VII. THE FIRE SITUATION

A. Local Fire Problem

The Sonoma-Lake-Napa Unit is not only the largest CDF Unit, but is also has one of the most diverse fire landscapes for any comparable sized area in the world. The Unit spans an area from the Pacific Ocean on the west, to the San Francisco Bay to the south, and the Sacramento Valley to the east. The Mendocino Unit and the Mendocino National Forest bound it to the north. Elevations range from sea level to nearly 5,000 feet (Figure 7), and it is not uncommon to have a 30 – 50 degree Fahrenheit range of temperatures in the Unit on a summer day. Nearly every major fuel type in California exists within the Unit's boundary, including grasslands, oak woodlands, brush, unique redwood forests, mixed conifer forests, and hardwood forests. The only fuel model not found is the desert type. Because of the extreme vegetative and climatic diversity, the Unit experiences virtually any type of wildfire that can occur in California, from fast spreading grass fires to full-blown forest fires. This means the Unit's fire protection system must be extremely versatile and adaptable.

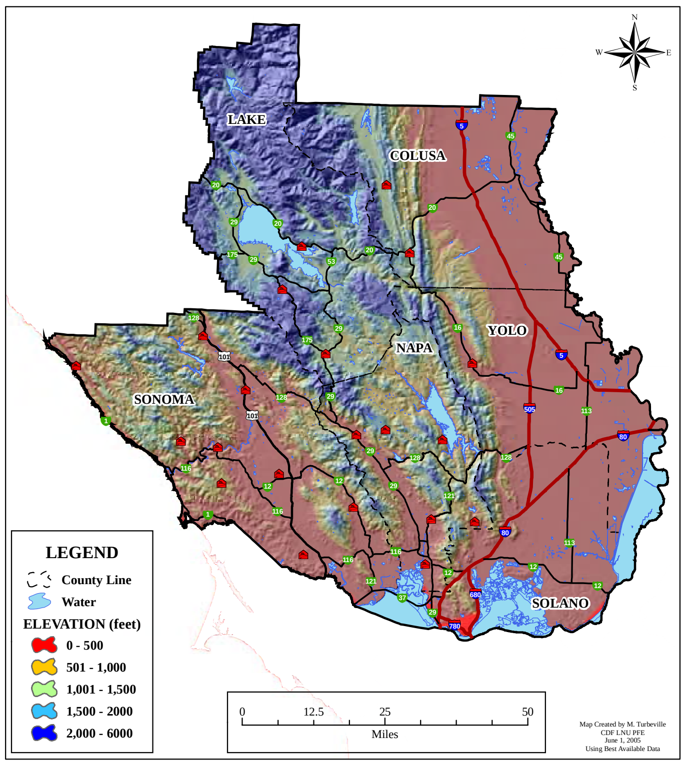

Figure 7: LNU Elevation

It has long been observed that certain areas are prone to wildfires again and again. These "historic wildfire corridors" occur where topography, fuels, and weather combine to channel large and damaging fires in particular locations. Well-documented examples include the mountainous area of western San Fernando Valley near Santa Susana Pass, Newhall Pass Canyon, and the Santa Monica Mountains between Topanga Canyon in Los Angeles County and Point Magu in Ventura Canyon. Other examples include the Cajon Pass in San Bernardino County, and the Oakland and Berkeley Hills in Alameda County.[5]

While most of the Unit has burned at least once since the beginning of organized fire protection, there are several areas of the Unit that have burned with such frequency as

[5] "Historic Wildfire Corridors," J. Meehan. Fire Management Notes, 1993 Vol. 54 No. 1

to exhibit the characteristic of historic wildfire corridors (Figure 8). Prominent among these areas are:

- The Geysers Geothermal Resources Area
- Lake Berryessa
- Rumsey Canyon
- Mt. St. Helena
- Cow Mountain
- North of Clear Lake
- North of Clear Lake

