities.

The following memo describes the results of the additional modeling analysis which are to be considered in conjunction with the WRA. The additional analysis was prepared using the same methodology as the previous models. For details on the methodology used to prepare the analysis for the Addendum please refer to the WRA Sections 2 Wildfire Hazard Assessment, Section 3 Wildfire Risk Assessment, and Section 4 Project Priority Areas.

1.1 Wildfire Hazard Assessment Results – Revised Wind-Driven Fire Scenario

The following section discusses the Integrated Hazard Results for the revised wind-driven scenario. The results include Nevada County and the four Forecast Zones (FZ). Results from the conditional flame length and burn probability were incorporated into the Integrated Hazard results and can be found in Appendix B and Appendix C of the WRA. The following discussion is to be considered in addition to the Wildfire Hazard Assessment results in the WRA Section 2.2 Wildfire Hazard Assessment Results.

1.1.1 Integrated Hazard Results – County Scale Revised Wind-Driven Fire Scenario

Acres classified as Non-Burnable for each FZ in the revised wind-driven scenario remain as the previous results since the location of the built environment is static. Pixels that are classified as Burnable but Not Burned are 1% within each FZ. The majority of burnable pixels are classified as either Moderate, High, or Very High Priority Hazard, with the exception of the Truckee/Donner

FZ. Lowest Priority Hazard ranges from 7% to 22% across the County with the largest concentration occurring in the granite outcrops located north of Emigrant Gap. Lower Priority Hazard ranges from 10% to 20% and are distributed across the County and tend to occur adjacent to other priority hazard classifications. Moderate Priority Hazard occurs throughout the County with concentrated groups at the western and eastern edges of the County with percentages ranging from 11% to 33% of burnable pixels. Burnable pixels that are classified as High Priority Hazard are intermixed with the other priority hazard classifications. There are more contiguous groups at the south end of the County, along Highway 20, and North of Truckee. Very High Priority Hazard mostly occurs along the river canyons in the center of the County (Table 1 and Addendum Figures).

TABLE 1: INTEGRATED HAZARD RESULTS – REVISED WIND-DRIVEN FIRE SCENARIO

Integrated Hazard Class	Higgins/Penn Valley (Acres/%)	Grass Valley/Nevada City (Acres/%)	Tahoe National Forest Area (Acres/%)	Truckee/Donner (Acres/%)
Non-Burnable	12,280 (9%)	16,000 (12%)	25,251 (11%)	17,246 (16%)
Burnable but Not Burned	1,886 (1%)	1,500 (1%)	1,842 (1%)	1,522 (1%)
Lowest Priority Hazard	10,229 (7%)	9,344 (7%)	49,880 (21%)	23,789 (22%)
Lower Priority Hazard	20,879 (15%)	13,329 (10%)	36,442 (16%)	22,026 (20%)
Moderate Priority Hazard	47,480 (33%)	15,915 (12%)	24,968 (11%)	27,008 (25%)
High Priority Hazard	34,866 (24%)	23,450 (17%)	39,579 (17%)	14,200 (13%)
Very High Priority Hazard	16,176 (11%)	56,686 (42%)	56,907 (24%)	2,616 (2%)

1.1.2 Integrated Hazard Results – Forecast Zone Scale Revised Wind-Driven Fire Scenario

Higgins/Penn Valley

The revised wind-driven scenario results in more distribution amongst the upper end of priority hazard classifications (Moderate, High, and Very High). Sixty percent (68%) of pixels are classified as either Moderate, High, or Very High Priority Hazards. Whereas, 22% of pixels are considered to be the Lowest or Lower Priority Hazard. The highest percentage of burnable pixels

classified as a priority hazard is in the Moderate Priority Hazard classification with 33% (Table 1 and Addendum Figures).

Grass Valley/Nevada City

In the revised wind-driven scenario for Grass Valley/Nevada City FZ the majority of pixels are classified as either Moderate, High, or Very High Priority Hazard. Seventy-one percent (71%) of burnable pixels are in the three highest-priority hazard classifications, with the highest percentage (42%) in the Very High Priority Hazard classification. In total, 17% of burnable pixels are Lower or Lowest Priority Hazard (Table 1 and Addendum Figures).

Tahoe National Forest Area

The revised wind-driven scenario results in the Tahoe National Forest Area FZ follow a similar pattern as the Higgins/Penn Valley and Grass Valley/Nevada City FZ with the majority of burnable pixels (52%) being either Moderate, High, or Very High Priority Hazard with the highest percentage (24%) of burnable pixels in the Very High Priority Hazard classification. Thirty-seven percent (37%) of burnable pixels are classified as either Lower or Lowest Priority Hazard (Table 1 and Addendum Figures).

Truckee/Donner

In the Truckee/Donner FZ 40% of burnable pixels are classified as Moderate, High, or Very High and 42% are classified as Lower and Lowest Priority Hazard. Moderate Priority Hazard has the largest percentage of burnable pixels with 25% (Table 1 and Addendum Figures).

1.2 Integrated Hazard Results Discussion – Revised Wind-Driven Fire Scenario

1.2.1 Integrated Hazard Discussion – County Scale Revised Wind Driven-Fire Scenario

In the revised wind-driven scenario, there is less alignment between significant topographic features and the High or Very High Priority Hazard classification. This results in the concentrated areas not being confined to major topographic features such as river canyons. In the revised wind-driven scenario, there is increased distribution of the High and Very High Priority classifications across the landscape. In the Higgins/Penn Valley FZ the Highest Hazard classification occurs in the McCourtney area, south of the South Yuba River, and west of Highway 49. In the Grass Valley/Nevada City FZ, the High and Very High Priority Hazard are more evenly distributed across the analysis area with large concentrations of the Very High Priority Hazard classification in the San Juan Ridge, Middle South Yuba River, and Bear River. The Tahoe National Forest Area FZ has the Very High Priority Hazard and is still concentrated areas of the Highest Priority Hazard along the Middle and South Yuba River Canyon as well as Highway 20 and Scott's Flat Reservoir. In the Truckee/Donner FZ, the Highest Priority Hazard areas are north of Tahoe Donner and in the Russell Valley area north of Prosser and Boca Reservoirs (Addendum Figures).

1.2.2 Integrated Hazard Discussion – Forecast Zone Scale Revised Wind-Driven Fire Scenario

Higgins/Penn Valley

In the revised wind-driven scenario results there are less concentrated areas of Lower and Lowest Priority Hazard. Moderate Priority Hazard is very concentrated in the southern half of the FZ. This area tends to be less topographically diverse and dominated by Oak woodlands and grass fuel. The concentrated areas of High and Highest Priority Hazard in the FZ are south of the South Yuba River, in the South Ponderosa area, and west of Highway 49 (Addendum Figures).

Grass Valley/Nevada City

In the revised wind-driven scenario, there is an increase in burnable pixels classified as High and Very High Priority Hazards. There is also a decrease in the concentration of these pixels in the river canyons as the pixels are more evenly dispersed across the FZ. This is consistent with expected fire behavior since in a northeasterly wind scenario the fire would be less constrained by topography. Notably, the San Juan Ridge and the Bear River are where many of the Very High Priority Hazard classifications are concentrated (Addendum Figures).

Tahoe National Forest Area

In the revised wind-driven the eastern half of the FZ is dominated by the Lower and Lowest Priority Hazard Classification. Again, this is consistent with the landscape as this area of the FZ contains headwaters and meadow areas. The western half of the FZ is where the majority of pixels classified as either High, or Very High Priority Hazard Classification are located. They are especially concentrated around the Middle Yuba River, the South Yuba River, Highway 20, and Scott's Flat. These pixels tend to occur along the top of ridgelines in addition to being located in steep drainages, which is consistent with the northeastern wind direction (Addendum Figures).

Truckee/Donner

In the revised wind-driven scenario, the priority classification is similar to the previous modeling results in the FZ. The majority of fuels in the Lower and Lowest Priority Hazard classification are west of Donner Summit and areas classified as either Moderate, High, or Very High Priority hazard east of Donner Summit. This is consistent with the changes in fire environment due to the granite outcrops and differences in fuel type and density. The locations of these pixels are generally in the same areas as in previous scenarios. There are changes in how the pixels are concentrated and distributed but they tend to occur by the Highway 89 Corridor, Highway 80 Corridor, Prosser Reservoir, Boca Reservoir, and in the Martis Valley area. This is consistent with the northeast wind direction in this scenario.

1.3 Wildfire Risk Assessment Results – Revised Wind-Driven Fire Scenario

The following describes the results of the Quantitative Wildfire Risk Assessment (QWRA) for each High-Value Resource and Asset (HVRA) at risk in each Forecast Zone (FZ) under the revised wind-driven scenario. The maps for these results are displayed in the Addendum Figures.

The Interagency Fuels Treatment Decision Support System (IFTDSS) classifies wildfire risk on a scale from Highest Threat to Highest Benefit. This is converted to Very High Priority Benefit through Very High Priority Risk as described in the Wildfire Risk Assessment (WRA) Section 3.1.5. The results are derived from the Expected Weighted Net Value Change (EwNVC), which analyzes the likelihood of a fire occurring and the effect on an HVRA. As described in the WRA Section 3.1.5, the EwNVC intersects the wildfire hazard with the likelihood of occurrence and the potential impact on an HVRA and is best used for planning scenarios where the likelihood of a fire needs to be considered, such the placement of fuel treatments, and therefore was selected to be the output of the QWRA. The results from the EwNVC indicate which areas in the County are more likely to experience effects from wildfire and can potentially benefit from wildfire risk reduction activities. However, the final product of the overall Wildfire Risk Assessment (WRA) is the Project Priority Areas which is described in the WRA Section 4. The EwNVC is valuable in determining what is at risk in Nevada County and the delineation of the Project Priority Areas. The analysis of the EwNVC is separated into the County-scale and the FZ-scale. The QWRA prioritization includes the Burn Probability results from the Integrated Hazard, a process that relies on comparing each pixel against the analysis maximum (the highest value in the model extent). Therefore, like the Integrated Hazard results the FZs cannot be compared against each other. However, trends can be identified and discussed at the County-scale.

1.3.1 Wildfire Risk Assessment Results – County Scale Revised Wind-Driven Scenario

In the revised wind-driven scenario the number of acres classified as Non-Burnable, is the same as in previous scenarios in the WRA due to the static nature of the built environment. In the revised wind-driven scenario 1% (6,750 acres) are classified as Burnable but Not Burned. The Primary-HRVA with the least acres classified as No Impact is the Community Lifelines Primary-HVRA and Economic Resources has the most acres classified as No Impact. No Impact generally occurs because there is no HVRA in that location. Within each Primary-HVRA, the majority of burnable pixels are either classified as High or Very High Priority Risk and range from 5% to 58%. The Primary-HVRA Natural Resources is the only Primary-HVRA to have areas classified as experiencing a potential benefit from wildfire. Where the High and Very High Priority Risk classifications occur is directly related to where the HVRAs are. (See Table 2 and Addendum Figures)

TABLE 2: NEVADA COUNTY RISK ASSESSMENT RESULTS – REVISED WIND-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	70,777 (11%)	70,777 (11%)	70,777 (11%)	70,777 (11%)
Burnable but Not Burned	6,750 (1%)	6,750 (1%)	6,750 (1%)	6,750 (1%)
No Impact	52,140 (8%)	89,169 (14%)	176,546 (28%)	385,762 (62%)
Very High Priority Benefit	0 (0%)	0 (0%)	4,494 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	3,690 (0%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	689 (0%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	20 (0%)	0 (0%)
Lowest Priority Risk	407 (0%)	52 (0%)	93 (0%)	0 (0%)
Lower Priority Risk	3,151 (0%)	1,311 (0%)	2,236 (0%)	366 (0%)
Moderate Priority Risk	25,645 (4%)	11,867 (2%)	16,794 (3%)	5,059 (0%)
High Priority Risk	104,846 (17%)	88,328 (14%)	72,455 (12%)	31,044 (5%)
Very High Priority Risk	359,581 (58%)	355,044 (57%)	266,754 (43%)	123,539 (20%)

1.3.2 Wildfire Risk Assessment Results – Forecast Zone Scale Revised Wind-Driven Scenario

As previously mentioned, the Quantitative Wildfire Risk Assessment (QWRA) determines the risk of High-Value Resources and Assets (HVRAs) at risk of being impacted by wildfire and

prioritization of that risk. Prioritization is based on the likelihood of a fire occurring, the importance of the HVRA, and the resulting impact on the HVRA. As such, the results from one Forecast Zone (FZ) cannot be compared to another FZ, but results within the respective FZ can be. The following describes the risk assessment results by FZ.

Higgins/Penn Valley

In the revised wind-driven scenario 9% (12,280 acres) of the FZ are classified as Non-Burnable across all four Primary-HVRA risk assessments and 1% (1,886 acres) are Burnable but Not Burned. Pixels classified as No Impact range from 11% to 87%. Seventy-eight percent (78%) of pixels in the Community Lifelines risk assessment are either High or Very High Priority Risk with 76% classified as Very High Priority Risk. Fifty-six percent (56%) of the burnable pixels in the Community Health risk assessment are classified as either High of Very High Priority Risk. In the Natural Resources risk assessment, 6% of the burnable pixels are either High or Very High Priority Benefit and 61% are either High or Very High Priority Risk from wildfire. Finally, in the Economic Resources risk assessment, only 3% of burnable pixels are impacted and are classified as Very High Priority Risk. (Table 3).

TABLE 3: HIGGINS/PENN VALLEY RISK ASSESSMENT RESULTS – REVISED WIND-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	12,280 (9%)	12,280 (9%)	12,280 (9%)	12,280 (9%)
Burnable but Not Burned	1,886 (1%)	1,886 (1%)	1,886 (1%)	1,886 (1%)
No Impact	16,321 (11%)	48,353 (34%)	31,857 (22%)	124,643 (87%)
Very High Priority Benefit	0 (0%)	0 (0%)	5,475 (4%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	2,807 (2%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	506 (0%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	18 (0%)	0 (0%)
Lowest Priority Risk	0 (0%)	0 (0%)	27 (0%)	0 (0%)
Lower Priority Risk	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Moderate Priority Risk	995 (1%)	234 (0%)	237 (0%)	0 (0%)
High Priority Risk	3,530 (2%)	1,301 (1%)	3,218 (2%)	4 (0%)
Very High Priority Risk	108,785 (76%)	79,744 (55%)	85,488 (59%)	4,984 (3%)

Grass Valley/Nevada City

The same number of pixels (12%) are classified as Non-Burnable in the revised wind-driven scenario as in previous scenarios results in the WRA. One percent (1%) (1,500 acres) of the pixels in the FZ are Burnable but Not Burned in the revised wind-driven scenario. Pixels classified as No Impact range from 5% to 79%. Seventy-six percent (76%) of the burnable pixels in the

Community Lifelines risk assessment are classified as High of Very High Priority Risk. In the Community Health risk assessment, 74% of the pixels are either High or Very High Priority Risk. One percent (1%) of pixels are considered to be Very High Priority Benefit in the Natural Resource risk assessment and 1% are classified as High Priority Benefit. However, 25% of the burnable pixels are considered to be High of Very High Priority Risk. In the Economic Resources risk assessment, only 8% of pixels are considered burned and they are classified as Very High Priority Risk. (Table 4).

TABLE 4: GRASS VALLEY/NEVADA CITY RISK ASSESSMENT RESULTS – REVISED WIND-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	16,000 (12%)	16,000 (12%)	16,000 (12%)	16,000 (12%)
Burnable but Not Burned	1,500 (1%)	1,500 (1%)	1,500 (1%)	1,500 (1%)
No Impact	6,389 (5%)	13,304 (10%)	82,652 (61%)	107,949 (79%)
Very High Priority Benefit	0 (0%)	0 (0%)	1,019 (1%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	866 (1%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	179 (0%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	2 (0%)	0 (0%)
Lowest Priority Risk	0 (0%)	0 (0%)	2 (0%)	0 (0%)
Lower Priority Risk	2 (0%)	0 (0%)	0 (0%)	0 (0%)
Moderate Priority Risk	884 (1%)	335 (0%)	111 (0%)	0 (0%)
High Priority Risk	8,165 (6%)	4,862 (4%)	860 (1%)	68 (0%)
Very High Priority Risk	103,285 (76%)	100,204 (74%)	33,034 (24%)	10,708 (8%)

Tahoe National Forest Area

In the revised wind-driven scenario, 11% (25,251 acres) of pixels are classified as Non-Burnable. One percent (1%) (1,842 acres) are classified as Burnable but Not Burned in the revised wind-driven scenario. In the Community Lifelines risk assessment, for the revised wind-driven scenario,

71% of the burnable pixels fell in either the High or Very High Priority Risk classification. For Community Health, 79% of the burnable pixels are classified as either High or Very High Priority Risk. In the Natural Resources risk assessment, there is 0% of pixels to be considered as having a priority benefit from wildfire. However, 65% of the burnable pixels are High of Very High Priority Risk. Forty-four (44%) of the burnable pixels in the Economic Resources Risk Assessment are High or Very High Priority Risk. (Table 5).

TABLE 5: TAHOE NATIONAL FOREST RISK ASSESSMENT RESULTS– REVISED WIND-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	25,251 (11%)	25,251 (11%)	25,251 (11%)	25,251 (11%)
Burnable but Not Burned	1,842 (1%)	1,842 (1%)	1,842 (1%)	1,842 (1%)
No Impact	23,535 (10%)	14,725 (6%)	46,116 (20%)	98,744 (42%)
Very High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	17 (0%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	4 (0%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Risk	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lower Priority Risk	1,238 (1%)	90 (0%)	407 (0%)	0 (0%)
Moderate Priority Risk	16,419 (7%)	6,518 (3%)	9,532 (4%)	3,814 (2%)
High Priority Risk	65,756 (28%)	58,702 (25%)	46,830 (20%)	24,547 (10%)
Very High Priority Risk	100,828 (43%)	127,741 (54%)	104,870 (45%)	80,672 (34%)

Truckee/Donner

The revised wind-driven scenario has the same number of pixels (16%) as previous scenarios results in the WRA. One percent (1%) (1,522 acres) are Burnable but Not Burned and the percentage of pixels in the No Impact classification ranges from 5% to 50%. The percentage of pixels classified as High or Very High Priority Risk in the Community Lifelines risk assessment is 68%. And in the Community Health risk assessment, the percentage is 66%. In the revised wind-driven scenario there are no pixels considered to have a priority benefit from wildfire in the natural resources risk assessment. However, 60% of the burnable pixels in the Natural Resources risk assessment are either High or Very High Priority Risk. In the Economic Resources risk assessment, 31% of the burnable pixels are classified as either High or Very High Priority Risk. (Table 6).

TABLE 6: TRUCKEE/DONNER RISK ASSESSMENT RESULTS – REVISED WIND-DRIVEN SCENARIO

Expected Weighted NVC	Community Lifelines (acres/percent)	Community Health (acres/percent)	Natural Resources (acres/percent)	Economic Resources (acres/percent)
Non-Burnable	17,246 (16%)	17,246 (16%)	17,246 (16%)	17,246 (16%)
Burnable but Not Burned	1,522 (1%)	1,522 (1%)	1,522 (1%)	1,522 (1%)
No Impact	5,895 (5%)	12,787 (12%)	15,921 (15%)	54,426 (50%)
Very High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
High Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Moderate Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lower Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Benefit	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowest Priority Risk	407 (0%)	52 (0%)	64 (0%)	0 (0%)
Lower Priority Risk	1,911 (2%)	1,221 (1%)	1,829 (2%)	366 (0%)
Moderate Priority Risk	7,347 (7%)	4,760 (4%)	6,914 (6%)	1,245 (1%)
High Priority Risk	27,395 (25%)	23,463 (22%)	21,547 (20%)	6,425 (6%)
Very High Priority Risk	46,683 (43%)	47,355 (44%)	43,362 (40%)	27,175 (25%)

1.4 Wildfire Risk Assessment Discussion – Revised Wind-Driven Scenario

The following is a discussion of the results from the Quantitative Wildfire Risk Assessment (QWRA) at both the County and Forecast Zone (FZ) scale for the revised wind-driven scenario to be considered in addition to the results discussed in the Wildfire Risk Assessment (WRA) Section 3.3 Wildfire Risk Assessment Discussion. The results from the QWRA are not the final results of the wildfire risk modeling process. These results are used to add to the Project Priority Areas which are the final result of the WRA. The following sections provide context to how the Project Priority Areas were determined.

1.4.1 Wildfire Risk Assessment Discussion – County Scale Revised Wind-Driven Scenario

In the results for the revised wind-driven scenario for the County-scale Wildfire Risk Assessment, the majority of burnable pixels are classified as either High or Very High Priority per the HVRA risk assessments. As with the WRA, the analysis focuses on the combination of pixels that are classified as either High or Very High Priority Risk so that the scope of the risk analysis is not overly narrow and allows for more areas to be considered for potential wildfire risk reduction activities. Further, where these pixels occur is consistent with previous scenarios discussed in the WRA. This is largely because the locations of High or Very High Priority Risk classification are driven by where the HVRAs are located, which is the same in all risk assessments for all scenarios, and the results from the Integrated Hazard.

In the revised wind-driven scenario, Community Lifelines risk assessments, the High and Very High Priority Risks occur adjacent to the communities. The locations are generally consistent across the risk assessments per HVRA and FZ. For instance, the Community Health risk assessment has pixels classified as High or Very High Priority Risk that are located around communities with some concentrated areas in the Higgins/Penn Valley FZ and in the Tahoe National Forest. In the Natural Resources Risk assessment, there are some more notable changes in the distribution of the results as it is the only risk assessment where fire could be potentially beneficial to the HVRA. The Economic Resource HVRA follows the same pattern as the results from the original WRA. Once again, the majority of the landscape is not impacted. This is due to the relationship between Economic Resources and Natural Resources in Nevada County. As discussed in the WRA, in Nevada County, the economy is directly tied to the environment itself due to tourism, especially recreation-based tourism. Therefore, it is not possible to separate economic resources in a meaningful way as they are components of all the HVRAs. Further, as a result, Economic Resources HVRA is very vulnerable to wildfire given that any impact on the other identified HVRAs also has the potential to impact the Economic Resources in Nevada County. For these reasons, the results from the Economic Resources risk assessments are once again not further analyzed in the beyond-the County scale discussion of the risk assessments both in the WRA and the Addendum.

1.4.2 Wildfire Risk Assessment Discussion – Forecast Zone Scale

Below is a discussion of the results from the risk assessments for each HVRA within each Forecast Zone (FZ). This discussion is included to provide more context to the results at the FZ level and generally is limited to describing where these classifications occur and some differences and similarities within the results. The following discussion is to be considered in addition to the discussion in the WRA.

Higgins/Penn Valley

In the Higgins/Penn Valley FZ the results for the Community Lifelines pixels classified as either High Priority or Very High Priority Risk are adjacent to communities. For instance, the communities of Lake Wildwood, Penn Valley, Highway 49, Lake of the Pines, and Alta Sierra have large concentrations of Very High Priority Risk around them. In the revised wind-driven scenario, there are more areas classified as Very High Priority Risk than High Priority Risk. However, because High and Very High Priority Risks are being considered together this is not a significant change (see Addendum Figures). For the Community Health risk assessment generally, burnable pixels are classified as High or Very High Priority Risk. There is overlap in where these locations occur between the Community Lifelines results and the Community Health results. Within the Higgins/Penn Valley FZ, the Natural Resources risk assessment does indicate the potential for HVRAs to have a potential benefit from exposure to wildfire. This is largely due to the presence of Oak Woodlands within this FZ. The remainder of the pixels in the Natural Resources risk assessment tend to be classified as High or Very High Priority Risk. Areas considered to have a potential benefit from wildfire will still benefit from wildfire risk reduction activities. Therefore, these results are not excluded from helping to inform the location of the Project Priority Areas.

Grass Valley/Nevada City

The Grass Valley/Nevada City FZ is generally where the majority of communities in Nevada County are concentrated. Therefore, the results from the Community Lifelines risk assessment are more contiguous in the FZ. Once again, the areas that are classified as either High or Very High Priority Risk tend to occur adjacent to communities. The results from the risk assessment for Community Health in the Grass Valley/Nevada City FZ follow a similar pattern to the Community Lifelines results. Meaning that there is overlap in the occurrence of either High or Very High Priority Risk areas between the two HVRAs and this tends to be around developed areas. The results from the Natural Resources risk assessment in the Grass Valley/Nevada City FZ are not as distributed across the FZ and this tends to occur where there are concentrations of Natural Resources. This is expected given that the majority of Grass Valley/Nevada City is where the Community Lifelines and Community Health HVRAs are concentrated because of the amount of development in this FZ.

Tahoe National Forest Area

The Tahoe National Forest Area FZ has the least number of developed communities. However, within the FZ there are very critical Community Lifelines related to critical community

infrastructure. The location of pixels classified as either Very High Priority Risk tend to occur west of the Emigrant Gap and around the South Yuba River drainage. The results from the Community Health risk assessment are consistent with the results from the Community Lifelines risk assessment. Meaning, that the majority of pixels classified as Very High Priority Risk are also concentrated in the South Yuba River drainage or west of Emigrant Gap. Within the Tahoe National Forest Area FZ, is one of the largest natural resource concentrations within Nevada County as this FZ includes the majority of the Tahoe National Forest itself. Therefore, it is unsurprising that the results from the Natural Resources risk assessment have quite a bit of continuity within the FZ.

Truckee/Donner

In the Truckee/Donner FZ the results from the Community Lifelines risk assessment has a concentration of High Priority and Very High Priority Risk around communities such as Tahoe Donner, Donner Lake, Truckee, Highway 89, and Glenshire. They are also concentrated around critical infrastructure resources such as Interstate 80. The results from the Community Health risk assessments in both scenarios tend to follow the same pattern as the results from the Community Lifelines. One notable difference is that in the Community Health results, there are more areas of No Impact scattered throughout the High and Very High Priority Risk areas than there were in the Community Lifelines results. The results from the Natural Resources risk assessment also tend to occur within the same locations as the Community Lifelines and the Community Health results.

1.5 Project Priority Areas

The main goal of the Wildfire Risk Assessment (WRA) was to use the modeling analysis to determine priority areas for wildfire risk reduction projects based on the intersection of wildfire risk and the values of the Nevada County community. This ensured that the WRA is not only identifying areas for strategic risk reduction based on the wildfire hazard but strategically calling out areas to be prioritized for wildfire risk reduction that could provide multiple benefits to the community. By taking this approach, Nevada County will be able to design more holistic wildfire projects and establish a landscape-level perspective of wildfire resiliency. This approach will also allow for greater diversity in the type of wildfire mitigation projects that could be identified and for greater participation in wildfire risk reduction scales across the County.

