

## V. GEOGRAPHIC INFORMATION SYSTEM METHODOLOGY

To facilitate understanding the figures, maps, and descriptions provided in this Plan, it is important to discuss how geographic information system (GIS) was used for analysis. GIS is software “tool” that applies data to be displayed as part of a map. A point, or area, can be assigned specific attributes that then can be used for map symbolization. The attribute forms a database. While producing a map is valuable for visualizing attributes, the real benefit of using GIS is for modeling, or completing calculations based upon attributes. The output of the modeling can then be incorporated into a map that shows the viewer the end product of the modeling process. Once a model is built, a vast area represented by GIS compatible data can be processed.

In order to represent such variables as assets at risk, fuels, and topographic factors that exist throughout California, a grid network was developed. It is impractical to have very small grids, though it would be more accurate, to represent the various factors for the entire State. Therefore, the grid network was derived by sectioning every 7.5-minute United States Geographic Society (USGS) quadrangle map into a 9 x 9 grid to create eight-one cells. Each cell is 450 acres and is referred to as a “Quad Eight-firsts” (Q81<sup>st</sup>). Q81<sup>st</sup> are used for all fire plan assessments, with each Q81<sup>st</sup> having attributes that describe the majority of the represented 450 acres. Refer to Figure 4 on the following page.

At a large scale, such as at the full extent of LNU, the “block” appearance of each Q81<sup>st</sup> is somewhat disguised, but if the user wants to zoom into a specific area, perhaps down to even to a property parcel, the parcel may not be accurately represented by the broad classification of the 450 acre Q81<sup>st</sup>. For this type of user, and to more accurately complete the fire plan assessments, a smaller grid needs to be developed.

