

Hoopla Valley Indian Reservation Community Wildfire Protection Plan



June, 1 2015

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1. Introduction

1.1. Purpose and Need

The Hoopa Valley Indian Reservation (HVIR) is a region of steep terrain, large areas of continuous fire fuels, long periods of drought, and a region of high arson activity make wildfire a major concern for the Tribe. Action can and should be taken to help reduce the overall risk of wildfire while developing a community that is resilient to the aftereffect of a major fire. These steps can also help improve the ecosystem around HVIR by restoring native plants (used for ceremony and economy), and improve response to wildfire. To achieve this a combination of assessment, education, mitigation (fuels and housing safety) and effective fire suppression must be undertaken to achieve the goal of a resilient community and its surrounding wildlands to be prepared for the effects of wildfires.

To achieve the goal of a fire safe community the United States Congress passed the 2003 Healthy Forests Act (HFRA), which allowed for the development of Community Wildfire Protection Plans (CWPP). The CWPP educates and creates a pathway for communities to understand and reduce their wildfire risk. The CWPP achieves this through an understanding of fire risk to the community as well as the area defined as the interface between the community and the wildlands (Wildland Urban Interface – WUI).

1.2. Planning Team and Process

This CWPP is written for the Hoopa Valley Indian Reservation to develop assessment, outreach and mitigation planning actions for wildfire risk reduction. This is not a legal document but is meant to educate and help secure potential funding for the Tribe. The work done for this CWPP followed the timeline as listed below in table 1. The work was completed with input from the HVIR community, subject matter experts both internal and external to the HVIR and reviewed by the HVIR CWPP key members also listed in table 1. The list of key CWPP members is not inclusive of everyone who helped in the process of the CWPP development.

Table 1: CWPP Process and key Hoopa Valley Indian Reservation members*

Task	Explanation
Form decision team	Development of responsible parties at Hoopa Valley Indian Reservation
Involve Federal Partners	Engage Bureau of Indian Affairs, U.S Forest Service, Humboldt County and CAL FIRE and other agencies as appropriate
Meet with subject matter experts	Community meeting with decision team and community subject matter experts to determine and prioritize location, issues, concerns, and mitigation plans
Meet with Community	Community meeting with decision team and community to determine and prioritize location, issues, concerns, and mitigation plans
Establish base map	Develop a base map that defines community at risk including wildland urban interface and critical infrastructure
Develop Fire Risk Assessment	Look at topography, climate, fuels, access, residential density and structure risk to categorize overall communities fire risk
Form mitigation action plan based on SME and community input	Develop a mitigation plan based on risk assessment and community meeting based on prioritization from development team, subject matter experts and community
Finalize CWPP	Review with development team and finalize CWPP
Hoopa Valley Indian Reservation Approval of CWPP	Receive approval from Hoopa Valley Indian Reservation Tribal Council on CWPP

Hoopa Valley Indian Reservation CWPP Key Members*

Darin Jarnaghan Sr.	Forestry Manager, Hoopa Tribal Forestry
Kevin Lane	Fuels Specialist, Hoopa Tribal Forestry
Rod Mendes	Director Office of Emergency Services, Hoopa Valley Tribe
Amos Pole	Fire Chief, Hoopa Volunteer Fire Department Hoopa Valley Tribe
Pliny (Jack) Jackson	Chairman, Hoopa Fire Safe Council, Hoopa Valley Tribe
Jim Campbell	GIS Specialist, Hoopa Forestry

*Please note that since the completion of the CWPP in June of 2015 that the Hoopa Valley Wildfire department has been restructured and is now the Hoopa Valley Fire Department (HVFD) and the main point of contact is Rod Mendes, Chief Hoopa Fire Department and

Director of the Office of Emergency Services. The HVFD reports directly to the Tribal Chairman. This note documents the change in communication structure and point of contact for the Hoopa Valley Fire Department and the Hoopa Valley Indian Tribe Community Wildfire Protection Plan.

2. Community Description

2.1. Community Description

The Hoopa Valley Indian Reservation (HVIR) is located in the Northeastern portion of Humboldt County, California. It is located 65 east miles of Eureka, 120 Miles west of Redding and 300 miles north of San Francisco. The HVIR is roughly square in shape with sides approximately 12 miles long encompassing an area of over ninety two thousand acres covering approximately 50% of the Hupa Aboriginal territory. Figure 1 shows location of HVIR in relation to Eureka, San Francisco and Sacramento in Northern California.

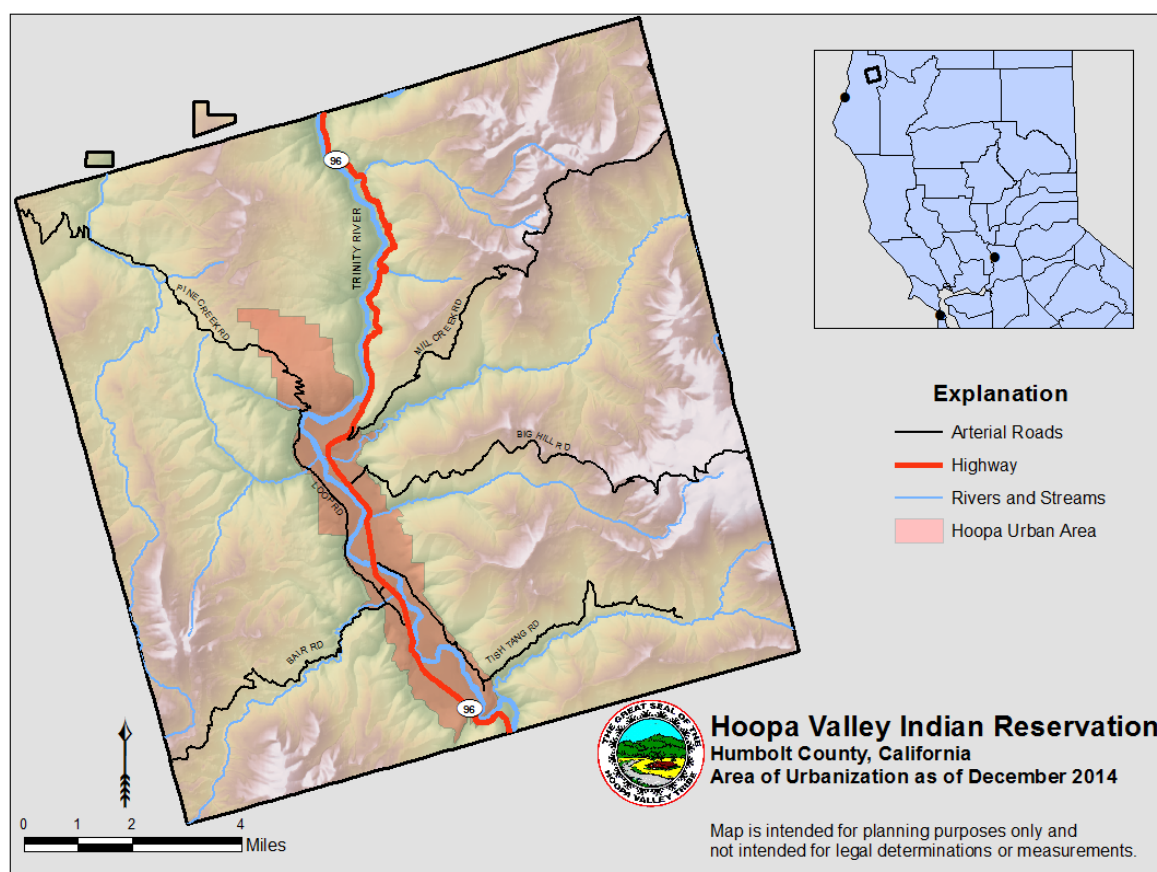


Figure 1: showing location of Hoopa Valley Indian Reservation, major roads, topography and defined urban area.

This makes HIVR the largest reservation in California. The main area of urbanization including Tribal government is located in the Trinity River Valley Floor. The valley is located near the reservation center and approximately 6 miles long by a mile wide. The Valley is separated into 7 districts, or fields, which represent traditional villages of the Hoopa People. The field names are Norton, Soctish/Chenone, Mesket, Agency, Bald Hills, Hostler/Matilton and Campbell. These districts constitute the classified urban area in the Community Wildfire Protection Plan (CWPP) with a 1.5 mile buffer. The slope increases dramatically and is steep sloped and heavily forested above the valley floor.

According to the 2010 US census the total population of HIVR is 3,041. The majority of this population live (85%) live in the 6 districts that are situated on the valley floor. The largest concentration of housing is in Campbell district. The Bald Hill district contains the rest of the HIVR population as dispersed housing in an upland setting. Commercial buildings are scattered along Highway 96 but are mainly concentrated in Agency, Campbell and Hostler/Matilton. Medical services including Kimaw Medical & Dental clinic, ambulance service and the rest home are located in Hostler/Matilton. Tribal government, records and most offices, as well as the K-12 schools and head start program, are located in Agency. These all were identified as critical infrastructure by the HIVR. Figure 2 shows the districts location on the HIVR as well as defined critical infrastructure (Tribal, commercial, and federal) in red and noncritical infrastructure in blue.

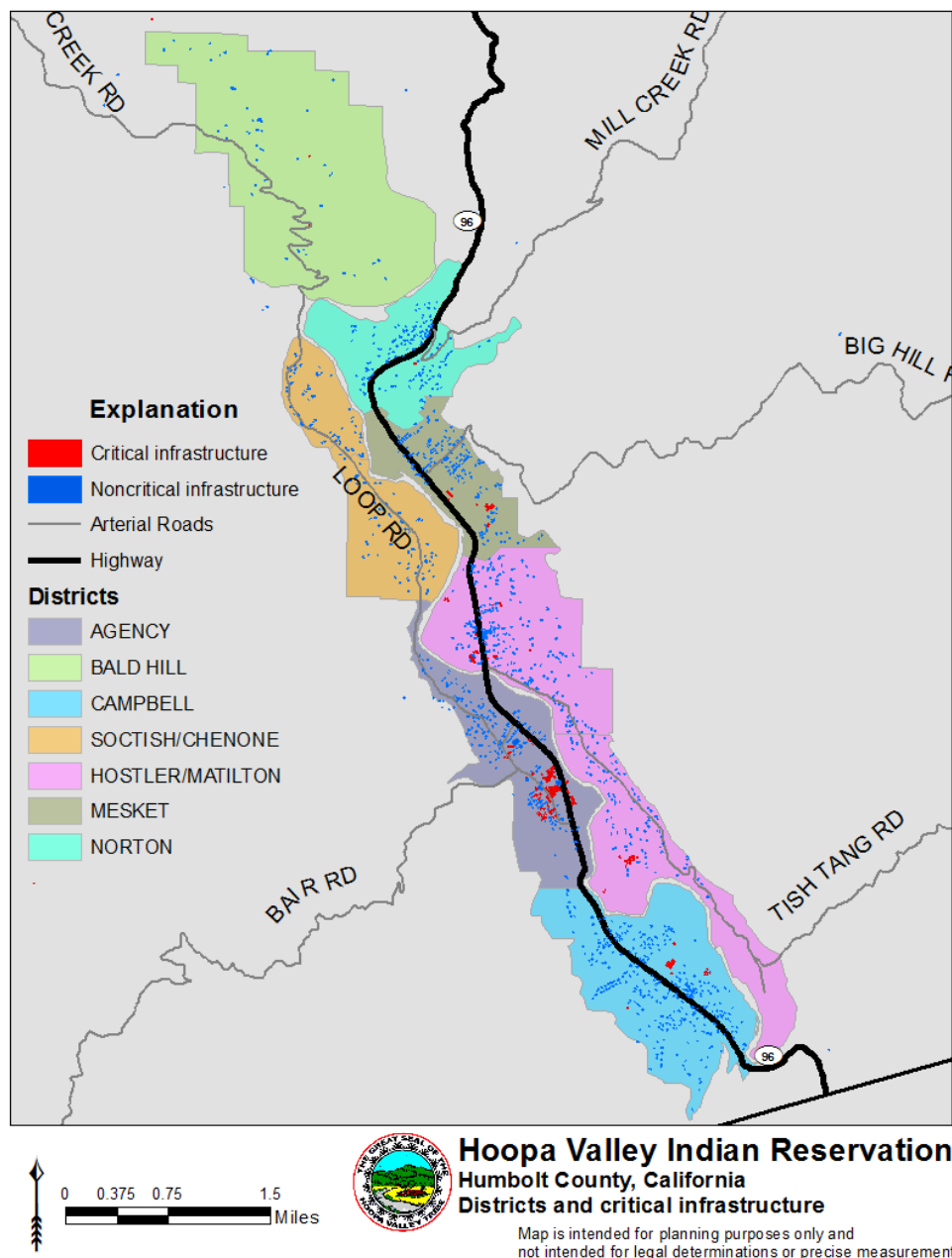


Figure 2: Map showing the 7 Hoopa Valley Indian Reservation Districts as well as critical (red) and noncritical (blue) infrastructure.

2.2. Fuels Mitigation

Fuel mitigation for the Hoopa Valley Indian Reservation is managed by Hoopa Forestry (Hoopa Wildland Fire Department (HWFD)). Despite a lack of funding from the BIA and other sources, the HWFD has developed a fuel mitigation strategy that includes: fuels reduction, timber sales, Wildland Urban Interface (WUI) management, and maintains or

improves cultural resources (traditional plants as an example). They have also worked to develop a fire prevention strategy that emphasizes the importance of enforcement in deterring incendiary fires.

Fuels reduction in all areas consists of prescribed burns, fuel breaks, hazel and Beargrass improvements, wildlife enhancement and specific work done on WUI lands. In 2013 a total of 782 acres received mechanical treatment while another 733 acres were prescribed burned. Table 1 below shows a summary of 2013 fuels reduction by Hoopa Forestry.

Table 2: 2013 Hoopa Forestry Fuels Reduction Accomplishments

Project Type	Mechanical Treatment (acres)	RX Burn (acres)
Timber Sales	300	300
Beargrass Habitat Enhancement	15	15
Hazel Habitat Enhancement	66	66
Fuel Breaks	75	0
Wildlife enhancement	26	52
WUI Specific fuels reduction	300	26
Totals Acres	782	733

Additional work planned for 2014 is to 150 acres of prescribed cultural burning (Beargrass and Hazel habitat enhancement), 100-500 acres of fuels reduction burning, and 300-500 acres of timber sales burning. An example of the type of work was the Tribal Community Fuels Project. This project was initiated to take a popular recreation area and return it to a useable state by removing hazardous fuels and noxious plants (poison oak). Figure 3 illustrates the effect a planned fuels reduction project can have for access and usability of an area with a high fuel load.



Figure 3: Pictures showing before and after fuels reduction work on a Tribal Community Fuels Reduction Project to make a recreation area usable again.

2.3. Fire History

Wildfires are a part of life in the western United States and especially northern California. CAL FIRE has documented the entirety of Hoopa Valley Indian Reservation (HVIR) is on a 35 year burn cycle or less, and of mixed intensity. Between 1999 and 2013 there were a total of 1,963 reported wildfires on the HVIR with over 97% being less than 10 acres in size (BIA data from USGS Federal Wildland Fire Occurrence Data (2014) website). The majority of these fires (98.5%) were human induced while all of the naturally occurring fires were caused by lightning strikes. The table below lists a selected group of wildfires including names, year, and acreage covered that were in the HVIR boundaries:

- Megram Lightning Fire, October 1999: 4,830 Reservation acres (125,000 acres total)
- Hoopa Fire, July 1999: 54 acres
- Big Hill Fire, September-October 2002: 184 acres
- Supply Creek #13 Fire, August- September 2002: 410 acres
- Deerhorn Fire, September 2008: 382 acres
- Mill Creek 4 Fire, October-November 2009: 1,942 Reservation acres (2,750 acres total)
- Mill Creek #1 Fire, July 2010: 50 acres
- Campbell Field #4, September 2012: 58 acres

The costs associated with wildfire and other fire incidents between the years 1999-2011 on the Reservation are totaled at \$15,710,150. Figure 4 shows the total number of wildfires

from 1999-2013 reported by the Bureau of Indian Affairs to USGS Federal Wildland Fire Occurrence Data (2014) website.