As discussed in the WRA Section 4.1 Project Priority Area Methodology, the Project Priority Areas are created by overlapping high-priority values that are at high levels of risk from wildfire. The risk categories of High Priority and Very High Priority Risk are considered together for the analysis. Areas where there is overlap between the three Primary-HVRAs of Community Lifelines, Community Health, and Natural Resources, are determined to be Project Priority Areas with the Highest Priority for wildfire risk reduction activities as they would provide the highest level of multi-benefits. Areas where only Community Lifelines and Community Health overlap are Project Priority Areas of High Priority because while they would still provide multiple benefits for wildfire risk reduction activities they would be less than the highest level.

The results from the revised wind-driven scenario were combined with the original Project Priority Area analysis to capture any additional areas. As the geographic distribution of the updated Project Priority Areas is very similar to the original analysis the following section provides updated acreage for each Project Priority Area classification at both the County and Forecast Zone (FZ) Scale (Table 7).

TABLE 24: PROJECT PRIORITY AREAS UPDATED ACRES

Scale	**High Priority:** Community Community Lifelines and Community Health (Acres)	**Highest Priority:** Community Lifelines, Community Health, and Natural Resources (Acres)
Nevada County	407,678	265,297
Higgins/Penn Valley Forecast Zone	77,085	52,661
Grass Valley/Nevada City Forecast Zone	100,054	29,982
Tahoe National Forest Area Forecast Zone	162,080	126,308
Truckee/Donner Forecast Zone	68,459	56,347

Addendum Figures

Wildfire Hazard Assessment

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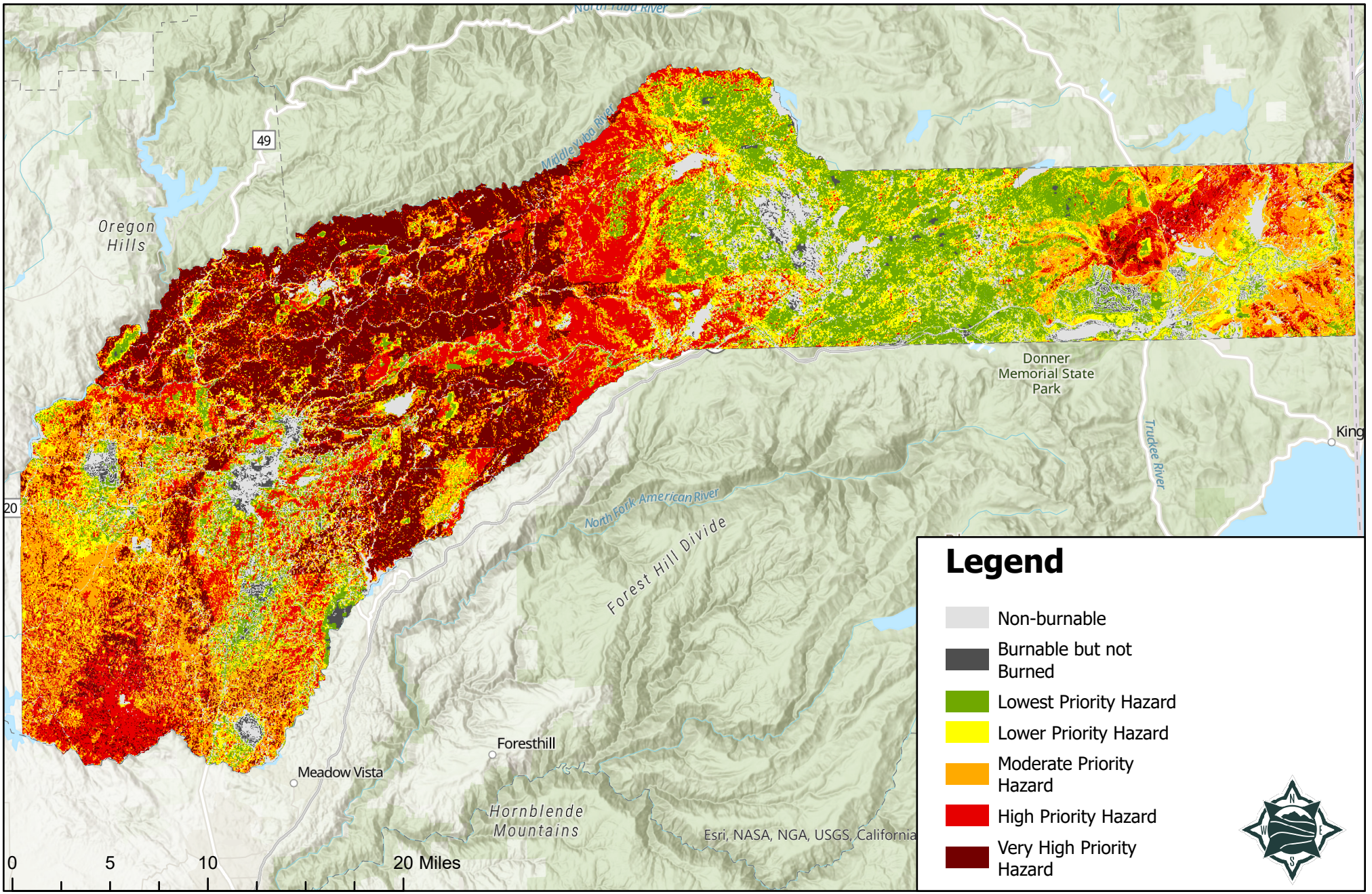
Nevada County Integrated Hazard: Revised Wind-Driven Fire Scenario

Addendum



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Higgins/Penn Valley Forecast Zone Integrated Hazard: Revised Wind-Driven Fire Scenario

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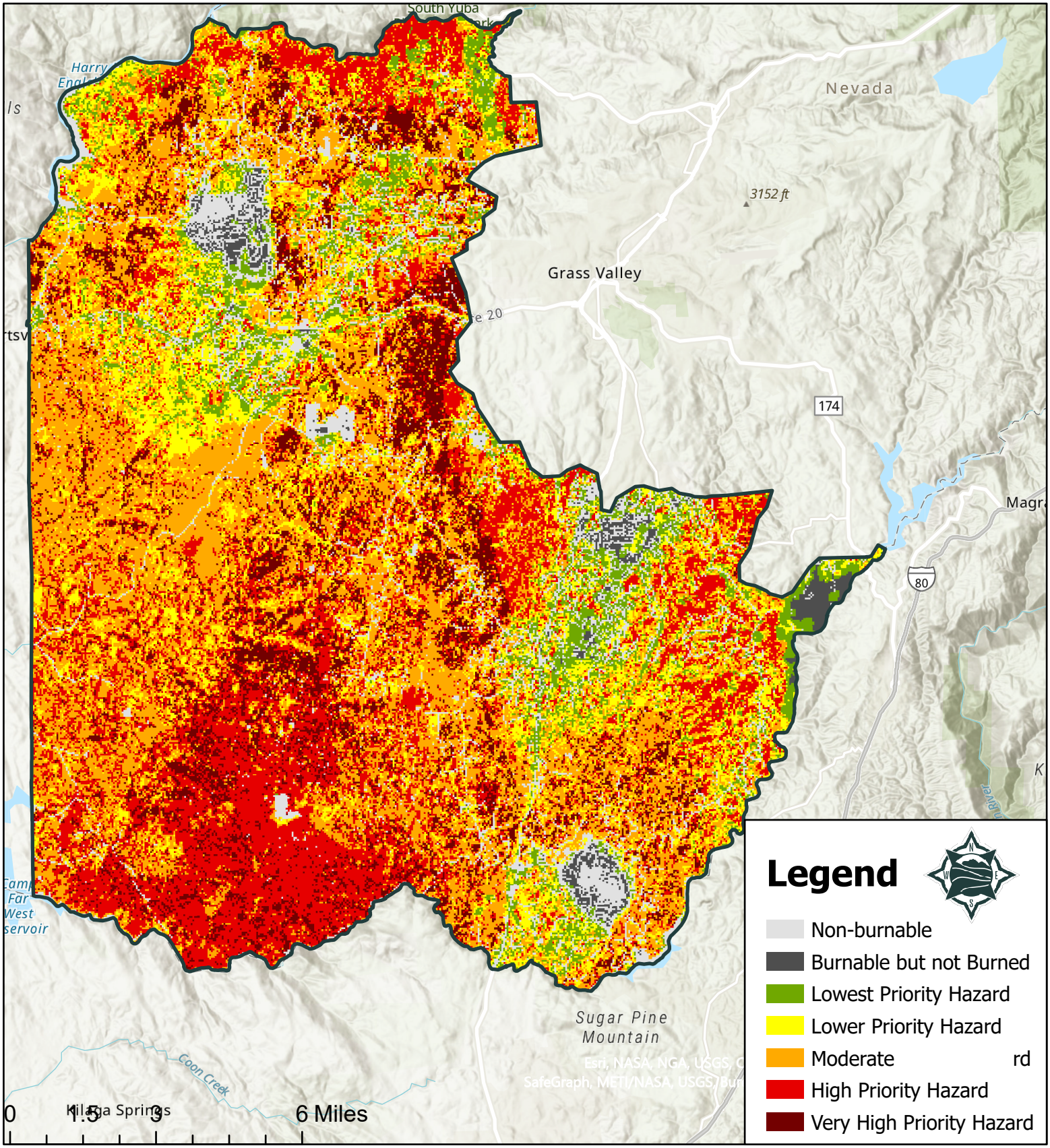

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Grass Valley/Nevada City Forecast Zone Integrated Hazard: Revised Wind-Driven Fire Scenario

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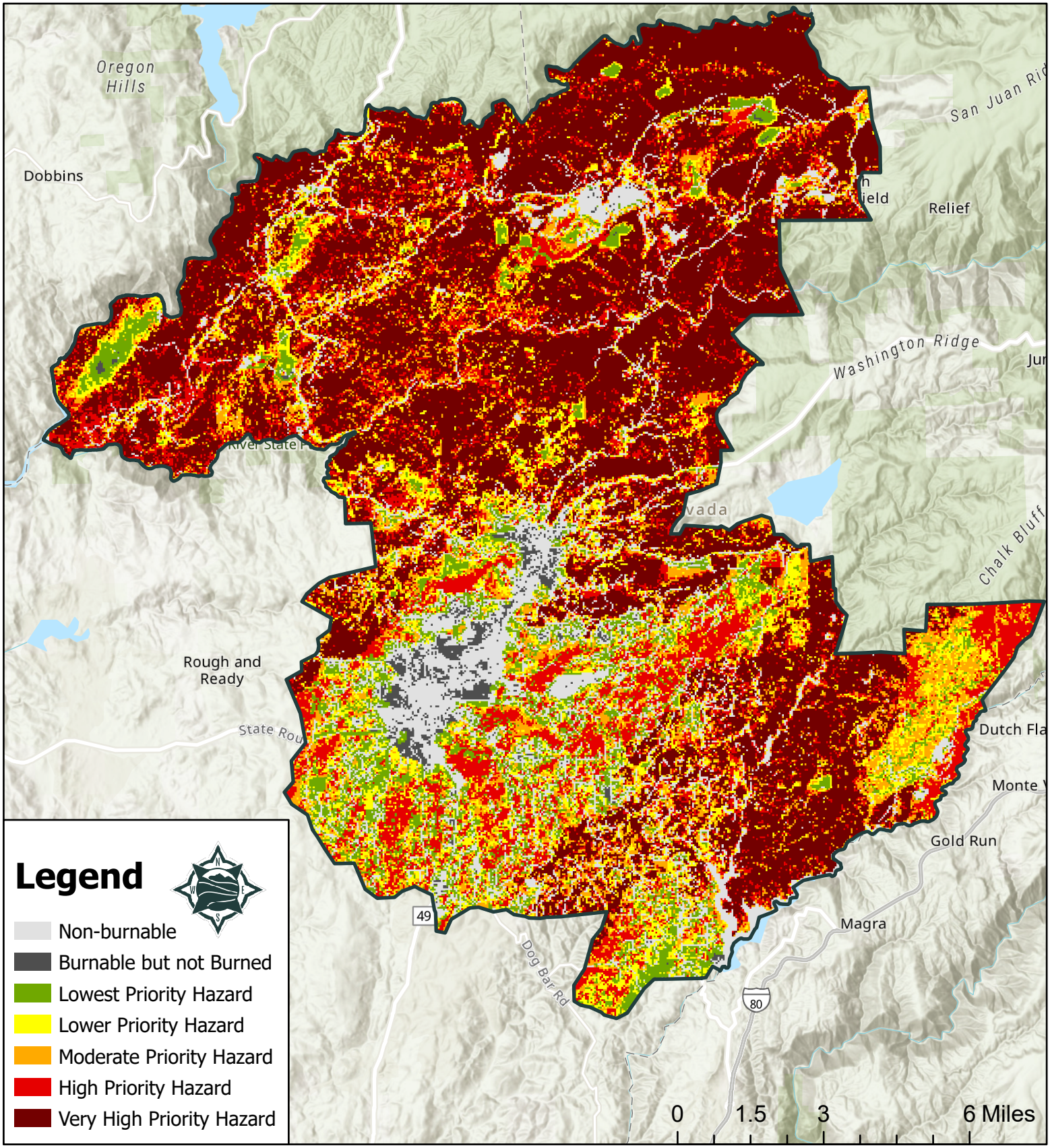
Addendum



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Tahoe National Forest Area Forecast Zone Integrated Hazard: Revised Wind-Driven Fire Scenario

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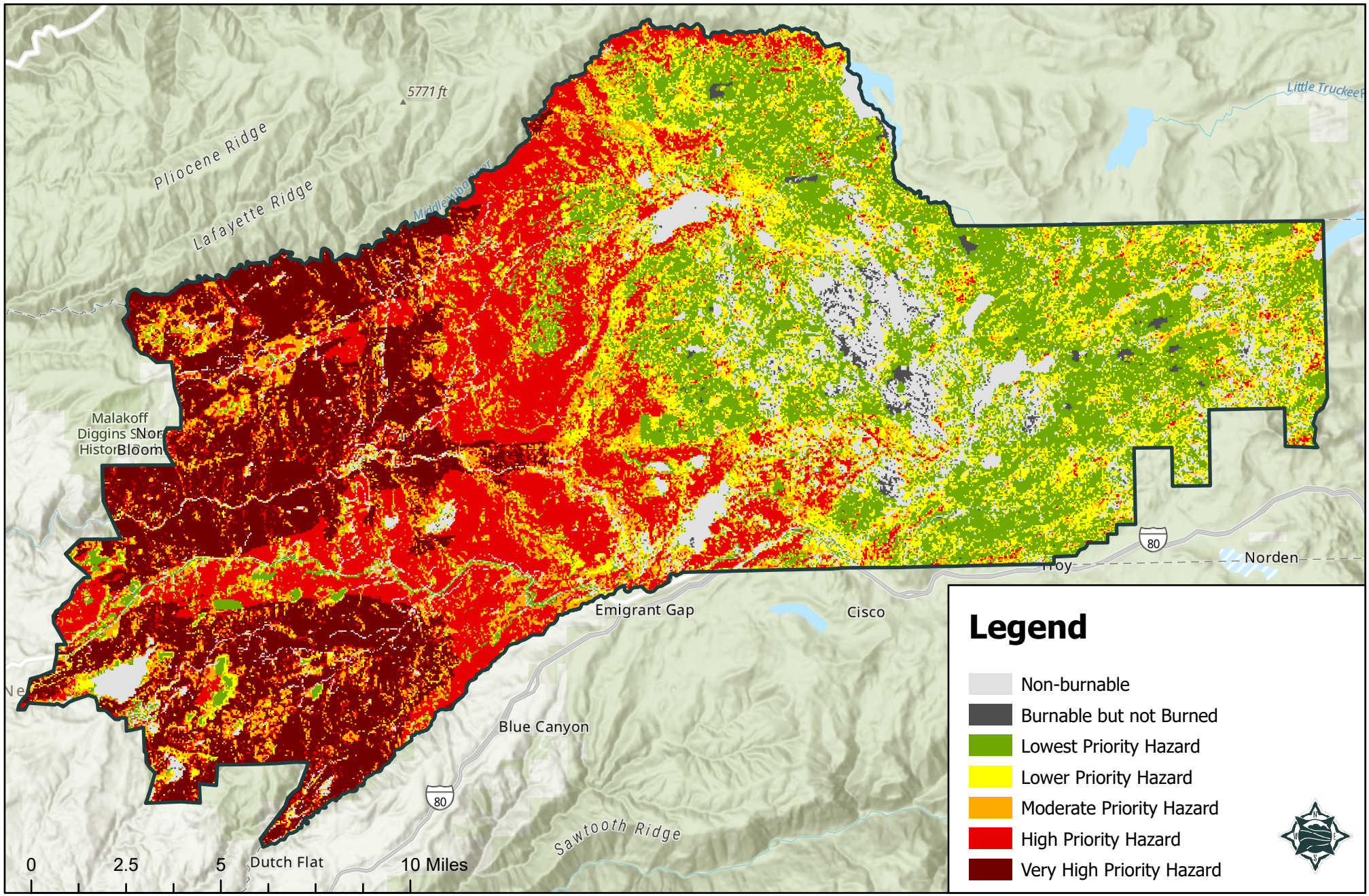

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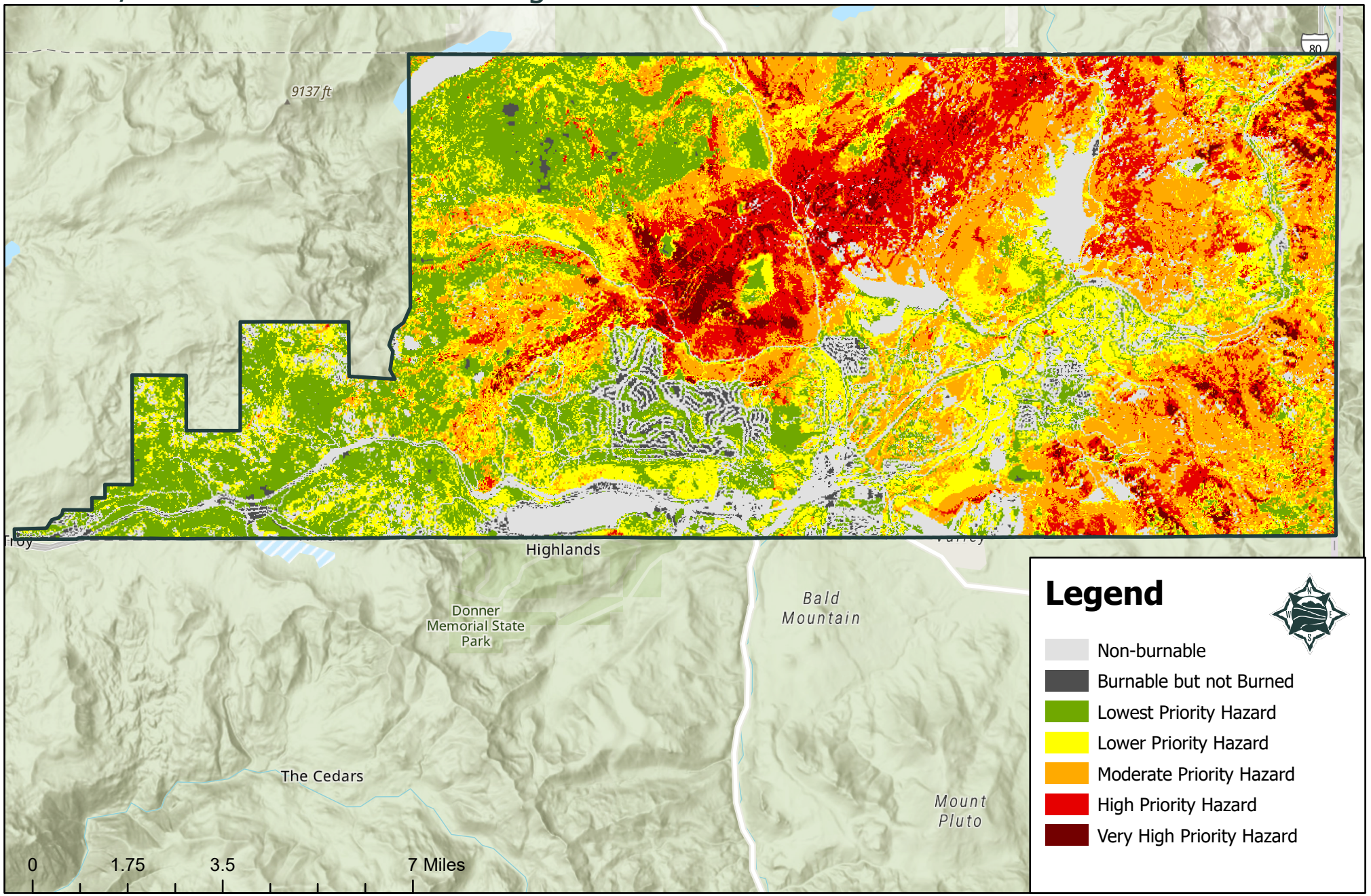
Truckee/Donner Forecast Zone Integrated Hazard: Revised Wind-Driven Fire Scenario Addendum



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Addendum Figures

Wildfire Risk Assessment

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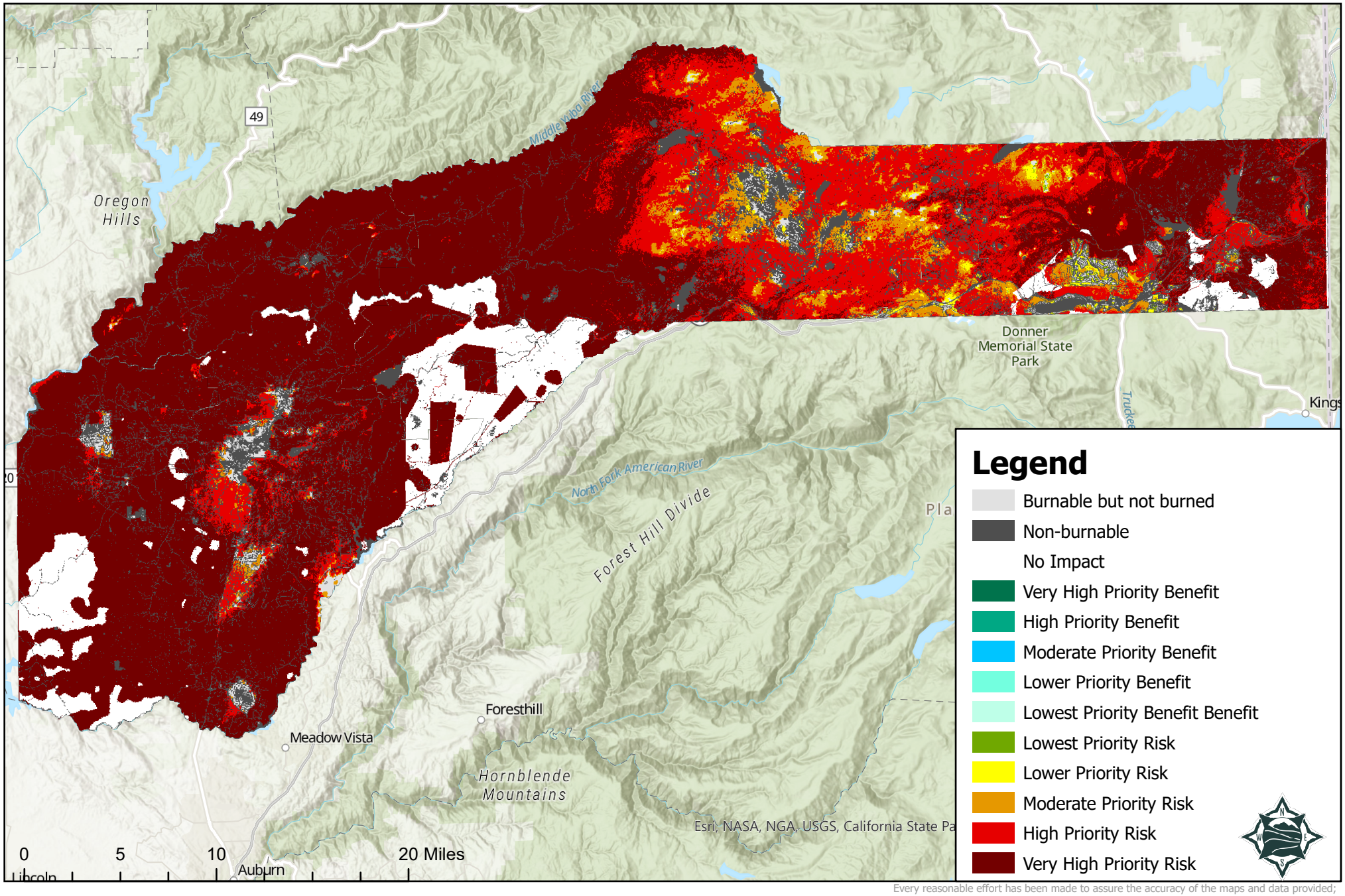
Nevada County Wildfire Risk Assessment Results: Community Lifelines, Revised Wind-Driven Scenario