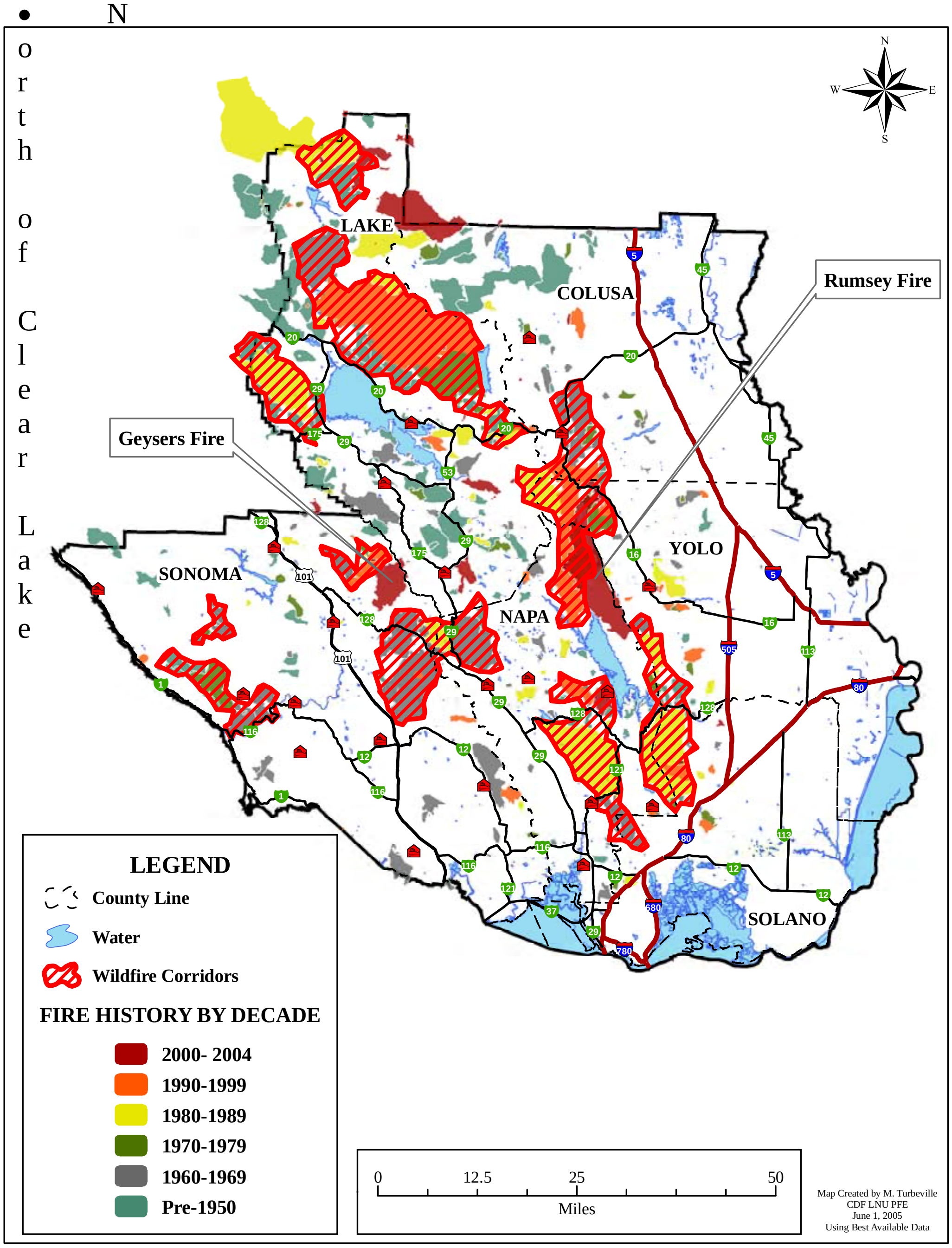

Figure 8: LNU Fire History with Wildfire Corridors

It is interesting to note that two of the largest fires, by acreage, in California during the 2004 fire season were located in LNU. The Geysers Fire started on September 3 and was contained on September 8 after burning 12,525 acres, and the Rumsey Fire started on October 10, contained on October 16, and consumed 39,138 acres. The Geysers Fire was located immediately adjacent to an area mentioned above, and the Rumsey Fire started in the Rumsey Canyon area.

The human impact on the local fire problem is inextricably linked with the natural factors that favor historic wildfire corridors. The Unit contains agricultural, industrial, and recreational populations, as well as an increasing commuter population working in the greater San Francisco Bay Area. The fire ignition history in the Unit is consistent with these human use factors and the state highway and county road corridors. A half dozen population centers account for approximately 80% of the Unit's ignition history, with three major recreation areas (Clear Lake, Lake Berryessa, and Lake Sonoma) accounting for another 10%. Agricultural and recreational equipment use account for the greatest proportions of ignitions, followed by debris burning.

