October, 2018

Petition to Establish Long Valley – Lake County AVA

This petition seeks to establish the Long Valley – Lake County AVA, and includes a request to revise a portion of the northeastern boundary line of the High Valley AVA and expand a portion of the eastern border of the North Coast AVA.

The proposed Long Valley – Lake County AVA includes Long Valley, a valley that runs in a north-northwesterly direction from State Highway 20 in Lake County, California and the surrounding hillsides and bench lands that rise 200 feet above the valley floor along the northern and eastern boundary line and 500 feet along the south western boundary line. It encompasses about 7,605 acres.

Long Valley is the eastern most viticulture area in northern Lake County. It is bordered by State Highway 20 to the south, High Valley AVA to the west and southwest, the Mendocino National Forest to the north and west, and steep mountainous terrain on the east. The western third of the proposed Long Valley area currently lies within the larger North Coast AVA.

Vineyard development in this area did not start until ten years later than much of the rest of Lake County. The alluvial valley floor, approximately 9 miles long and 1 mile wide, has elevations of 1,200 to 1,300 feet above sea level which is below the level of Clear Lake as well as most of the acreage planted to vines in Lake County.

Derek Holstein, winemaker for Cache Creek Vineyards, describes Long Valley this way, "Long Valley has a fair amount of diversity partly because of the nature of being in a canyon. The steeper sloped bench land of Cache Creek tends to grow more vigorous canopies on the vines with flavors that are more herbaceous and flavorful. The tannins produced from these grapes are slightly bolder and the wines are more focused. The lower bench land which is closer to the Creek is flatter and grows grapes that are leaner and dryer in tannin. The soil is lighter in color and the vines grow a smaller canopy so the grapes have more exposure to the sun."[1]

Differences in elevation, geology, and climate distinguish the proposed viticultural area from the surrounding region and other AVAs in Lake County. Appendix Exhibit 1, page 77 contains a list of growers and wineries in Long Valley.

History of Agriculture and Viticulture

Long Valley was the ancestral home of Lake County's native people for at least 20,000 years according to history of the area gathered by local historian Dr. John Parker. White settlers arrived in the Valley starting in mid-1800.

James and Hiram Kennedy purchased the property that is still known today as Kennedy Ranch

[1] Private communication from Derek Holstein on Long Valley, March 19, 2018

in 1859. Hiram and his family had a dairy operation on the property for more than 25 years and later switched to raising beef and pork. The Kennedy family dairy produced butter and dairy products served at Bartlett Springs Resort in Lake County.

John Garner came to Long Valley in 1883. Eventually controlling 2,700 acres, Garner established Garner Stock Farm. Garner Ranch, a working cattle and hay ranch, is now known as Eleven Roses Ranch is still in the Garner family.

The first record of vineyards in Long Valley was a family vineyard planted on land near the southern end of the Valley by John Bonham in 1883. This was followed by in 1885 when N E Hanson planted a vineyard with 2,000 vines on his ranch called "The Crags".

Modern viticulture in the proposed area started with the planting of a block of vines with cuttings from the Fay vineyard that won the 1976 "Judgement of Paris" by David James. James and his wife moved to Lake County in 1978 and purchased Pomo Ranch that is located on the western shelf along the southern end of Long Valley. The vines were planted on their own rootstock and are still in production. Today this property is the location of Stonehouse Cellars, a licensed Lake County wine producer (Et Al Wines, Inc).

In 1985, Don Fiora planted the first winegrapes on his property, just up the road from Stonehouse Cellars. This was followed by vines at Noggle Vineyards nearby. Today, this proposed growing area has about 149 acres planted to vines and three bonded wineries. The area is known for producing high quality red winegrapes including Cabernet Sauvignon, Cabernet Franc, Petite Sirah, and Syrah. Appendix Exhibit 2, page 78, has a map of the proposed area showing locations of vineyards and wineries.

Name Evidence

The name Long Valley has been recognized for this geographical area in Lake County since the late 1800s. Name evidence presented below includes evidence of the historical references, government documents and street names, maps, and references found on-line for news articles and real estate listings.

Historical References

Numerous references to Long Valley including references to early settlers as well as voting records and distance information can be found in the History of Napa and Lake Counties published in 1881. The screen shot below was taken from the History of Napa and Lake County on the website archive.org.[2]

[2] History of Napa and Lake Counties, California - Lake (Slocum, Bowen, & Co., Publishers 1881) page 89

Items.	1868.	1873.	1880.
Assessed value of improvements	$40,000	....	....
Assessed value of personal property	$415,916	....	....
Toll roads, miles	....	....	41½
Toll roads, total value	....	....	$2,760
Broom corn, pounds	....	....	4,000
Wagons and buggies	....	....	667
Watches	....	....	605

School Census.—The school census for the years 1869 and 1881 is as follows:

District.	1869.	1881.	District.	1869.	1881.
Cinnabar	26	.....	Calayomi	.....	34
Lower Lake	89	129	Clover Creek	.....	23
Excelsior	49	38	Cache Creek	.....	13
Rincon	61	28	Eureka	.....	24
Morgan Valley	25	40	East Lake	.....	14
Burns Valley	28	19	Fair View	.....	21
Loconoma	76	55	Great Western	.....	41
Uncle Sam	36	99	Gravelly Valley	.....	22
Kelsey Creek	41	33	Highland	.....	46
Lakeport	70	219	Lakeshore	.....	11
Blue Lake	24	23	Liberty	.....	26
Big Valley	63	34	Mountain	.....	39
Pleasant Grove	72	46	Middletown	.....	135
Upper Lake	100	119	Spruce Grove	.....	38
Ashland	.....	45	Sulphur Bank	.....	33
Bachelor Valley	.....	27	Scotts Valley	.....	62
Bartlett Springs	.....	20			
Cobb Valley	.....	13	Total	760	1569

Increase in twelve years, 809, or over fifty per cent.