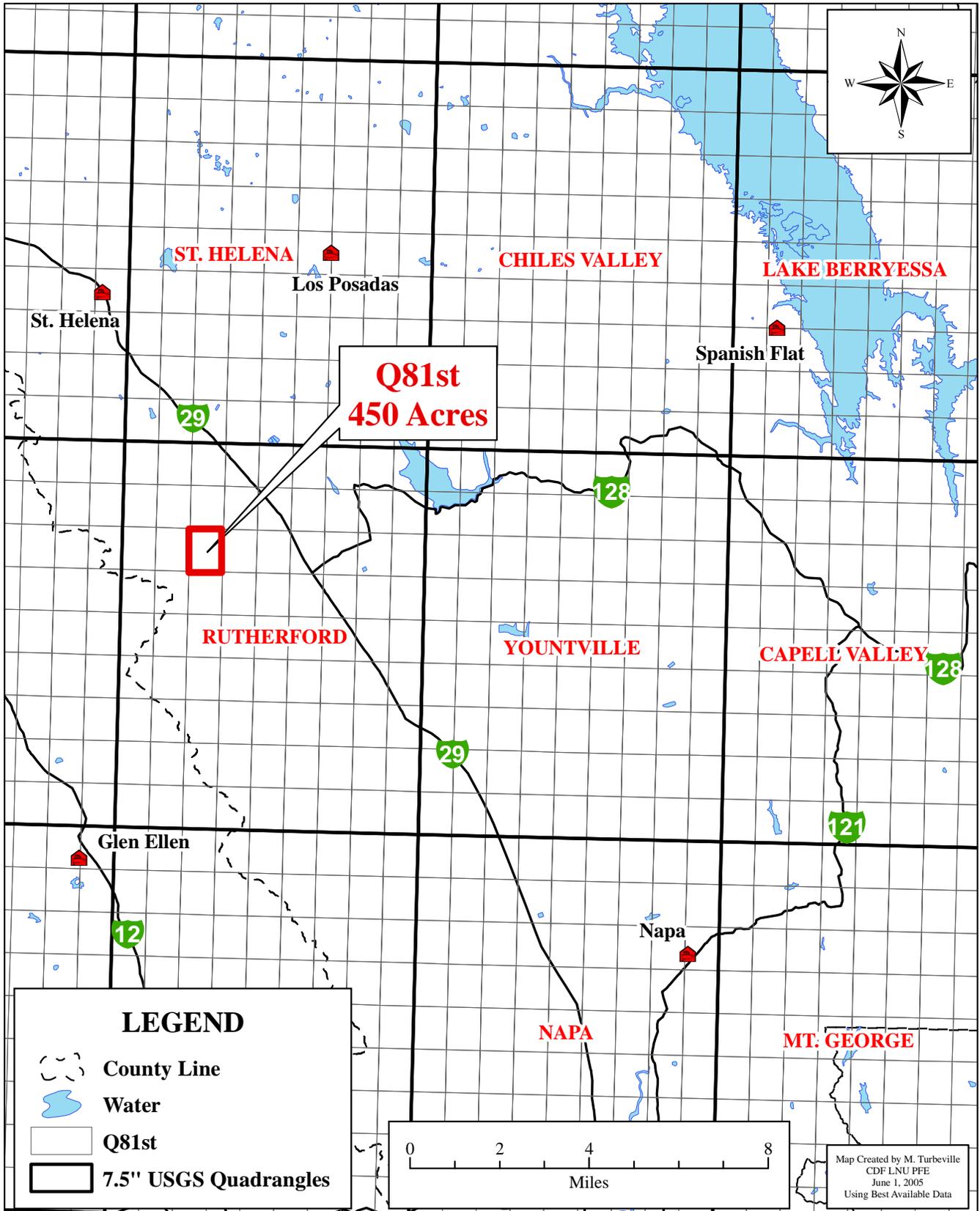


Figure 4: Illustration of a Q81<sup>st</sup>

## VI. ASSETS AT RISK

The primary purpose of wildland fire protection is to safeguard the wide range of assets than can be threatened by wildfire. Assets at risk refer to real and societal values that have the potential to be burned or damaged by wildfire. In LNU, these assets include life and safety, structures, water and watershed values, agriculture, rangeland, recreation, air quality, soil resources, wildlife, unique scenic areas, cultural and historic resources. Among the Unit's assets at risk are some of the world's most valuable agricultural lands, which are often interspersed with high-value real estate, both residential and commercial. Sixteen assets have been identified by the State Fire Plan and ranked as to their risk from

wildfire. The table on the next page provides a description of the assets evaluated.



Photo 5: LNU Agricultural Land Use

The resident population within the Unit is more than 1.2 million. Suburban populations are booming in the southern end of the Unit, particularly in Solano County, along the Interstate 80 corridor that links San Francisco and Sacramento. As available Local Responsibility Area (LRA) lands are used for residential, industrial, and

agricultural purposes, there is increasing pressure for development in SRA lands. Accelerated growth is occurring in the population centers of Santa Rosa, Petaluma, Windsor, Healdsburg, Cloverdale, Vacaville, Fairfield, Vallejo, and Lake County. All of these areas are characterized by a growing wildland urban interface (WUI) fire problem.

In addition more than an estimated five million tourists travel through the Unit each year, taking part in a wide variety of recreational activities from wine tasting to enjoying the waterways. The fire ignition history in the Unit is consistent with these human use factors and the state highway and county road corridors.

The Geysers geothermal field, which is located in the Clear Lake Volcanic Area straddling Sonoma and Lake Counties, is a unique asset at risk, and one that plays a large role in the Unit's wildfire protection planning. The complex is comprised of dozens of high value structures, including 22 power generating plants scattered over 30,000 acres of remote, steep, and broken topography of the Mayacamas Mountains. This geothermal field is the largest and most productive in the world. It has an estimated electrical generating capacity of over 2,000 megawatts and supplies power, day in and day out, to over one million California residents. More than four billion dollars in capital improvements is at risk to wildfire in the midst of some of the Unit's most high hazard wildland fuels. The numerous power-generating activities are not only at risk to wildfire, but also have periodically been sources of ignition.