Addendum



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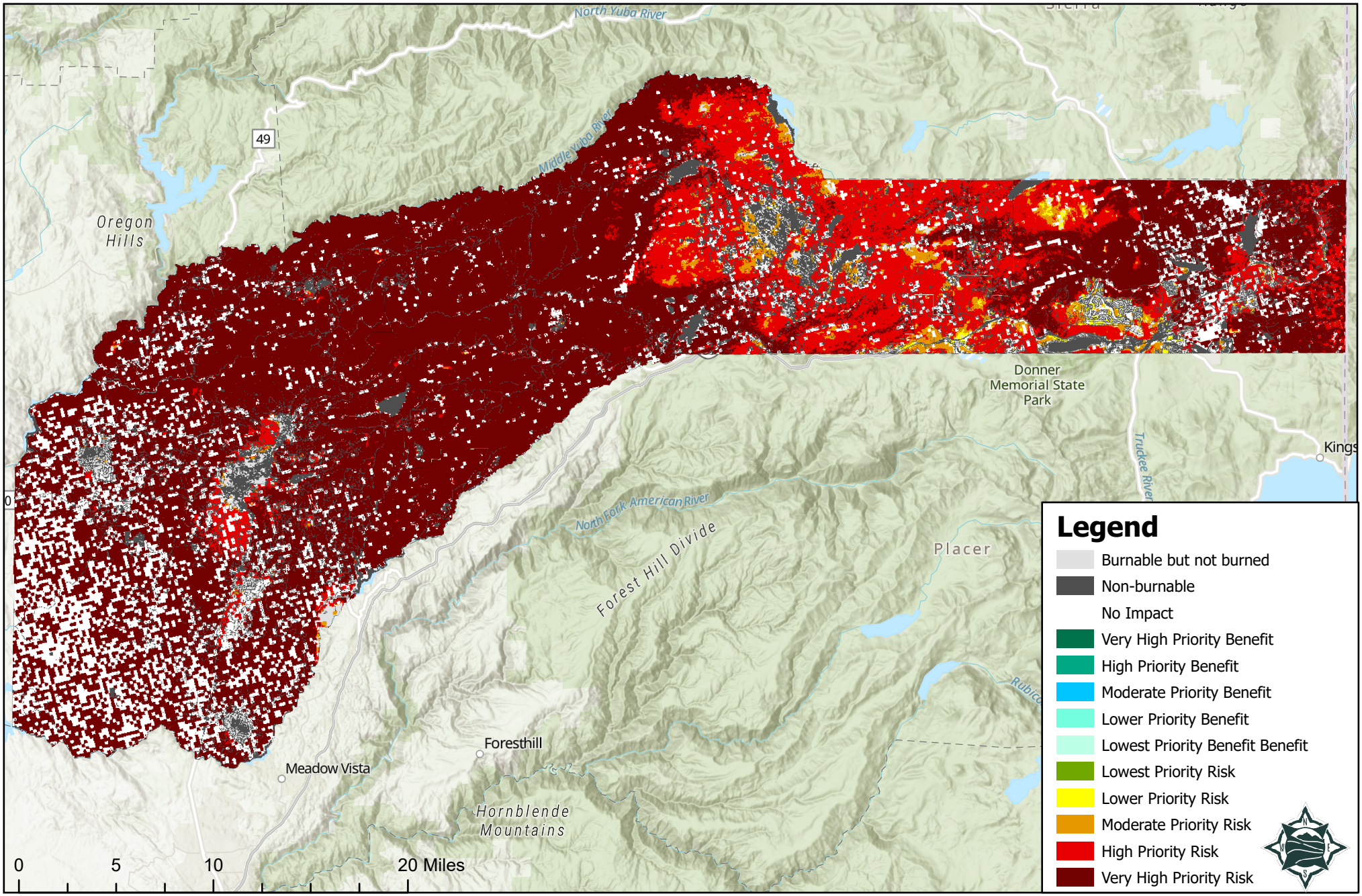
Nevada County Wildfire Risk Assessment Results: Community Health, Revised Wind-Driven Scenario Addendum



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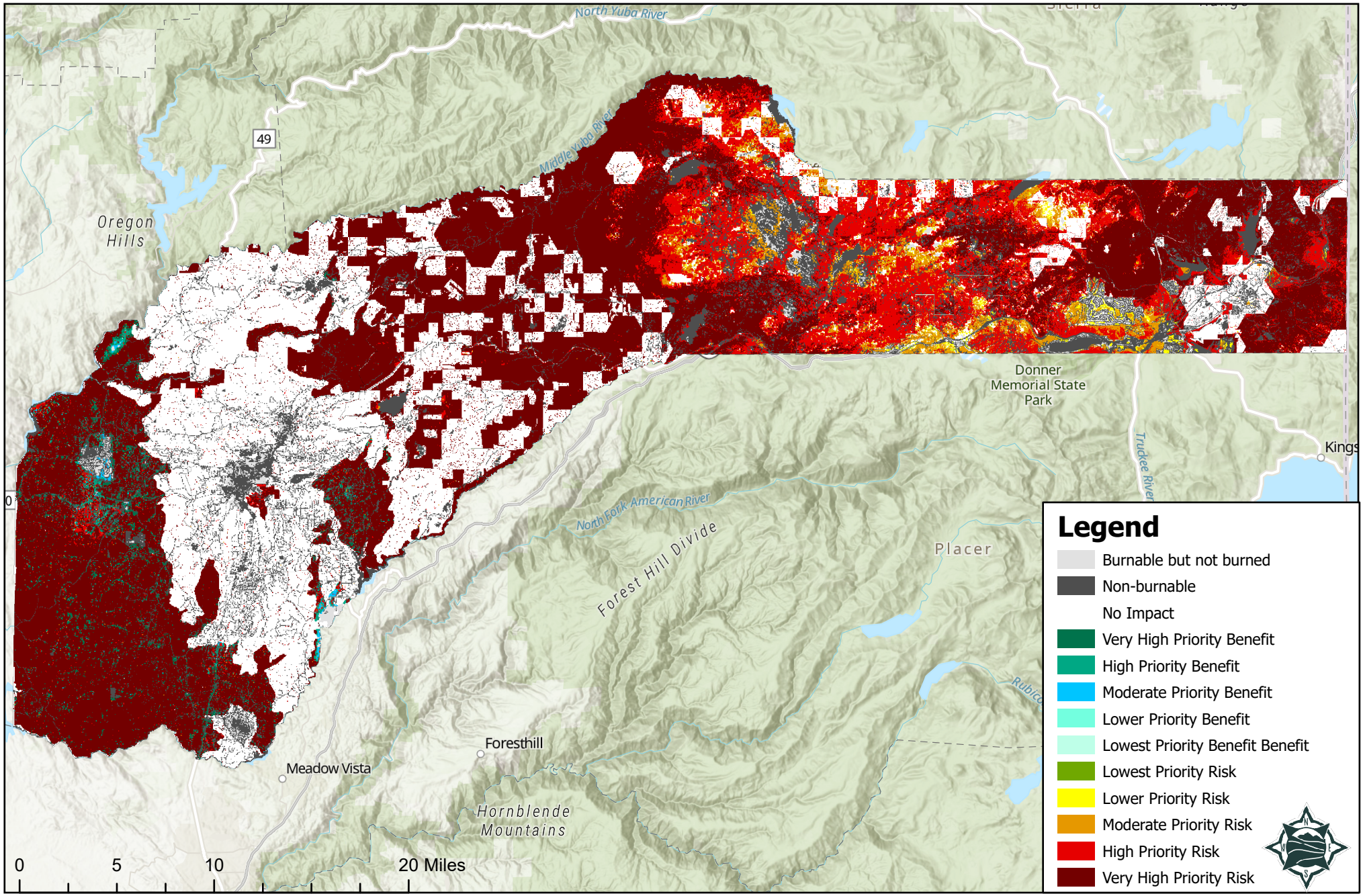
Nevada County Wildfire Risk Assessment Results: Natural Resources, Revised Wind-Driven Scenario Addendum



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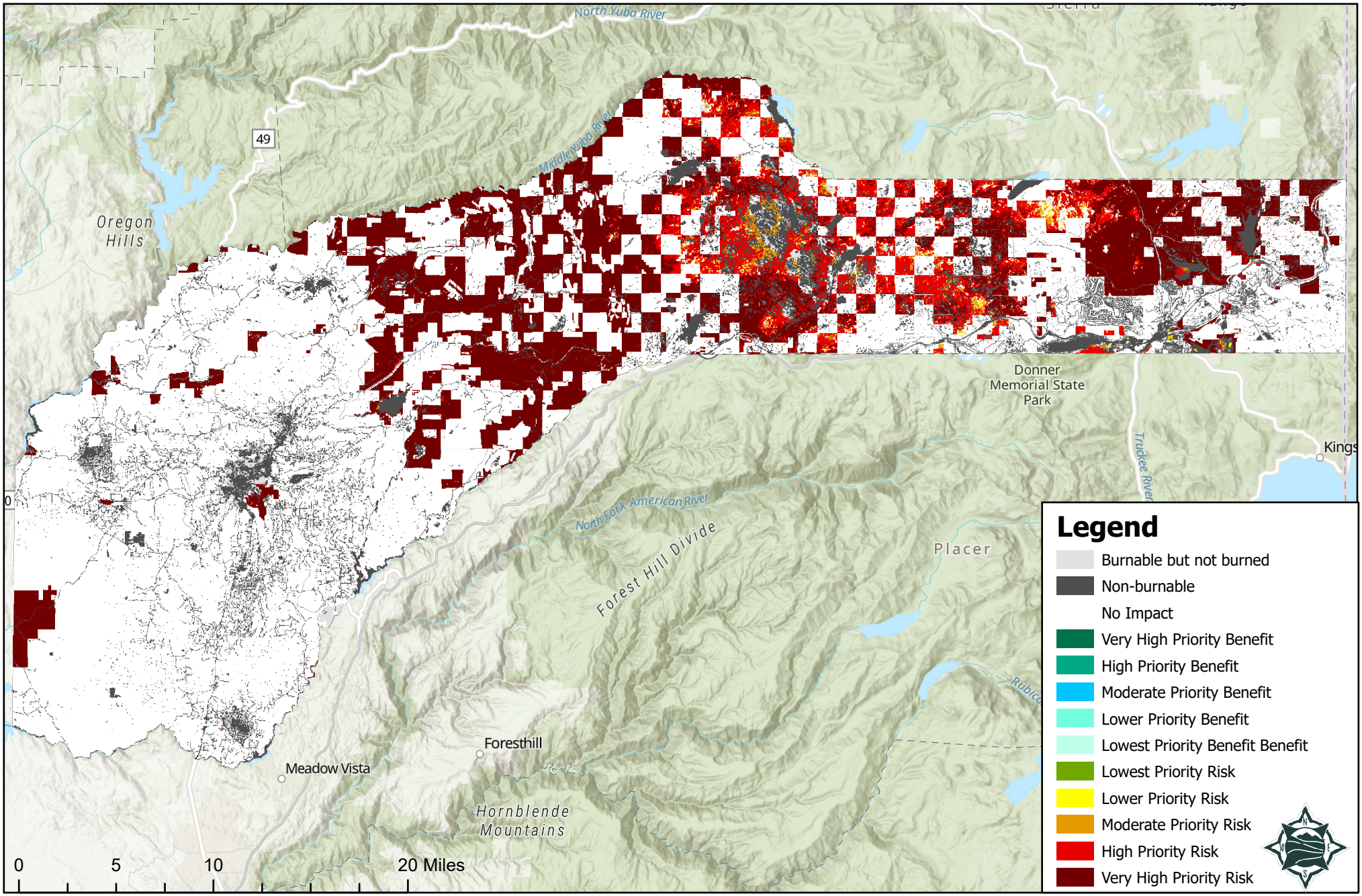
Nevada County Wildfire Risk Assessment Results: Economic Resources, Revised Wind-Driven Scenario

Addendum



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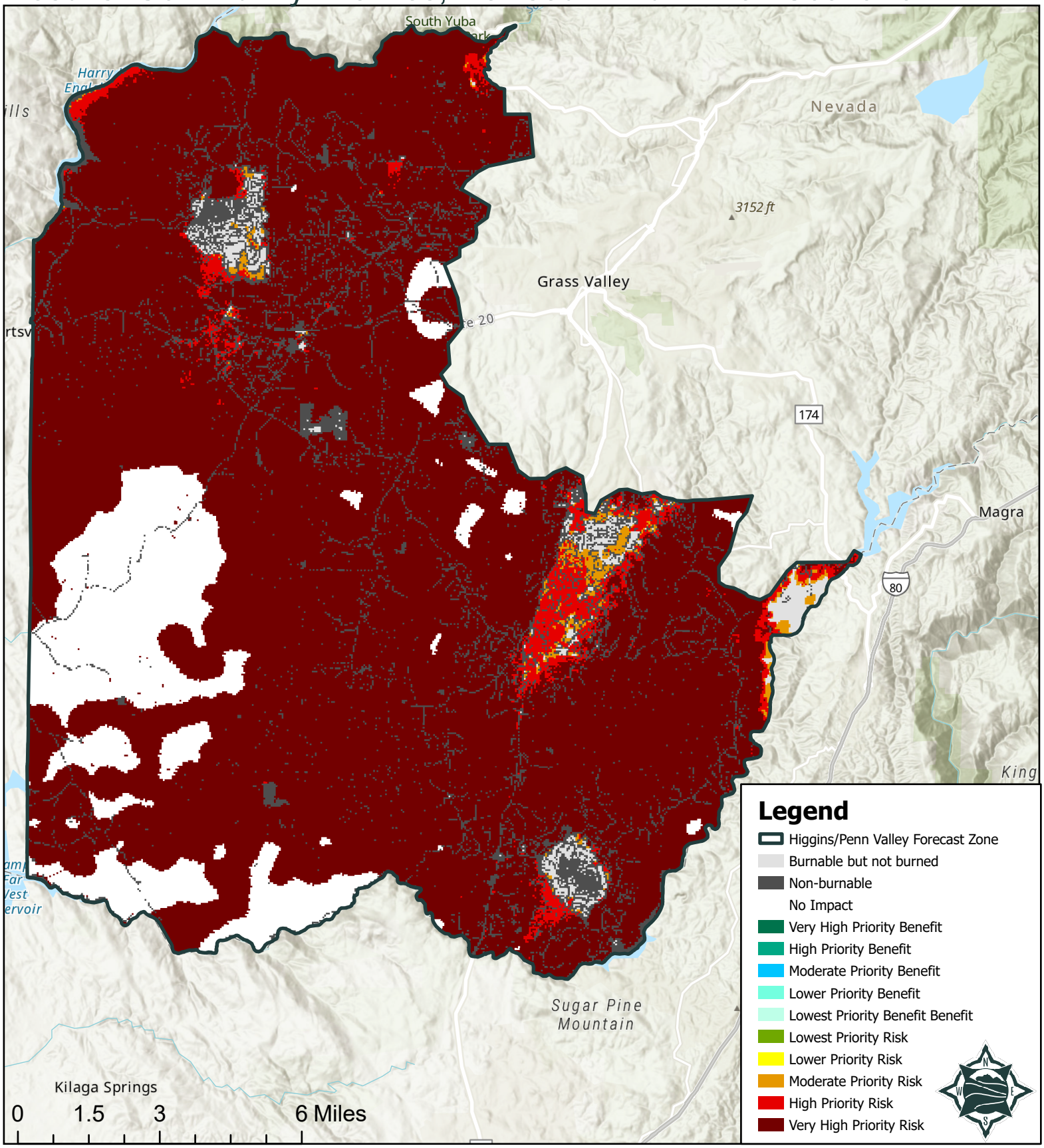
Higgins/Penn Valley Forecast Zone Wildfire Risk Assessment Results: Community Lifelines, Revised Wind-Driven Scenario Addendum



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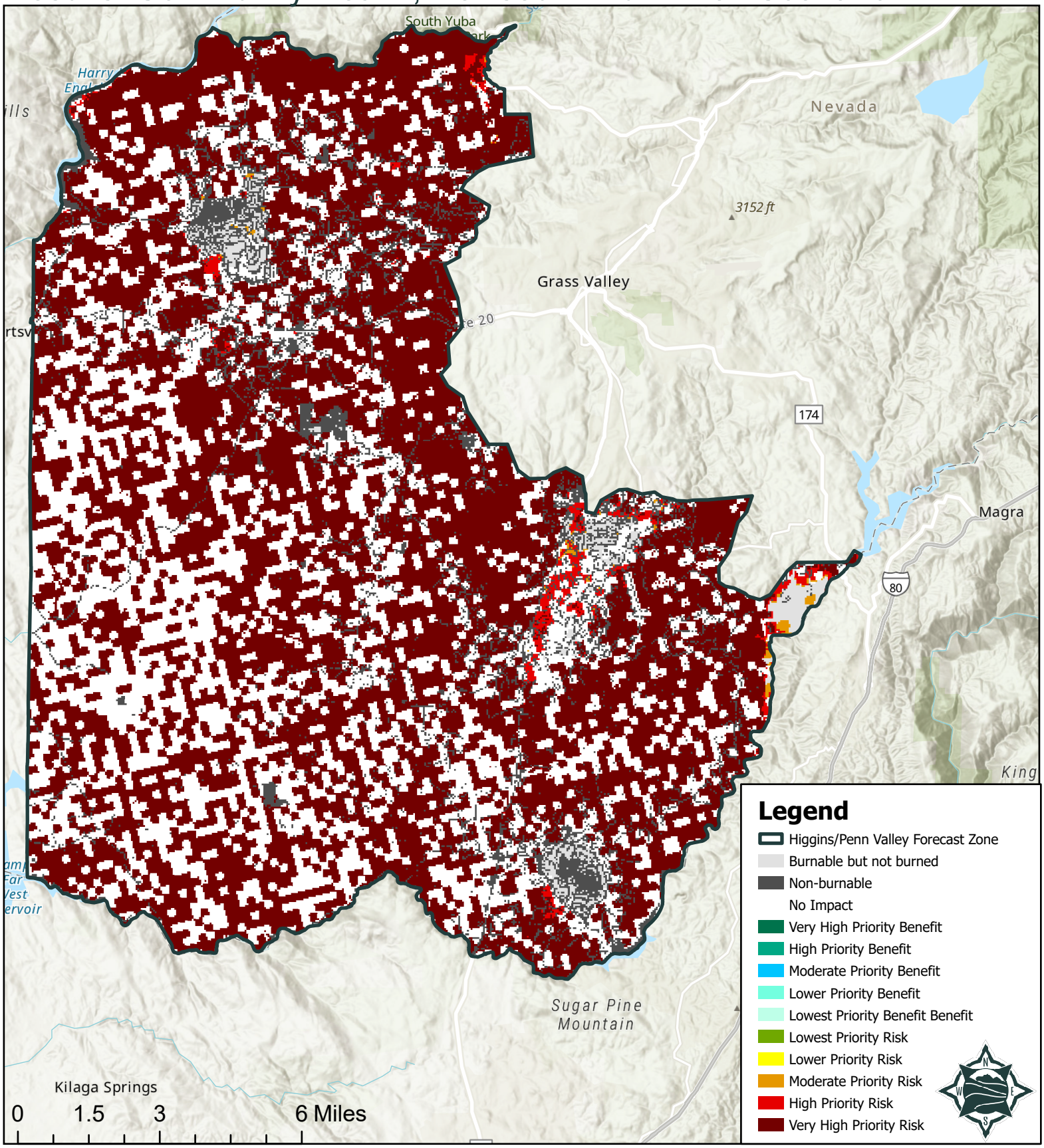
Higgins/Penn Valley Forecast Zone Wildfire Risk Assessment Results: Community Health, Revised Wind-Driven Scenario

Addendum



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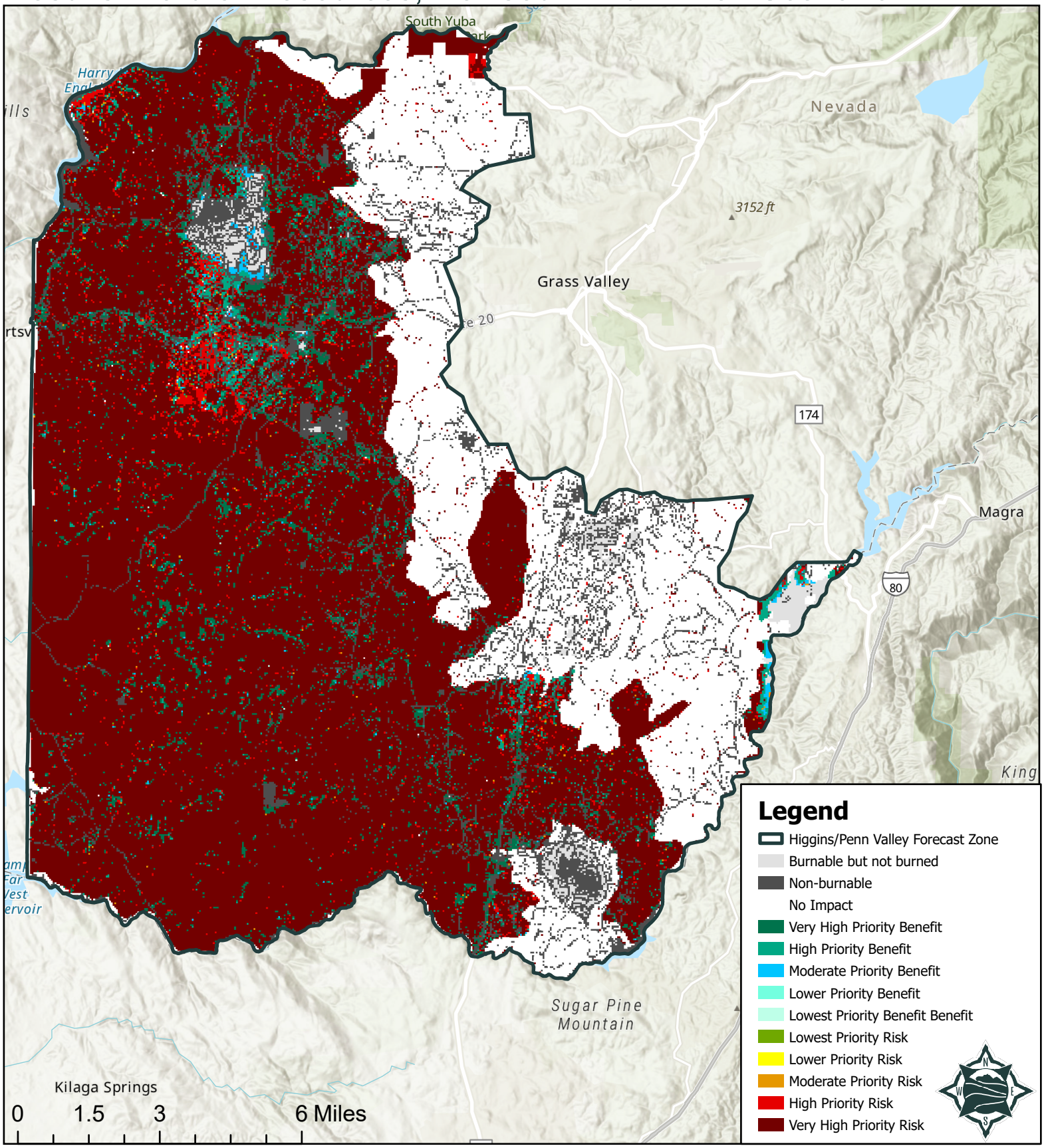
Higgins/Penn Valley Forecast Zone Wildfire Risk Assessment Results: Natural Resources, Revised Wind-Driven Scenario

Addendum



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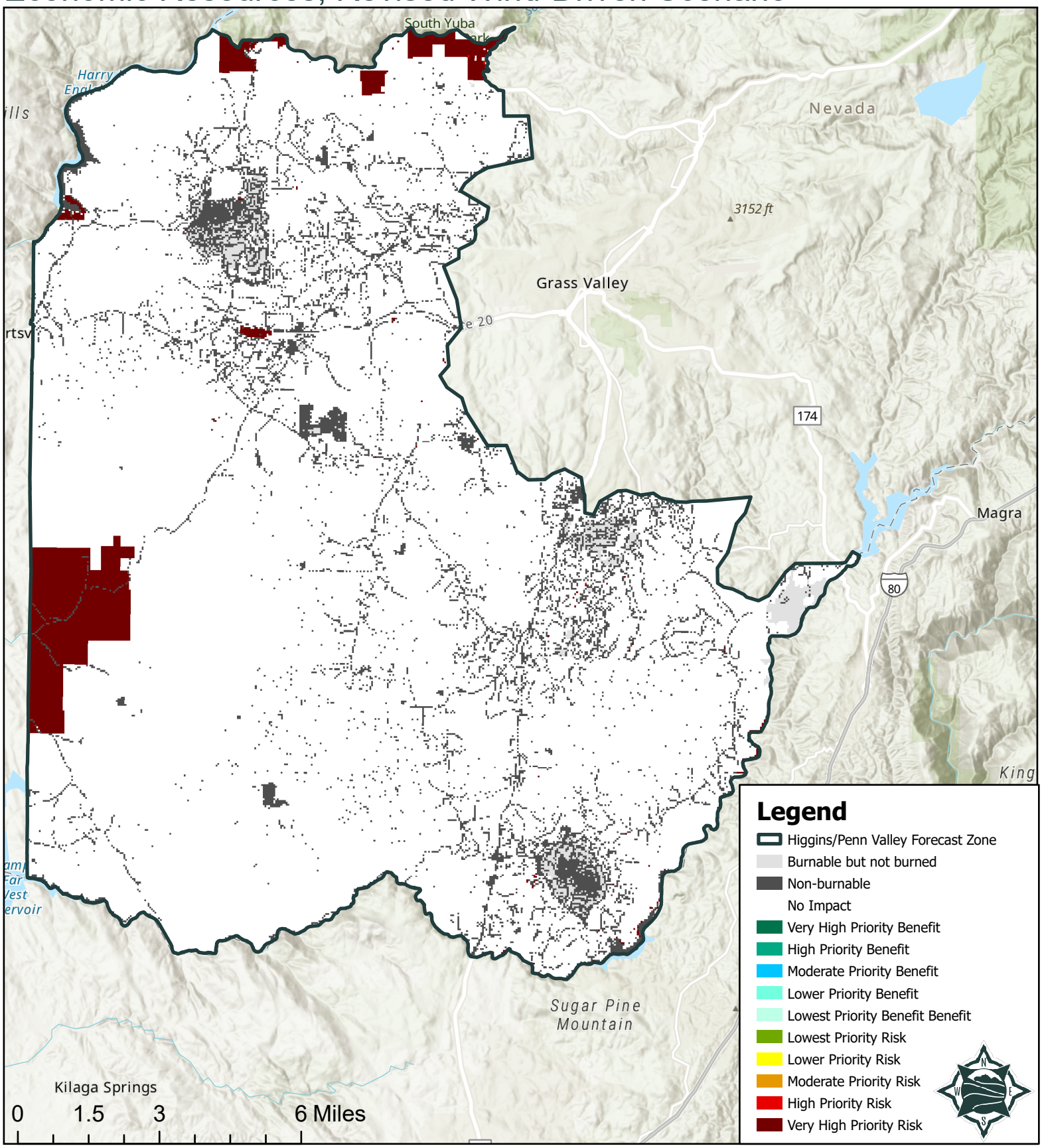
Higgins/Penn Valley Forecast Zone Wildfire Risk Assessment Results: Economic Resources, Revised Wind-Driven Scenario