Legal Distances.—The following are the distances from Lakeport, as established by the Board of Supervisors:

Morgan Valley	37 miles.	Lower Lake	25 miles.
Excelsior	28 "	Long Valley	30 "
Guenoc	35 "	Middletown	35 "
Cobb Valley	19 "	Kelseyville	8 "
Scotts Valley	4 "	Upper Lake	10 "
Bachelor Valley	14 "	Gravelly Valley	40 "
Bartlett Springs	28 "		

Figure 1 Long Valley is included in list of distances from Lakeport.

A Description of Lake County California published in 1888 by the authority of the Board of Supervisors also contains a reference to Long Valley. "Long Valley lies on the east side of Clear Lake, and is separated from it by a high range of mountains. It has an area of about six square miles of timber and farming land, most of which is very fertile and productive.[3]

Government References

Long Valley was the site of a U S Post Office in the early 1900s. Called Arabella, it was located in Long Valley about five miles from Clearlake Oaks according to the "California's Lake County Places and Postal History" by Erving R. Feltman. Appendix Exhibit 3, pages 79 – 80, contains an excerpt from Feltman's work with a history of the Arabella Post Office.

"Long Valley" is used in two local street names in the area – New Long Valley Road, and Old Long Valley Road. The photo below was taken at the intersection of New Long Valley Road and State Highway 20.

Figure 2 Photo of road sign at New Long Valley Road and State Highway 20

Long Valley is included in the Shoreline Communities Area Plan prepared by the Lake County Community Development Department and adopted by the Lake County Board of Supervisors on September 15, 2009. The Executive Summary states, "Agriculture – The primary areas within the planning area designated as agriculture include High Valley, Long Valley, and properties with active Williamson Act (Agricultural Preserve) contracts."[4]

The report titled Ground Water of the Lower Lake – Middletown Area Lake County, California, Geological Survey Water-Supply Paper 1297 by J. E. Upson and Fred Kinkel printed in 1955 includes four pages on Long Valley. Appendix Exhibit 4, pages 81-85, contains the pages on Long Valley taken from this report.

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[3] James Hilly, Upper Lake, A Description of Lake County California, Published by Authority of the Board of Supervisors, 1888, page 8

[4] The Shoreline Communities Area Plan prepared by Lake County Community Development Department, p I-3

Long Valley Groundwater Basin – Long Valley is designated as a groundwater basin by the State of California. A copy of Bulletin 118 for this groundwater basin is included with this petition as Appendix Exhibit 5, pages 86-87.

Maps

The name "Long Valley" appears on local maps either as a direct reference to the valley or in reference to Long Valley Creek. Figure 3 below is a photo of a portion of the Shaded Relief Map of Lake County found on the Lake County, CA GIS website (https://gispublic.co.lake.ca.us/portal/sharing/rest/content/items/c32114b85a494400908b8d2d7d13d6b0/data).

Figure 3 Excerpt of Shaded Relief Map of Lake County, California

Long Valley Creek as well as both New Long Valley Road and Old Long Valley Road appear on the current version of the AAA Ukiah-Mendocino-Fort Bragg – Clear Lake map. The map is included with this petition as Appendix Exhibit 6, pages 88 - 89.

Other Sources

Real estate listings – Appendix Exhibit 7, page 90, contains a current real estate listing for property for sale on New Long Valley Road.

News accounts – Articles on the Wye Fire in 2012 identified Long Valley as one of the areas where the fire was active. The article entitled "Wye Fire in Lake County Burns Out of Control by Lori Preuitt, published on August 12, 2012, stated, "The fire shut down Highway 20 east of Clearlake Oaks Sunday afternoon and had people in the nearby Spring Valley and Long Valley communities under evacuation orders." [5] (See article in Appendix Exhibit 8, pages 91-92.)

Modifier – Lake County

The modifier "Lake County" was added to the name to distinguish the location of the proposed AVA. A similar modifier was used for Red Hills – Lake County, Big Valley District – Lake County, and Kelsey Bench – Lake County.

Distinguishing Features

The distinguishing features of the proposed Long Valley – Lake County AVA are topography and elevation, geology and climate.

Topography and Elevation

The proposed Long Valley includes the valley floor and hillsides rising along the edges of the Valley. Long Valley Creek runs along the valley floor. Wolf Creek flows south along the west side in the area known as Spring Valley. Both creeks merge and empty into the North Fork Cache Creek shown in Figure 4. The valley floor as well as the bench area along the southwest side are generally flat with slopes from 0% to 10%. Hillsides are much steeper with slopes along some areas more than 30%.

[5] https://www.nbcbayarea.com/news/local/Wye-Fire-in-Lake-County-Burns-Out-of-Control-165934666.html

Figure 4 North Fork of Cache Creek is fed by Long Valley Creek and Wolf Creek.

In describing the Planning Area Geography, the Shoreline Communities Area Plan characterizes the area with the following, "The narrow valleys were locally filled by lake deposits, volcanic flows, and alluvium. Associated erosion of adjacent ridges has developed an overall rolling foothill and valley topography."

The elevation for the proposed area varies. The median elevation of the valley floor is about 1322 feet above sea level with the end of the Valley nearest State Highway 20 as low as 1063 feet above sea level. This is below the level of Clear Lake which is 1330 feet above sea level. The elevation chart in Figure 5 below shows the elevation of parcels located on New Long Valley Road.