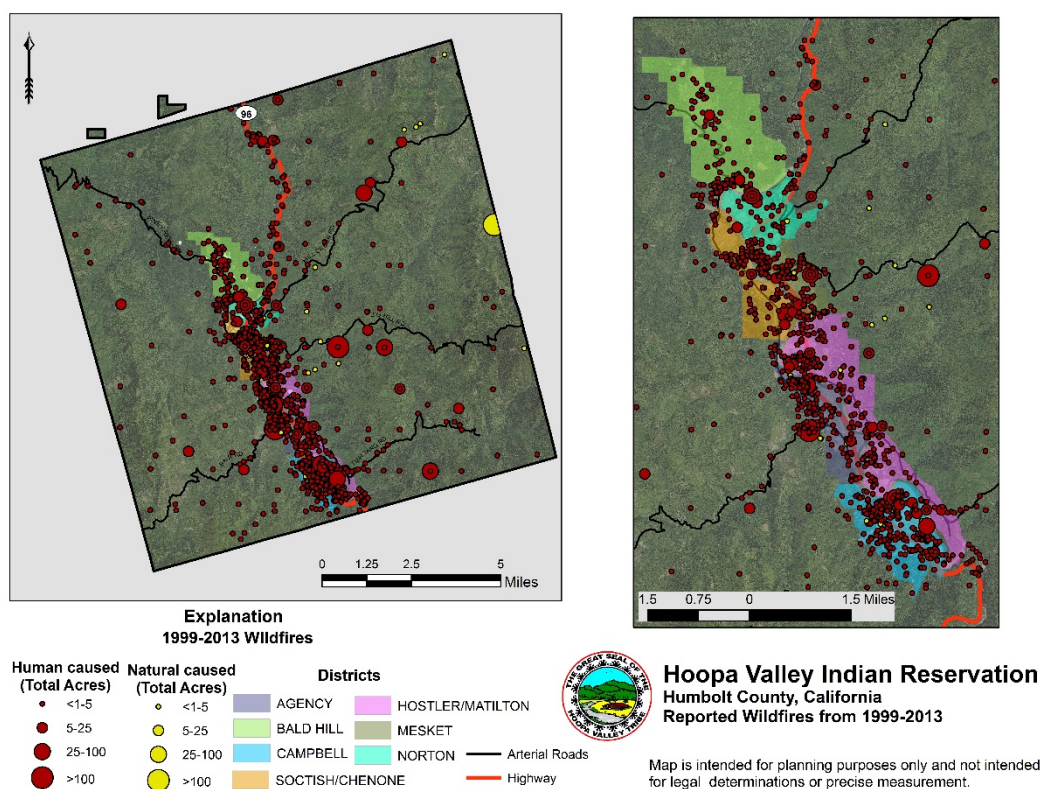


Figure 4: Map showing 1999-2003 wildfires displayed by cause and size for the Hoopa Valley Indian Reservation (From USGS Federal Wildland Fire Occurrence Data (2014)).

The Native people of Hoopa Valley understood and used the natural cycle of burning. Cultural burning for clearing areas for crops, basketry material (Hazel and Beargrass, and hunting has been done for thousands of years in the region. According to tribal elders, traditional and naturally occurring fires were used to “cleanse” the land and were allowed to burn naturally without suppression. This resulted in fuel load reduction and decreases in fire severity and intensity.

2.4 Wildland Urban Interface

The determination of the Wildland Urban Interface (WUI) for the development of the CWPP was based on the community demographics, critical infrastructure and political boundaries. The definition of a WUI is ‘where houses mingle or meet with undeveloped wildland

vegetation.’ The California Fire Alliance in 2001 defined the buffer region for a WUI to be 1.5 miles from the edge of defined structures. This value represents approximately the distance a firebrand can be carried from a wildfire to the roof of a structure. This buffer reinforces the idea that structures not near a potential wildfire location can still be at risk. It should be noted that due to ceremonial locations, wildlife and food harvesting across the reservation, the entire reservation is classified as a WUI. However, this classification was reduced for this study to concentrate on the developed areas and the nearby regions only. Since nearly all structures (both critical and noncritical) on HVIR are within the 7 defined political districts (Figure 2), it was determined that these districts will serve as the base of the WUI. We determined that the 1.5 mile buffer around the districts would potentially capture the direct interface area as well as any new building that has occurred since the structure map was developed by Hoopa Forestry. Figure 5 shows the defined WUI (districts and 1.5 mile buffer) for this study along with critical and noncritical infrastructure.

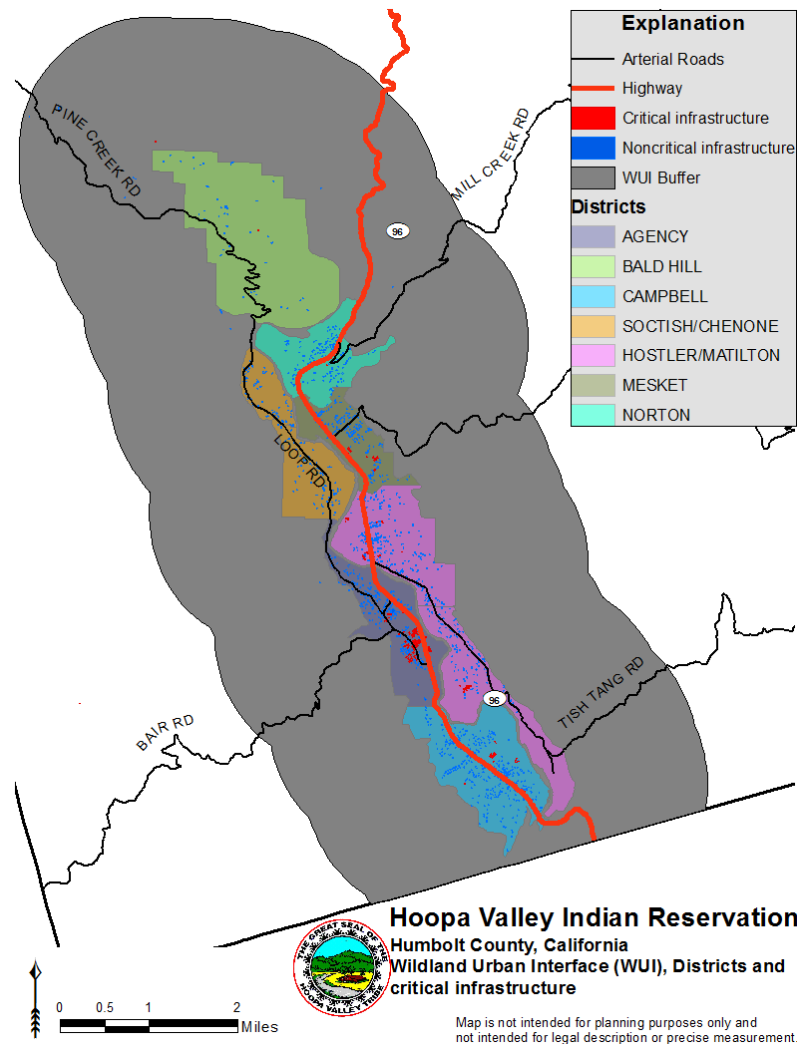


Figure 5: Map showing the Community Wildfire Protection Plan Wildland Urban Interface (WUI), the 7 Hoopa Valley Indian Reservation Districts as well as critical (red) and noncritical (blue) infrastructure.

3 Policies and Programs

The Hoopa Valley Indian Reservation CWPP is designed to be a planning document that is used in conjunction with other HVIR fire management and fuels reduction plans/legal documents to create a fire safe environment for the Hoopa community. There are no legally binding requirements to implement any of the recommendations in the HVIR CWPP. Any actions on Tribal land will be subject to, and require compliance with, Tribal policies and procedures as well as any applicable federal, state, and county policies and procedures. Any actions taken on private land should be in accordance with applicable land use codes, building codes and tribal

governance. The HVIR CWPP must also be approved by the Hoopa Tribal government, Hoopa Forestry, and Hoopa Volunteer Fire Department.

There are several federal legislative acts that outline policy and guidance for the development of the HVIR CWPP.

[3.1 Healthy Forests Restoration Act \(HFRA\)](#)

The HFRA enacted in 2003 is federal legislation to promote healthy forest and open space management, hazardous fuels reduction on federal land, community wildfire protection planning, and biomass energy production. The HFRA promotes gathering of information on wildland fire, early detection of pest/disease outbreaks allowing for ecosystem restoration creating a sustainable healthy forest. More information can be found at: <http://www.gpo.gov/fdsys/pkg/BILLS-108hr1904enr/pdf/BILLS-108hr1904enr.pdf>.

[3.2 National Fire Plan](#)

In 2000 Congress mandated the implementation of the National Fire Plan. This plan is a long term commitment to deal with issues on unsustainable wildland fuel and ecosystem conditions that have evolved from up to 100 years of active fire suppression in the United States. In conjunction with the Western Governors association a 10-year comprehensive strategy (2001) which developed an interagency plan that focuses on firefighting coordination, firefighter safety, post-fire rehabilitation, hazardous fuels reduction, community assistance, and accountability. This plan directed federal agencies to work directly with communities to develop adequate fire protection as well as maintain the condition of the land. More information on the National Fire Plan can be found here: <http://www.fireplan.gov>, and for the 10-year comprehensive strategy implementation plan here: <http://www.forestsandrangelands.gov/resources/plan/>.

[3.3 Federal Land Assistance, Management and Enhancement](#)

In 2009 congress passed the Federal Land Assistance, Management, and Enhancement Act of 2009 (the FLAME Act). This legislation was a natural continuation of the previous legislation and actions taken by the Partner Caucus on Fire Suppression Funding Solutions

(<http://www.americanforests.org/our-programs/public-policy/our-public-policy-work/our-public-policy-work-forests-fire/>); a coalition of over 160 environmental, industry, outdoor recreation, and forestry organizations led by National Association of State Foresters (NASF), The Wilderness Society and American Forests. They led the initiative to develop legislation that will lead to sustainable fire suppression strategies in the United States by the Department of the Interior and the U.S. Forest Service. There are components in this legislation that allow for community risk assessment, methods for allocation of hazardous fuel reduction funding based on priority projects, and reinvest in non-fire programs, all of which progress towards creating fire resilient communities. The 2009 FLAME Act: Report to Congress (http://www.forestsandrangelands.gov/strategy/documents/reports/2_ReportToCongress03172011.pdf) has detailed information for further review.

3.4 National Fire Protection Association (NFPA) Codes and Standards

The NFPA is an international not-for-profit agency designed to reduce the loss of life and property by developing codes, standards, training, and educational outreach protocols. They have developed more than 350 standards and have over 65,000 members worldwide. These standards/codes cover everything from a standard for electrical safety in the workplace (NFPA 54) to Life Safety Code (NFPA 101). There are five standards that are used widely for wildland fire suppression and intensity reduction for communities. They are:

- **NFPA 1141:** The Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas covers the requirements for the fire protection infrastructure in suburban and rural areas when Land use/ land change occurs. This is important for rezoning but also new development.
- **NFPA 1142:** The Standard on Water Supplies for Suburban and Rural Fire Fighting identifies a method for determining the minimum requirements for alternative water supplies for structural fire-fighting purposes in areas. This standard is only applicable where the jurisdictional authority determines that adequate and reliable water supply systems do not otherwise exist.
- **NFPA 1143:** The Standard for Wildland Fire Management provides minimum requirements for fire protection organizations on the management of wildland fire, including prevention, mitigation, preparation, and suppression. This standard is already met by Hoopa Forestry.
- **NFPA 1144:** Standard for Reducing Structure Ignition Hazards from Wildland Fire. This standard provides a methodology to assess wildland fire ignition hazards around

existing structures and residential developments as well as planned or improved properties that will be located in the WUI. It also provides minimum requirements for new construction in the WUI. The main goal of this standard is to reduce the number of structures ignited from wildland fires.

- **NFPA 299:** Standard for the Protection of Life and Property from Wildfire. This standard provides a method for the assessment of wildfire hazard Severity Analysis existing and improved structures; location, design and construction of new structures; creation of defensible space and community planning. This is one of the fundamental standards for community wildfire protection.

These five standards, as well as a review of all other codes/standards, if appropriate, should be considered for future planning by Hoopa Valley Indian Reservation. More information including all detailed information on the codes and standards can be found at the NFPA website: <http://firewise.org/wildfire-preparedness/regulations-and-plans.aspx>.

3.5 Federal Emergency Management Agency (FEMA) Disaster Mitigation Act

The FEMA Disaster Mitigation Act of 2000 provides a legal basis for Indian Tribal, state and local governments to develop multiple-hazard and mitigation planning. This Act allows for up to 7% of the Hazard Mitigation Grant Planning Funds available for the development of Indian Tribal, State and Local mitigation plans. More information on the FEMA Disaster Mitigation Act of 2000 can be found here: <http://www.fema.gov/media-library/assets/documents/4596>. FEMA may be a potential avenue for project funding in conjunction with an adopted Hazard Mitigation Plan (HMP). The FEMA website on Grants has more information on potential funding opportunities: <http://www.fema.gov/grants>.

Additionally, the national Firewise program (<http://www.firewise.org>) focuses on education about enhanced fire safety in the wildland Urban Interface. It provides resources and guidance on preparedness, prevention and mitigation for individuals and communities.

4. Wildfire Risk Assessment

A risk wildfire risk assessment was undertaken based on discussion from the community and subject matter meeting. This assessment was based on analysis of Wild fire hazards, protection

capabilities, and values at risk. The information is based on the priorities and issues that were identified and discussed at the meeting with tribal members and officials. GIS data and analysis is based on data from Hoopa Valley Indian Reservation (HVIR) Forestry Department (Hoopa Forestry), Bureau of Indian Affairs (BIA), and California Department of Forestry and Fire Protection (CAL FIRE) 2012 Fire and Resource Assessment Program (FRAP). The CAL FIRE FRAP data that was used for this study is an aggregation of tribal, city, county, federal (BIA as an example) which is processed and archived on the CAL FIRE site (per personal communication with Josh Simmons). The federal LANDFIRE Project site was also explored for data but the spatial resolution on these data was too coarse to be of use in this analysis. Hoopa Forestry stated that they are looking at developing higher resolution data sets for HVIR and follow the methodology of the LANDFIRE Project to develop more accurate maps that detail existing vegetation, wildland fuel and map departure of landscape from historical conditions.

[4.1 Wildfire Hazard](#)

The wildland fire season for HVIR is from May to October with the months between July and September being the highest risk. As shown in Figure 2.3.1, humans are responsible for nearly all fire ignitions on the HVIR. Anthropogenic ignition (human caused fires) has been an ongoing problem throughout the Reservation, to the extent that arson or suspicion of arson has represented more than 90% of fires since 1999. The rest of the anthropogenic fires result from campfires, trash/brush burning, vehicles, and fireworks. Lightning is the sole natural cause for fires reported on the Reservation and is only responsible for 0.54% of fire starts since 1999. Therefore, with 160-250 ignitions occurring each year, HVIR approaches 100% risk for wildfire development.

The majority (94%) of the HVIR is classified by CAL FIRE as Very High and High being around 5%. Moderate and urban/unclassified are both classified as 1%. The fire severity map for the WUI show have values of: Very High 87%, High 7%, Moderate 2%, and urban/unclassified 4%. It should be noted that all of the moderate and urban/unclassified are located in the WUI so that is the main cause for the percentage changes. The CAL FIRE severity map and close-ups of the districts and WUI so the dominance of Very High Fire severity risk for the HVIR region of interest (See Figure 6 for reference).