Addendum



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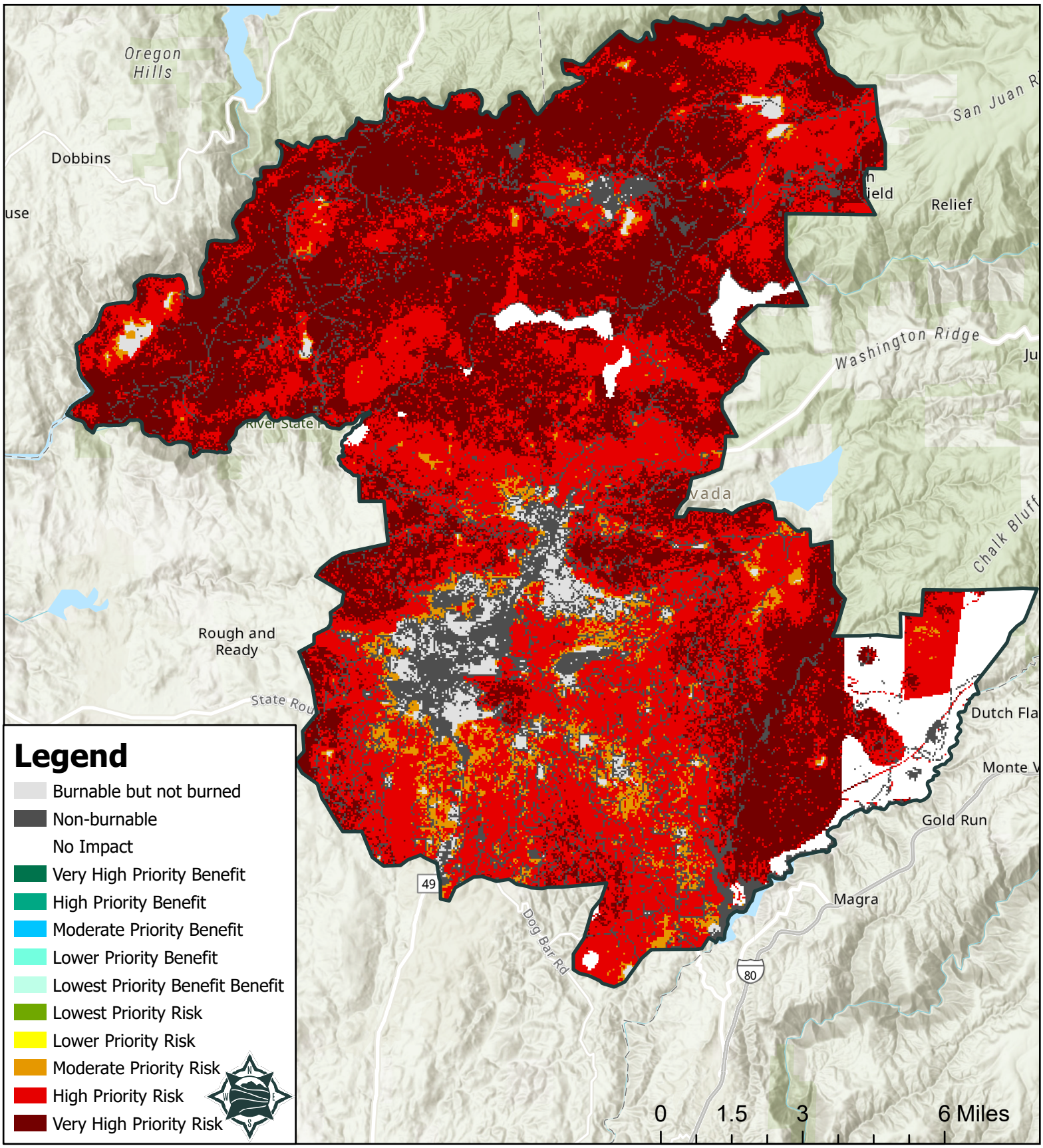
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Community Lifelines, Revised Wind-Driven Scenario

Addendum



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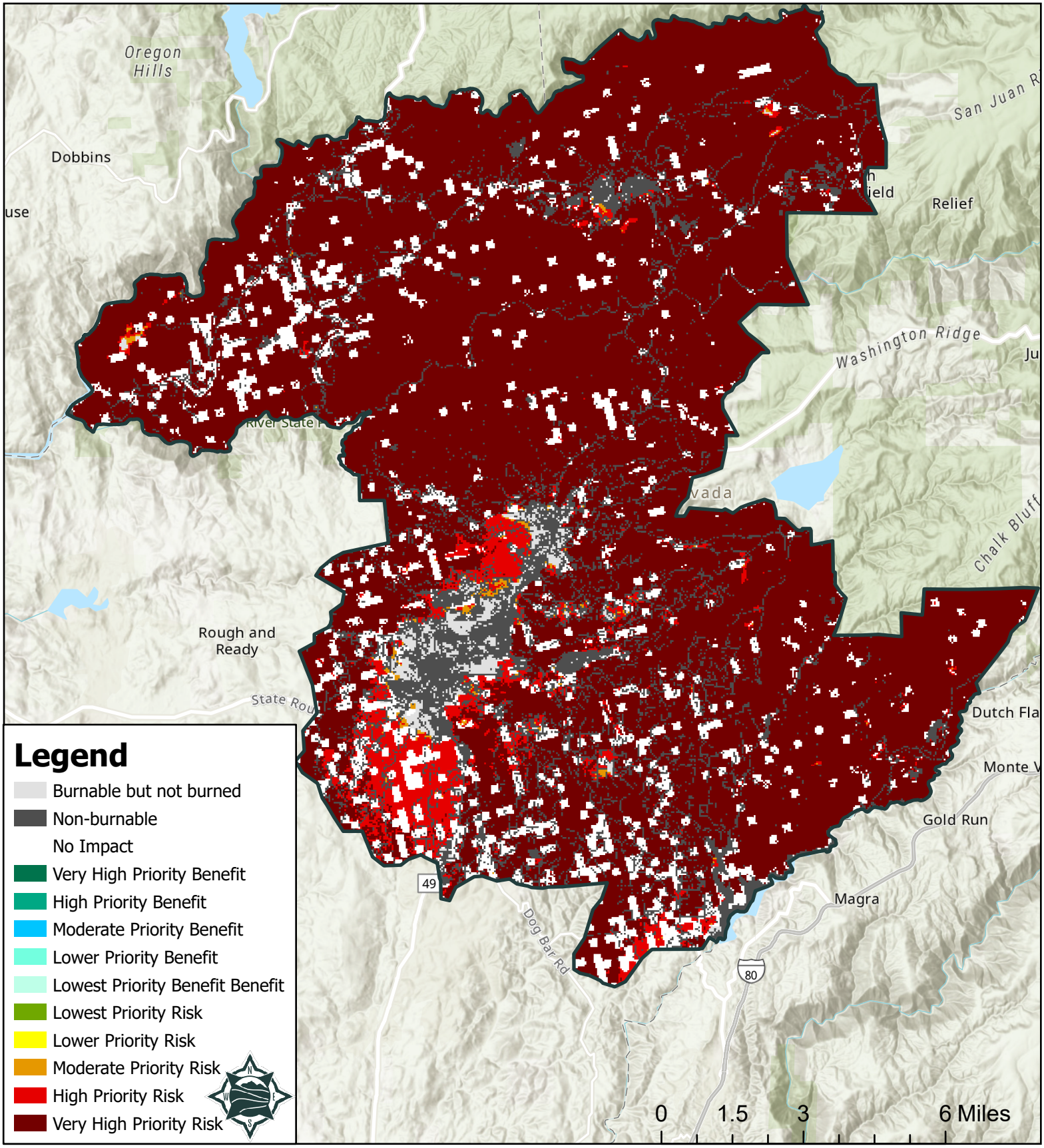
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Community Health, Revised Wind-Driven Scenario

Addendum



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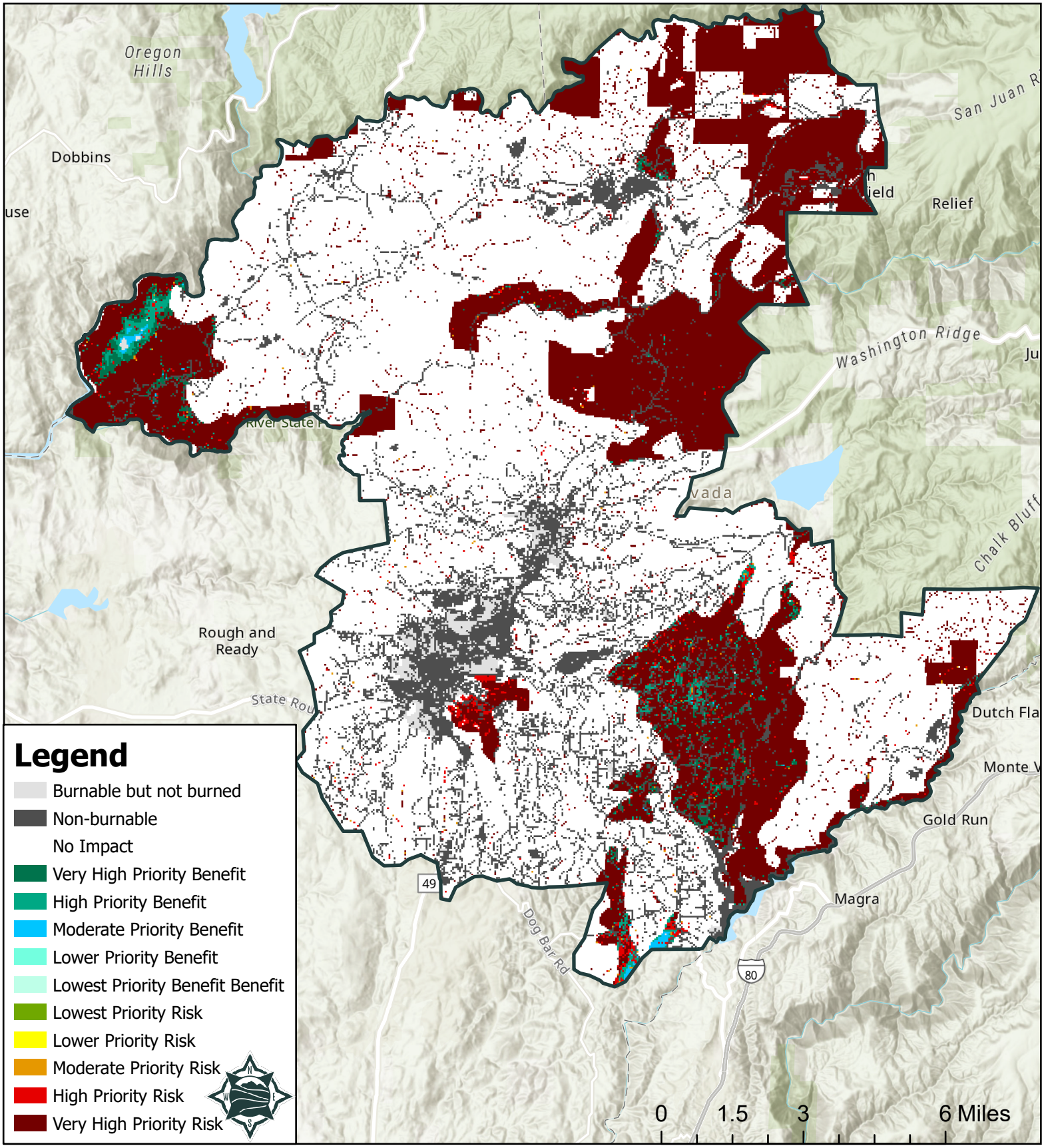
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Natural Resources, Revised Wind-Driven Scenario

CWPP Appendix B

Addendum



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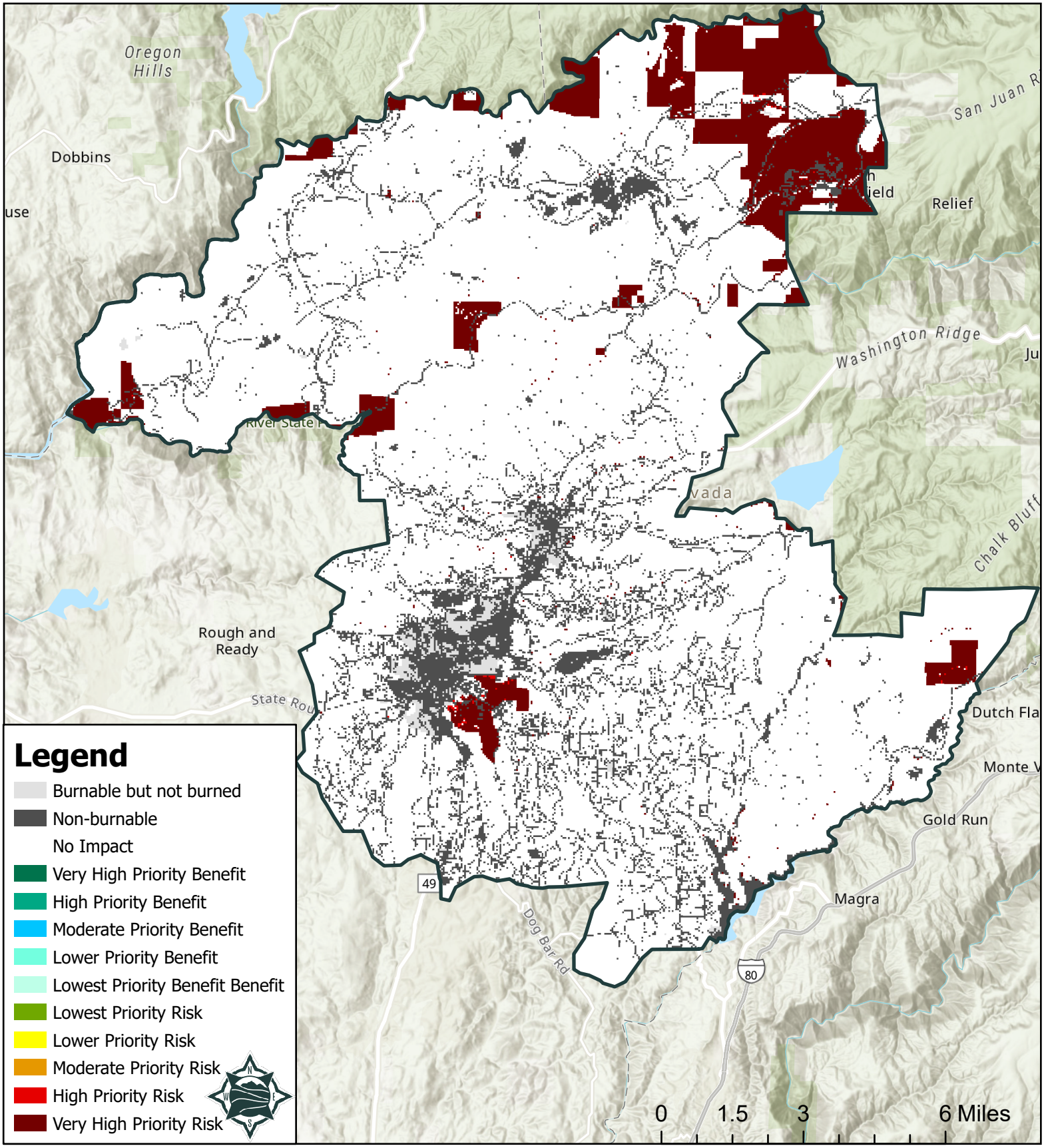
Grass Valley/Nevada City Forecast Zone Wildfire Risk Assessment Results: Economic Resources, Revised Wind-Driven Scenario

CWPP Appendix B

Addendum



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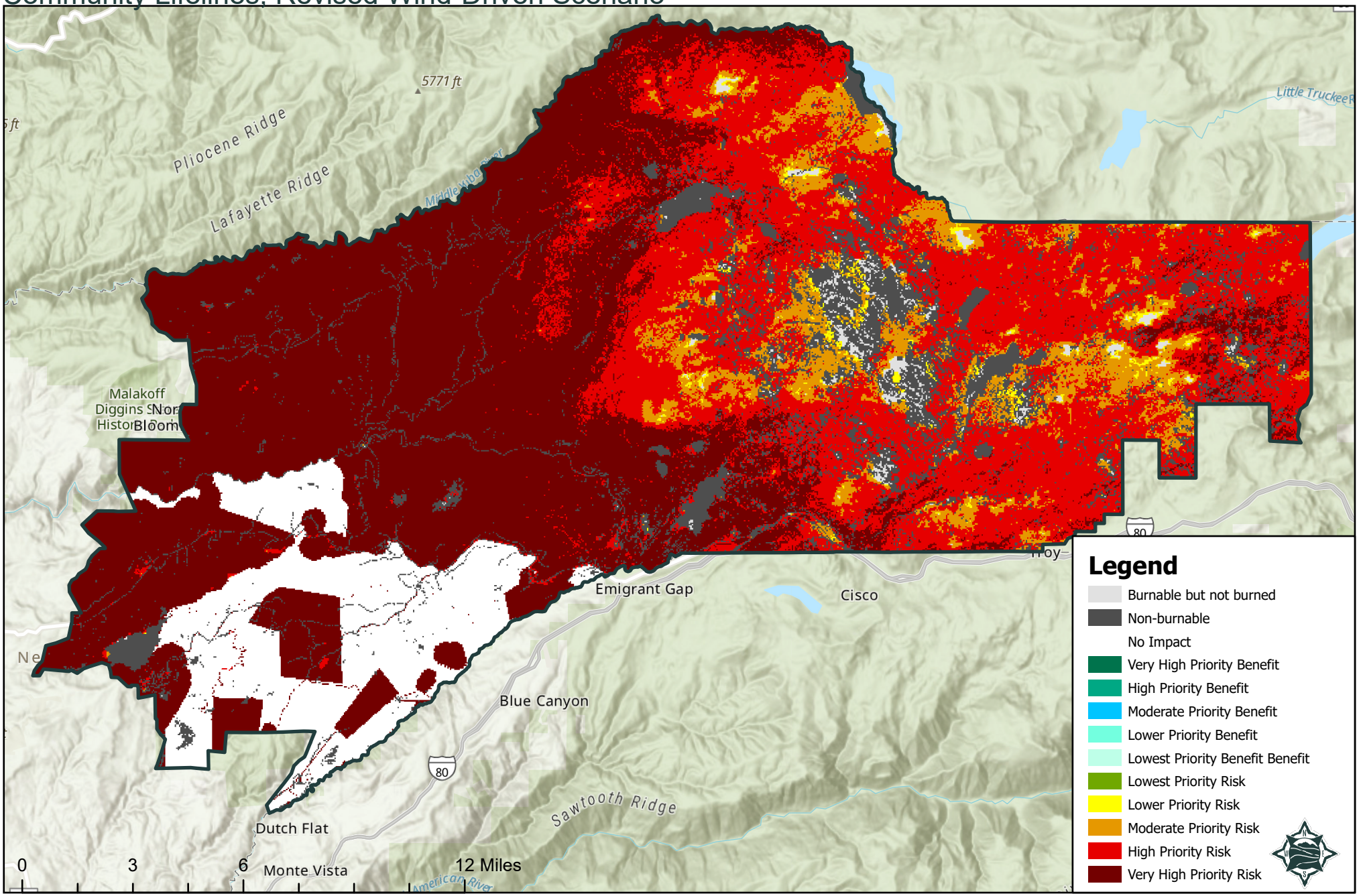
Tahoe National Forest Area Forecast Zone Wildfire Risk Assessment Results: Community Lifelines, Revised Wind-Driven Scenario



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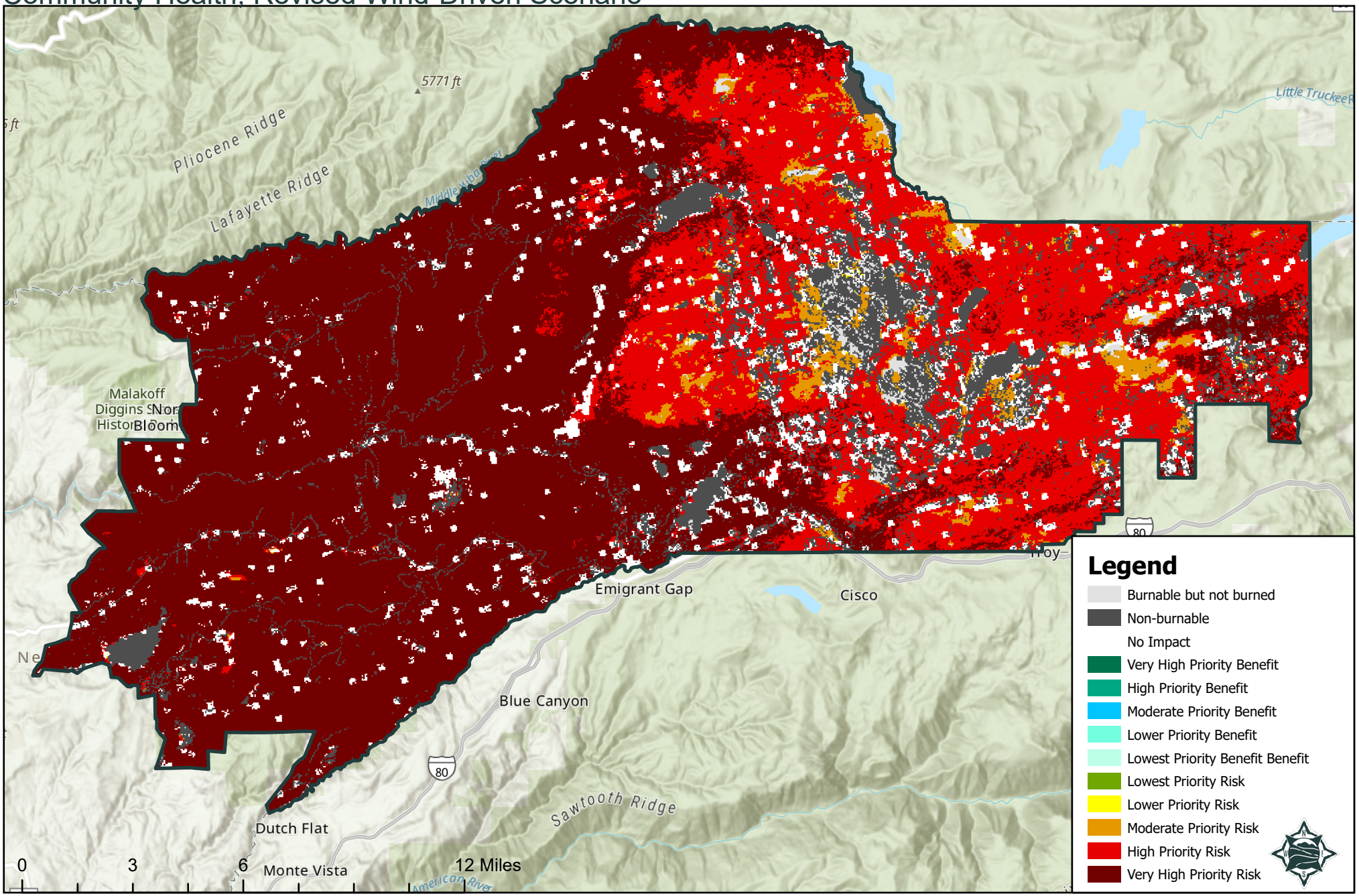
Tahoe National Forest Area Forecast Zone Wildfire Risk Assessment Results: Community Health, Revised Wind-Driven Scenario

Addendum



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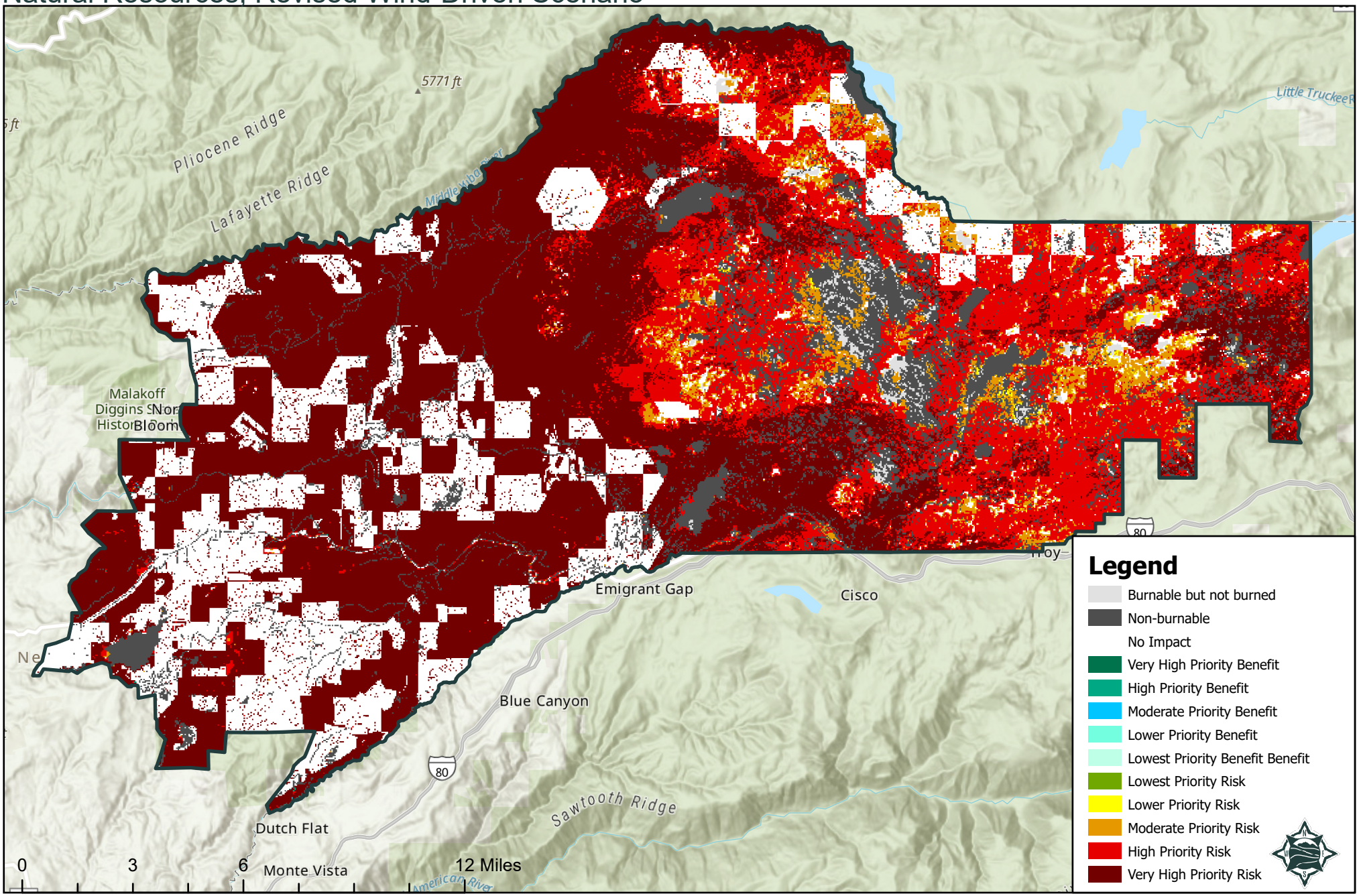
Tahoe National Forest Area Forecast Zone Wildfire Risk Assessment Results: Natural Resources, Revised Wind-Driven Scenario