Photo 7: Geysers Fire Perimeter and Surrounding Vineyards

B. Desired Future Condition

Wildfire will never be completely eliminated from the landscape. As an element of California's ecology, it is natural and inevitable as wind or rain. All the factors that effect wildland fire behavior can be categorized into three environment elements: weather, topography, and fuel. It is unlikely that humans will ever be able to control, manage, or change the effects of weather or topography on wildfire behavior. But it is possible to manage fuel, both vegetative and structural, which provides the basis for fire protection planning. Managing fuel is the focus of LNU's Fire Management Plan.

The goal of this Plan is to create not just a heightened awareness of wildfire, but a "fire safe" environment where citizens can continue to live, work, and recreate in the areas that are prone to wildfire; that is, most of the wildland areas of California. To ensure this, the Plan sets out to educate the citizenry to the hazards and risk of wildfire and to engage them in the development of appropriate actions to minimize the negative impacts resulting from wildfire.

As fire management plans are successfully institutionalized, it is expected that the general public will grow in understanding of living in a wildfire prone environment. This Plan will help focus citizens and other stakeholders into developing mitigation strategies and specific projects to implement them. Hopefully, defensible space around structures, firewise building practices, adequate water supplies, and fire equipment access will become as commonplace as smoke alarms and fire extinguishers are today in residential and commercial occupancies.

Photo 8: Palomino Lakes Subdivision near Cloverdale

In the near-term, public outreach programs and fuel reduction projects will be implemented, many using grant funds. But in the long-term, these programs will become institutionalized, a feature of “living with wildfire.” Community-wide fuel management projects will be integrated into aspects of community well being on the same order of priority as community water supply, waste collection systems, flood and erosion control, and neighborhood beautification. Catastrophic wildfire losses will become as rare, or nonexistent, as catastrophic fires in schools, hospitals, high-rises, or any other category of occupancy that has had its’ fire risk mitigated aggressively over the years through built-in fire protection measures.

Wildfires will continue to occur in California. But in the desired future condition, humans will weather them with little more difficulty than they currently weather the wind and rain. Why? Because they will view wildfire realistically, not as something that “can’t happen here," but as a phenomenon that not only can happen, but probably will happen. Along with the realistic assessment of wildfire risk will come the realization that much can be done to prepare for and mitigate the wildfire hazard, and that local fire management plans, or Community Wildfire Protection Plans (CWPP) are a prime vehicle for accomplishing this.

C. Ignition Workload Assessment (Level of Service)

The ignition workload assessment is meant to focus on identifying those areas with the highest potential of experiencing unacceptable loss and high suppression cost wildfires. One key to mitigating this potential is the successful mobilization of firefighting resources in a timely manner. It is the purpose of the ignition workload analysis to assess how successful CDF has been in providing equal fire protection to similar lands, and to identify where this goal is not being achieved and improvement is needed.

Photo 9: Example of CDF's Fire Suppression

The intent of the California Fire Plan methodology is to use ignition data to analyze fire intensity, damage, cause, vegetation type, and initial attack success or failure. "Success" or "failure" in this system is a theoretical construct based on subjective evaluation, after the fact, of the level of firefighting resource commitment and ultimate fire size. The validity of analysis is limited if it neglects to take into account such factors as the commitment of resources to other fires or incidents when a new fire starts, operational discretion, and extreme fire weather conditions that may not be reflected in burned acreage numbers. For example, a fire that burns more acres than the theoretical threshold determined by vegetation type may be deemed a "failure," while in reality, operational tactics may have resulted in asset protection at the expense of more acres of burned wildland vegetation. In realm of wildland firefighting, such operational results would be considered a "success."

Photo 10: Remote Activated Weather Station (RAWS)

One of the major inputs into the ignition workload assessment is the accurate determination and documentation of weather conditions at the time of ignition. Essentially, this assessment is most valid in areas where reliable and representative weather data is continuously available. Unfortunately, this isn't the case in many areas of the State, including large portions of LNU. It isn't unusual in the summer, for example, for coastal portions of the Unit to be bathed in fog with temperatures in the 50s, while at the same time, further inland temperatures may be in the 90s and the burning conditions are extreme. The same type of variation can be attributed to elevation differences, being above or below the fog. Because of the climatic diversity, it can be misleading to rely on the nearest available remote activated weather station (RAWS) data in such an assessment. Until the State is able to provide RAWS coverage that provides a comprehensive representation of California's fire environments, in all their diversity, this assessment will be most valid in those areas and units with relatively homogeneous weather and adequate RAWS coverage.