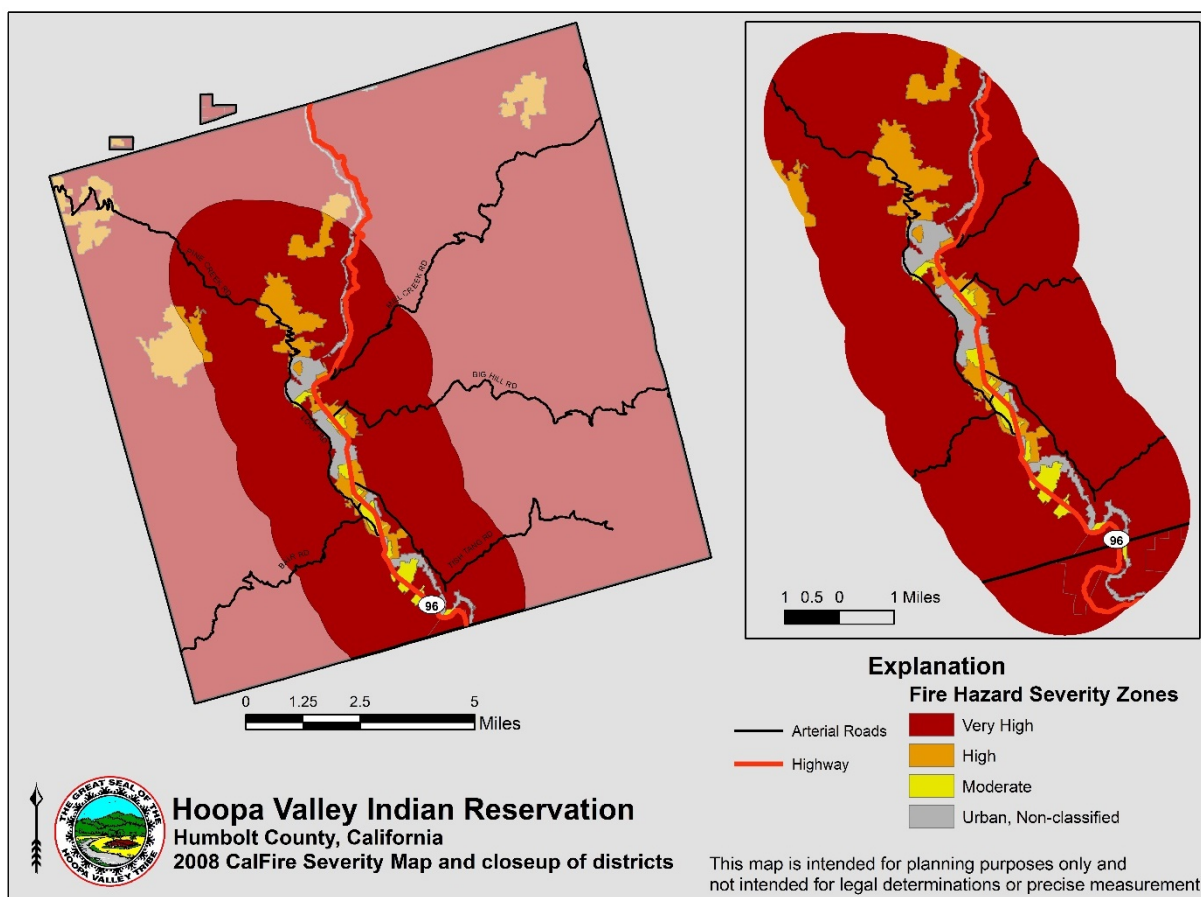


Figure 6: Map showing the 2008 Fire Hazard Severity Map for Hoopa Valley Tribe Indian Reservation

4.1.1 Slope and Weather Patterns

Slope

The Hoopa Valley Indian Reservation is located in the Northeastern portion of Humboldt County with the main population centers located along Highway 96 in the Hoopa Valley (See location map figure 7 for reference) in the Trinity River Watershed. The valley floor is an alluvial plain for the Trinity River and is approximately 7 miles in length and on average 1.5 miles wide. This is the only region on the reservation that has moderate slopes adequate for development with the town of Hoopa, (the densest population and center of tribal government) also located here (See Figure 6; regions with a percent rise $>21\%$ indicates a greater than 45 degree slope). Slope plays a role in fire severity of the fire. Steeper slopes allow preheating of fuels upslope which exacerbates rate, extent, and flame length.

Steeper slopes on the HVIR will create ladder fuel situations where fires transition from a ground fire into tree canopy becoming a crown fire. Crown fires can become severe, thus increasing the amount of potential acreage and property destroyed. Steep slopes and ladder fuels exist in all districts of the HVIR outside of the valley floor, including some areas of Bald Hill.

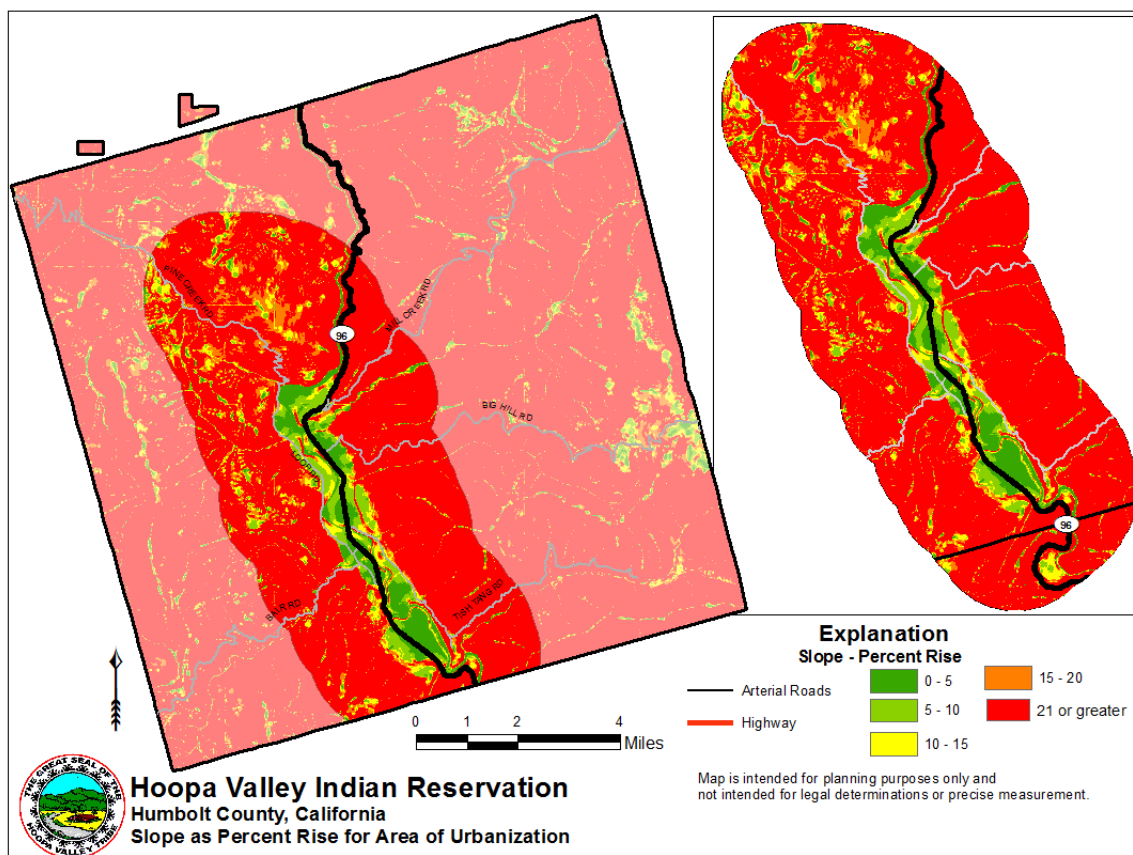


Figure 7: Map showing slope as a percent rise for the Hoopa Valley Indian Reservation and a close-up of the buffered (1.5 miles) area of urbanization as a defined Wildland Urban Interface (WUI) (Developed from NED 10 DEM).

While Slope and terrain do not increase the likelihood of a fire they contribute significantly to the potential for severe fire and limit the ability to combat a fire.

Climate and Weather

Like most of California, the HVIR enjoys a Mediterranean type climate with hot dry summers and cool moist winters. The mean annual temperatures are a high of

69° F (July is the hottest month at 92°F) and a low of 40°F (December is the coldest month at 32° F). The mean annual precipitation is 57 inches with 90 percent occurring between October and April. Precipitation during fire season (June-August) averages only 1.15 inches indicating this region is at its greatest risk for fire during these months. The region also is affected by straight-line winds (winds in excess of 50 miles per hour) which occur regularly with some instances where wind speeds exceed 70 mph. These wind conditions can affect fuel load because of their ability to promote fuel drying which can accelerate an active fire. These winds can dry out understory vegetation if they arrive in late spring / early summer, thus increasing fuel load potential. Droughts occur regularly within the region which have the potential to last decades or more. This reduction in total precipitation leaves the region more susceptible to wildfire and also reduces resources to fight fires when they occur. This phenomena can potentially create conditions that lead to a year-round fire season, well beyond the normal 5 month season (May-October). The Histogram in Figure 4.1.1.2 shows the monthly Palmer Drought Severity Index (PDSI) values for interior Northern California from 1895-2014 with associated drought determinations to show frequency of long term drought in the region.

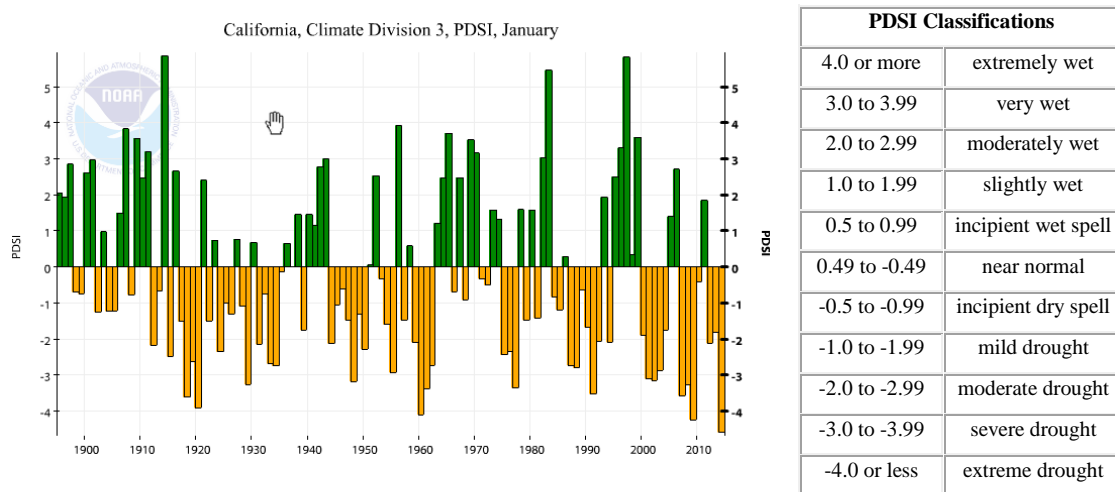


Figure 8: Showing Northern Interior California Palmer Drought Severity Index and Classifications for 1895-2014. Values below -1.0 on the graph are considered to be in drought conditions. Please note that 2014 was most extreme drought conditions since 1895 (From NOAA (2015))

4.1.2 Heavy Fuel Loading

The natural vegetation of the Hoopa Valley Indian Reservation is predominantly Douglas fir (Old Growth and 2nd and 3rd Growth) along with some mixed conifer (white fir and red fir). Stands of Oak Woodlands occur on the eastern slope of the Trinity River Valley and interspersed elsewhere on the reservation lands. Other hardwoods include California bay laurel, red alder and Pacific madrone. Other softwoods on the reservation include, but may not be limited to, coastal redwood, giant sequoia, grand fir, western hemlock, cedars (western red, incense, and Port Orford), pine species (Jeffrey, ponderosa, and sugar), and Pacific yew. The valley has a mix of wild rose and other briars (shrubs), grasses, and ferns Figure 9 shows the distribution of major vegetation by classes from Hoopa Forestry updated vegetation survey data (2013).

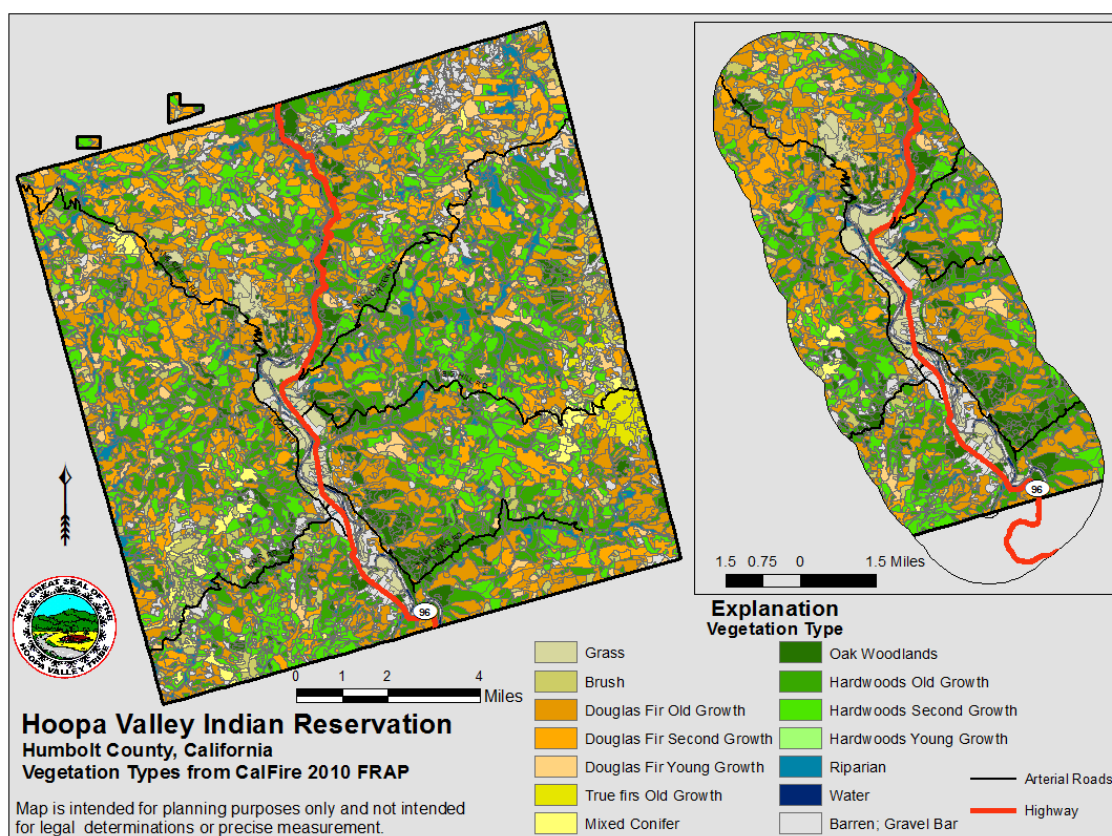


Figure 9: Map showing vegetation classes for the Hoopa Valley Indian Reservation including enlargement of WUI regions.