Addendum



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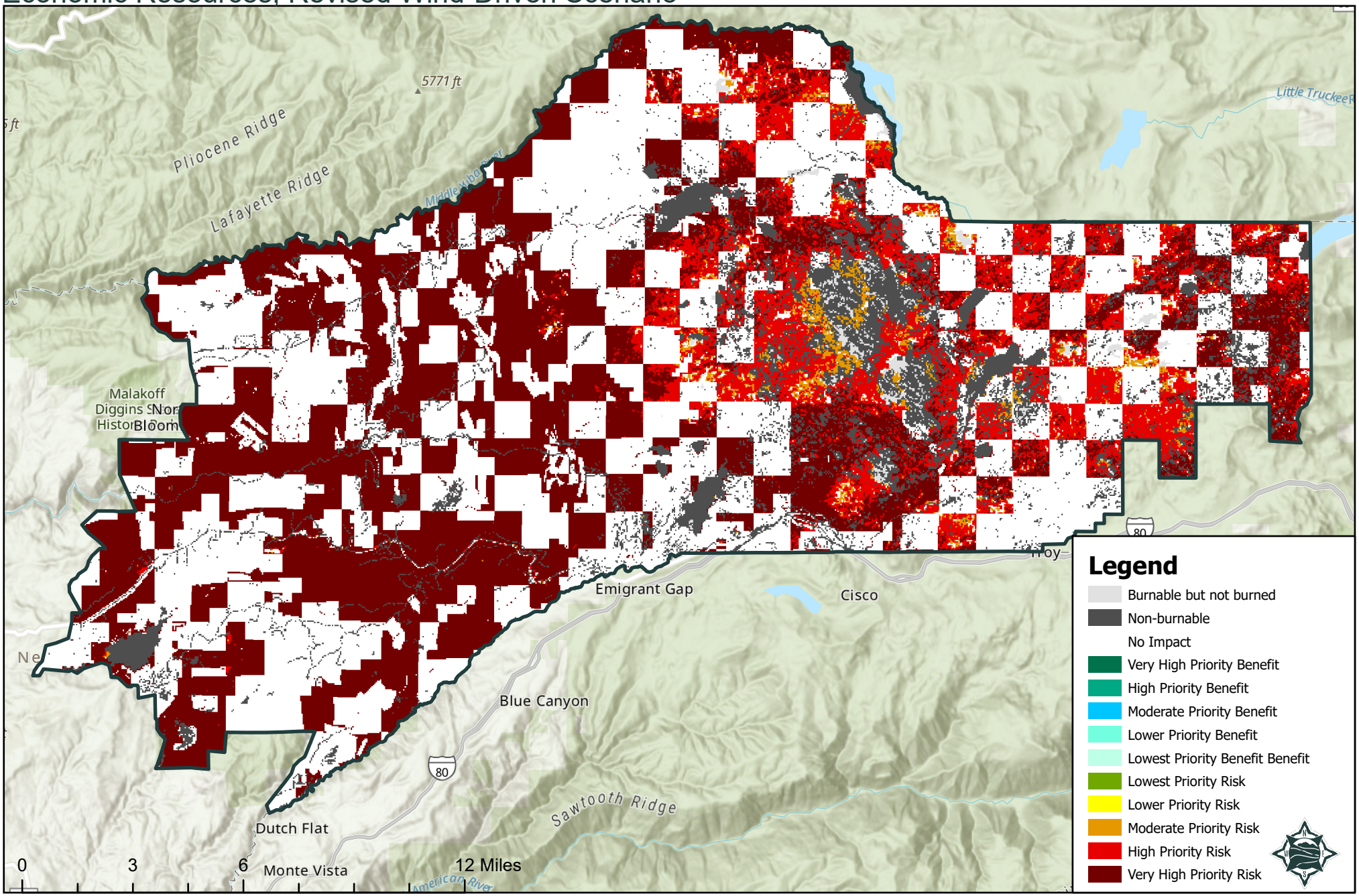

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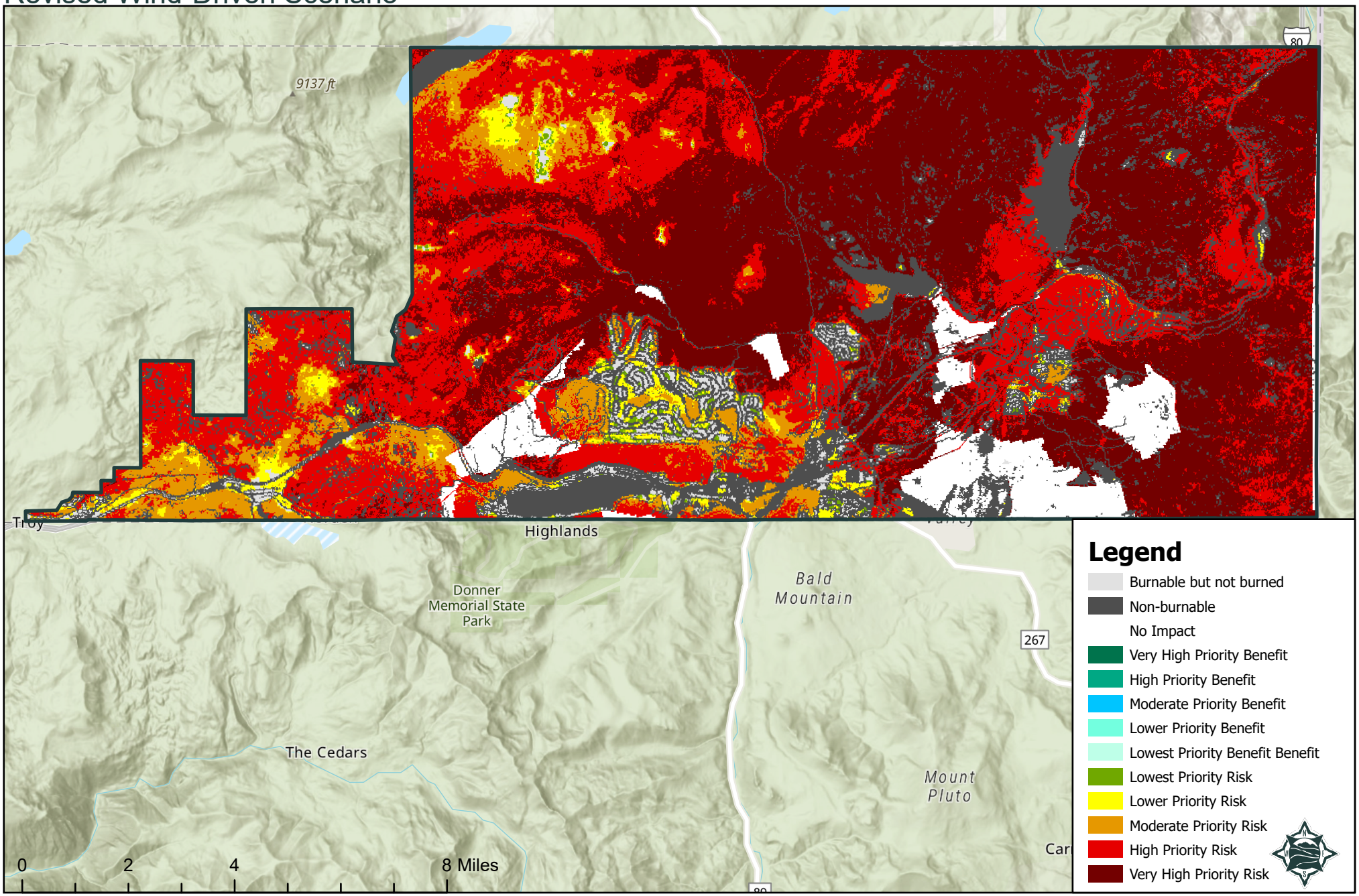
Truckee/Donner Forecast Zone Wildfire Risk Assessment Results: Community Lifelines, Revised Wind-Driven Scenario



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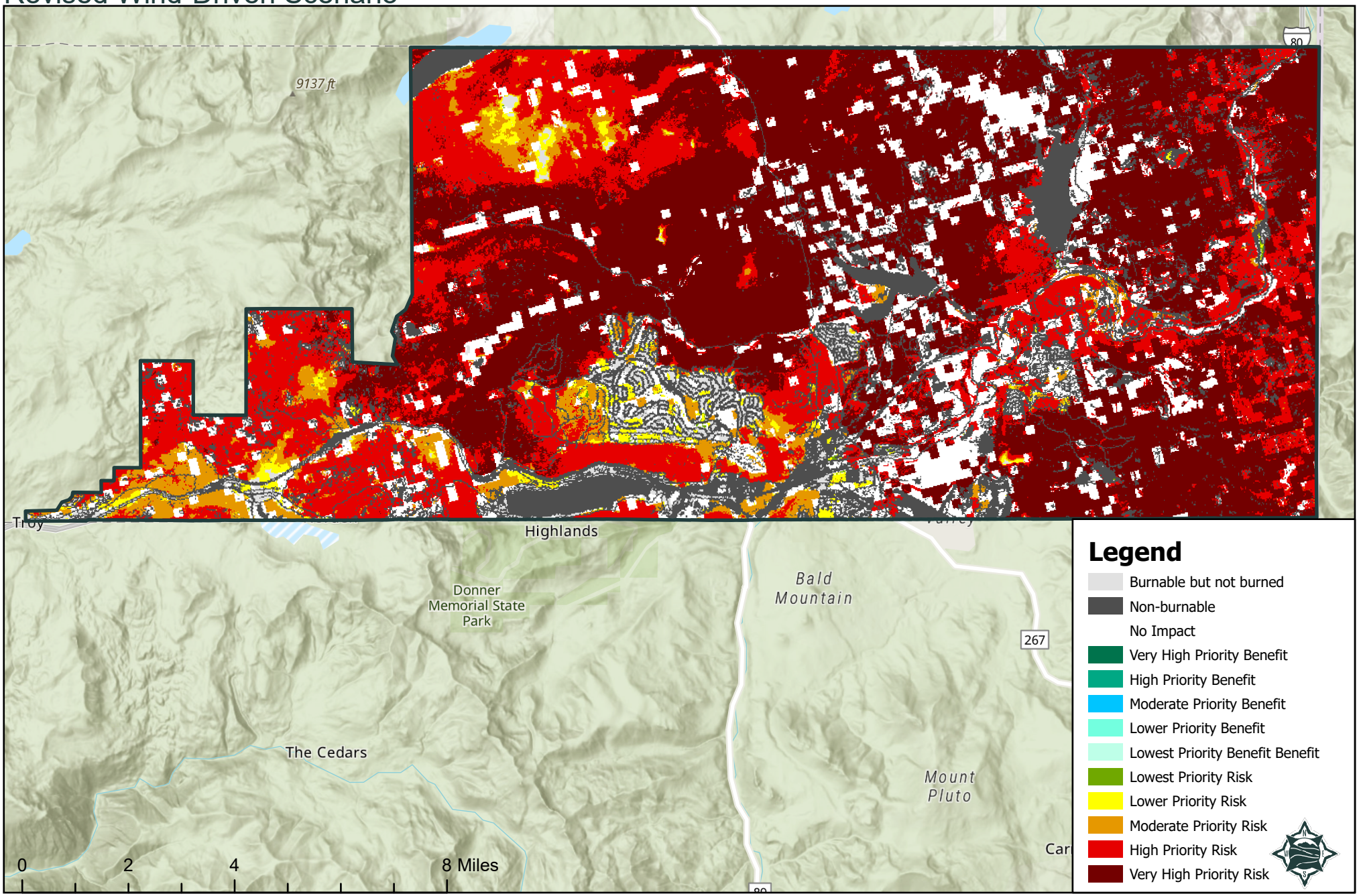

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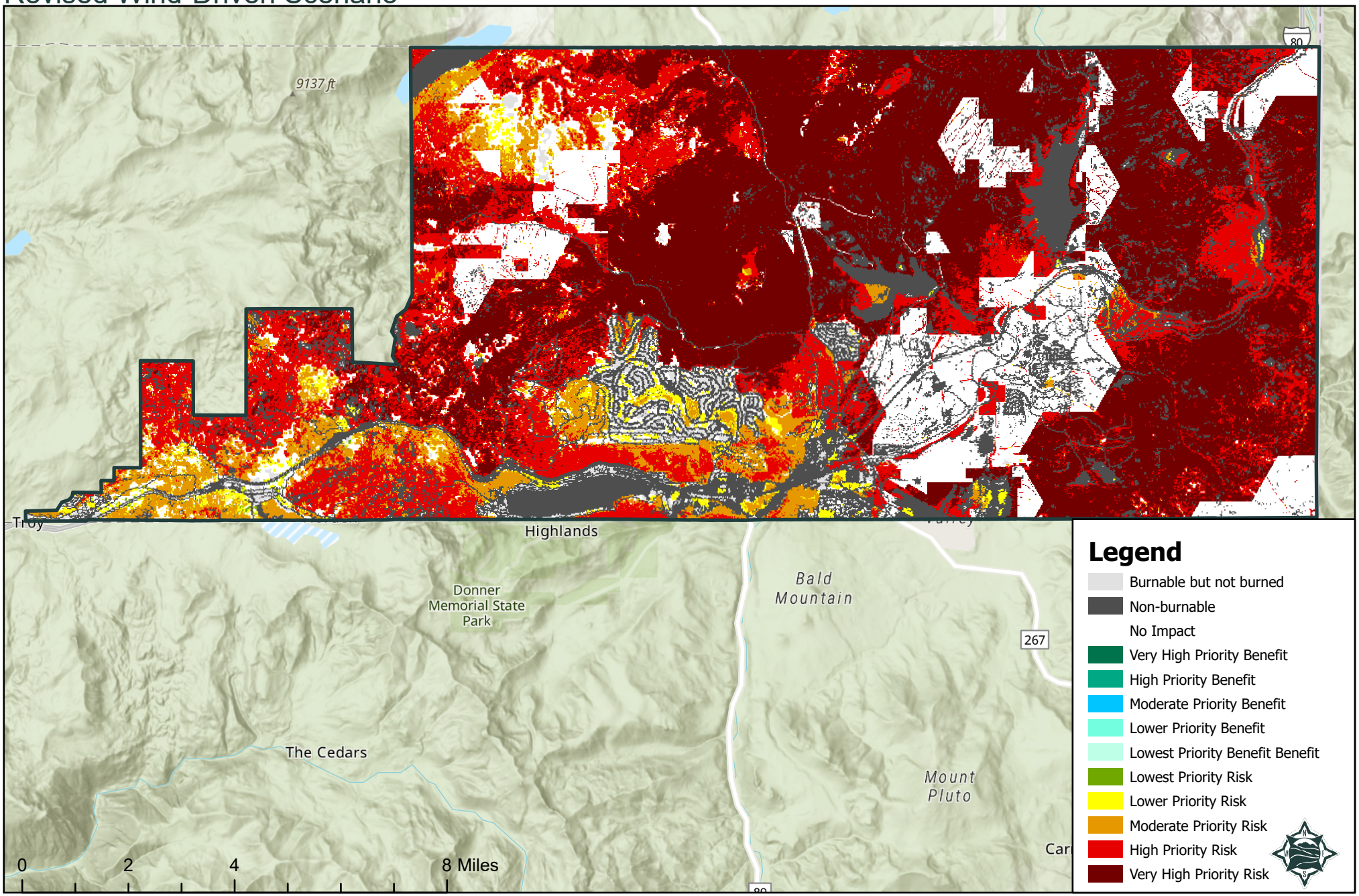

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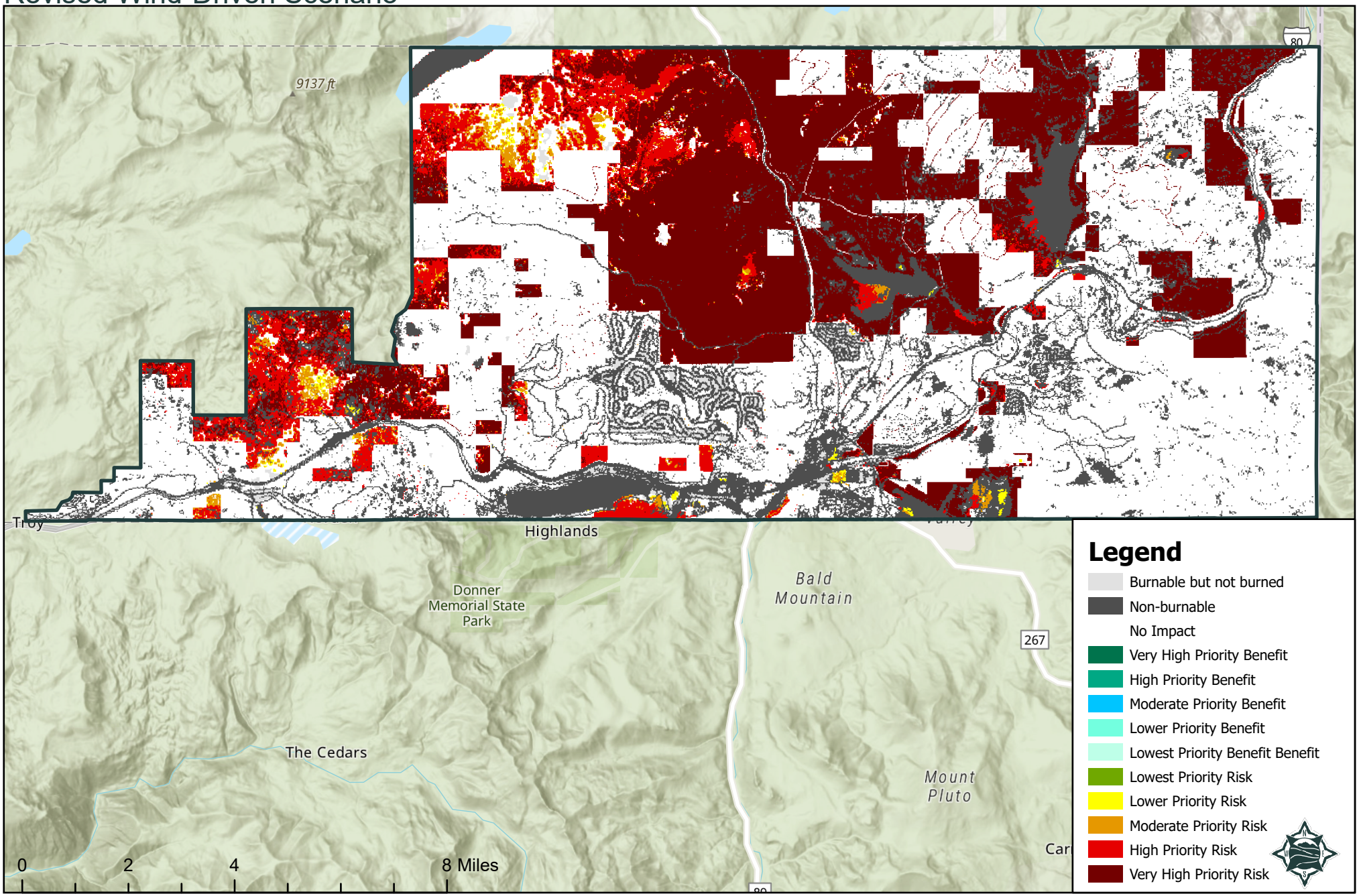

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Addendum Figures

Project Priority Areas

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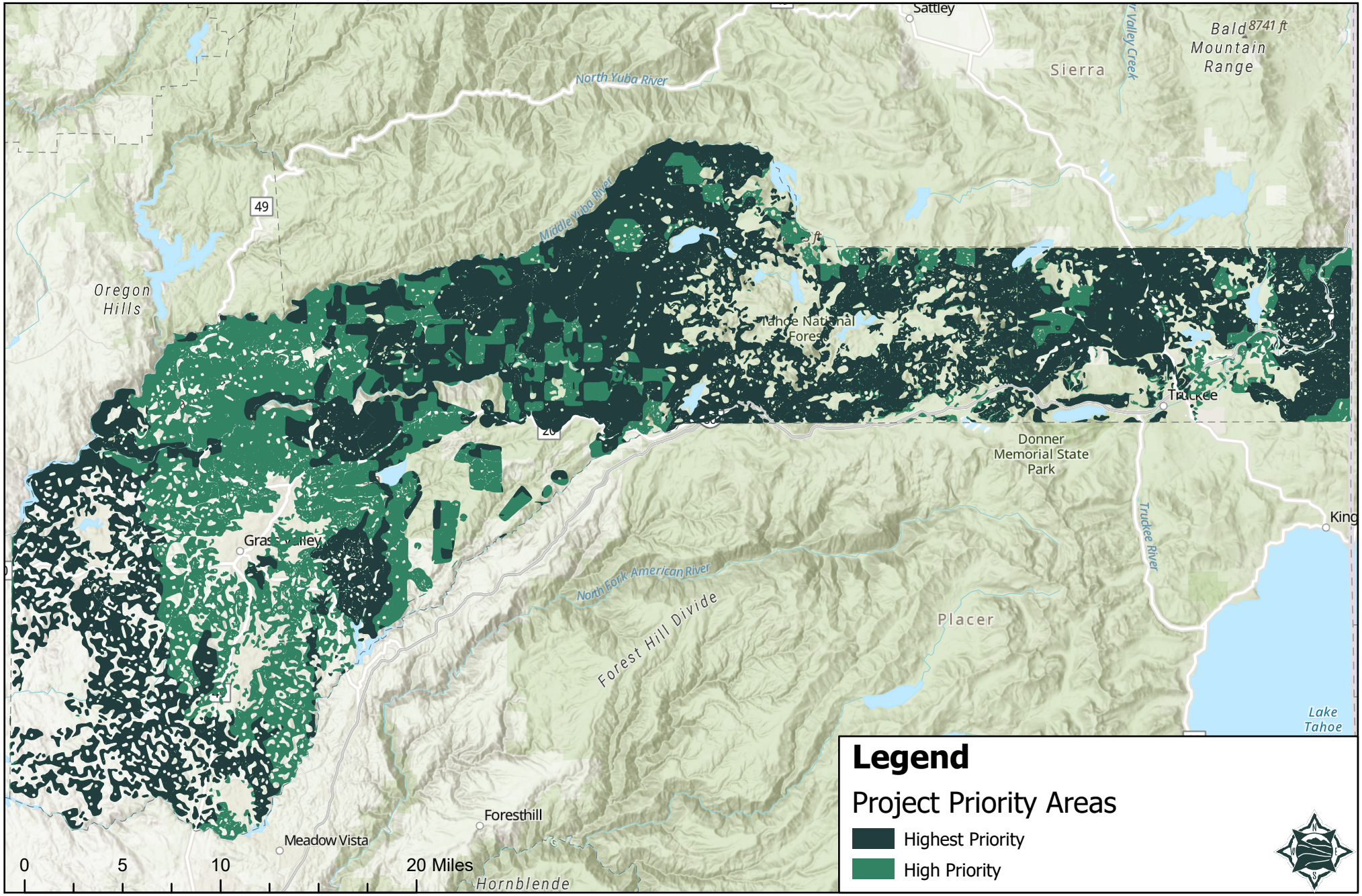
Nevada County Project Priority Areas



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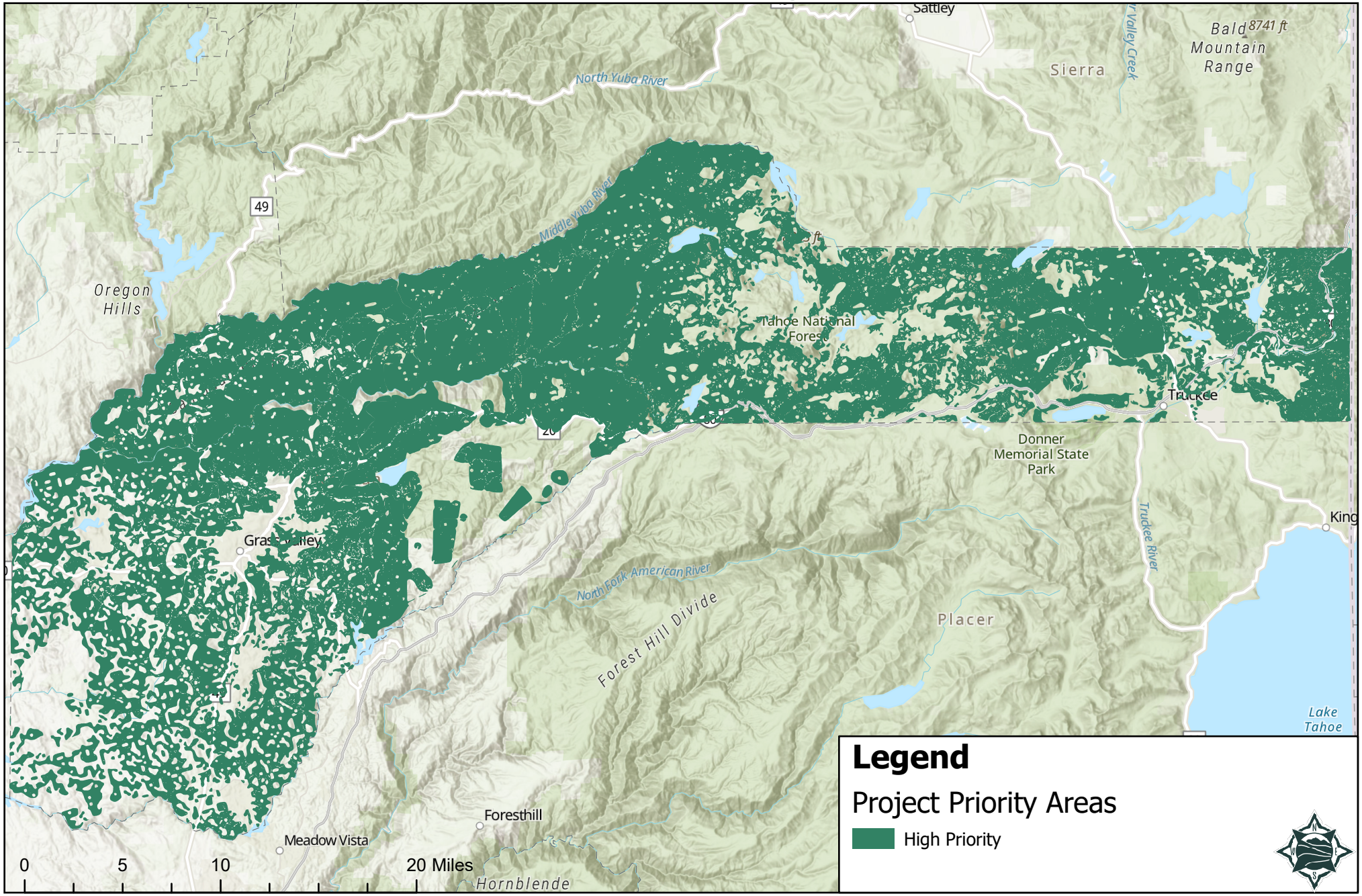
Nevada County Project Priority Areas - High Priority