Elevation for Addresses in Proposed Area	
Source: Elevation map of Lake County, CA, USA	
Address	Elevation
250 New Long Valley Road	1138
300 New Long Valley Road	1129
400 New Long Valley Road	1076
500 New Long Valley Road	1083
600 New Long Valley Road	1063
700 New Long Valley Road	1063
800 New Long Valley Road	1076
900 New Long Valley Road	1355

1000 New Long Valley Road	1073
1100 New Long Valley Road	1083
1200 New Long Valley Road	1079
1300 New Long Valley Road	1083
1400 New Long Valley Road	1089
1500 New Long Valley Road	1355
2000 New Long Valley Road	1391
2100 New Long Valley Road	1194
2200 New Long Valley Road	1198
2300 New Long Valley Road	1214
2400 New Long Valley Road	1240
2445 New Long Valley Road	1250
2500 New Long Valley Road	1719
2600 New Long Valley Road	1339
2700 New Long Valley Road	1401
2800 New Long Valley Road	1335
2900 New Long Valley Road	1322
3000 New Long Valley Road	1322
3500 New Long Valley Road	1322
4000 New Long Valley Road	1322
4500 New Long Valley Road	1322
4881 New Long Valley Road	1322
4887 New Long Valley Road	1322
5000 New Long Valley Road	1355
5369 New Long Valley Road	1322

Figure 5 Elevation for selected parcels along New Long Valley Road[6]

The foothills included in the proposed area rise an average of 200 feet above the valley floor on the east side of the Valley to 500 feet on the west side. The west side of the Valley has a bench area along Old Long Valley Road. Vineyards are planted in this area which is level to gently sloping with good sun exposure. The map in Figure 6 is a screen shot of taken of the Slope and Terrain map for Lake County showing this bench area. Slopes are depicted by color. The area shown in gray being is relatively flat with slopes of 0% - 10%.

[6] Elevation map of Lake County, CA, USA, http://elevation.maplogs.com/poi/lake_county_ca_usa.13106.html

.Figure 6 – Photo of Slope and Terrain map for the Old Long Valley Road bench area. The gray area is 0% - 10% slope, yellow is 10% - 29% slope, red is 20% - 30%, and green is greater than 30%.[7]

This bench area was formerly home to Cache Creek Indian Rancheria. The photo of the map in Figure 7 shows the location of the Rancheria outlined in yellow.[8] The property was subsequently sold and sub-divided into individual parcels. Today, Noggle Vineyards and Winery and Fiora Vineyards are located on this property.

[7] Lake County CA GIS Map, Slope and Terrain; http://gispublic.co.lake.ca.us/portal/apps/webappviewer/index.html?id=de53cdcea0c44a53a2b9f444e729960c

[8] Map of Lake County, CA, Lake County 1955c, compiled and published by Harry Freese, County and State Maps

Figure 7 Cache Creek Rancheria (outlined in yellow) was located on the bench above Long Valley

Stonehouse Cellars, a winegrape grower and licensed producer also located in this area includes the following comments in their ranch history, "Before America was discovered native people lived in Lake County. They spent the summer at the lake and the winter on a shelf above Cache Creek because it was protected, had a mild climate and had an abundance of great water."[9]

[9] Stonehouse Cellars About Us – Ranch History https://stonehousecellars.com/about-us/

Figure 8 Stonehouse Cellar's vineyard located on the gently sloping bench on Old Long Valley Road. The mountains seen in the distance in the photo run along the east side of Long Valley.

Vineyards located along the bench area on the west side of the Valley generally have excellent cold air drainage due to the location and topography. Last spring frosts are typically in mid-April and a danger for the new grape shoots. Noggle Vineyards and Winery has no frost protection, and depends on the cold air drainage provided by the topography. Fiora Vineyards located nearby installed a wind machine about two years ago to take advantage of frost protection afforded by the inversion layer.

Vineyards along the Valley floor also benefit from the topography with winds coming from the west and blowing along the valley floor. Frost protection is more important for vineyards planted on the valley floor. Clay Shannon from Shannon Ridge Family of Wines and vineyard owner in the proposed area, notes that he needs overhead sprinkler frost protection on his property as it lies below the inversion layer. He also stated that the vineyard has early afternoon winds from the west.

Importance to Viticulture

The topography and location of this area with the long narrow valley floor between the surrounding higher elevations of the mountains provides a beneficial environment for viticulture. Air drainage provides protection from damaging frosts and winds cool the vines during the heat of the day in the growing season.

The term "bench" was used in historical writings about Lake County. In the book History of

Napa and Lake Counties – Lake, a discussion on Soils stated that "there is a peculiar "half and half" kind of soil which predominates on the "second bottom" or benches of land lying at the foot of the mountains."[10] A related example referring to similar topography using the term bench can be found in the book Soils for Fine Wines by Robert E. White. In the discussion of the location, climate, and geology of the Napa Valley, Mr. White states, "Alluvial and colluvial fans (locally called "benches") occupy parts of the lower foot slopes." He goes on to say, "The most favored areas of Napa are the benches in the foot slope regions, where the soils are shallower, less fertile, very stony in places, and well drained."[11]

Konocti Variant – Konocti – Hambright complex, soil map unit 155, covers much of the land planted to vineyards along Old Long Valley Road. With 2% to 15% slopes, the Konocti Variant portion of the soil is deep and well drained while the Hambright soil is shallow and well drained. Both were formed in material weathered from basalt.

Cold air drainage is considered an important factor in selecting sites for vineyard development. Sites with good air drainage have fewer issues with frost damage during the spring growing season and to a lesser degree, during the fall ripening period. In an on-line article called Vineyard Site Selection in New York State, the authors' note, "Air drainage is a critical factor for good vineyard sites, as it allows cold air to move down slope and be replaced by warmer air from above. Topography has a major influence on air drainage. Slopes help to remove cold air but closed valleys and hollows increase the risk of cold injury (Dry and Smart 1988)."[12] The diagram in Figure 9 below depicts this principle.

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[10] History of Napa and Lake Counties, (Slocum, Bowen, & Co., Publishers 1881) page 20

[11] Robert E. White, Soils for Fine Wines, (Oxford University Press, 2003) page 239 - 240

[12] Roger D. Magarey, Robert C. Seem Department of Plant Pathology, Cornell University, NYSAES, Stephen D. DeGloria. Department of Soil Crop and Atmospheric Sciences, Cornell University, Vineyard Site Selection in New York State, *web.pppmb.cals.cornell.edu/seem/magarey/Vinesite/Elevation.htm*

Figure 4.1 Effect of vineyard site topography on air temperature stratification during a radiational cooling period characterized by calm winds and clear skies.