Sonoma-Lake-Napa Unit  
Fire Management Plan  
2005

Asset at Risk	Public Issue Category	Location and Ranking Methodology
Hydroelectric Power	Public Welfare	1) Watersheds that feed run of the river power plants are ranked based on plant capacity. 2) Q81 <sup>st</sup> cells adjacent to reservoir-based powerplants receive a low rank. 3) Q81 <sup>st</sup> cells containing canals and flumes receive a high rank.
Fire-Flood Watersheds	Public Safety Public Welfare	Watersheds with a history or problems or the “proper” conditions for future problems. Rank is based on affected downstream population.
Soil Erosion	Environment	Watersheds ranked based on erosion potential.
Water Storage	Public Welfare	Watershed area up to 20 miles upstream from water storage facility, rank based on water value and dead storage capacity of reservoir.
Water Supply	Public Health	1) Watersheds that are up to 20 miles upstream from water supply facility receive a high rank. 2) Q81 <sup>st</sup> cells containing domestic water diversions are ranked based on number of connections. 3) Q81 <sup>st</sup> cells containing ditches that contribute to the water supply system assigned a high rank.
Scenic	Public Welfare	Four mile viewshed around scenic highways and ¼-mile viewshed around wild and scenic rivers; rank is based on potential impacts to vegetation types (tree vs. non-tree specie type).
Timber Range	Public Welfare	Timberlands’ rank based on values and susceptibility to damage.
Range	Public Welfare	Rangelands’ rank based on potential replacement feed cost by region, owner, and vegetation type.
Air Quality	Public Health Environment Public Welfare	Potential damages to health, materials, vegetation, and visibility. Rank is based on vegetation type and air basin.
Historic Buildings	Public Welfare	Historic buildings ranked based on fire susceptibility.
Recreation	Public Welfare	Unique recreation areas or areas with potential damage to facilities. Rank is based on susceptibility.
Structures	Public Safety Public Welfare	Ranking based on housing density and fire susceptibility.
Non-game Wildlife	Environment Public Welfare	Critical habitats and species locations based on input from the California Department of Fish and Game, and other stakeholders.
Game Wildlife	Environment Public Welfare	Critical habitats and species locations based on input from the California Department of Fish and Game, and other stakeholders.
Infrastructure	Public Safety Public Welfare	Infrastructure for delivery of emergency and other critical services (e.g.: repeater sites, transmission lines)
Ecosystem Health	Environment	Ranking based on vegetation type and fuel characteristics.

Table 2: Assets at Risk Description

Assessment of the type, magnitude, and location of assets at risk to wildfire is a critical element of pre-fire management. Because fire protection resources are limited, it is prudent to allocate them based, at least in part, in the value of the assets at risk. The total Assets at Risk map on the following page (Figure 5) represent an attempt to involve stakeholders in the evaluation of the Unit's wildfire protection system. All assets at risk are equally weighted and included in the modeling. The Q81<sup>st</sup> are then color-coded corresponding to the percentile in which they belong; i.e. the upper 5% is red.



Photo 6: Remote Historical Structures

Areas with a high cumulative asset values can be further evaluated for wildfire hazard. The resulting high risk, high hazard map can be used to prioritize management activities. The initial risk ranking is a somewhat subjective process, though it benefits from the professional judgment and knowledge of the Unit's fire professional staff. In this initial assessment, structures were given the highest weight, timber, infrastructure, water storage, and water supply were given a moderate weight, and all other assets were weighted at relatively low risk from wildfire. The resulting map is currently undergoing wide stakeholder review, and is subject to change over time. Refer to Figure 6.