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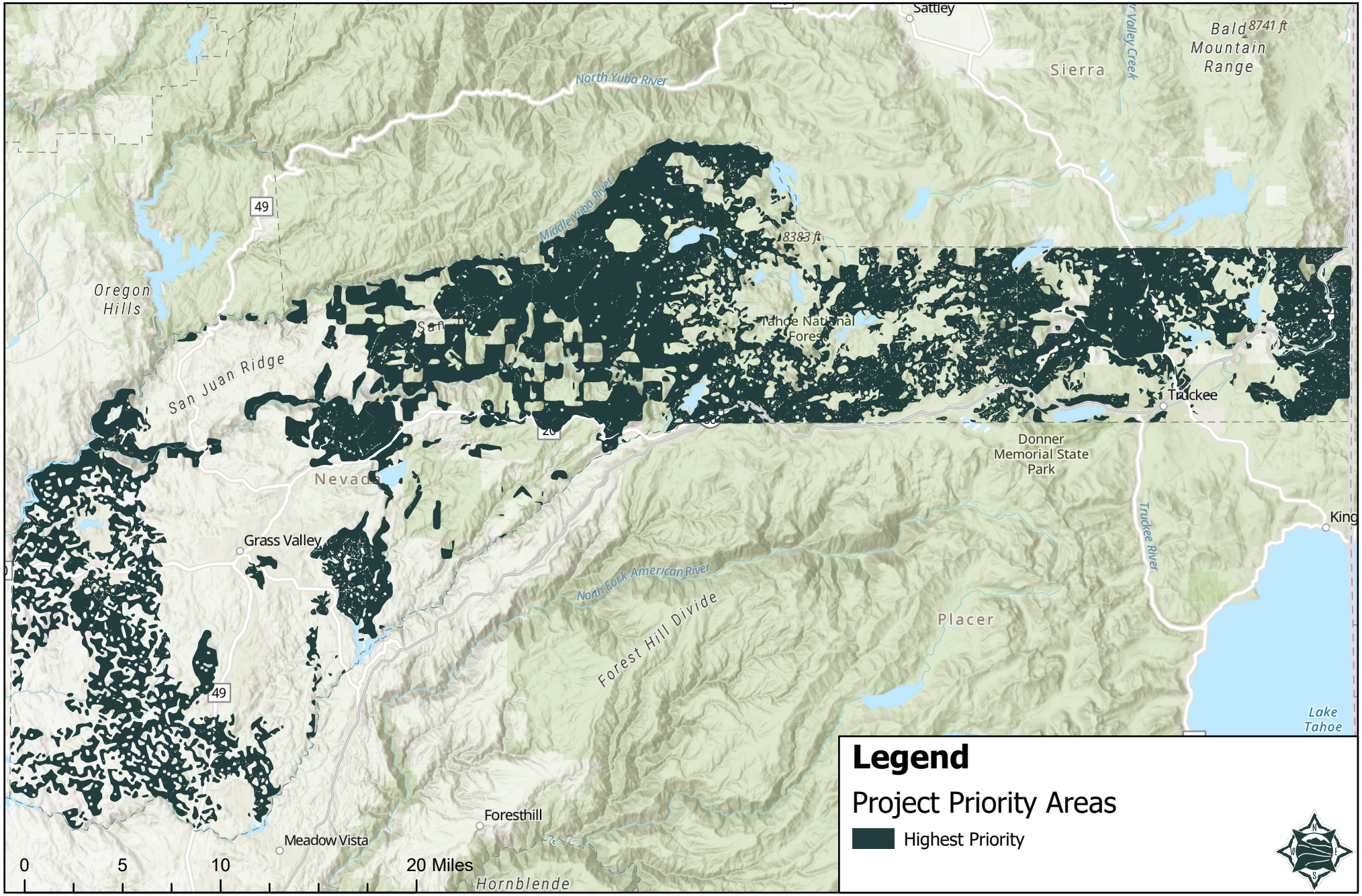
Nevada County Project Priority Areas - Highest Priority



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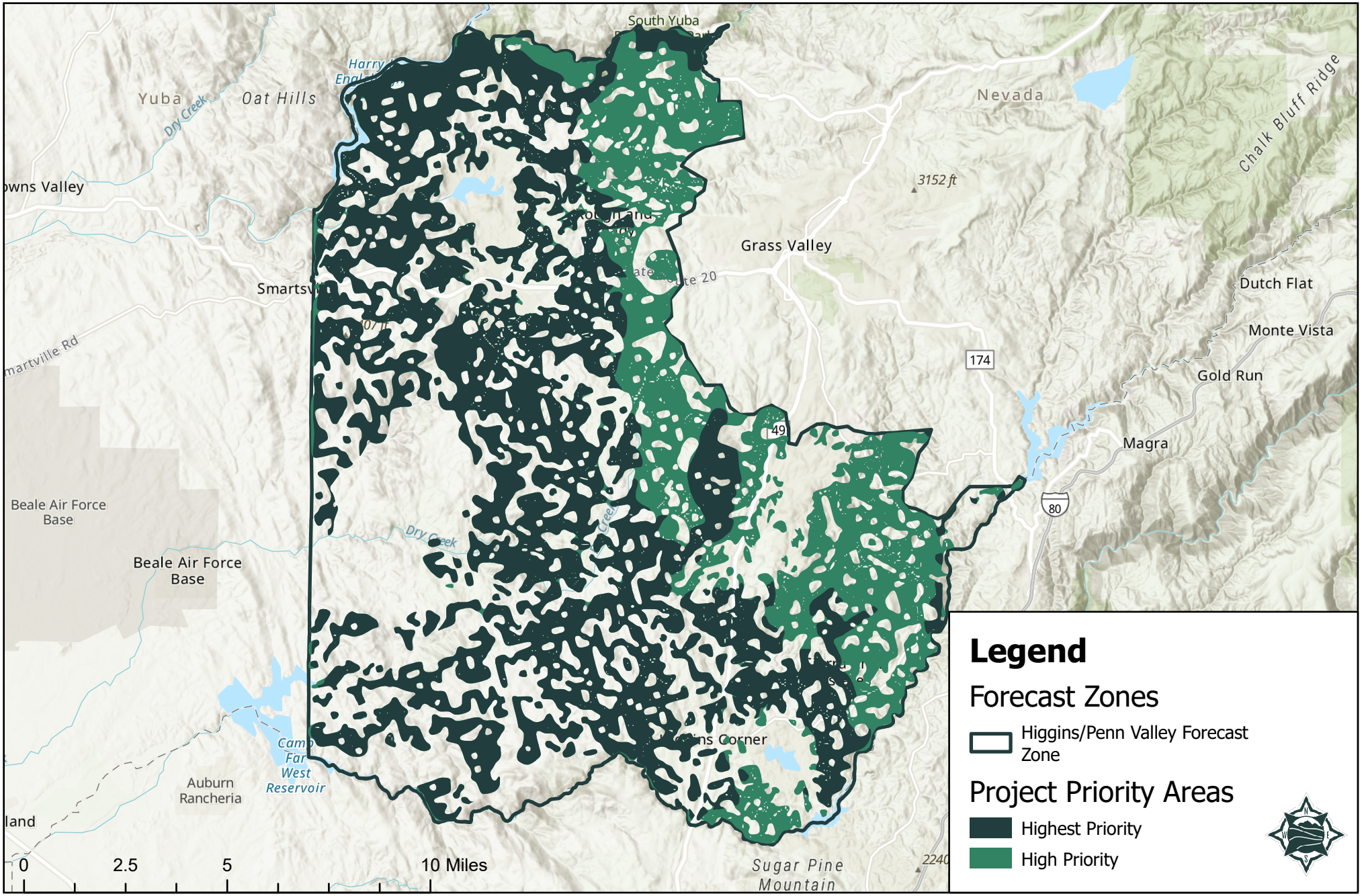
Higgins/Penn Valley Forecast Zone Project Priority Areas



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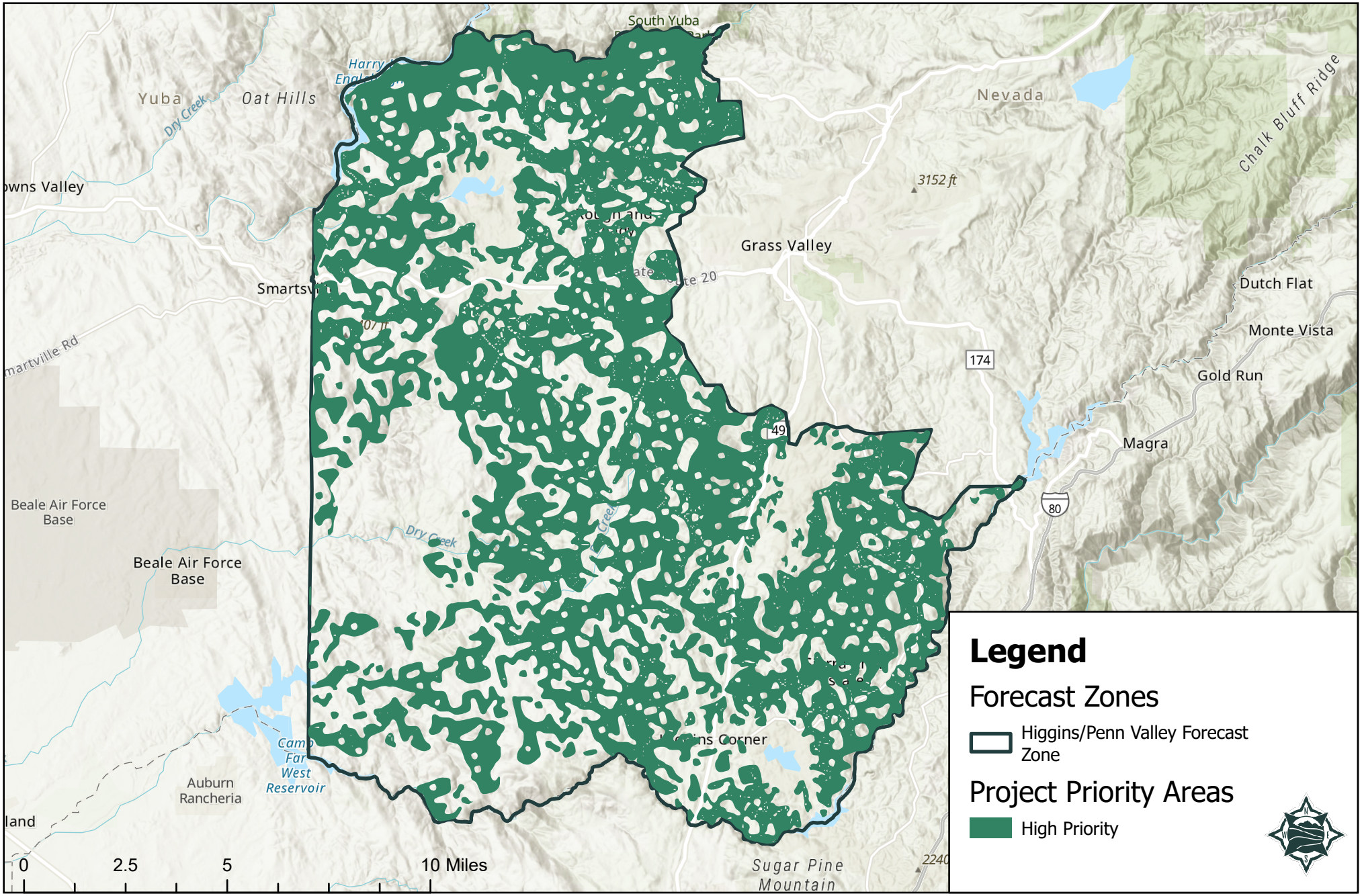
Higgins/Penn Valley Forecast Zone Project Priority Areas - High Priority



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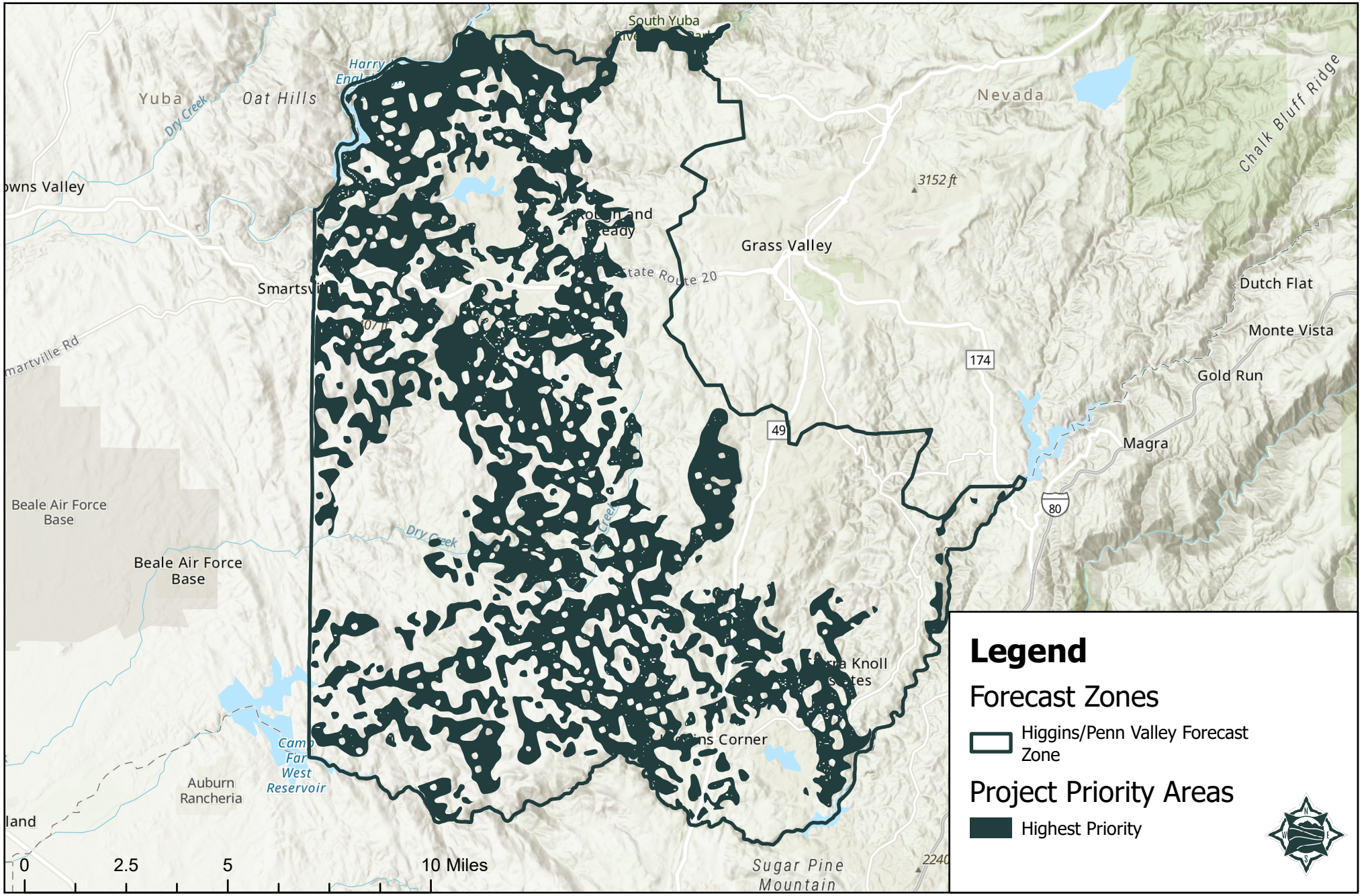
Higgins/Penn Valley Forecast Zone Project Priority Areas - Highest Priority



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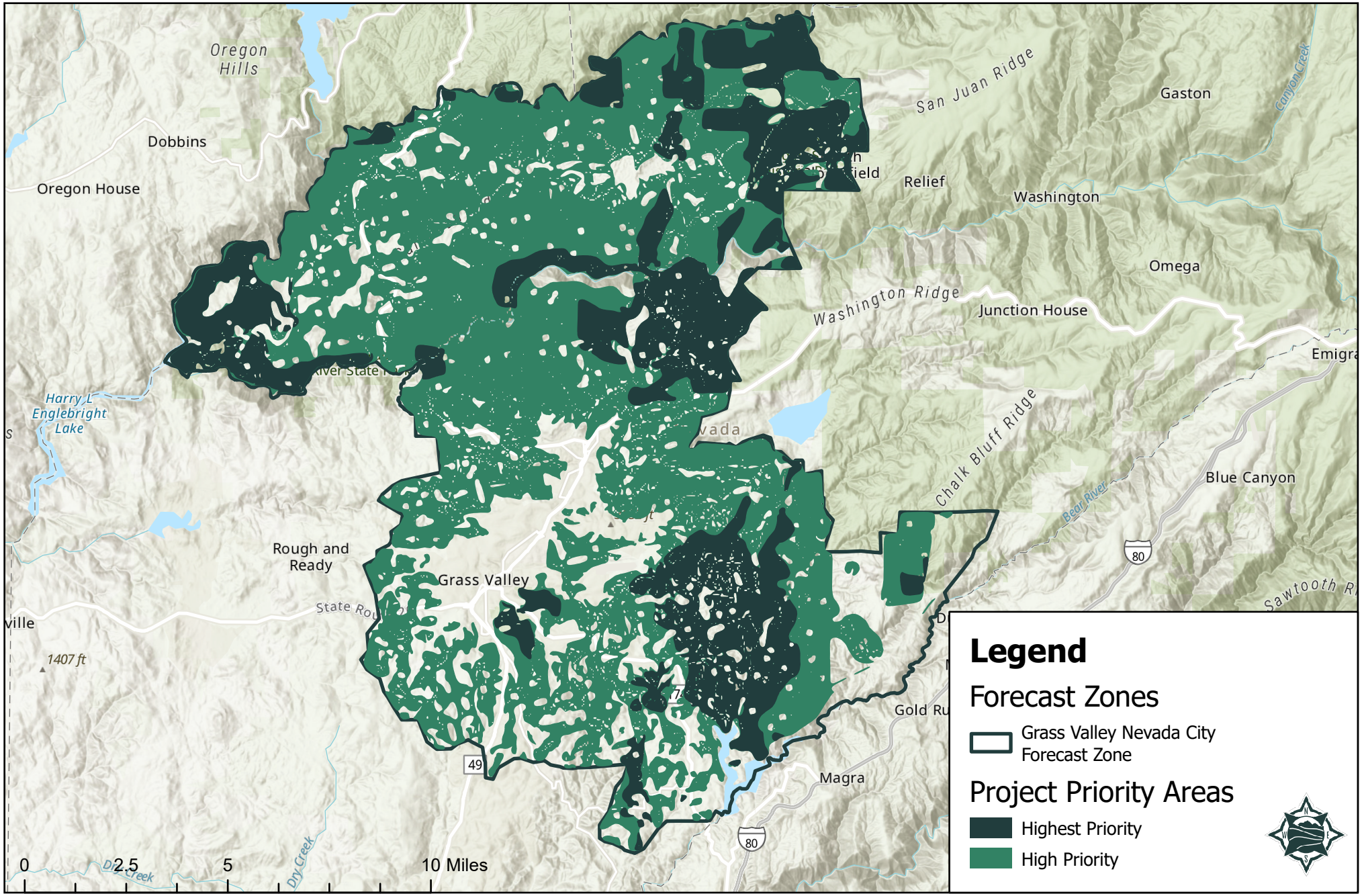
Grass Valley/Nevada City Forecast Zone Project Priority Areas



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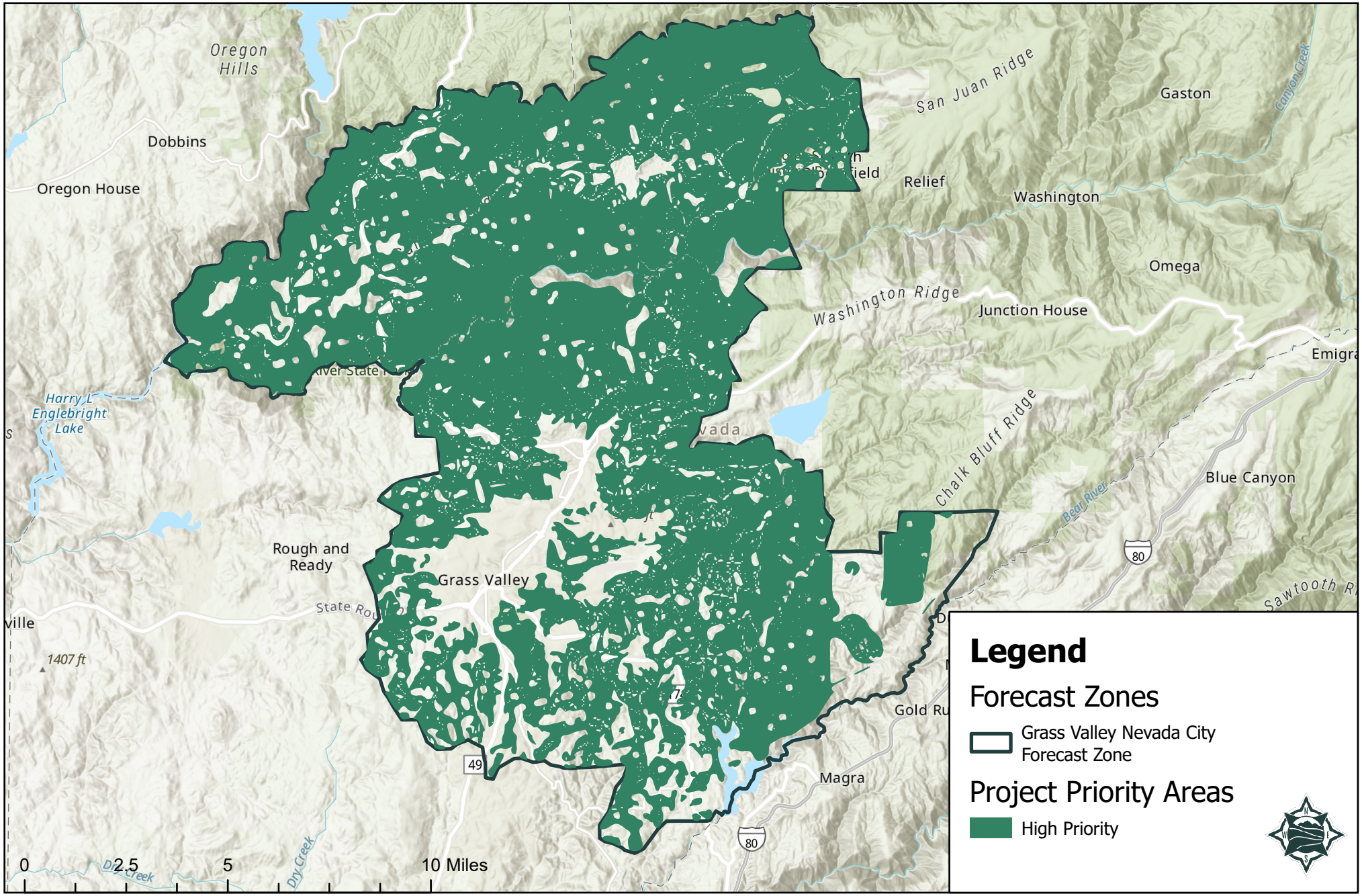
Grass Valley/Nevada City Forecast Zone Project Priority Areas - High Priority