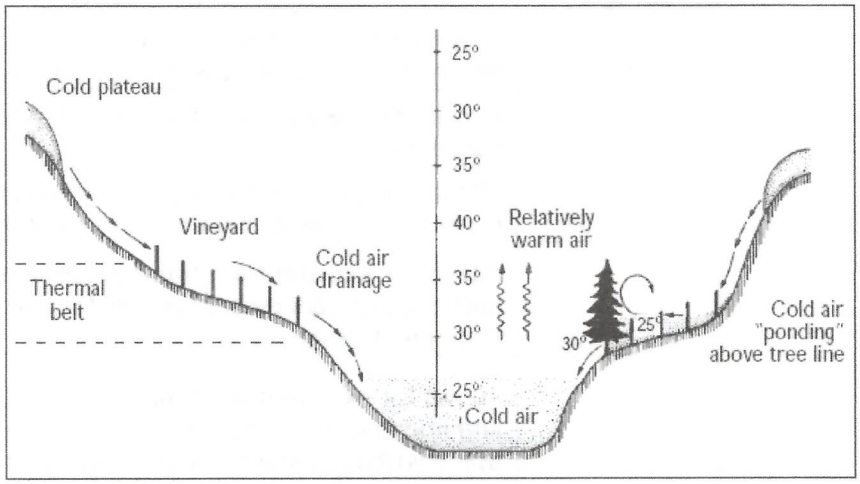

Figure 9 Topography and Air Drainage[13]

John Gladstones also found that air drainage was a key factor in vineyards. According to Gladstone, "if their topographies are carefully examined, (see, for instance, Johnson 1971), the very best vineyards will usually be found to have two or more of the following features (Gladstone 1976, 1977)…

1. They are on slopes with excellent air drainage and situated above the fog level.
2. The very best are usually on the slopes of projecting or isolated hills. These have outstanding air drainage characteristics.
3. Even in hot areas they directly face the sun during at least some part of the day. Part – easterly aspects are common.
4. If inland, they tend to be close to substantial rivers or lakes."[14]

Slope also plays an important role in air drainage. The valley floor as well as the bench area in the proposed area are relatively level with slopes between 0% and 10%. The chart in Figure 10 describes the relative benefits and challenges for vineyards planted on various slope categories.[15]

[13] The North Carolina Winegrape Grower's Guide, Chapter 4, Vineyard Site Selection, AG-535, published January, 2007, www.cals.ncsu.edu/hort_sci/fruit//wine_grapes/winegrapes4.pdf, page 46
[14] John Gladstones, Viticulture and Environment, Winetitles, 1992 , page 41
[15] Dr. Robert Pool, Cornell University, The Basics of Vineyard Site Evaluation and Selection, www.acerserver2.iagt.org/vll/learnmore.aspx

Slope Category	Comments
Flat to 2.5%	Easy to manage, little soil erosion, may be prone to cold air inversions in places with frost problems
2.5 to 5%	Allows for adequate air drainage; may have some erosion concerns
5 to 7.5%	Allows for good air drainage; increasing erosion concerns; concerns for row orientation and equipment on slope
7.5 to 10%	Allows for excellent air drainage; serious erosion and nutrient loss concerns; concerns for row orientation and equipment usage
10 to 15%	Allows for excellent air drainage but with serious erosion and nutrient loss concerns; likely unsafe for equipment usage without some form of terracing or self-leveling equipment, diversion ditches to control runoff, and rows oriented perpendicular to slope
>15%	Not recommended; serious erosion and equipment rollover concerns

Figure 10 Benefits and Challenges for vineyards by slope category

Frost protection is an important factor for vineyards in the proposed area. Even with good cold air drainage along the bench area, spring frosts can be damaging. Frost is definitely a hazard in the lower valley elevations with a tendency for cold air pooling along the valley floor.

Boundary Discussion Elevation and Topography

West and Southwest

High Valley lies to the west and southwest of the proposed Long Valley – Lake County area. High Valley varies in elevation with the valley floor at 1,700 to 1,800 feet and the surrounding ridges as high as 3,000 feet. The petition to establish the High Valley AVA refers to Long Valley and states, "At approximately 1350, Long Valley, which lies directly to the north of High Valley and is the headwaters for the North Fork of Cache Creek, is at an elevation much lower than High Valley's.

East and South

The lands to the east and south of the proposed area are steep hillsides with slopes exceeding 30% as shown in Figure 11. Elevations vary, rising to 2,000 feet along the highest peaks.