The Hoopa Valley Tribe Indian Reservation historically, as was the policy of the time for the western United States, actively suppressed wildfires since the 1930's. Results from altering the natural fire regime, as indicated from CAL FIRE data, shows that approximately 90% of the HVIR has been moderately altered from its natural fire regime (~60% significantly and ~30% moderately). This deviation, largely caused by fire suppression, promotes conditions for increased vegetation density and debris/litter on the forest floor as well as increased tree density. This litter and debris increase the fuel load thereby increasing potential for greater flame height and duration, thus creating conditions for more intense fires. The ecosystem in this region has evolved < 35 year fire cycle which is normally adequate to manage understory debris with low intensity fires. More intense fires can utilize the debris as ladder fuel to reach the canopy/crown and allow the fires to become much more destructive.

Himalayan Blackberry also contributes significantly to fuel loading. . This aggressive invasive species outcompetes lower fuel load grasses and natural briars (wild rose and huckleberry). Blackberries occur in large dense thickets that can clog riparian areas and contribute large masses of woody debris. The blackberry extent has not been fully mapped on the reservation though an updated vegetation map was sent to CAL FIRE for the 2015 FRAP by Hoopa Forestry. The widespread nature of the blackberry has caused a significant change in fuel load along the valley floor and in the defined urban interface area of concern for wildfires. Figures 10 A and B illustrate the woody nature of the Himalayan Blackberry as a ladder fuel which can promote high intensity fires on tribal lands.

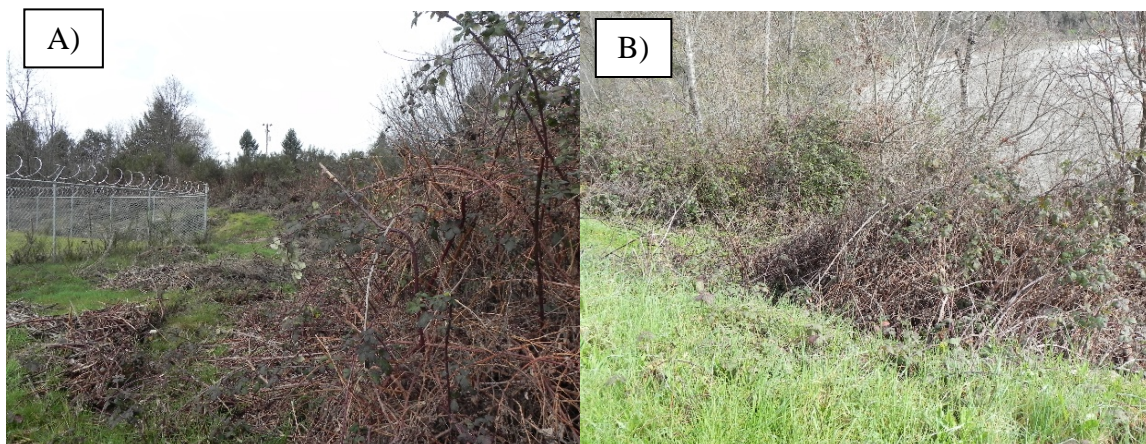


Figure 10: A) and B) shows the woody understructure of the Himalayan Blackberry, its ability to become a major ladder fuel and how it aggressively replaces native grasses and shrubs.

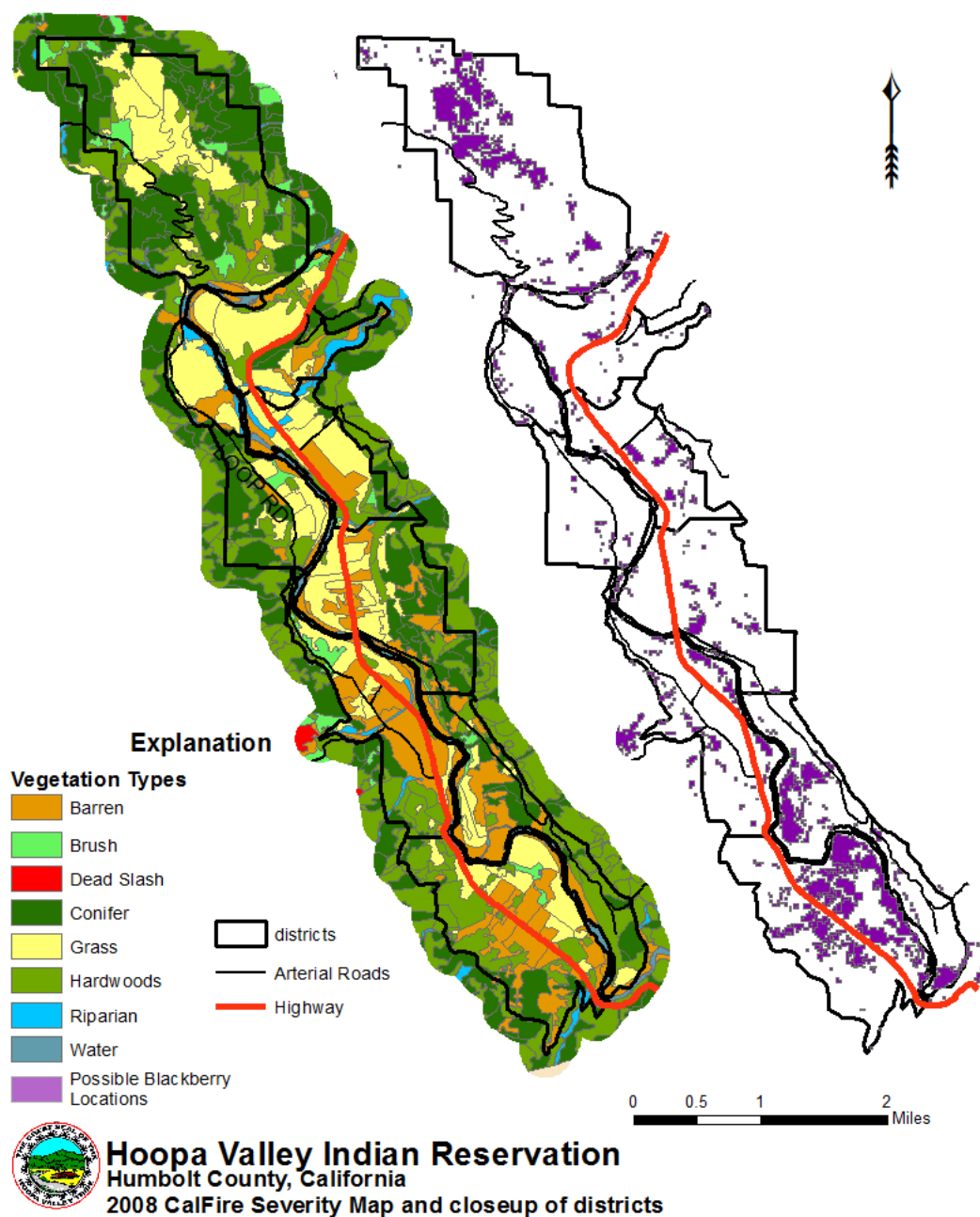
The blackberry is present in all districts, along all major drainages and natural fire breaks. It has also grown in around critical infrastructure and (pictured in figure 10 A) near emergency siren and cell tower as well as water tanks (Figure 11) on the reservation.



Figure 11: Picture showing vegetation including Himalayan Blackberry encroachment on water tank.

This creates a heavy fuel load near critical infrastructure and is a current concern for the Hoopa Valley tribe. The blackberry is a significant ladder fuel, along with other debris that can quickly change a ground fire to a crown fire. It has changed the fire regime and fire severity potential for the whole valley floor as well as along all access roads. Figure 12 the potential region of Blackberry spread as differentiated from the original CAL FIRE vegetation map. This is potential map of the blackberry spatial extent as it is

increasing each year even in the face of severe drought. These results may not include all areas of infestation.



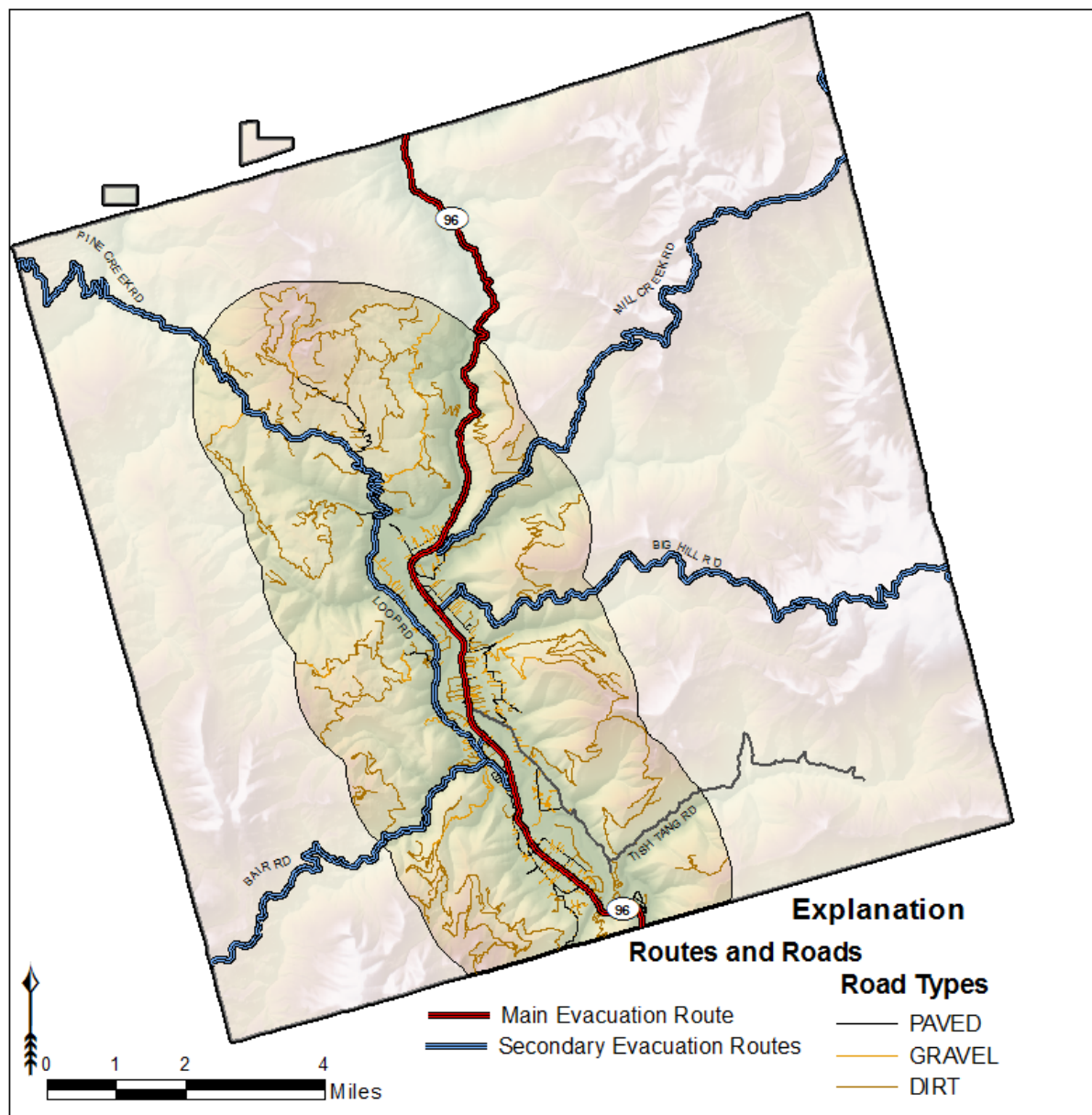
This map is intended for planning purposes only and not intended for legal determinations or precise measurement.

Figure 12: Map showing potential locations of Himalayan Blackberry infestation and vegetation type change in the Trinity River Valley Hoopa Indian Reservation near districts. Maps developed from data supplied by Hoopa Forestry (2015).

There is also a history of even aged silviculture (clear-cutting) practices on tribal lands. This has resulted in regions of the reservation that have a fire behavior indicative of areas with shrub/brush fuel loads. This can potentially increase the rate of spread in these areas. If open spaces contain dense blackberries or briars, then the presence of heavier than expected ladder fuels will increase flame heights and burn time, leading to increased fire severity.

4.1.3 Limited Access and Egress

The Hoopa Valley Indian Reservation has one main ingress and egress (Highway 96) and one bridge that links Norton, Mesket, and Hostler/Matilton districts with the rest of city; including services residing in the Agency district. There are other external access roads that can reach HVIR, but most are mountainous and unimproved making it potentially difficult for emergency vehicles to access and respond. These other access/egress roads are Mill Creek Road, Tish Tang Road, Bair Road and Pine Creek Road. Most roads are local for neighborhood access and can sometimes be very narrow and choked with vegetation (invasive blackberry as an example). This is evident in Campbell district where dense understory thickets make conditions difficult for evacuation or access should a wildfire ignite in these locations. Bald Hill as another example its access is not cut off by the bridge however Bald Hill through Loop Road has a single point of ingress/egress and therefore potential issue. It should also be noted that one of the main secondary routes, Pine Creek Road is accessible from the Bald Hill community. Figure 1 highlights primary and secondary roads as well as evacuation routes into and out of the reservation. A review of the 2013 Hoopa Corral Complex Fire Structure Protection and Evacuation Plan reiterated that primary evacuation routes are narrow and there are issues with limited turnaround points for emergency vehicles in each of the defined evacuation districts.



Hoopa Valley Indian Reservation
Humboldt County, California
Evacuation Routes and secondary Roads

Map is intended for planning purposes only and not intended for legal determinations or measurements.

Figure 13: Map showing the main (Highway 96) and secondary evacuation routes for Hoopa Valley Indian Reservation.

4.1.4 High Residential Density

Residential housing is concentrated along the valley floor with large housing communities in Campbell, Hostler/Matilton and Norton. In Campbell, which has the highest housing density, with residents are clustered into groups with a single egress/ingress. These conditions increase the risk for multiple structure fires. Limited access for emergency vehicles and evacuation compound the community's vulnerability to multiple structure fires. These conditions, coupled with the high number of human caused fires in Campbell, make this community a high risk for property loss and loss of life to wildfire. There are two modular housing locations on the reservation that are at great risk to wildfire. One is located in Campbell off of Shoemaker Road and the other is off of Highway 96 in Hostler/Matilton. The development in Campbell has a single point of access and is in a woody and developed area on the western slope up from the valley floor. There is potential for ladder fuels to start a crown fire in this area that could quickly overtake the development and block access causing great risk for property loss and loss of life. The Hostler development is on the valley floor in an area that has been cleared of standing fuels but has extensive Blackberry encroachment that could change the fire severity risk. At both community locations it was noted that firewood was stored near houses and also by propane tanks, thus increasing the fire risk in these locations. These fire risks should be remediated to reduce the fire potential (See figure 14 A and B).



Figure 14: Examples of residential fire risk in high density communities on the Hoopa Valley Indian Reservation. A) Firewood stacked next to house and B) Firewood stacked next to propane tank

It was also noted that there were quite a few locations where multiple structures were evident on one parcel of land. Some of these structures are in poor condition and covered or filled with debris creating a significant fuel source and potential point of ignition.

Although not possible to evaluate every residence in HVIR for the CWPP, we did evaluate the two residential (modular housing) communities. We used the NFPA Fire Risk Assessment form 299-1144 to determine the fire risk for both developments. This form can also be used for individual houses and is included in the appendix B of this CWPP. The assessment form examines subdivision/house area design, vegetation, topography, utility types, available fire protection and building/roofing materials and methods. It categorizes risk from low to extreme. Both communities rated as a high fire hazard (both scored an 88 with the cut off being 112 for extreme) approaching extreme fire hazard conditions based on the NFPA Firewise program standards. The analysis was conducted at the community scale and does not reflect the fire safety of individual houses, which should be considered as well. Some of the values that factored into high risk are due of course to topography and surrounding vegetation type and would be hard to mitigate other factors can be easy mitigated. It should be noted that the subject matter expert meeting highlighted a concern regarding hydrant functionality on HVIR. It was stated that some hydrants on HVIR do not currently work or have not been tested for pressure or rating. This requires further inquiry but were noted as a concern on the assessment form. The NFPA Firewise form also allows for reassessment of the residence/subdivision and can be further customized based on location specific issues (such as above ground propane tanks, time to access instead of distance for response, etc.).The assessment sheets for the communities as well as a blank copy are available in Appendix B.