A benefit of using GIS is the ability to query the database that is being displayed in the maps. A query can also be done by a geographic area such as a county, response area, or a specific battalion. Using fire ignition data from January 6th, 1994 to February 2nd, 2005, which includes 3,663 ignitions, the following graph was developed to show fire causes by percentage per county along with the Unit's overall average.

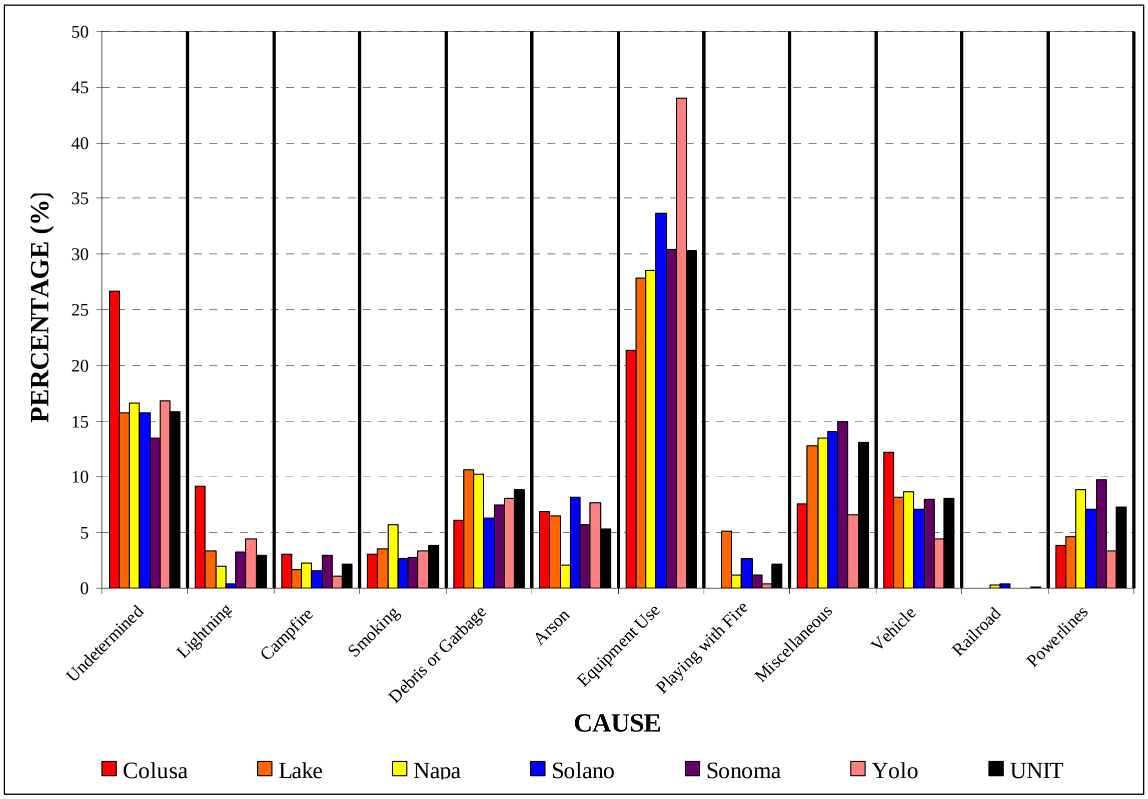

Figure 10: Graph of Fire Cause by County

The statistical map approximating initial attack workload assessment is depicted in Figure 11. The map is designed to show the effectiveness of the suppression organization in meeting the initial attack fire workload. The ignitions captured in the map are within the timeframe as the above graph. The attempt to control fires before they become large and costly is evaluated in this assessment. The underlying assumption is that fires, which are successfully contained in the initial attack[6] (IA) stage, are not the primary problem.