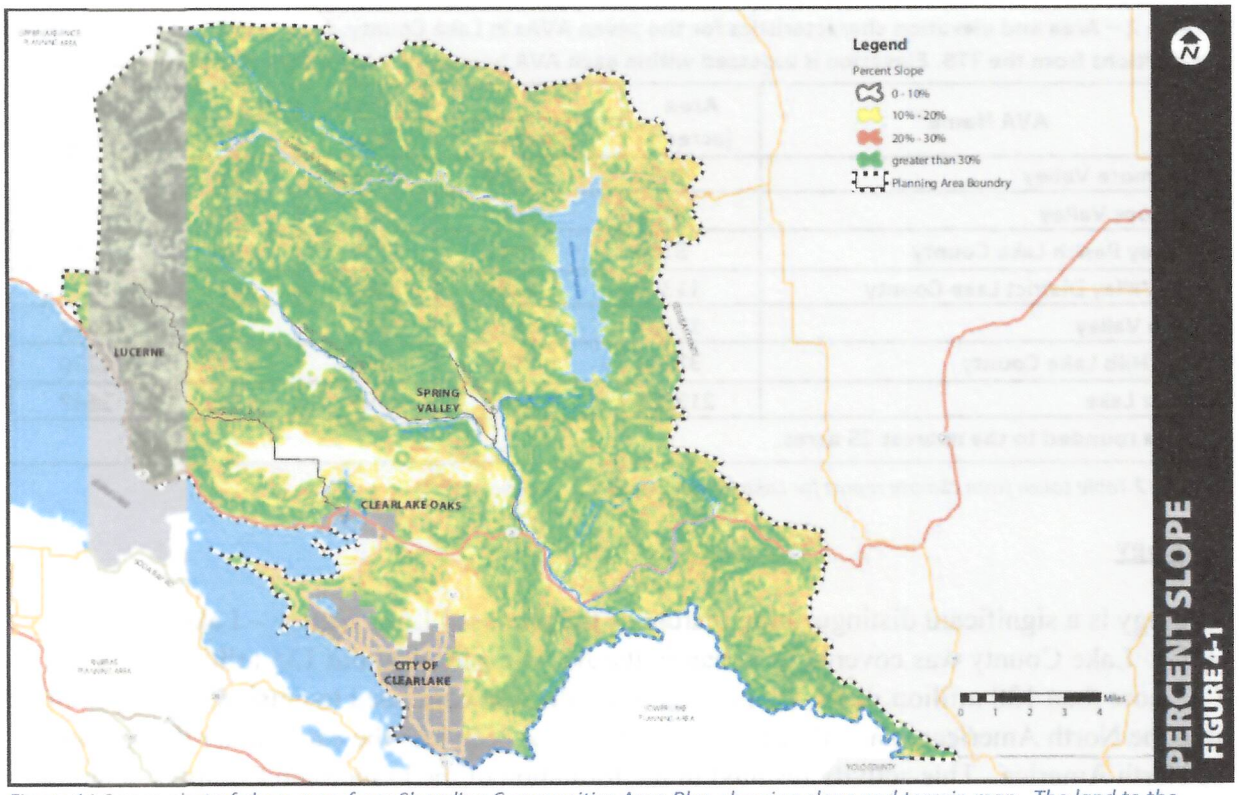

Figure 11 Screen shot of slope map from Shoreline Communities Area Plan showing slope and terrain map. The land to the east of the proposed area has slopes greater than 30%.[16]

Lake County AVAs

Lake County has seven established AVAs and an eighth one has been proposed for approval. Elevation ranges were included in the 2015 climate study for the Lake County winegrape growing region completed by Professor Greg Jones. Figure 12 includes elevations for each AVA. The proposed Long Valley has elevations that range from a low of 1,063 feet above sea level on the valley floor to a high of 1,720 feet above sea level along a portion of the boundary line shared with High Valley AVA. The Guenoc Valley and possibly Big Valley District are the only appellations that have lower elevations than the proposed Long Valley AVA.

[16] The Lake County Community Development Department, Shoreline Communities Area Plan, adopted September 15, 2009, Figure 4.1

Table 2 – Area and elevation characteristics for the seven AVAs in Lake County. Area is derived from approved boundary definitions from the TTB. Elevation is assessed within each AVA boundary using a 10m digital elevation model.

AVA Name[2]	Area (acres[1])	Elevation (ft.)			
		Median	Max	Min	Range
Benmore Valley	1450	2598	2795	2116	679
Guenoc Valley	4200	1059	1581	974	607
Kelsey Bench Lake County	9150	1519	1775	1384	391
Big Valley District Lake County	11300	1355	1551	1328	223
High Valley	17225	1971	3339	1332	2007
Red Hills Lake County	32025	2037	3746	1332	2230
Clear Lake	219200	1548	3956	1309	2647

[1] Area rounded to the nearest 25 acres.

Figure 12 Table taken from climate report for Lake County winegrape production.[17]

Geology

Geology is a significant distinguishing feature of the proposed Long Valley – Lake County AVA. Lake County was covered by ocean in the Jurrasic period, about 135 million years ago. For more than 130 million years, the process of subduction continued to crash the ocean floor into the North American plate, thrusting the ocean floor deep into the earth under the continent of North America. This activity resulted in the formation of the Franciscan Complex, a jumble of rocks made up of rocks found on the deep ocean floor and ocean crust on the western part of Lake County and the Great Valley Sequence to the east.[18]

The cessation of subduction and the passage of the leading edge of the San Andreas Fault which is the boundary between the North American Plate and the Pacific Plate, brought about many changes. The plates are moving past each other in a right lateral transform motion instead of colliding. This caused the rise of the Coast Ranges, formation of structural basins such as Clear Lake, and the beginnings of volcanic activity in the Clear Lake Volcanic fields.

The proposed Long Valley area sits on the Cache Formation, a geological area that has been studied by noted geologist Michael J Rhymer and others as early as 1888 to determine its age and composition. The Cache Formation was the subject of Rhymer's 1978 thesis. After further study, he classified it as a separate formation from the Lower Lake Formation and the Kelseyville Formation. Rhymer updated information about the Cache Formation with his findings published in Geological Survey Bulletin 1502-C in 1981.

The Cache Formation, primary water-bearing formation of the Clear Lake Cache Formation Groundwater Basin in eastern Lake County, is estimated to be 1.6 to 2.8 million years old and identified as the Blancan (Pliocene and early Pleistocene) period. California's Groundwater Bulletin 118 for the Clear Lake Cache Formation Groundwater Basin describes the Cache

[17] Gregory V Jones, PhD, Climate Characteristics for Winegrape Production in Lake County, California, 12.1.2014, www.lakecountywinegrape.org, page 11

[18] Dana Eker, Wannabe A Clear Lake Geologist? Dana Lee Eker, 2005, page 1

Formation. "The Cache Formation is largely made up of lake deposits. The formation consists of tuffaceous and diatomaceous sands and silts, limestone, gravel, and intercalated volcanic rocks. In some areas the general lithology includes up to 400 feet of blue clay and shale with alternating strata of shale and limestone below 400-feet (DWR 1957).[19]

The Lake County Soil Survey also describes the Cache Formation further. "The Cache Formation is a sequence of transported freshwater sediments that were subsequently uplifted and dissected to form the hills east of Clearlake Highlands."[20]

The diagram in Figure 13 was taken from the U S Geological Survey Bulletin 1502 and shows the general location of the Cache Formation as well as the Lower Lake Formation and the Kelseyville Formation.[21] The proposed Long Valley area from State Highway 20 north along North Fork Cache Creek shown on the Benmore Canyon Quadrangle (Appendix Exhibit 24, page 119) is included in the location depicted in the diagram.