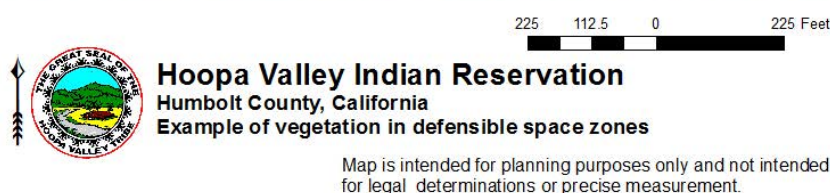
4.1.5 High Structural Vulnerability

Almost all residences in the Hoopa Valley Indian Reservation are in the wildland urban interface region of interest. Of these residences, 38% are mobile homes and the remaining majority are stick frame construction with traditional roofing material (not metal or Class A fire-rated roof covering). A significant proportion of residences do not have defensible space zones clear of heavy vegetation including Himalayan Blackberry, and also have debris and litter on roofs. In some instances multiple structures (abandoned mobile homes as an example) are within the recommended 30 feet of the main living structure.

Figure 15 shows some examples of vegetation/debris and multiple structures within the defensible space zone.



Figure 15 Shows examples of the vegetation/debris as well as multiple structures in the defensible space zones.



The percentage of mobile in specific districts pose another concern for structural vulnerability. Mobile homes of older construction subject to complete destruction will burn rapidly and completely causing total loss. Limited access also poses an issue with these heavy fuels and high risk structures in that, if fires break out in some regions, the emergency vehicles cannot reach them in time to contain the fire, increasing the potential

for multiple structure fires, loss of life, and combustion of ladder fuels, thus creating conditions favorable for larger scale wildfires.

[4.2 Protection capabilities](#)

In 1991, the Hoopa Valley Indian Reservation, through the self-governance process, compacted the Wildland Fire Program from the BIA and formed the Hoopa Volunteer Fire Company (HVFC). Since then fire protection on the reservation is undertaken by the Hoopa Wildland Fire Company (HWFC) and the Hoopa Volunteer Fire Company (HVFC). The HWFC is supported by ten full-time members, seven temporary members, and six seasonal members. They are responsible for wildland fires and are under the jurisdiction of Hoopa Forestry. Their apparatuses include: four type-3 engines, two type-4 quick attack engines, and one water tender. The HVFC, established by the tribal council, is an all-risk organization that deals with structural fires and provides fire services to all residents within the reservation boundaries. It consists of 14 volunteers, and their apparatuses include: one type-1 engine, one type-3 engine, one rescue utility vehicle, a command vehicle, and a Yamaha jet outboard unit. During the fire offseason the HWFC maintains a “skeleton crew” to staff an engine 365 days a year. Volunteer Fire generally has at least 3-5 volunteers on call 24 hours a day and 365 days a year. Both programs are trained in ICS and pertinent emergency response programs. The HWFC works through the use of Mutual Aid agreements to partner with other agencies including the HVFC to provide structural fire suppression in wildland fire situations.

[4.3 Values at Risk](#)

Assets are defined as anything that impacts quality of life and the economics of the reservation. So these are defined in terms of what would be impacted from wildfire. These may include community assets such as homes, businesses, ceremonial or sacred sites, as well as environmental values such as wildlife habitat, natural resources, and air quality, along with any other important attribute that individual communities rely on for their wellbeing. All assets involved in a wildfire will be impacted and can have social and/or economic ramifications. For this section we evaluated critical infrastructure other than residential that would impact social, economic or operational nature of the Hoopa Valley Indian Reservation and its people. Given the current drought, fuel load, structure density, vulnerability and

limited ingress/egress nearly entirety of the Reservation is at risk for a catastrophic wildfire. This threat is increased given the level of potential wildfires anticipated in the western United States, coupled with finite fire crews who will be stretched across these fires this oncoming summer. All structures (private, governmental and commercial) could potentially be at risk or destroyed in a catastrophic wildland fire along with human life and health which would also be at serious risk. These observations are supported through evidence in past fires and limited evacuation options. During the 1999 Megram fire, PM10 levels proved to be well above levels identified as a risk to human health. This potentially would involve a reservation wide evacuation. The potential economic loss would be enormous as value of the timber is estimated in the hundreds of millions of dollars. Table 2 below, modified from the 2011 Hoopa Valley Indian Reservation Multi-Hazard Mitigation Plan update, shows the potential wildfire losses with the Urban Zone defined as all districts but Bald Hill which is upland residential. The upland region is all tribal land other than the districts.

Table 3: 2011 Potential Wildfire Loss estimates

Assessment Area	Districts	Estimated Vulnerability	Structure Ownership ¹	Number of Structures ²	Structure losses	Contents Losses	Location/Comments
Urban Zone	Socotish/Chenone, Hostler/Matilton, Agency, Campbell, Mesket, Norton and WUI Buffer	High	T	26	\$34 Million	\$21 Million	All structures and infrastructure are valuable
			P	1078	\$129 Million	\$22 Million	
			O	5	\$137 Million	\$1.4 Million	
Upland Residential	Bald Hill and WUI Buffer	Very High	T	1	\$300 Thousand	\$50 Thousand	All structures and infrastructure are valuable
			P	25	\$3 Million	\$510 Thousand	
			O	0	n/a	n/a	
Upland Region	Reservation area outside WUI Buffer	Very High	T	n/a	n/a	n/a	Mostly Loss of Timber, revenue and cultural resources
			P	n/a	n/a	n/a	
			O	n/a	n/a	n/a	
1 - T = Tribal Ownership, P = Private Ownership, and O = Other Ownership (Federal, State County, School District, etc.)							
2 - Tribal buildings, residences and other structures identified and tallied based on 2005 aerial photos							

Community members and subject matter experts were consulted during open meetings to define and then refine a listing of critical infrastructure on the HVIR. These were broken down by district and noted issues were discussed. Table 3 lists these values at risk.

Table 4: 2011 Critical infrastructure by district and majority Fire Risk Level

District	Soctish/Chenone	Bald Hill	Hostler/Matilton
Critical Infrastructure	Pine Creek Road - Evacuation Route	Pine Creek Road - Evacuation Route	Evacuation Route - Tish Tang Road
	Agriculture/Livestock	Cell Tower	Police Department
		Pump Station	76 Gas Station
		Emergency Siren	Lucky Bear Casino and shopping mall
		Village/Dance Grounds	Central Coast Credit Union
		Water Tanks (4)	Tsewenaldin Inn
		Agriculture/Livestock	Post Office
			Radio Station
			Trinity River Bridge
			Kimaw Medical & dental clinic, Ambulance, & rest home
			Airport
			2 Village/Dance Grounds
			Water Tanks (4 - 3 in service)
			Ceremonial Grounds
Wildland Fire Risk	Very High	High/Very High	Very High
District	Agency	Campbell	Norton and Mesket
Critical Infrastructure	School Grounds (K-12) and Head Start	Modular Plant	Mill Creek Road - Evacuation Route
	PGE Substation	Roads Department Main Office	Village/Dance Grounds
	Public Utilities Department	Aggregate Plant	Norton Field Housing Authority
	J.M. Water Treatment	TCCC/Americore	Emergency Siren
	Emergency Operation Center	Village/Dance Grounds	Water Tank
	Tribal Council Offices and Tribal Records	water tanks (2)	
	Tribal Forestry	Evacuation Route - Bair Road	
	Volunteer Fire Department	Hoopa Modular Construction Site	
Wildland Fire Risk	Very High/High, some Moderate	Very High	Very High/High some Moderate

It should be noted that all districts fall into the Very high category even in the CAL FIRE analysis which does not classify the urban areas. These urban areas as discussed in this section are all at least at **HIGH RISK** though most are at **VERY HIGH RISK** for severe impact from a wildland fire.

5 Mitigation Action Plan

5.1 High Priority Actions

Himalayan blackberry, Himalayaberry

Himalayan Blackberry, an invasive species in California and the west coast, grows into dense thickets near Critical Infrastructure and Key Resources (CIKR) throughout the Hoopa Reservation. It established itself initially along route 96 in drainage and then spread to much of the open ground. Blackberry is now pervasive in all Districts on the Hoopa Reservation. These dense woody thickets become a major fire hazard that has significantly different fuel characteristics than the native grasses and shrubs they have replaced. Areas including regions BIA designed as firebreaks as well as roadways and natural water courses (natural fire breaks) are congested with blackberry. Figure 16 shows a false color image of Campbell District overlain on a false color map (red is vegetation and blue is bare soil and buildings) with two representative locations of blackberry infestation outlined in green. Location A is along a BIA firebreak and location B along an access road to housing which would block emergency equipment access.

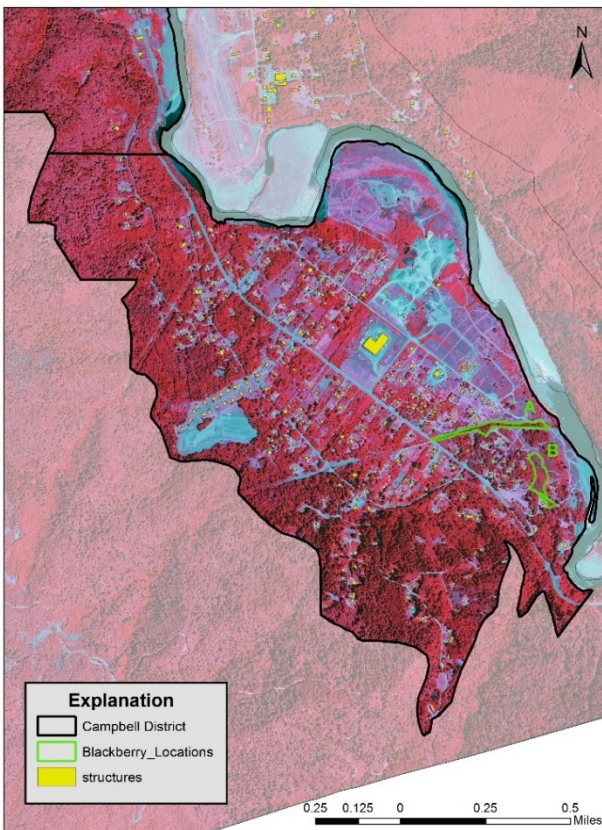


Figure 16: False color image (Vegetation is red and bare ground blue) showing potential blackberry location A and B in Campbell district.

Livestock avoid blackberry thickets as they are unpalatable. The increased pervasiveness of this invasive on open pastures reduces the available forage production of those pastures, thus impacting the local economy. Figure 2 is an example of a typical blackberry thicket on the Hoopa Reservation.



Figure 17: Examples of overgrown Himalayan Blackberry thickets in the Campbell District, Hoopa Indian reservation.

Himalayan blackberry (*Rubus discolor*) grows as a dense thicket of long, bending branches (canes), appearing as tall, ten-foot mounds or banks, particularly along watercourses. Canes have hooked prickles. The canes can reach a length of 40 feet and build and create dense woody thickets of over 500 stems per square meter. Flowers are white, yielding blackberries that usually ripen later than native black berries. It seeds heavily and seeds are readily dispersed by mammals and birds. Seeds can be spread considerable distances by streams and rivers. Himalayan blackberry thickets can produce 7,000 to 13,000 seeds per square meter. However, Himalayan blackberry seedlings receiving less than 44 percent of full sunlight typically do not survive. It is intolerant of shade. Flowering begins in May and continues through July. Fruit is produced from July to September. Fruit ripens late compared with native blackberries and over a considerable interval from mid-summer to fall. It also spreads vegetatively by rooting of cane tips.

Removal

Mechanical removal or burning may be the most effective ways of removing mature plants. Post removal herbicide treatment is recommended; however, proximity to floodplain increases a non-point source risk to the surrounding environment. Options include physical control through mechanical methods and manual methods. Mechanical control techniques, such as cutting or using a weed wrench, are suitable for Himalayan blackberry. Care should be taken to prevent vegetative reproduction from cuttings. Burning slash piles is an effective method of disposal. Removal of canes alone is insufficient to control Himalayan blackberry, as root crowns will re-sprout and produce more canes. Another option is a manual method including hand digging removal of rootstocks. It is a slow but effective way of destroying Himalayan blackberry, which resprouts from roots. The work must be thorough to be effective because every piece of root that breaks off and remains in the soil and may produce a new plant. This technique is suitable only for small infestations and around trees and shrubs where other methods aren't practical. Himalayan blackberry plants may be trimmed back by tractor mounted mowers on even ground or by scythes on rough or stony ground. These perennial weeds require several cuttings before underground plan parts exhaust their reserve food supply. If only a single cutting can be made, the best time is when plants begin to flower.

Prescribed burning is suitable for removing large thickets, but requires follow-up to control resprouts as root systems can be greater than 4 feet in depth (Francis).

Biological control is not supported by the USDA; however, grazing with sheep, cattle and horses can be effective in reducing the spread. This method has been effective in preventing canes from covering large areas. In many areas of California, the use of angora and Spanish goats is showing promise in controlling Himalayan blackberry. (California Invasive Plant Council, n.d.)

[Recommendation](#)

Blackberry infestation should be identified around CIKR and removed as first priority. The subsequent recommendations are: 1) a detailed mapping of Blackberry infestation on reservation land, 2) Develop a prioritized removal plan based on mapping and CIKR, 3) Determine best method for removal of Blackberry thickets in region and finally 4) Implement removal plan. It is suggested that some test sites be implemented to see best method for removal in conjunction with removal around CIKR and infestation mapping to reduce timeline for removal.

[5.2 Other Actions](#)

[5.2.1 Fuels Mitigation Projects](#)

Public outreach remains one of the key methods to develop awareness and acknowledgement of a community wide hazard, risk, vulnerability and/or problem. Incentives create a reward system for those who comply with common sense fire safety; however, discovering what inspires homeowners into action is unique. A variety of wildfire specific, public information and support is available through the internet. A simple Google search on “Wildfire Safety Outreach” provides a link to a variety of resources. The U.S. Fire Academy provides publications that provide short overviews for all audiences. And, provides links to other organizations. Hoopa Valley Forestry is currently working on a Fuels reduction plan for 2015 forward and is in review with the Bureau of Indian Affairs. Once approved it will be reviewed with the CWPP, and the CWPP will be updated with current projects so that the impact to wildfire risk and severity in the WUI can be reevaluated.

5.2.2 Increased Responsibility and Funding

Federal Emergency Management Agency, Pre-Disaster Mitigation Project Grant (PDM)

This competitive funding is based upon reducing the vulnerability to a known hazard by completing long term changes to the “built structure”. The funding is provided to support new mitigation plans, updates to mitigation plans, and to support mitigation projects. The maximum allowable on a mitigation project is up to \$3 million dollars. Under this funding stream, “hazardous fuels reduction” projects are possible. The period of performance is (2) two years and the match can be as low as 10% for a federally recognized tribe with high unemployment, low per capita demographics and a population of 3,000. Normally, the match is 25%.

The FEMA PDM project grant is available annually and must be submitted to the FEMA Regional office. There is technical support through the FEMA Regional office and advanced technical support available through the FEMA Headquarters office.