[6] Initial attack refers to the first set of resources sent by CDF upon being notified of a fire. If initial attack isn't successful, the response and strategy-situation is upgraded to extended attack with additional

Problem fires are the few that exceed initial attack suppression capabilities, generally due to extreme weather conditions, are costly to control and cause substantial damage. The large fires account for a majority of acreage that is burned in the State each year. Due to the lack of weather data for some areas, a number of failures appear as statistical anomalies; were they to be matched with representative weather data, which is not currently available; they would be recorded as "successes." Nevertheless, they are displayed in this analysis as an initial approximation. As further evaluation occurs to better match weather data with ignitions, the quality of this assessment will improve.

To create the map, the location of where each fire started, or in firefighting terminology, the "point of origin," are plotted in the center of the respective Public Land Survey (PLS) section, and color-coded based on success/failure scores. It is possible to have more than one point of origin per section. Where this occurs, the colored coded symbols are stacked upon one another. Figure 12 represents failure density or Q81st areas where more than one ignition has escaped initial attack.

resources being sent. The last response is "major," which is an extended that usually calls for the activation of an incident management team and resources responding from a much larger geographic area.

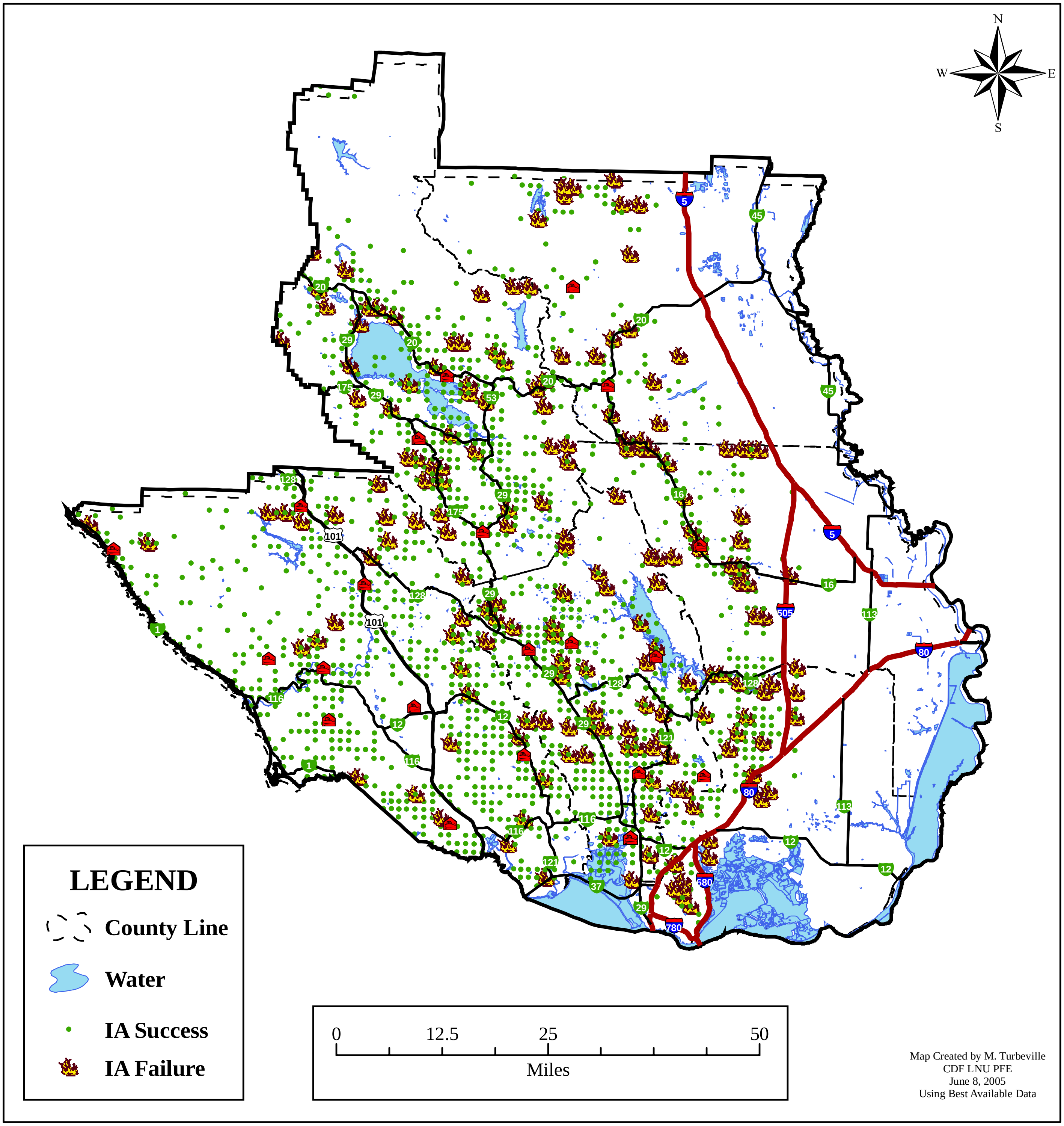

Figure 11: LNU Initial Attack Success and Failure

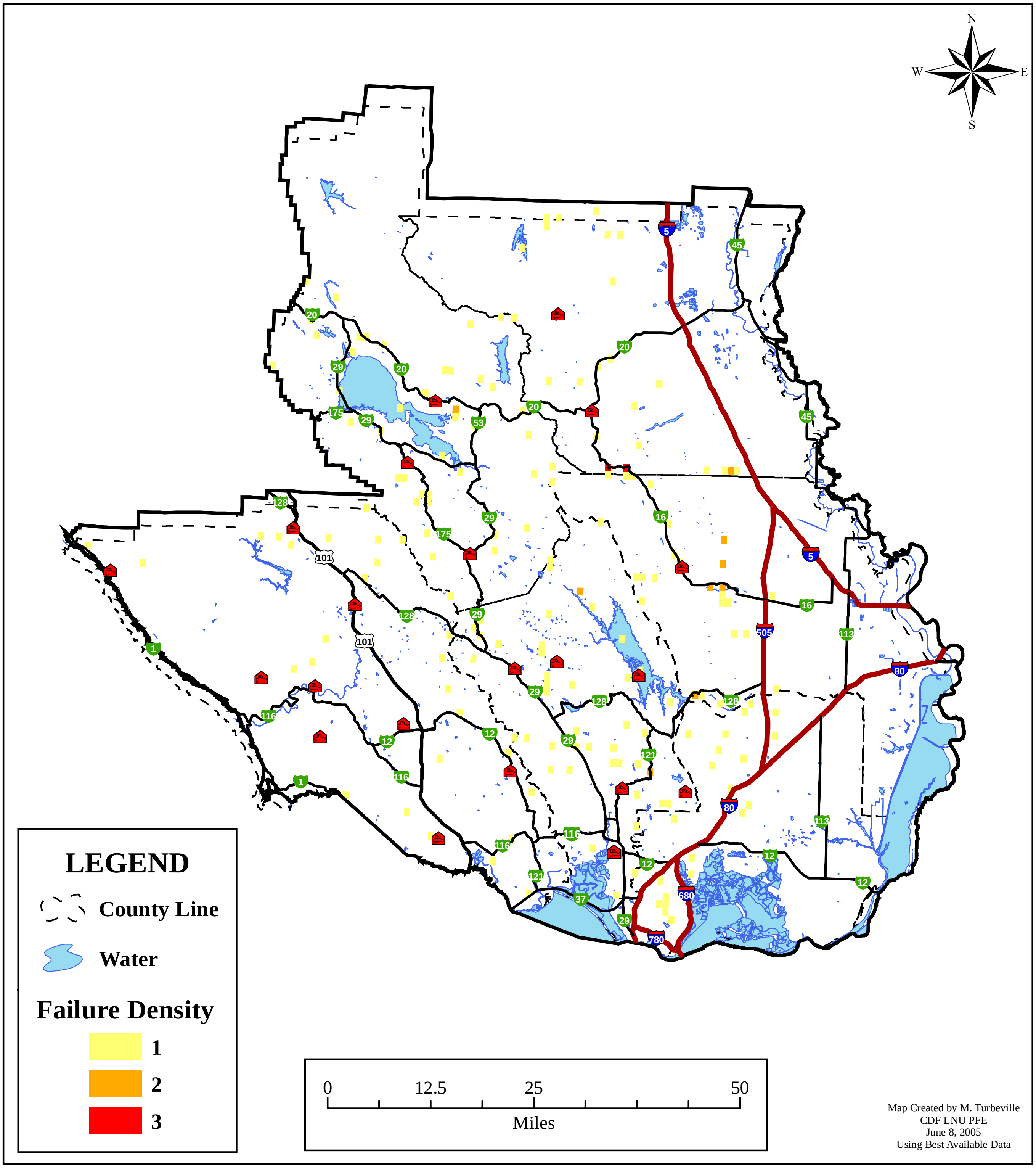

Figure 12: LNU Ignition Failure Density

1) Initial Attack Success and Failures

The legislature has charged the Board of Forestry and CDF with delivering a fire protection system that provides an equal level of protection for lands of similar type (Public Resources Code (PRC) 4130). In order to do this, CDF utilizes a process that evaluates the level of service currently afforded a particular wildland area with a predetermined level for each area. This rating is expressed as the percentage of fires that are successfully extinguished during initial attack. Success is defined as those fires that are controlled during the initial attack phase before unacceptable damage and cost are incurred.