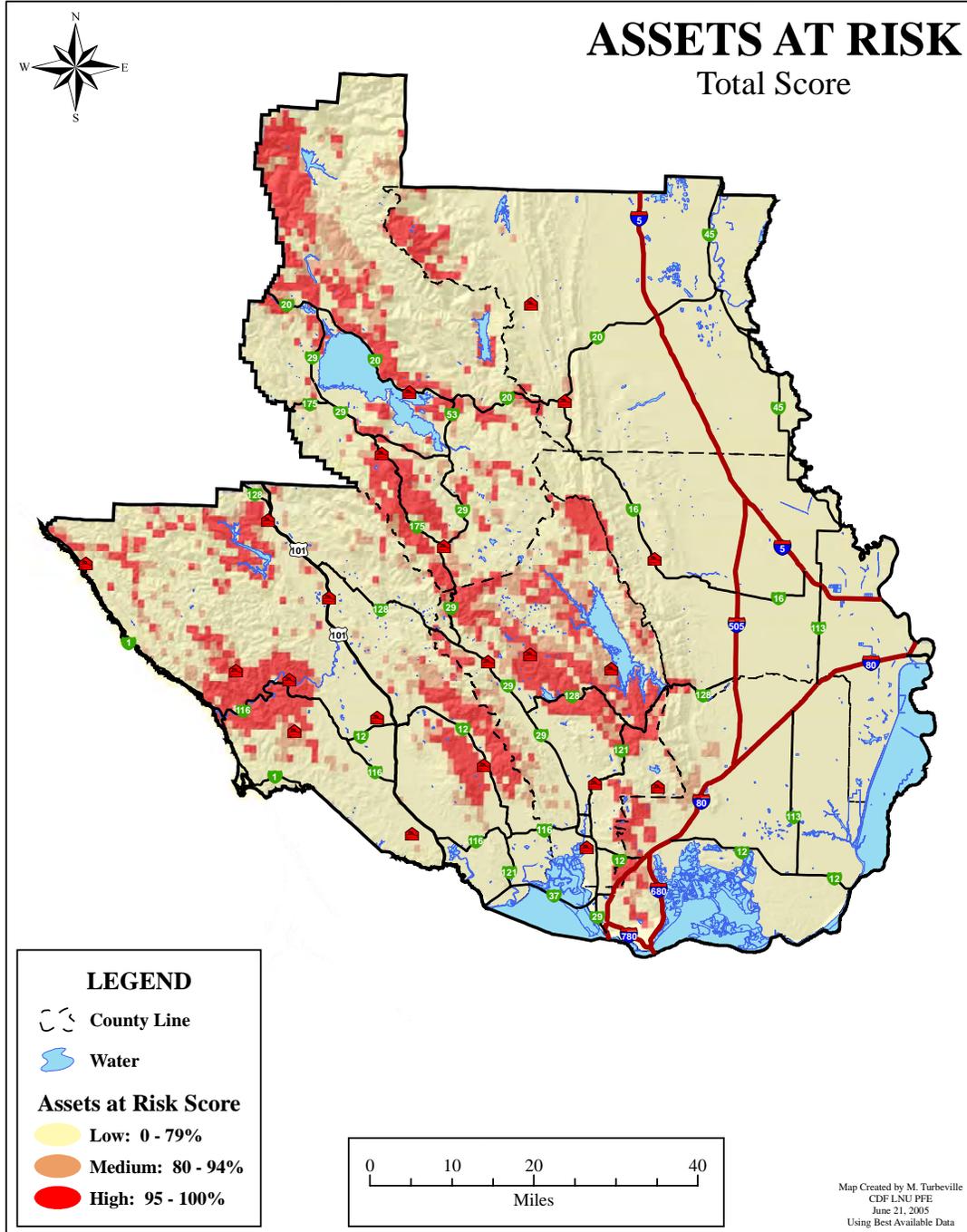


Figure 5: Assets at Risk Map (Total Score)