5.2.3 Long Term Wildfire Risk Reduction Planning with WUI Partners

County resources are available through direct collaboration with Humboldt County representative, Cybell Immett. Ms. Immett’s commitment, experience and knowledge demonstrate the collaborative spirit of the local jurisdictions. An idea surfaced while discussing the CWPP during an interview and following email conversations. The idea was to create a demonstration project. The project would focus on actions, such as removal, that reduce wildfire risk. Signage would display various stages in the removal actions, beginning with an introduction, then, change as the work progressed. The point is to give local commuters an education on wildfire hazard and demonstrate the effectiveness of simple changes. Some of the changes include:

- Moving firewood away from the structure
- Relocating fuel tanks away from structure
- Reduce ladder fuels
- 100’ clearance away from structure

Public outreach and education opportunities are available as well. Using pre-printed and vetted public information can assist in development of this component. As a local partner, Humboldt County demonstrates a willingness to collaborate.

5.3 Education and Community Outreach

The use of existing website and documentation from sites such as the Firewise program or the Ready, Set, Go! (RSG) Program, managed by the International Association of Fire Chiefs (IAFC). These organizations have developed presentations, tools and handouts to help communities become wildfire resilient and have better communication and outreach between first responders and the community in general. Their information is easy to understand and should be made available for distribution and also linked to the relevant HVIR websites. This along, with community awareness meetings, help increase the understanding of the risk for individuals living in the HVIR WUI and what they can do to reduce their risk can help to facilitate a more resilient HVIR community against wildland fire. Examples of the Firewise (<http://www.firewise.org/>), FEMA's America's prepareAthon website (<http://www.community.fema.gov/connect.ti/AmericasPrepareathon>), and the Ready, Set, Go! (RSG) Program (<http://www.wildlandfirersg.org/>) are in Appendix C and include a look at wildfire hazards in the WUI, a brochure for homeowners on defensible space and a FEMA report on what individuals can do to help develop a fire resistant community.

5.4 Monitoring and Evaluation

Annual updates to the Multi-Hazard Mitigation Plan will automatically monitor and evaluate each plan, each initial implementation, and each final project. With every completed project, it is recommended that a thorough after action cycle is completed. Evaluate the project, create a "lessons learned" list and follow through with recommended changes.

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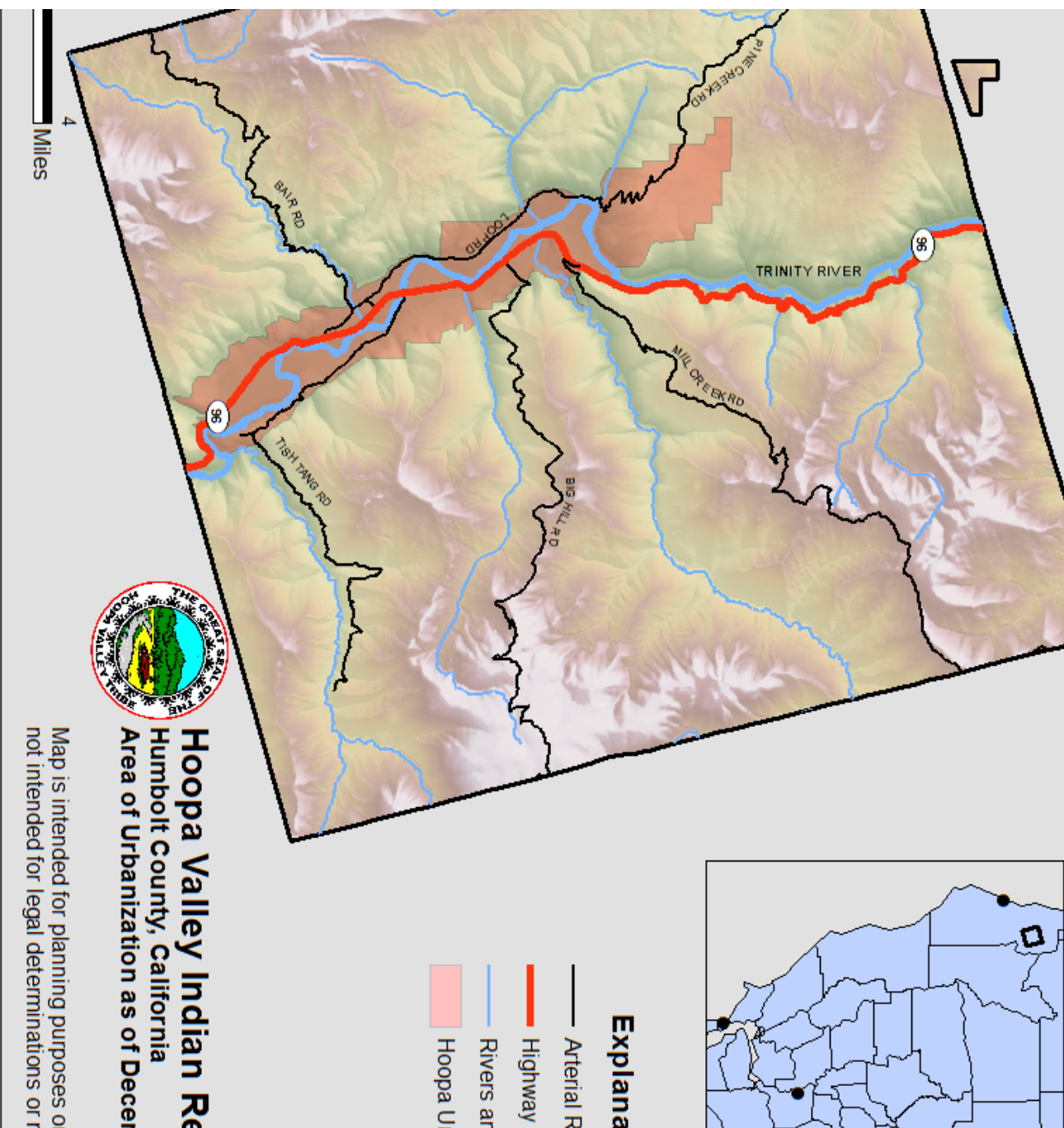
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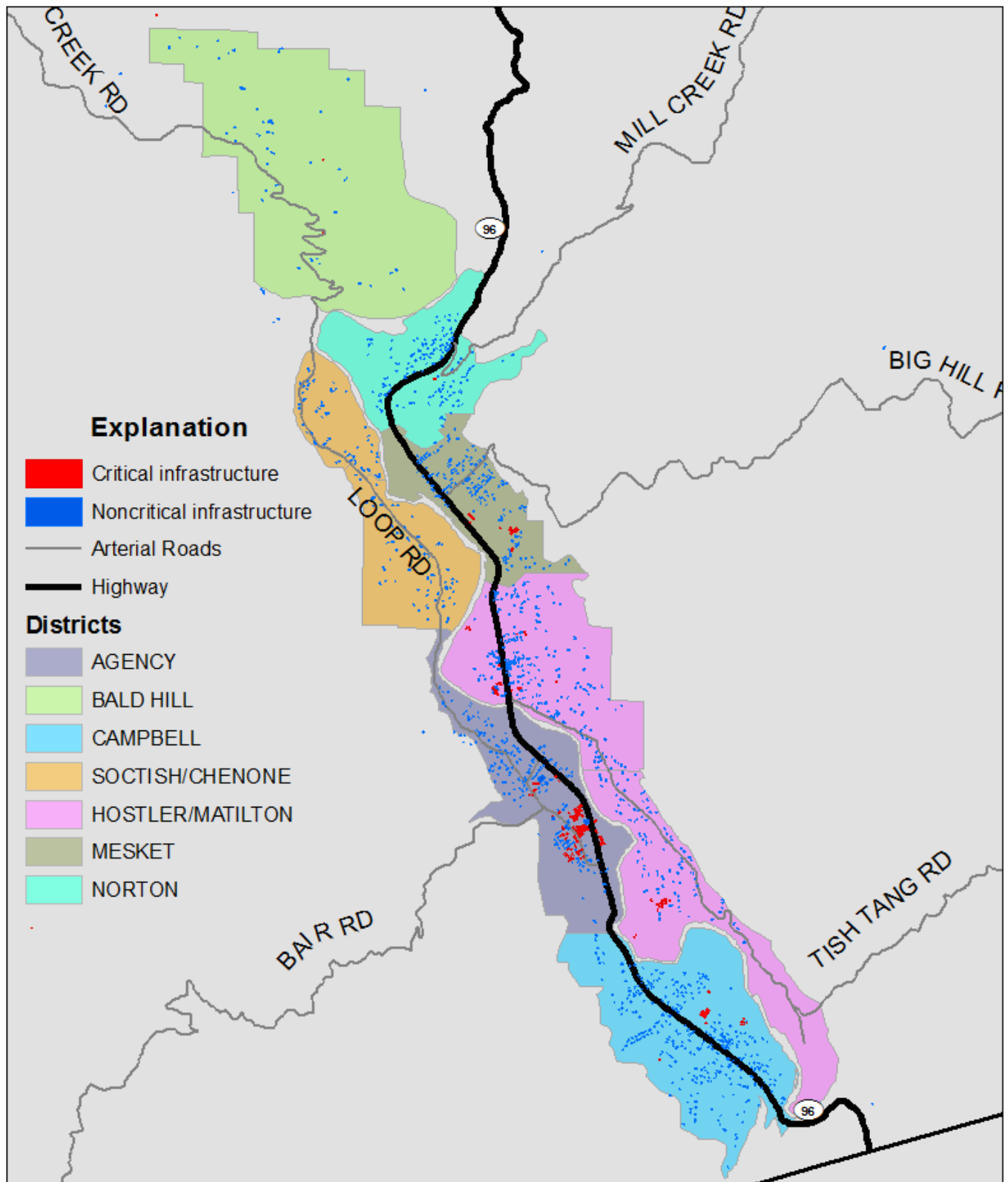
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APPENDIX A

Maps

- Map 1: Location Map of Hoopa Valley Indian Reservation with area of urbanization
 - Map 2: Hoopa Valley Indian Reservation Districts as well as critical and noncritical infrastructure
 - Map 3: 1999-2003 wildfires displayed by cause and size for the Hoopa Valley Indian Reservation
 - Map 4: Community Wildfire Protection Plan Wildland Urban Interface (WUI), Hoopa Valley Indian Reservation Districts, and critical and noncritical infrastructure
 - Map 5: 2008 Fire Hazard Severity Map for Hoopa Valley Tribe Indian Reservation
 - Map 6: Slope as a percent rise for the Hoopa Valley Indian Reservation and close-up of the Wildland Urban Interface (WUI)
 - Map 7: Vegetation classes for the Hoopa Valley Indian Reservation including enlargement of WUI
 - Map 8: Potential locations of Himalayan Blackberry infestation and vegetation type change in the Trinity River Valley Hoopa Indian Reservation near districts
 - Map 9: Main (Highway 96) and secondary evacuation routes for Hoopa Valley Indian Reservation
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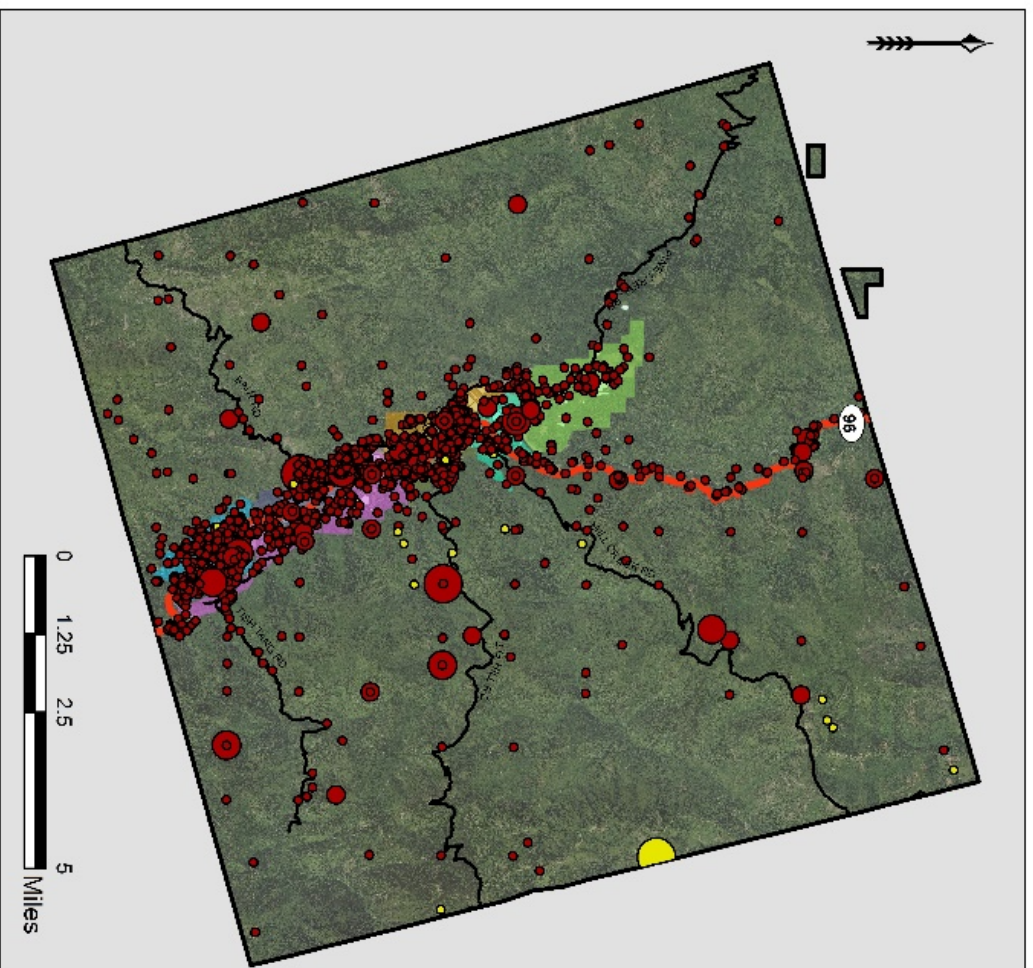