California has a complex fire environment and CDF data on assets at risk relative to damage from wildfire is incomplete. These factors combine to make it very difficult to develop a true performance-based fire protection planning system. CDF has resorted to prescription-based fire protection planning, using such factors as response times, fire detection systems and associated reporting times, acreage goals, as a way to overcome the complexity of the issues. It is very hard to put “numbers” to factors that are subjective and/or don’t lend themselves to being quantified, such as address posting, defensible space, and fire apparatus access, aircraft availability and response, water supply systems, etc. Unfortunately, prescription based planning tends to oversimplify some issues, For instance, prescription standards also make it difficult to integrate the interrelationships of various fire protection programs, such as the value of fuel reduction programs in reducing the level of fire protection effort required.

Despite the shortcomings of a prescription-based fire protection planning system, the Level of Service (LOS) rating can be used a “relative” system, which attempts to measure the impact of fire on the various assets at risk. The LOS rating can be readily used to describe the degree of success to stakeholders. The rating can also provide a way to integrate the contribution various program components of fire prevention, fire protection planning, vegetation management, and fire suppression toward the goal of keeping damage and cost within acceptable limits. It is important to reiterate that this system is a relative system and that the ratings are only approximate.

In the rating process, a fire may be considered a failure based upon the number of resources committed and the fire size. Obviously, this approach oversimplifies the myriad of factors that truly determine initial attack success, as has been discussed earlier in this Plan.