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[19] California Groundwater Bulletin 118, Sacramento Valley Groundwater Basin, Clear Lake Cache Groundwater Basin, February 27, 2004

[20] National Cooperative Soil Survey, United States Department of Agriculture, Soil Conservation Service, Soil Survey of Lake County, California, (May, 1989), page 220

[21] Michael J Rhymer, Stratigraphic Revision of the Cache Formation (Pliocene and Pleistocene) Lake County, California, Geological Survey Bulletin 1502-C, United States Government Printing Office, Washington, DC, page 15

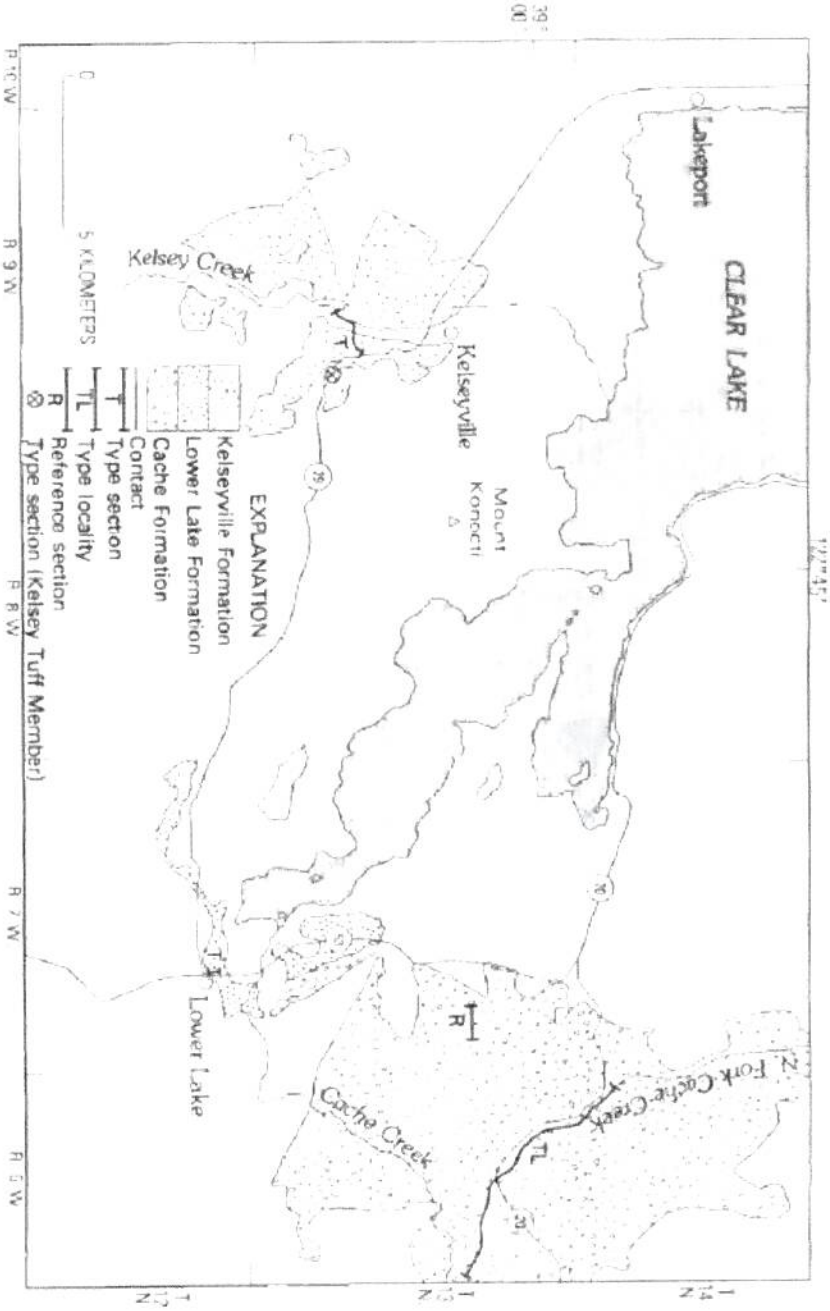

FIGURE 8.—Location map of measured sections of the Cache, Lower Lake, and Kelseyville Formations and the Kelsey Tuff Member of the Kelseyville Formation.

Figure 13 Map showing location of Cache Formation

Importance to Viticulture

The geology of the proposed Long Valley is important to viticulture. Geologic events created the Cache Formation and shaped the topography and soils of the area. The Cache Formation is the foundation for the soils and its nutrients. Many of the soils found on the Valley floor are designated as prime farmland which makes them suitable for viticulture. The map in Figure 14 is a screen shot of the proposed area. [22] Appendix Exhibit 9, page 93, has a close-up of the proposed area in the farmland map from the Shoreline Communities Area Plan.