Hoopa Valley Indian Reservation

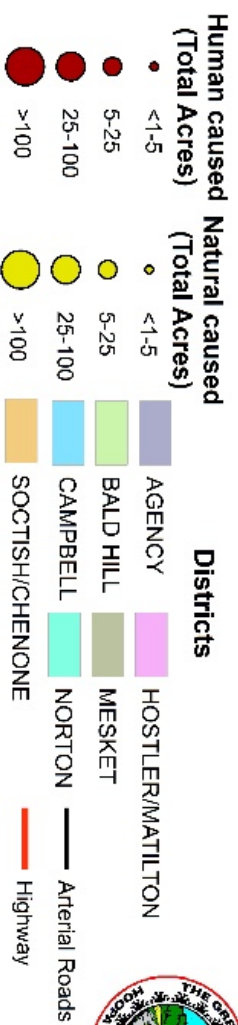
Humboldt County, California

Districts and critical infrastructure

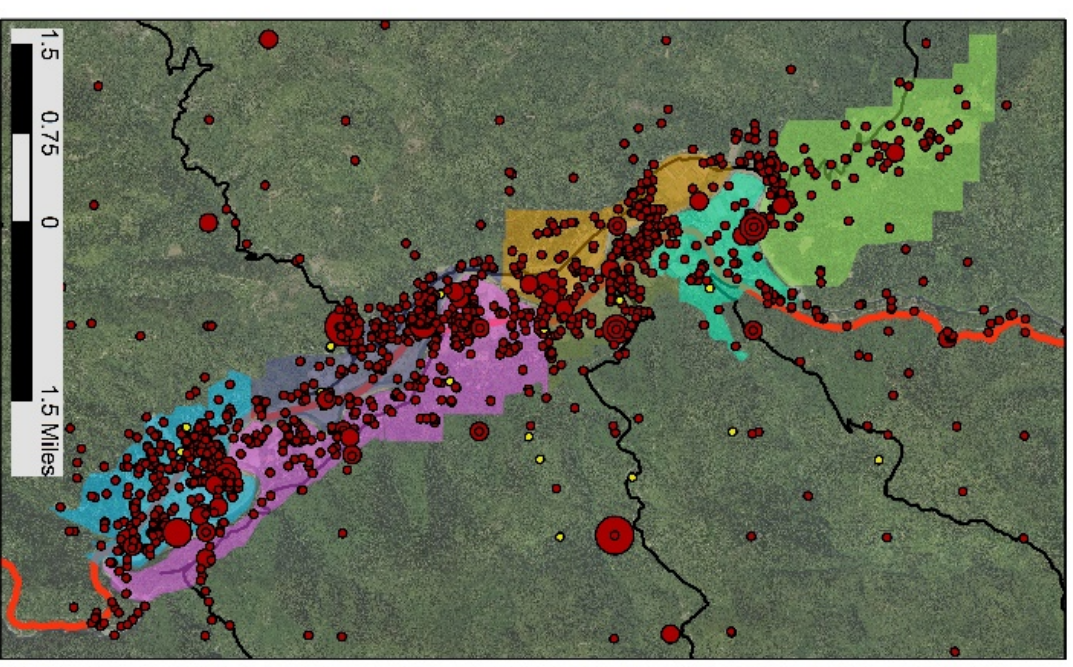
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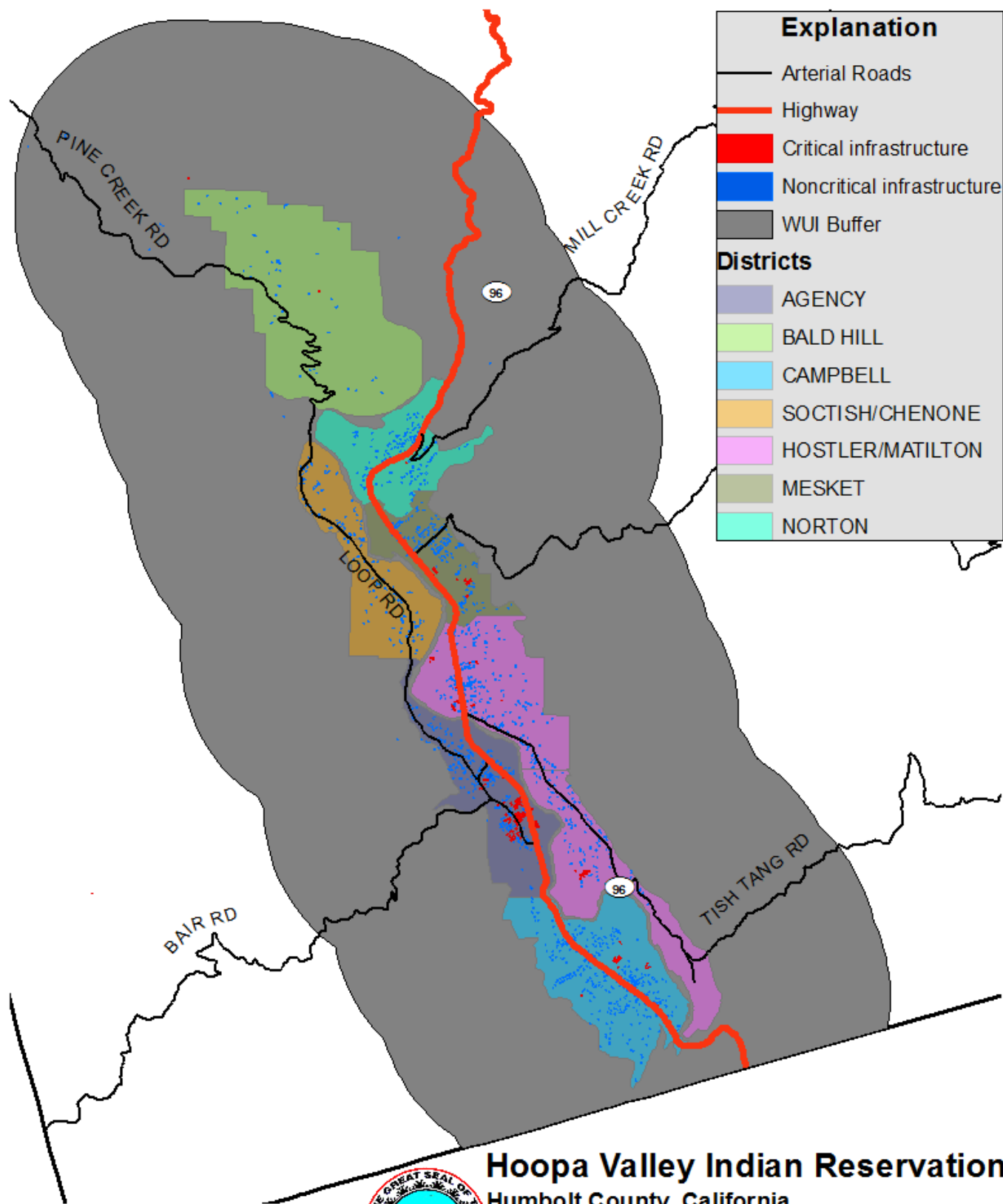
Explanation
1999-2013 Wildfires



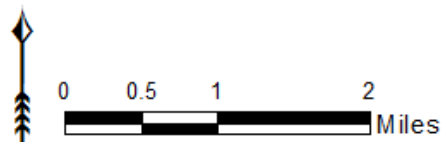
Hoopa Valley Indian Reservation Humboldt County, California Reported Wildfires from 1999-2013



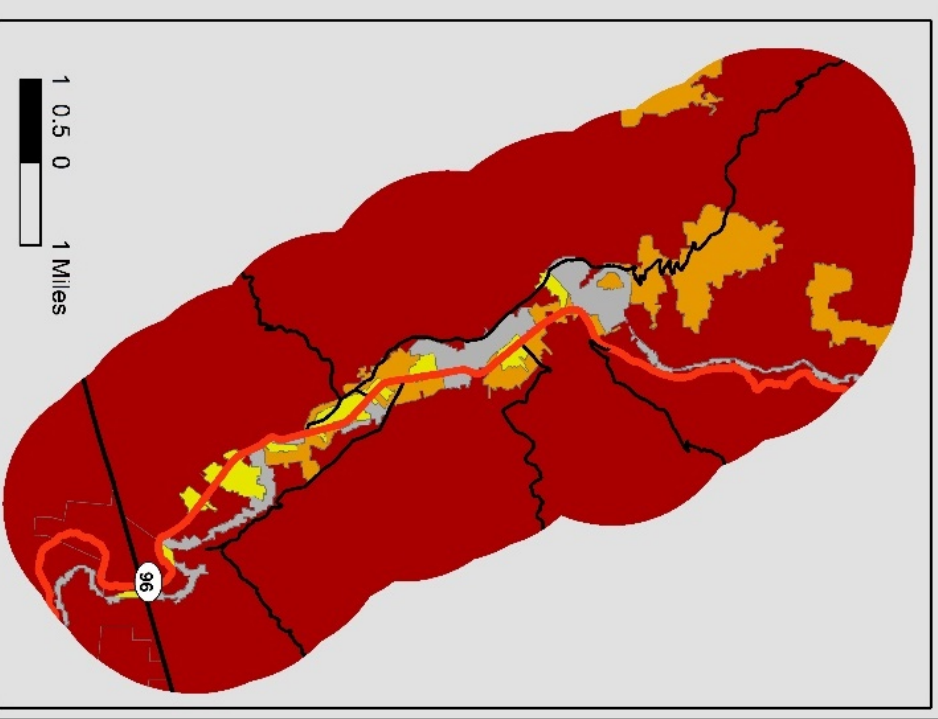
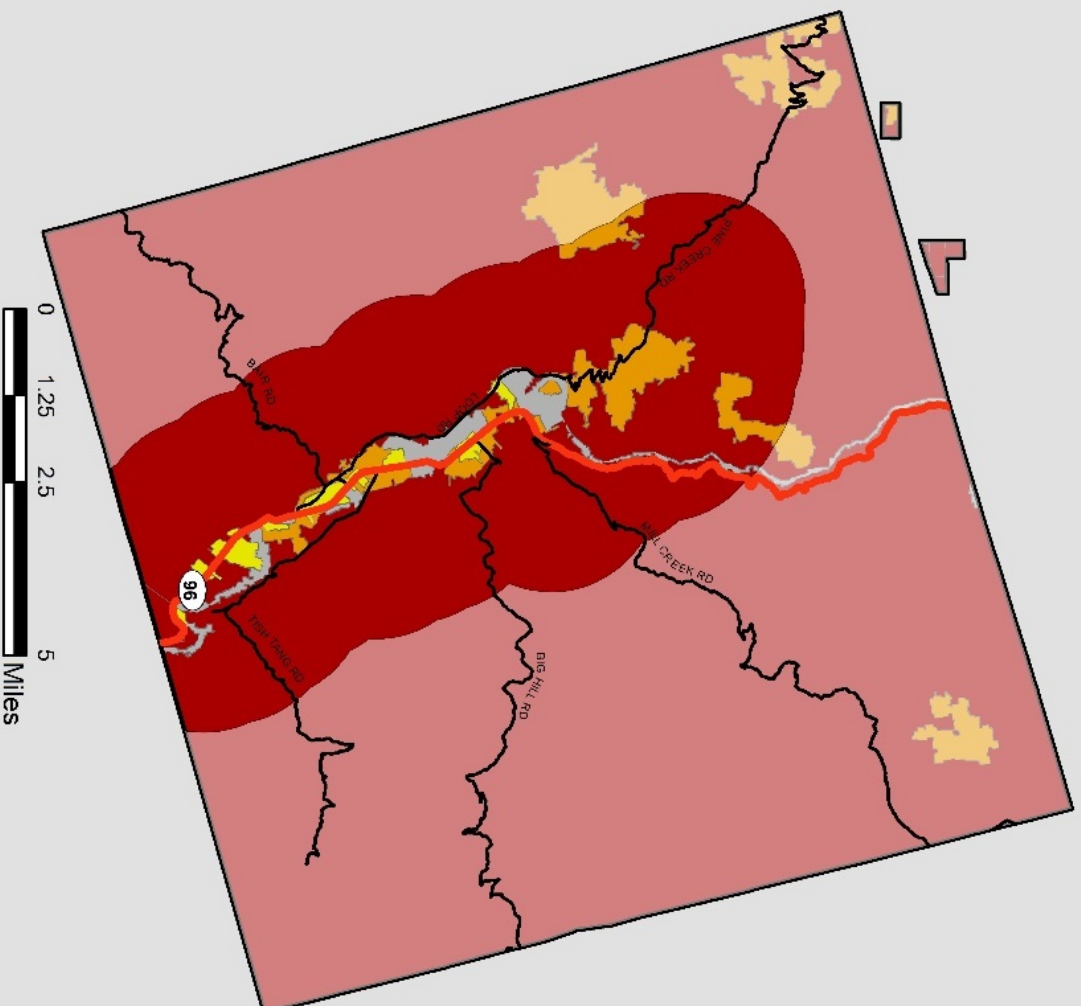
Map is intended for planning purposes only and not intended for legal determinations or precise measurement.



Hoopa Valley Indian Reservation Humboldt County, California Wildland Urban Interface (WUI), Districts and critical infrastructure

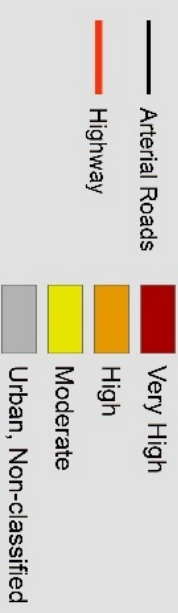


Map is not intended for planning purposes only and
not intended for legal description or precise measurement.