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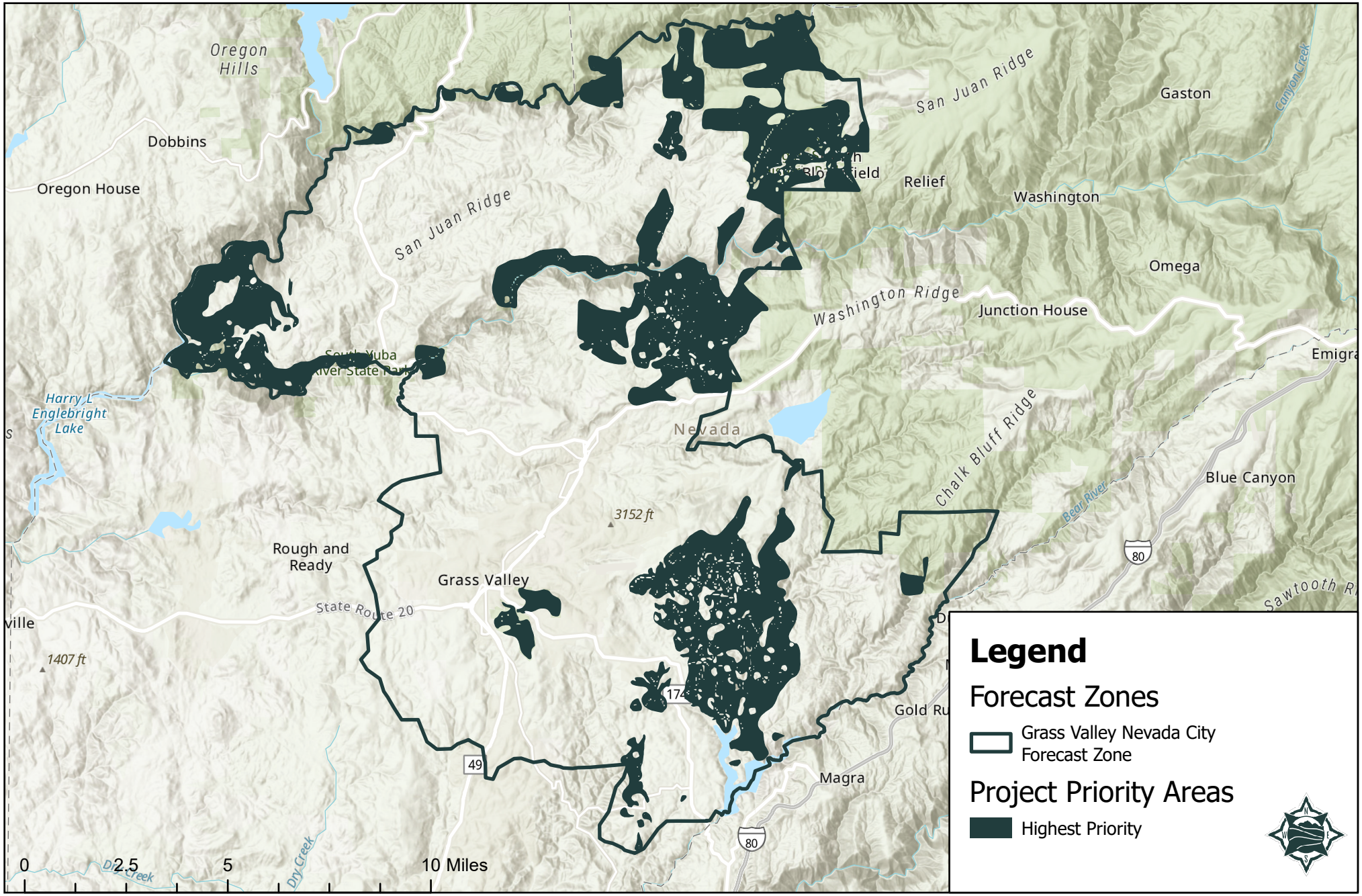
Grass Valley/Nevada City Forecast Zone Project Priority Areas - Highest Priority



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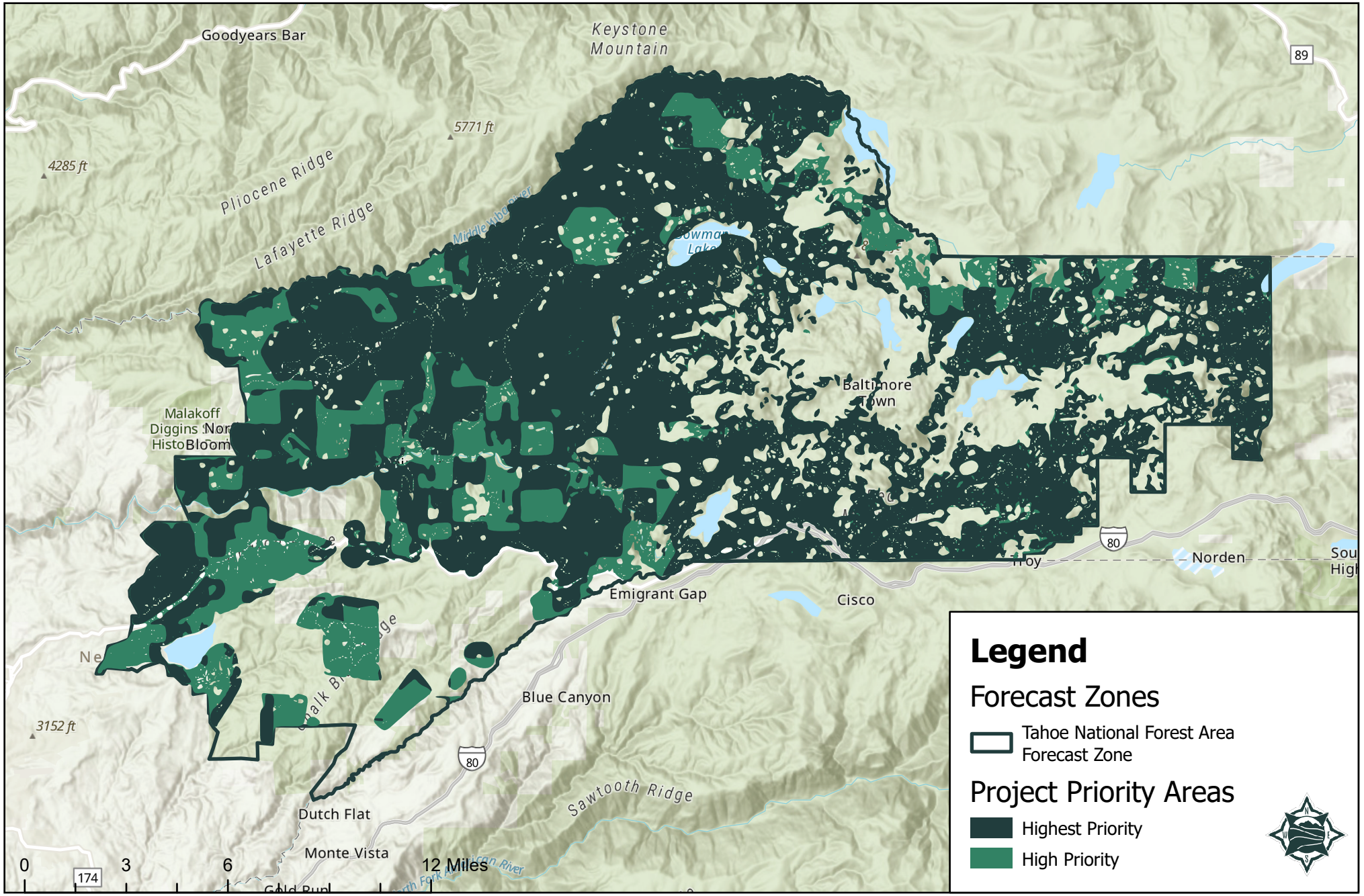
Tahoe National Forest Area Forecast Zone Project Priority Areas

CWPP Appendix B



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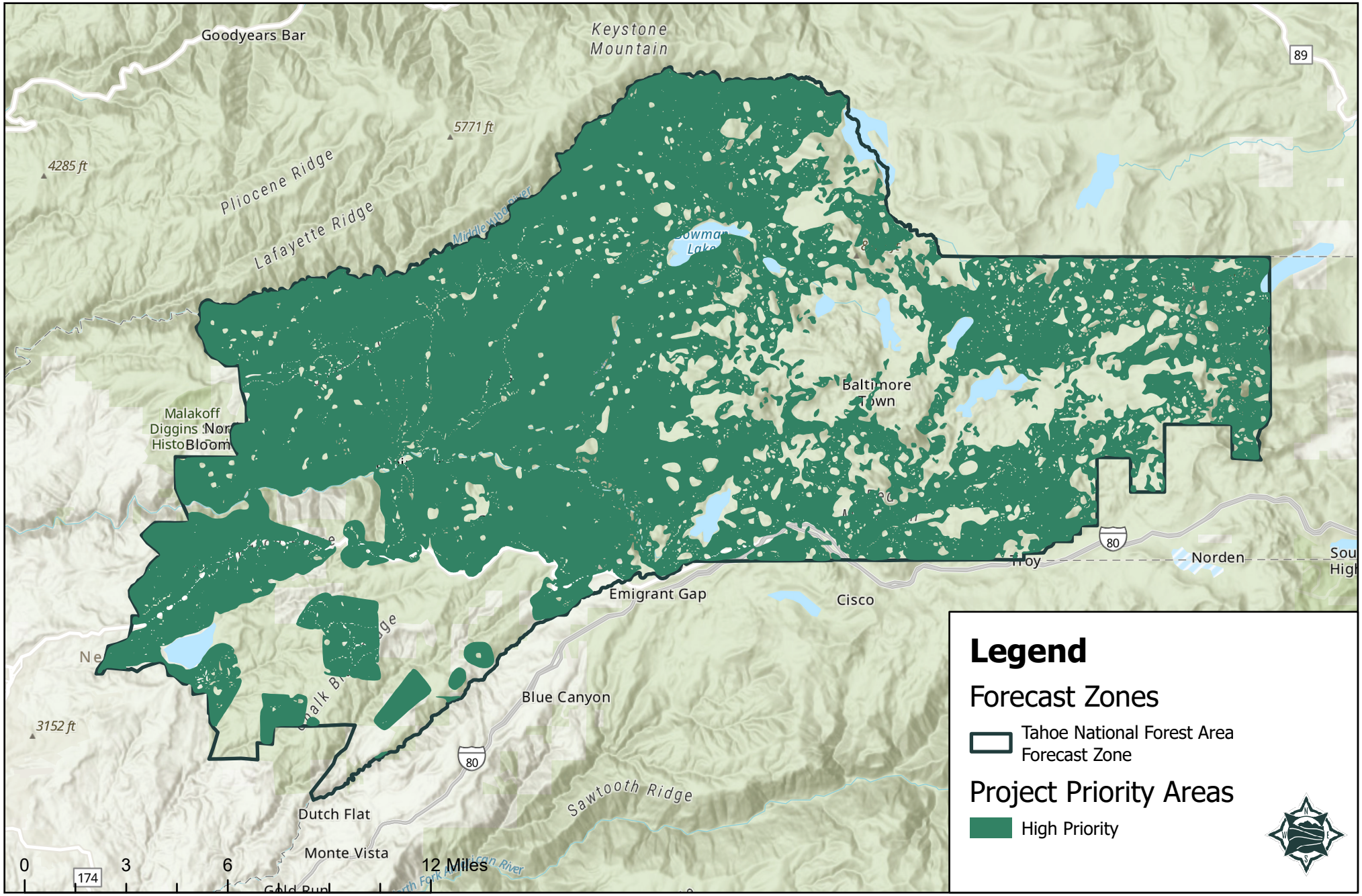

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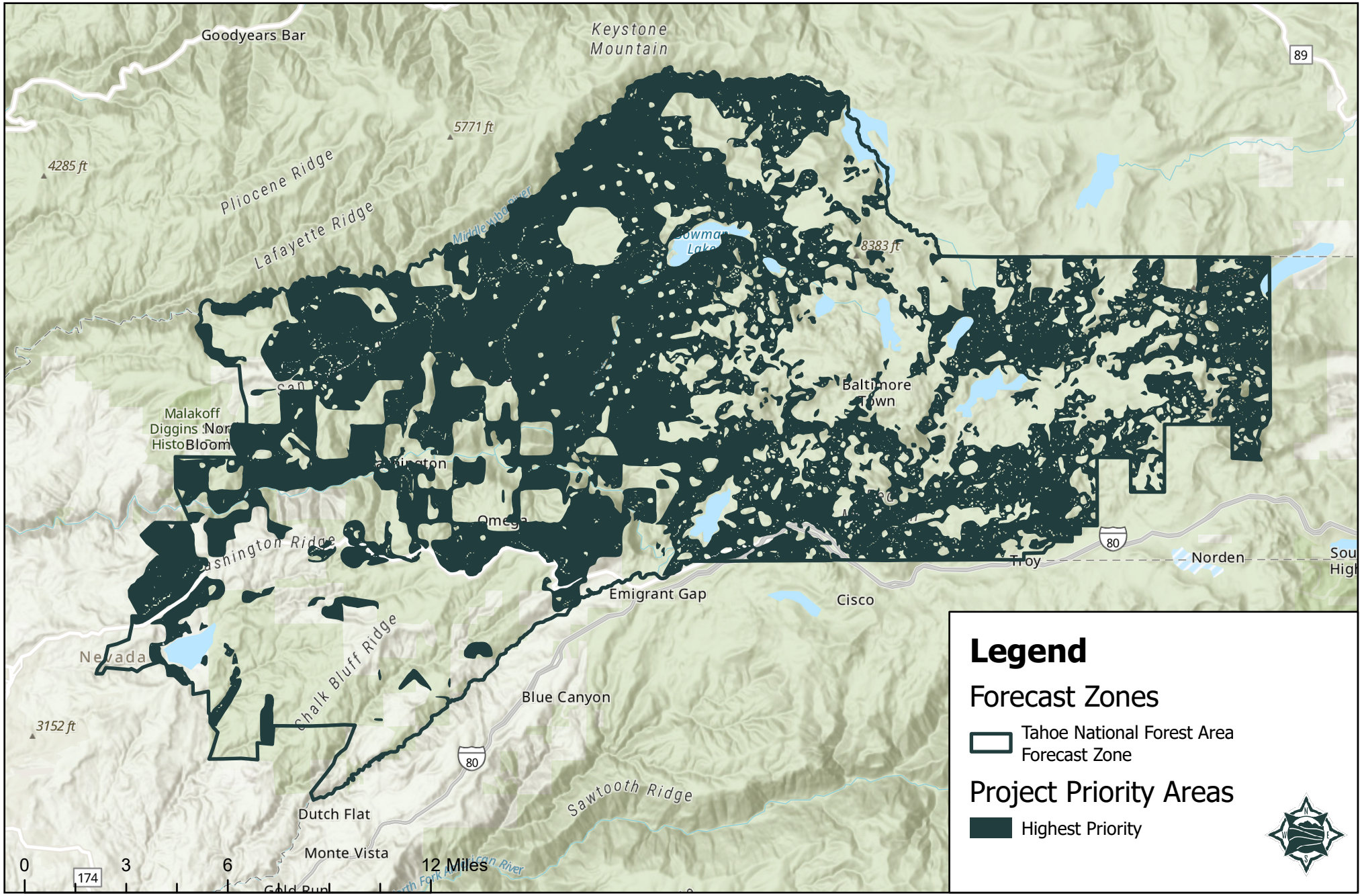

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Addendum Reports

IFTDSS Reports

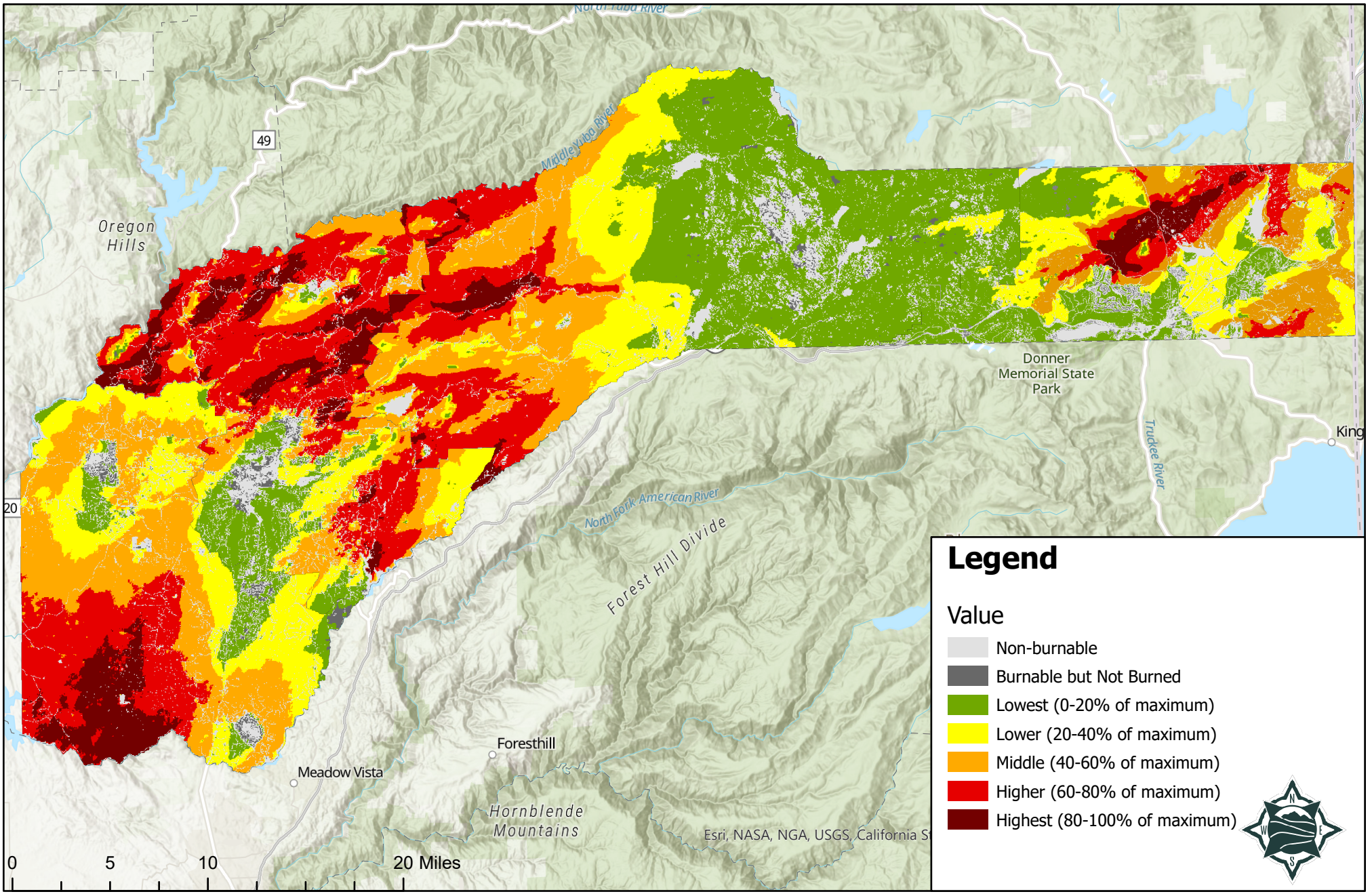
UPON REQUEST

Addendum Figures

Burn Probability

Nevada County Burn Probability: Revised Wind-Driven Fire Scenario

Addendum



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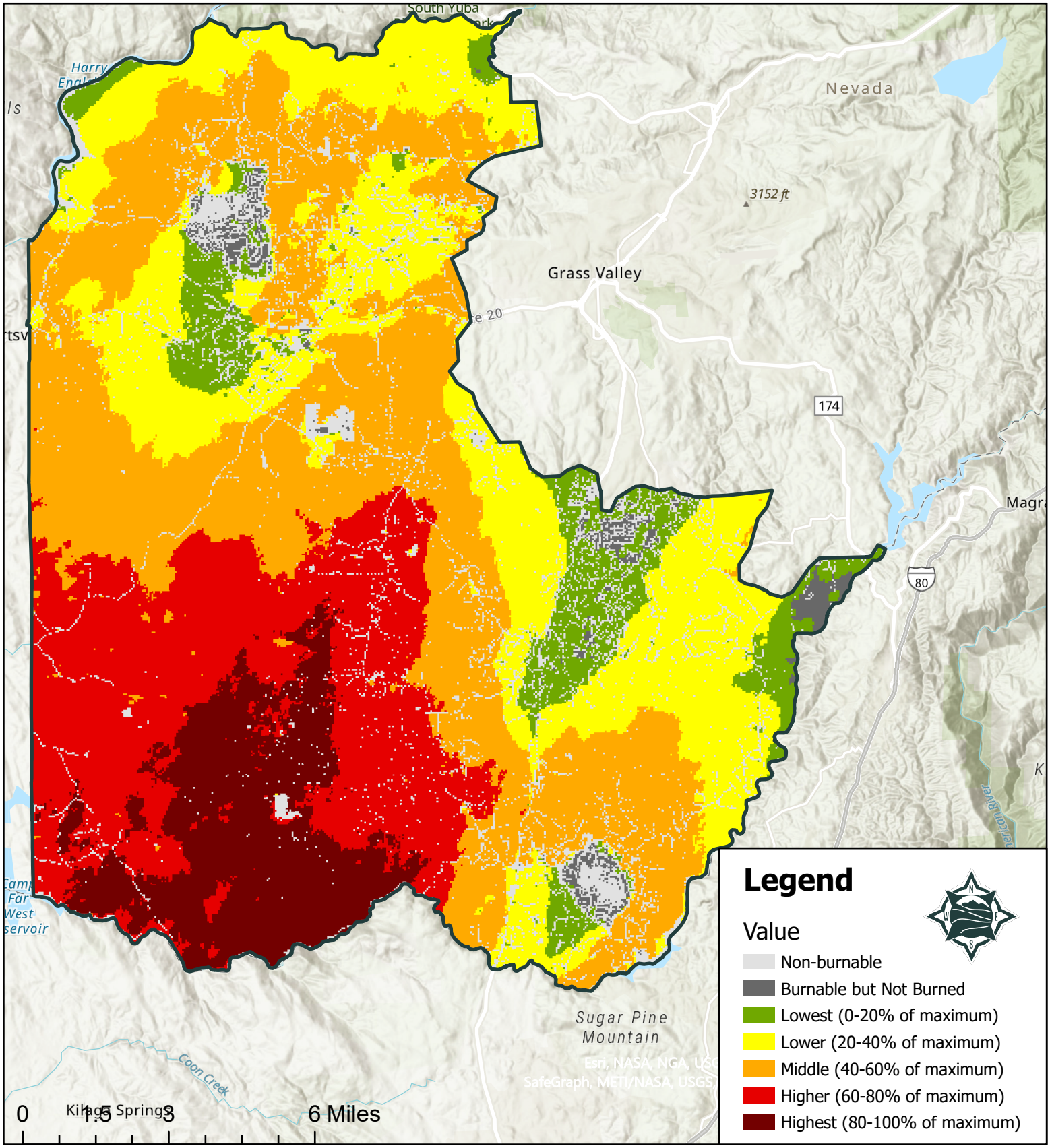
Higgins/Penn Valley Forecast Zone Burn Probability: Revised Wind-Driven Fire Scenario

CWPP Appendix B

Addendum



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CWPP Appendix B

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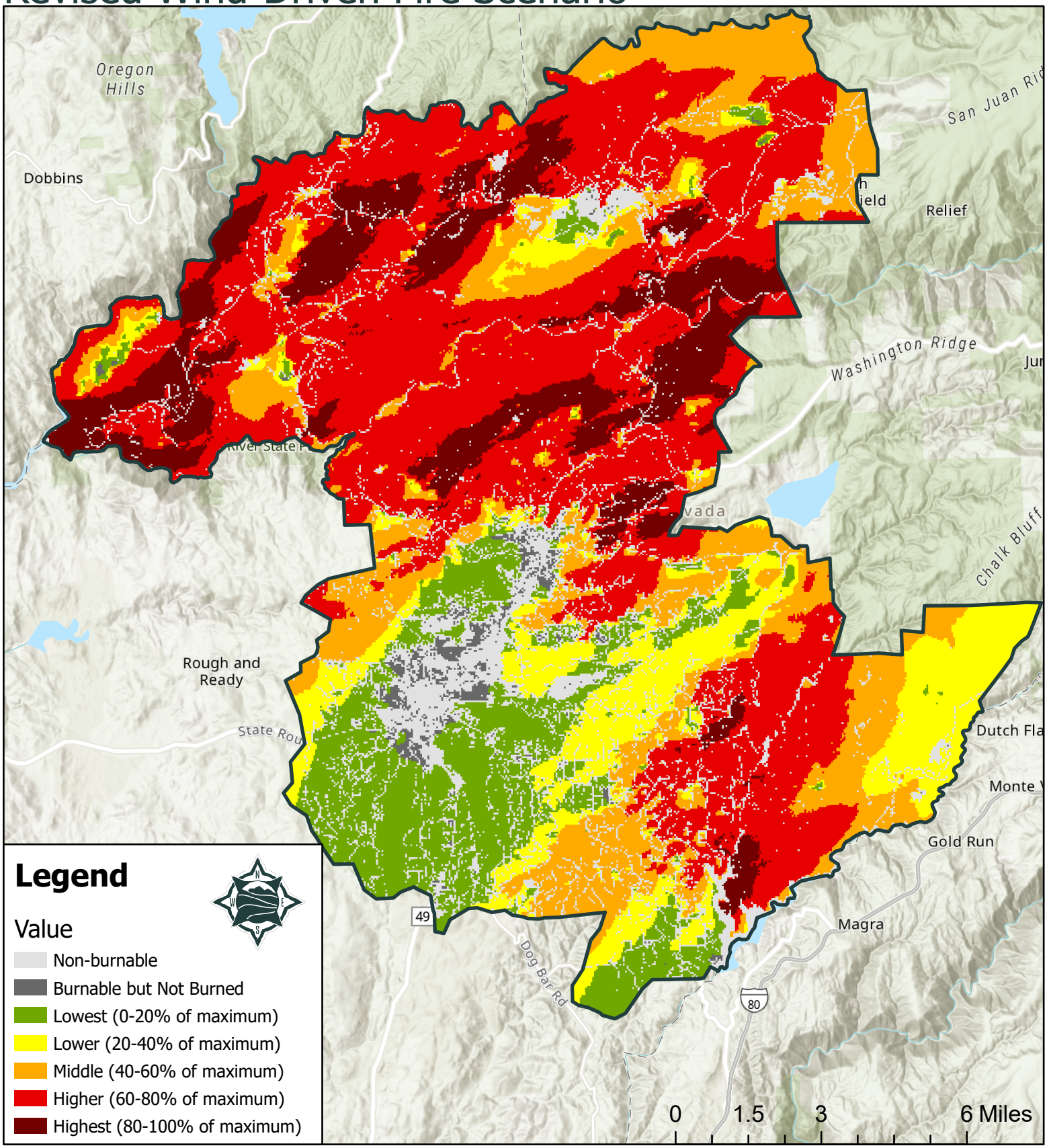