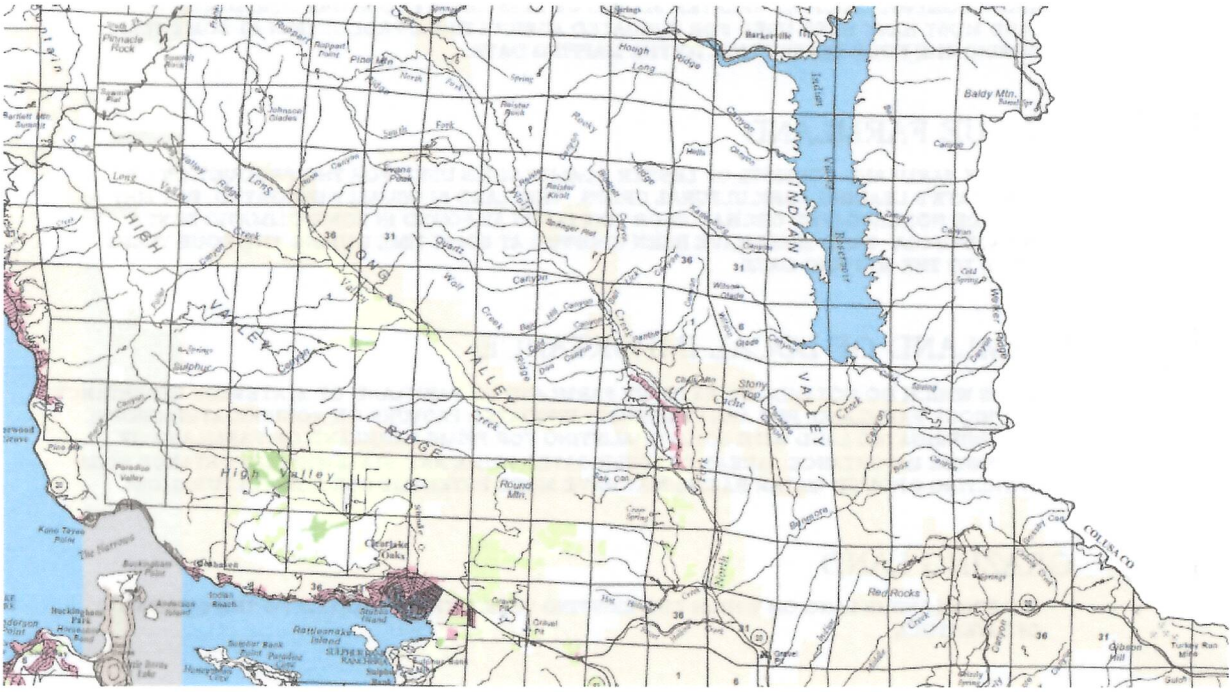

Figure 14 Screen shot taken from Lake County Important Farmland 2014 map.

Lands along the Valley floor are designated as Farmland of Local Importance. There is also a small pocket of Prime Farmland.[23] (See map key screen shot in Figure 15.)

[22]California Department of Conservation Map of Lake County Important Farmland 2014, Department of Land Resource Protection, Farmland Mapping and Monitoring Program

[23] ibid

PRIME FARMLAND

PRIME FARMLAND HAS THE BEST COMBINATION OF PHYSICAL AND CHEMICAL FEATURES ABLE TO SUSTAIN LONG-TERM AGRICULTURAL PRODUCTION. THIS LAND HAS THE SOIL QUALITY, GROWING SEASON, AND MOISTURE SUPPLY NEEDED TO PRODUCE SUSTAINED HIGH YIELDS. LAND MUST HAVE BEEN USED FOR IRRIGATED AGRICULTURAL PRODUCTION AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.

FARMLAND OF STATEWIDE IMPORTANCE

FARMLAND OF STATEWIDE IMPORTANCE IS SIMILAR TO PRIME FARMLAND BUT WITH MINOR SHORTCOMINGS, SUCH AS GREATER SLOPES OR LESS ABILITY TO STORE SOIL MOISTURE. LAND MUST HAVE BEEN USED FOR IRRIGATED AGRICULTURAL PRODUCTION AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.

UNIQUE FARMLAND

UNIQUE FARMLAND CONSISTS OF LESSER QUALITY SOILS USED FOR THE PRODUCTION OF THE STATE'S LEADING AGRICULTURAL CROPS. THIS LAND IS USUALLY IRRIGATED, BUT MAY INCLUDE NONIRRIGATED ORCHARDS OR VINEYARDS AS FOUND IN SOME CLIMATIC ZONES IN CALIFORNIA. LAND MUST HAVE BEEN CROPPED AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.

FARMLAND OF LOCAL IMPORTANCE

LANDS WHICH DO NOT QUALIFY AS PRIME FARMLAND OR FARMLAND OF STATEWIDE IMPORTANCE OR UNIQUE FARMLAND, BUT ARE CURRENTLY IRRIGATED PASTURE OR NONIRRIGATED CROPS; AND UNIRRIGATED LAND WITH SOILS QUALIFYING FOR PRIME FARMLAND OR FARMLAND OF STATEWIDE IMPORTANCE. AREAS OF UNIRRIGATED PRIME AND STATEWIDE IMPORTANCE SOILS OVERLYING GROUND WATER BASINS MAY HAVE MORE POTENTIAL FOR AGRICULTURAL USE.

GRAZING LAND

GRAZING LAND IS LAND ON WHICH THE EXISTING VEGETATION IS SUITED TO THE GRAZING OF LIVESTOCK.

Figure 15 Screen shot of a portion of the key for farmland designations from the Lake County Important Farmland 2014 map

The Lake County Soil Survey describes the Cache Formation. "The Cache Formation is a sequence of transported freshwater sediments that were subsequently uplifted and dissected to form the hills east of Clearlake Highlands."

Soils of the general soil map unit Still-Lupoyoma, including soil map units 158, (Lupoyoma silt loam protected), 246, (Wolf Creek gravelly loam), and 247, (Wolf Creek loam) are the most prevalent soil series on the western half of the valley floor of the proposed area. These soils are described in the Lake County Soil Survey as very deep, moderately well to well-drained soil formed in alluvium from mixed rock sources. These soils are level with slopes of 0% to 2% and are included in the list of soil map units that are noted as prime farmland when irrigated.[24]

Xerofluvents very gravelly or Xerofluvents - Riverwash complex, (soil map units 248 and 249), are found along the creek beds of Long Valley Creek, Wolf Creek, and North Fork of the Cache Creek. These soils are typically not suitable for viticulture. Pockets of Maywood

[24] National Cooperative Soil Survey, United States Department of Agriculture, Soil Conservation Service, Soil Survey of Lake County, California, (May, 1989) Page 133

variant sandy loam, (soil map unit 176) is also found on the southern end of the Valley floor. This soil map unit is included in the list of soils that comprise prime farmland.[25] All of these soils are part of the Talmage-Xerofluvents-Riverwash general soil map unit, and found along stream beds.