Explanation

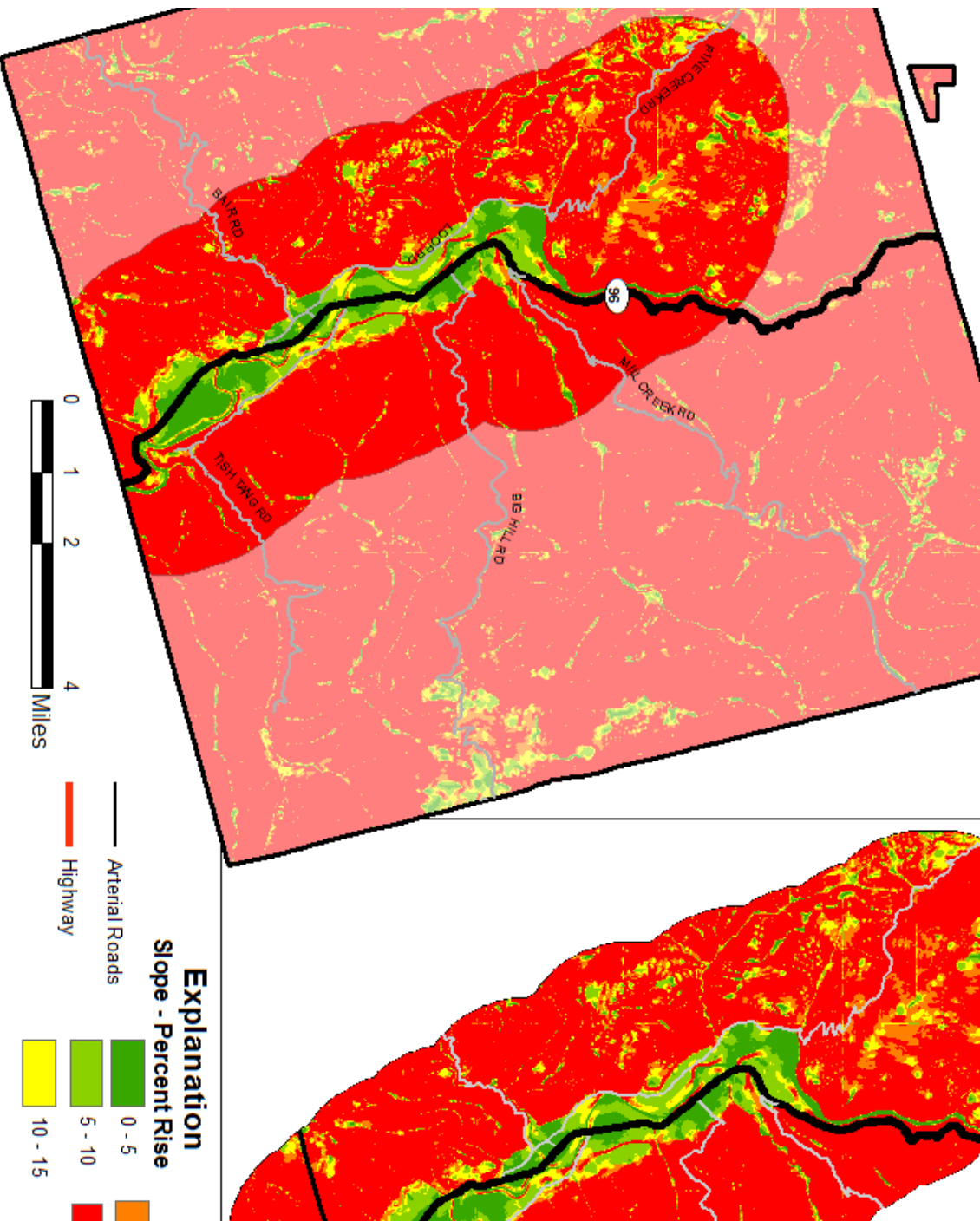
Fire Hazard Severity Zones



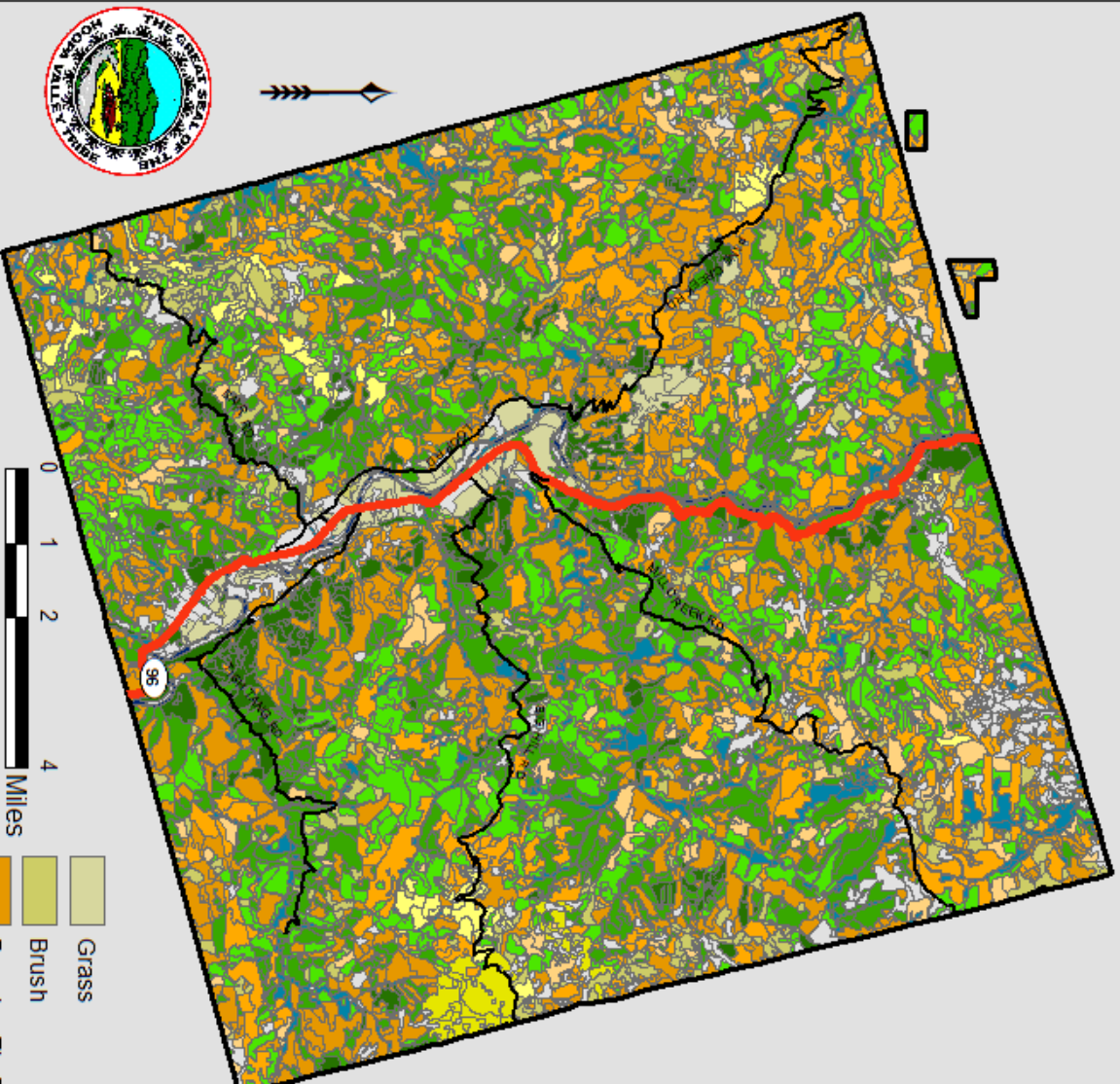
This map is intended for planning purposes only and not intended for legal determinations or precise measurement.



Hoopa Valley Indian Reservation Humboldt County, California 2008 CalFire Severity Map and closeup of districts

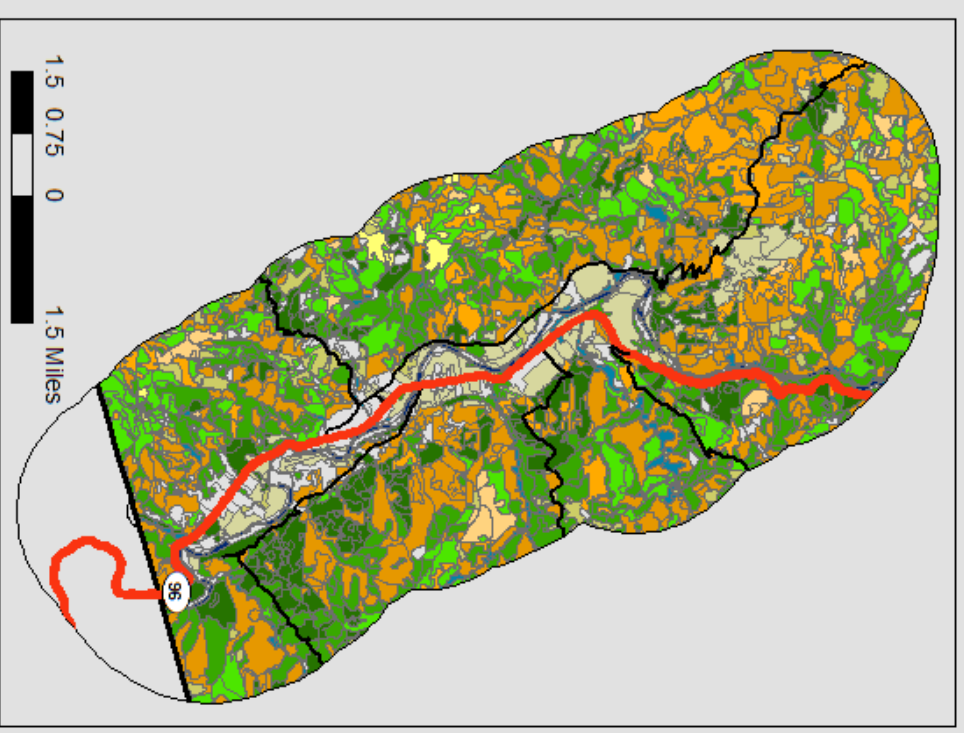
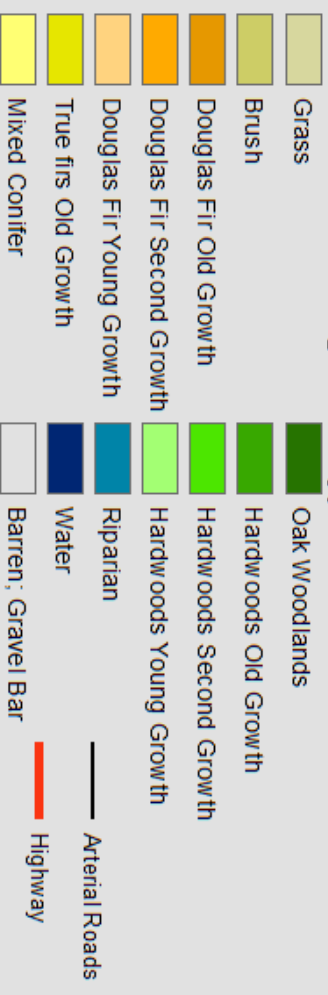


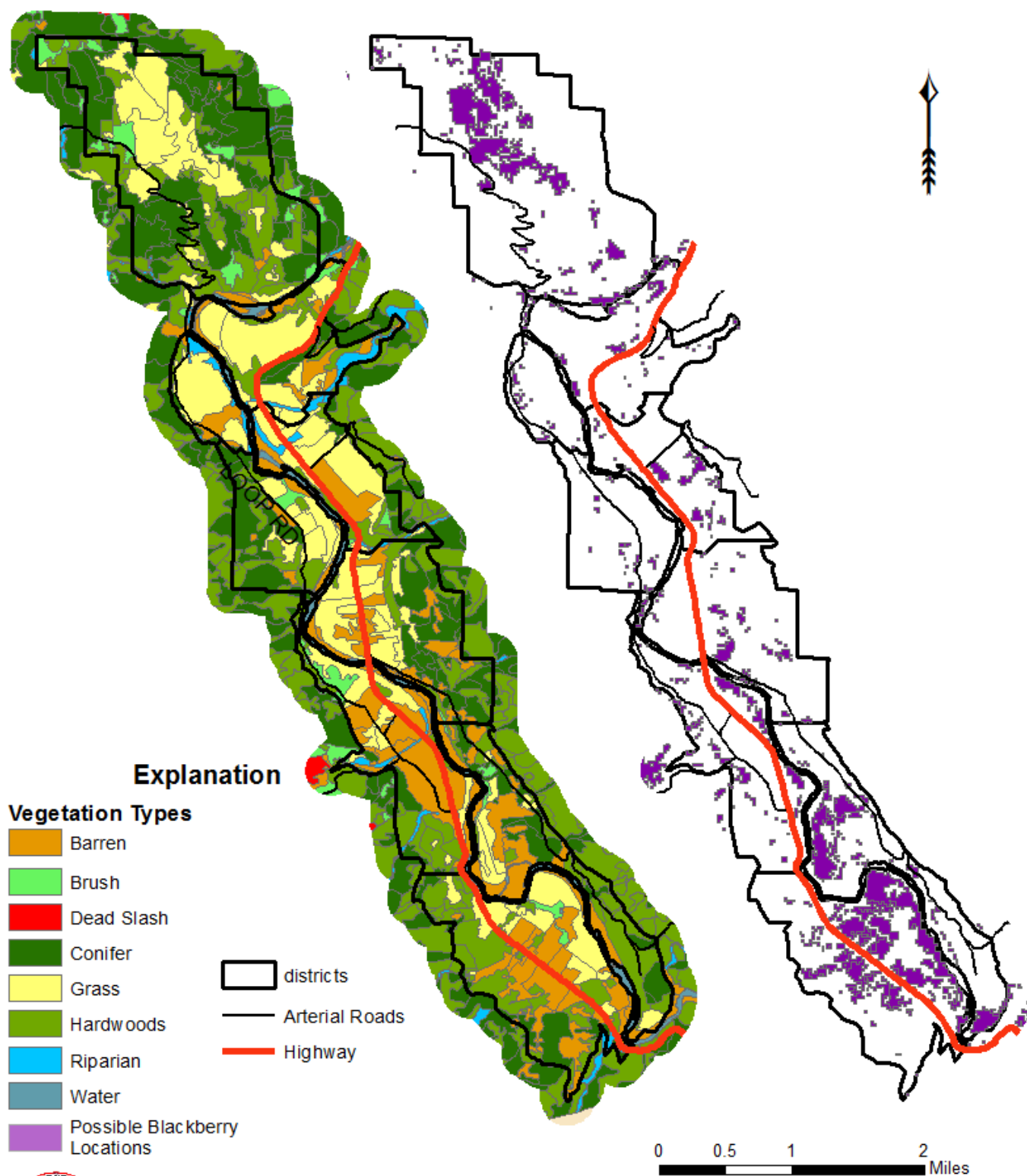
Hoopa Valley Indian Reservation Humboldt County, California Slope as Percent Rise for Area of Urbanization



Hoopa Valley Indian Reservation **Humboldt County, California** **Vegetation Types from CalFire 2010 FRAP**

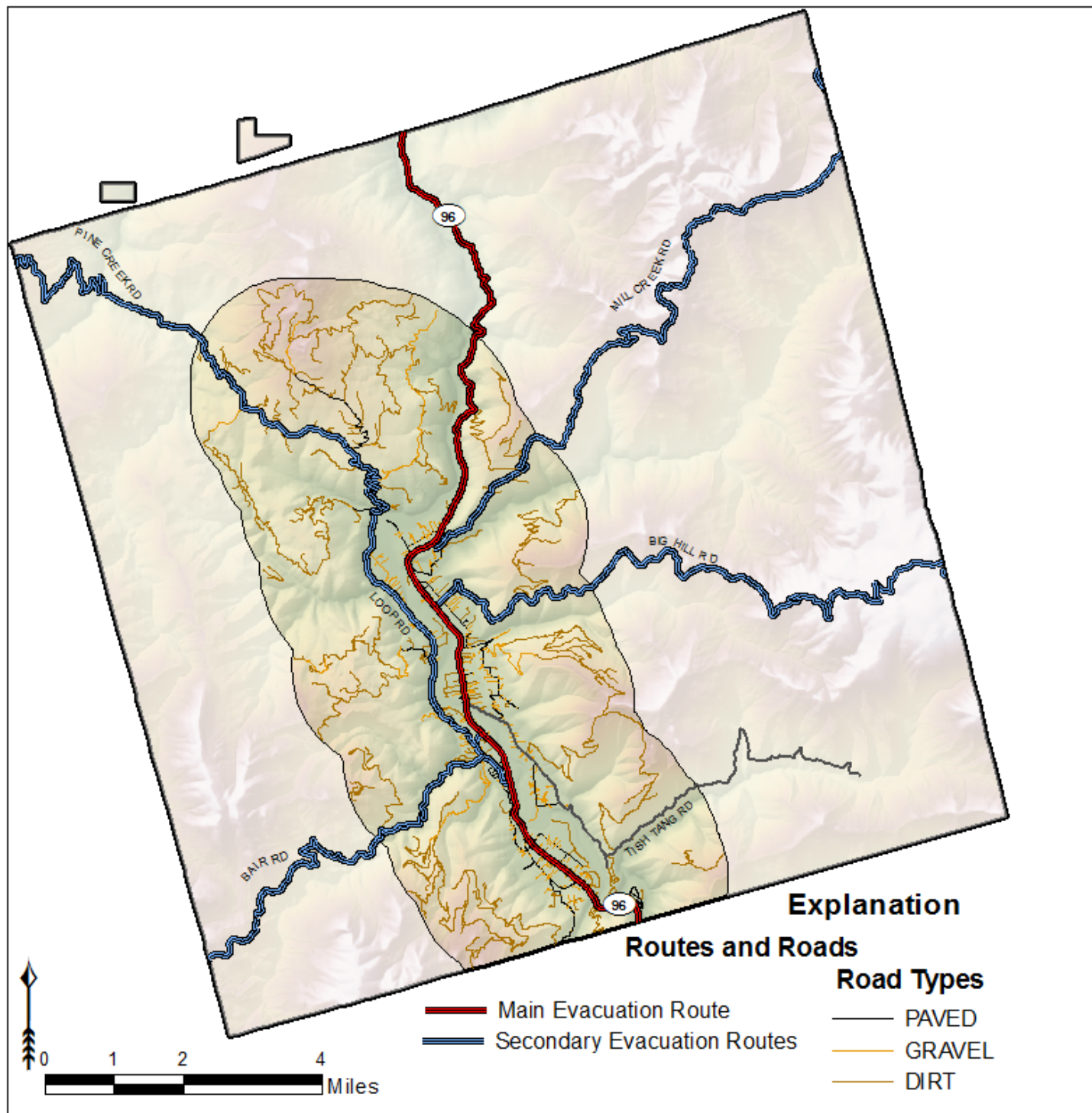
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Hoopa Valley Indian Reservation
Humboldt County, California
2008 CalFire Severity Map and closeup of districts

This map is intended for planning purposes only and not intended for legal determinations or precise measurement.



Hoopa Valley Indian Reservation

Humboldt County, California

Evacuation Routes and secondary Roads

Map is intended for planning purposes only and not intended for legal determinations or measurements.

APPENDIX B

Completed Community Wildfire Risk and Hazard Assessment Forms NFPA 299-1144 and Blank form for future use

Hostler/Matilton modular housing development Assessment

Campbell modular housing development Assessment

Blank NFPA 299-1144 Wildfire Risk and Hazard Assessment Form

APPENDIX C

Education and Community Outreach Documentation

How to Have a Firewise home

A new look at understanding hazard assessment methodologies

Firewise guide to Landscape and construction