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CWPP Appendix B

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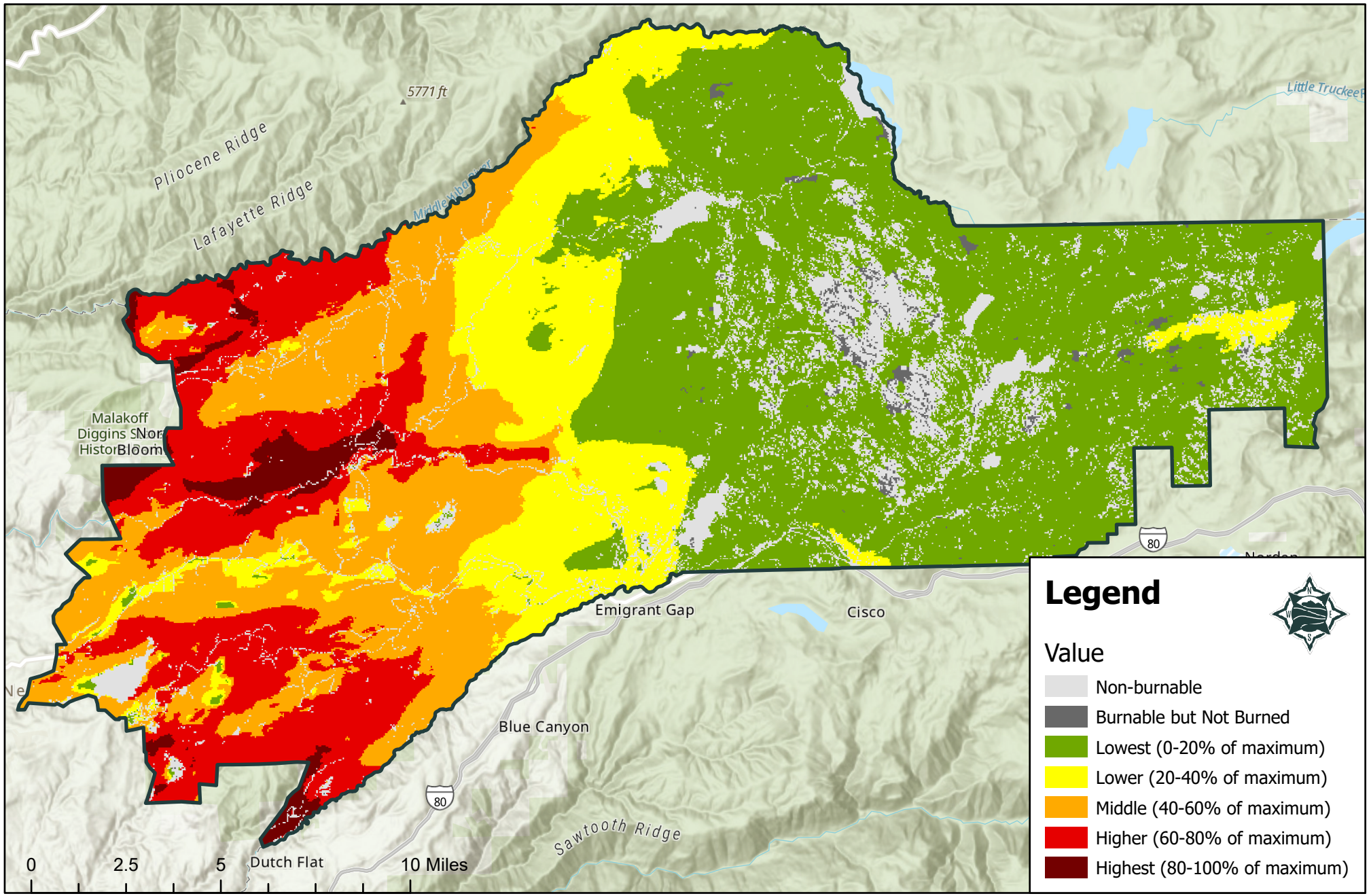

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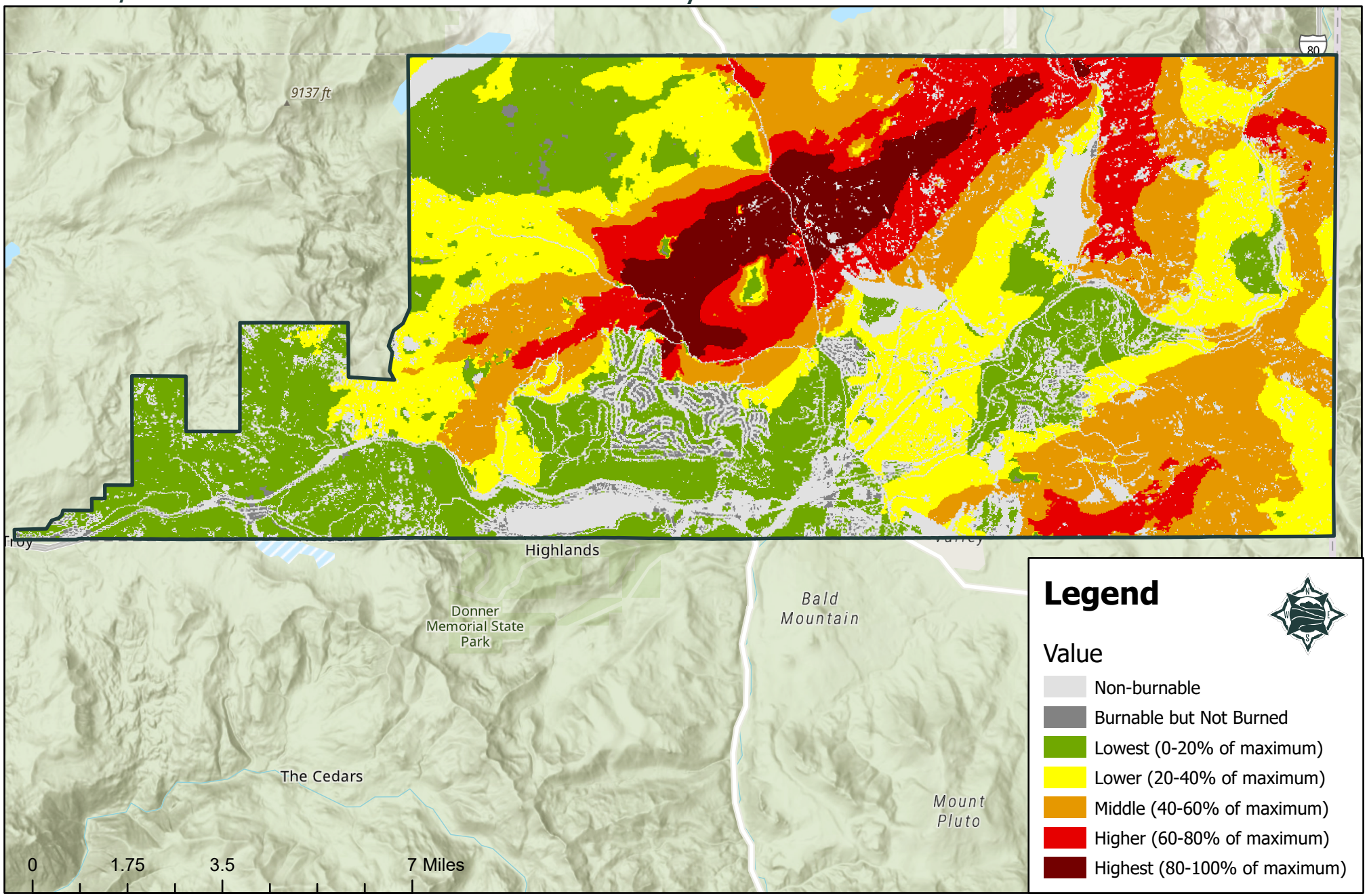
Truckee/Donner Forecast Zone Burn Probability: Revised Wind-Driven Fire Scenario

Addendum



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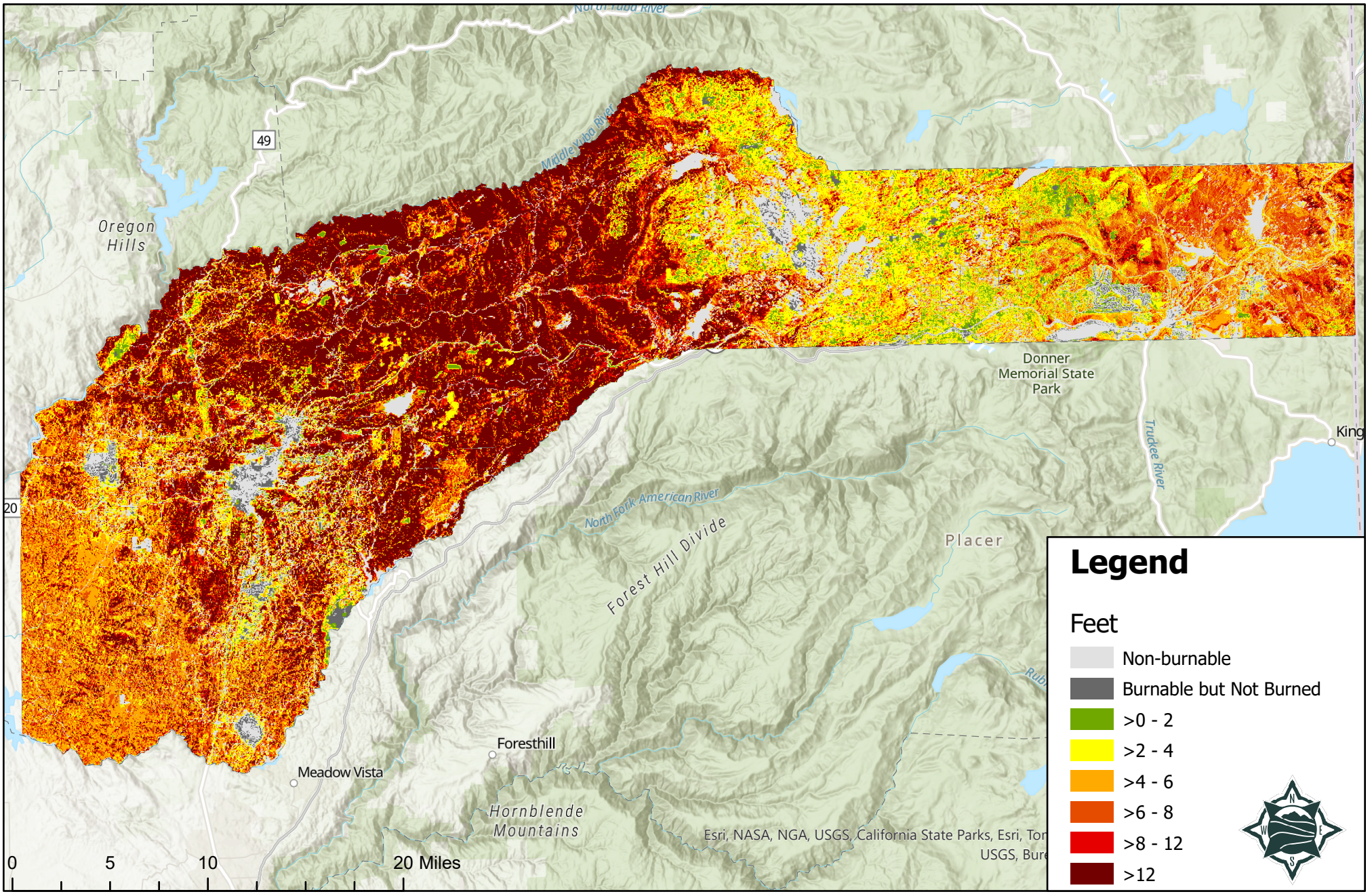
Addendum Figures

Conditional Flame Length

Nevada County Conditional Flame Length: Revised Wind-Driven Fire Scenario Addendum



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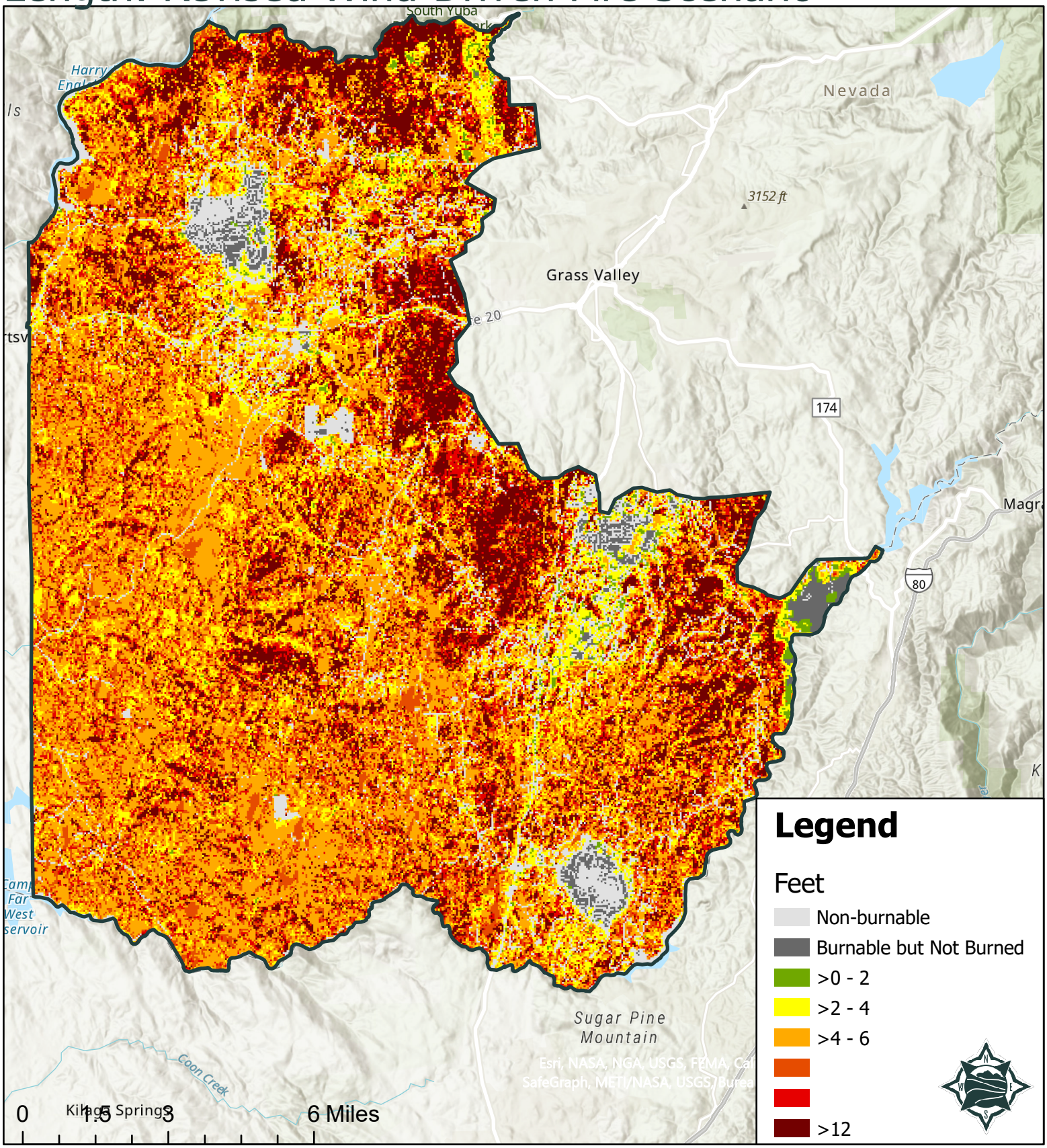
Higgins/Penn Valley Forecast Zone Conditional Flame Length: Revised Wind-Driven Fire Scenario

Addendum



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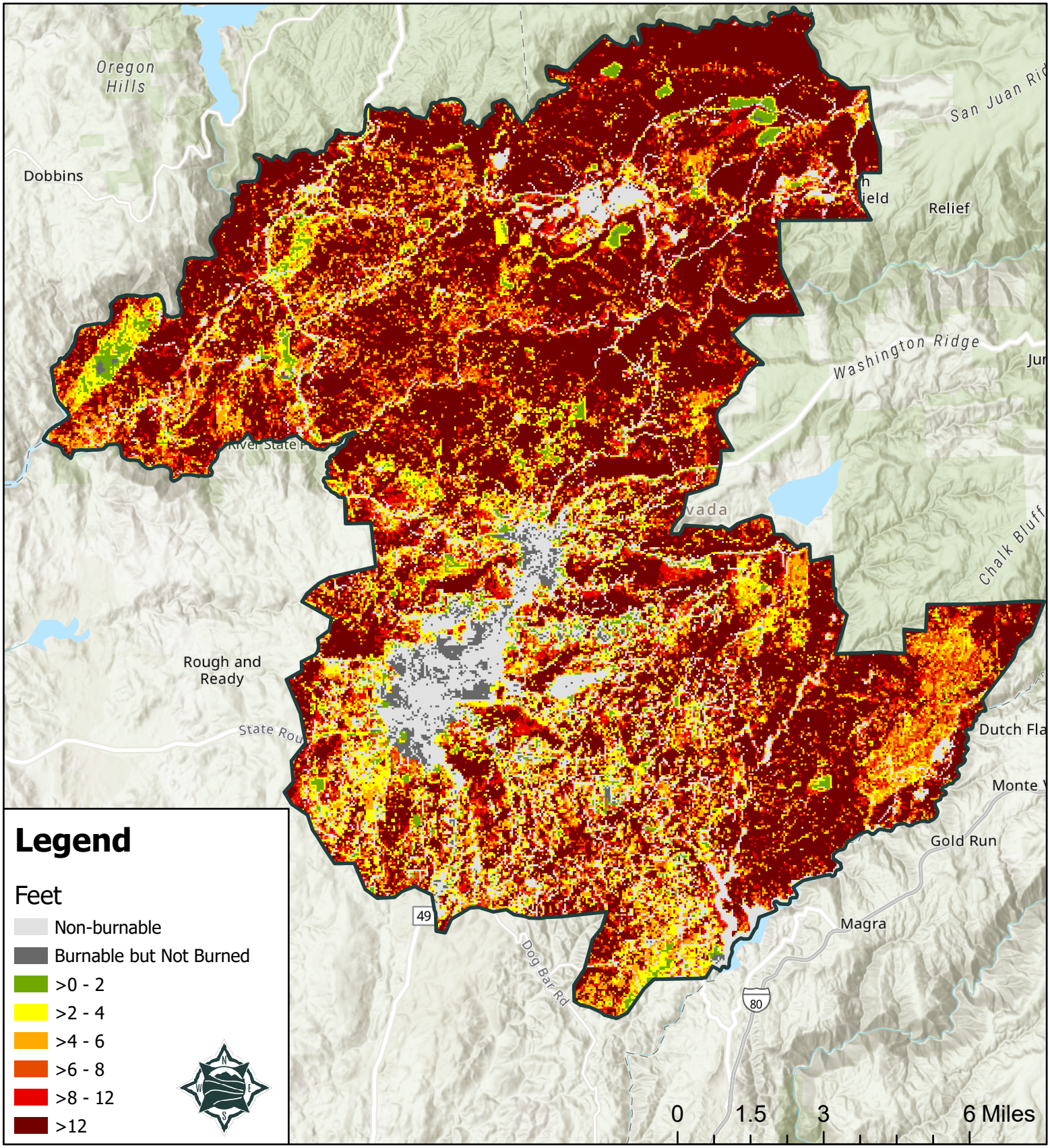
Grass Valley/Nevada City Forecast Zone Conditional Flame Length: Revised Wind-Driven Fire Scenario

CWPP Appendix B Addendum



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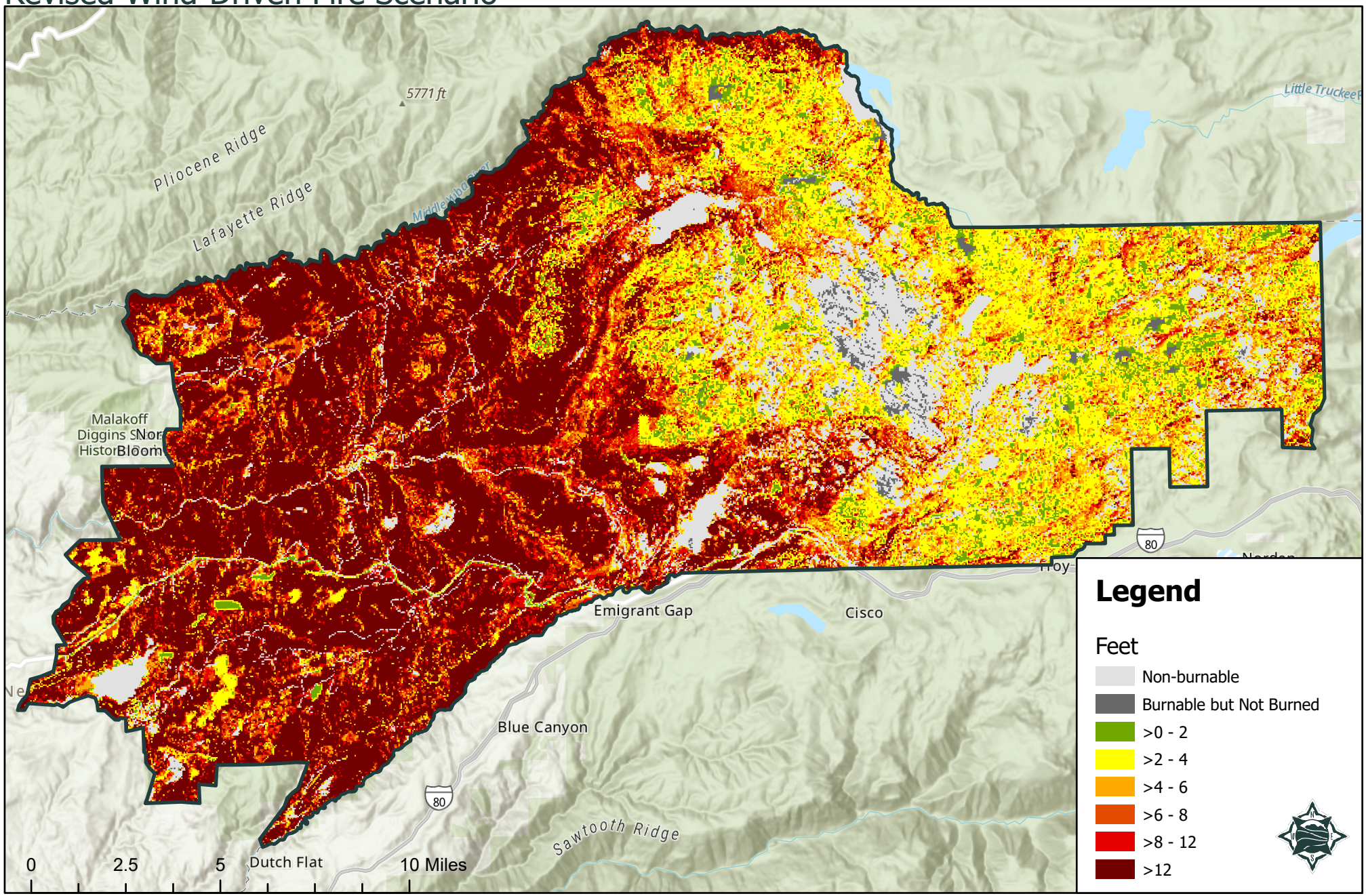
Tahoe National Forest Area Forecast Zone Conditional Flame Length: Revised Wind-Driven Fire Scenario

CWPP Appendix B

Addendum



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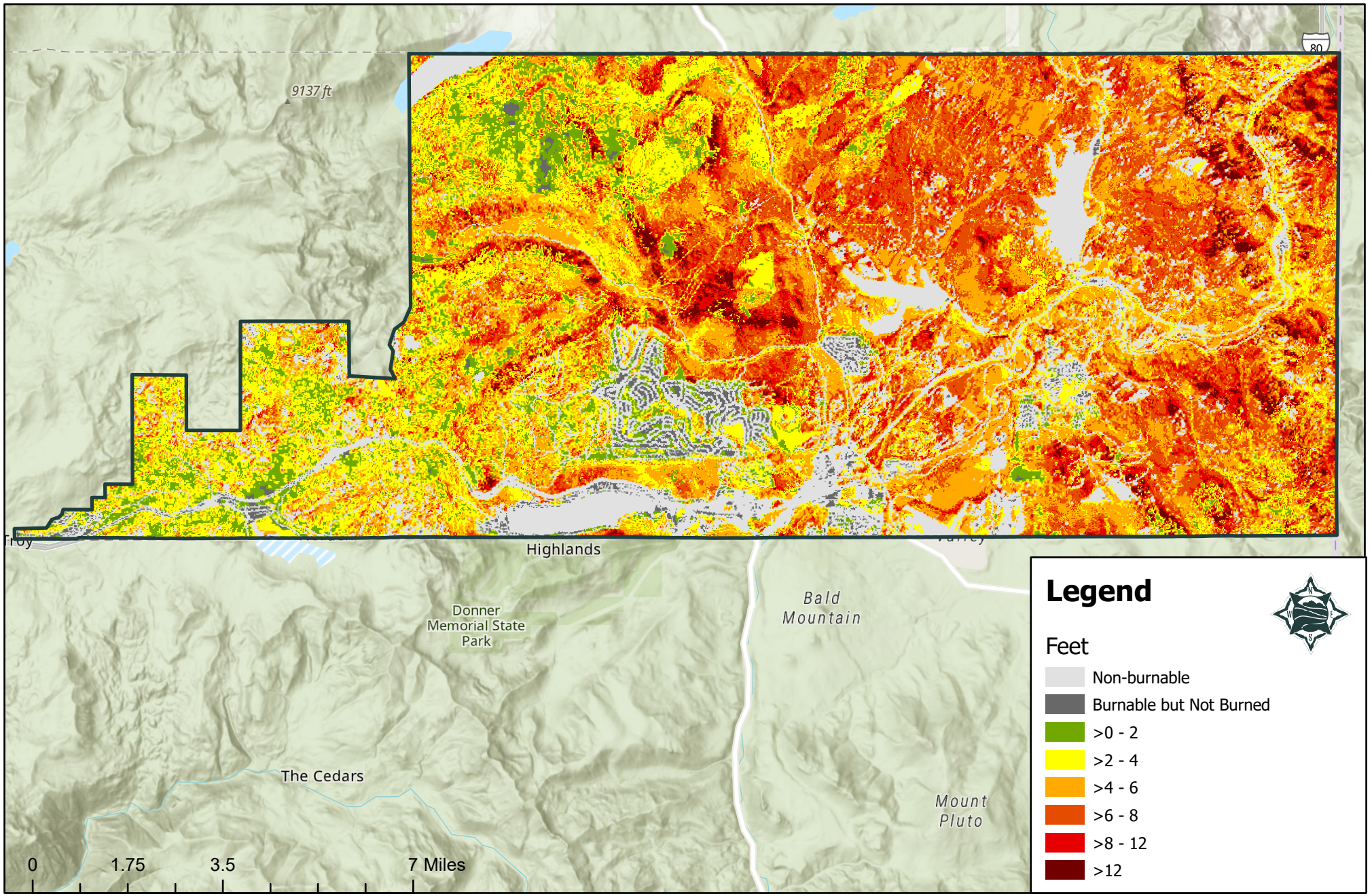
Truckee/Donner Forecast Zone Conditional Flame Length: Revised Wind-Driven Fire Scenario

CWPP Appendix B Addendum



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