The LOS rating, mathematically, is a ratio of successful initial attack fire suppression efforts to the total number of fire starts. Refer to Figure 13 for the formula. It used GIS to graphically display the success and failures of the fire suppression resources by overlaying ten (10) years of wildfire history onto a map, as shown in Figure 11, and deriving the average annual number of fires by size, severity of burning conditions, and assets lost.

$$\text{Success Rate (\%)} = \frac{\text{Annual Number of Fires Extinguished by Initial Attack}}{\text{Total Number of Fires}} \times 100$$

Figure 13: Level of Service (LOS) Ratio Formula

The result is an initial attack success rate measured as a percentage of fires by vegetation type and area. Success is defined as those fires that are controlled before unacceptable damage and cost are incurred and where initial attack resources are sufficient to control wildfires.

Rather than apply the LOS formula to all wildfires they are separated by which fuel type, or planning belt, the fire burned. Then within each planning belt, fires are further classified based on final size and weather conditions at the time of ignition. Each fire is in turn classified as either a successful initial attack or a failure. Failures are defined by planning belt as follows:

- Grass: 12 acres and greater
- Brush: 6 acres and greater
- Timber (Coastal and Interior Conifer): 3 acres and greater
- Woodland: 15 acres and greater

The analysis time period for Table 3 is the same as Figure 11, January 6th, 1994 through February 2nd, 2005. The planning belt vegetation types were analyzed independently. A cumulative initial attack success rate of 95% was observed for this period of time. State values are also included for comparision.

Planning Belt	Success Rate		Successful I.A.		Failure I.A.	
	LNU	State	LNU	State	LNU	State
Grass	97%	95%	924	20,339	33	1,039
Brush	90%	94%	500	16,600	54	1,099
Coastal Conifer	98%	98%	263	2,534	5	48
Interior Conifer	94%	95%	774	19,092	46	1,040
Woodland	98%	97%	186	9,622	4	335
Not Classified	96%	97%	837	33,852	38	1,191
AVERAGE	**95%**	**96%**	3,484	102,039	180	4,752

Table 3: Initial Attack Successes and Failures