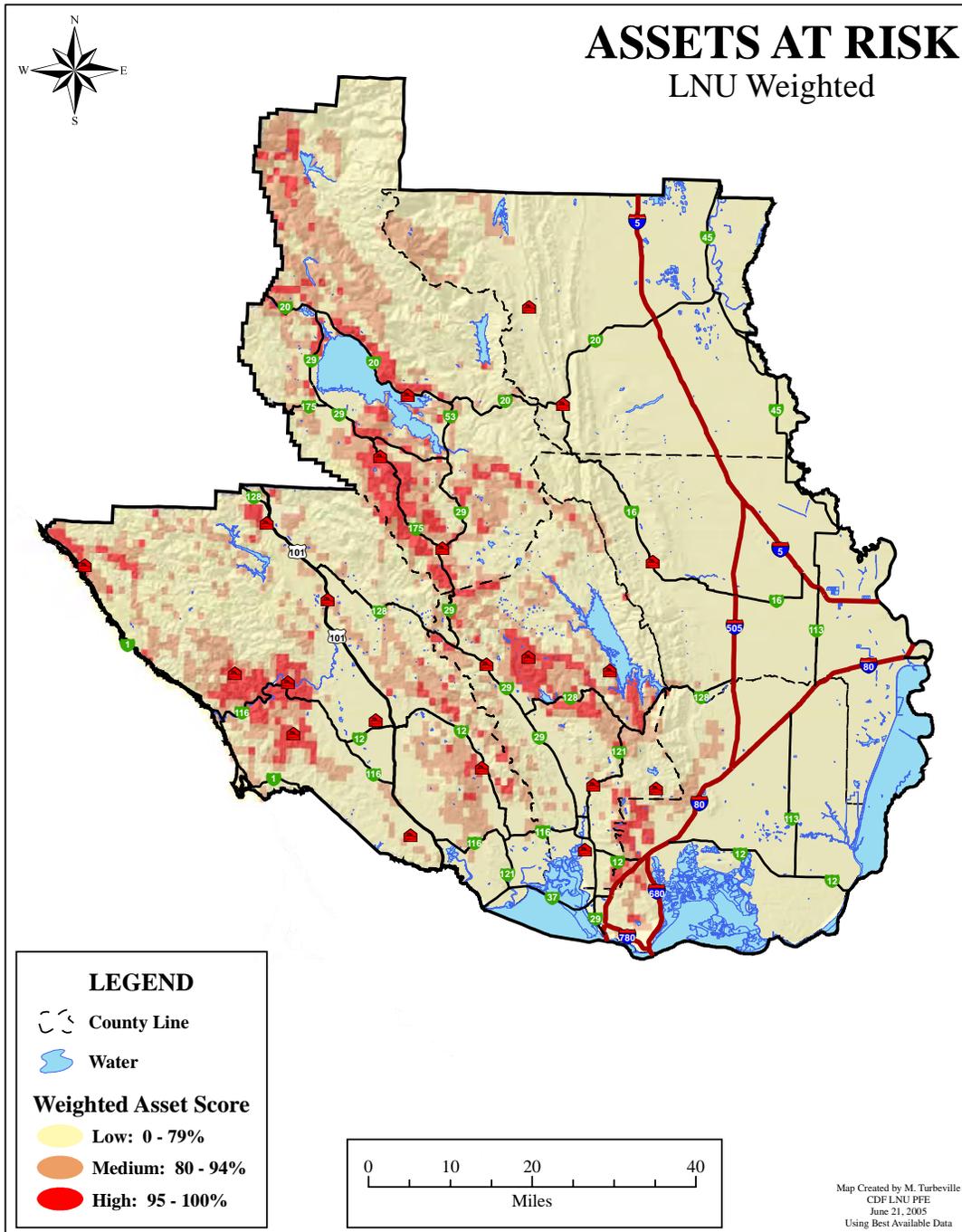


Figure 6: LNU Weighted Assets at Risk Map