There are also pockets of Manzanita gravelly loam, (soil map unit 162), found along the Valley floor closer to Highway 20. Cache Creek Vineyards which sits on a bench on the south-eastern side of Long Valley, has mostly Phipps Complex soil, (soil map unit 195). Slopes in this map unit are steeper, ranging from 5% to 15%.

All of these soil map units have a common theme in that they were formed in alluvium from mixed rock sources. This is consistent with the description of the Cache Formation description as "a sequence of transported freshwater sediments".

Boundary Discussion

Geology

The proposed area is bounded by mountains of the Inner Coastal Range and steep terrain. The Mendocino National Forest lies to the north. The Sacramento Valley lies further to the east. High Valley lies to the west and southwest.

The diagram in the Figure 16 and explanatory map key in Figure 17 taken from Ryhmer's work on the Cache Formation depicts the geology of the Cache Formation as well as surrounding areas demonstrating the geologic differences to the north, south, east, and west.[26]

[25] Ibid, page 133

[26] Michael J Rhymer, Stratigraphic Revision of the Cache Formation (Pliocene and Pleistocene) Lake County, California, Geological Survey Bulletin 1502-C, United States Government Printing Office, Washington, DC, page 6 and 7

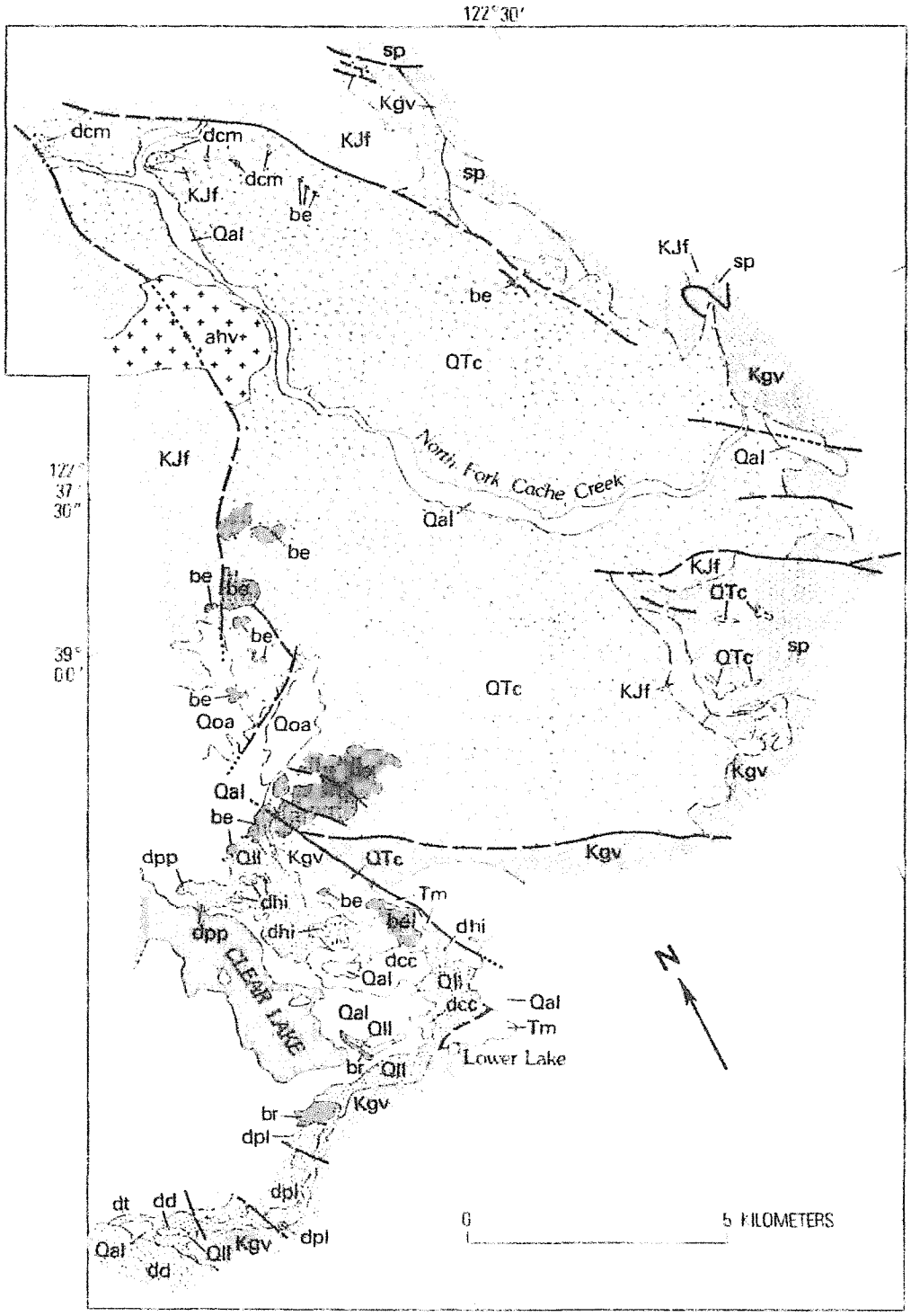

FIGURE 3.—Geologic map of the Cache Formation, Lower Lake Formation, and surrounding rocks. Geology by the author (from 1974 to 1977) and from Hearn, Donnelly, and Goff (1976), Brice (1953), McNitt (1968a), and Lawton (1956).

Figure 16 This diagram shows the geology of the proposed area and surrounding area.

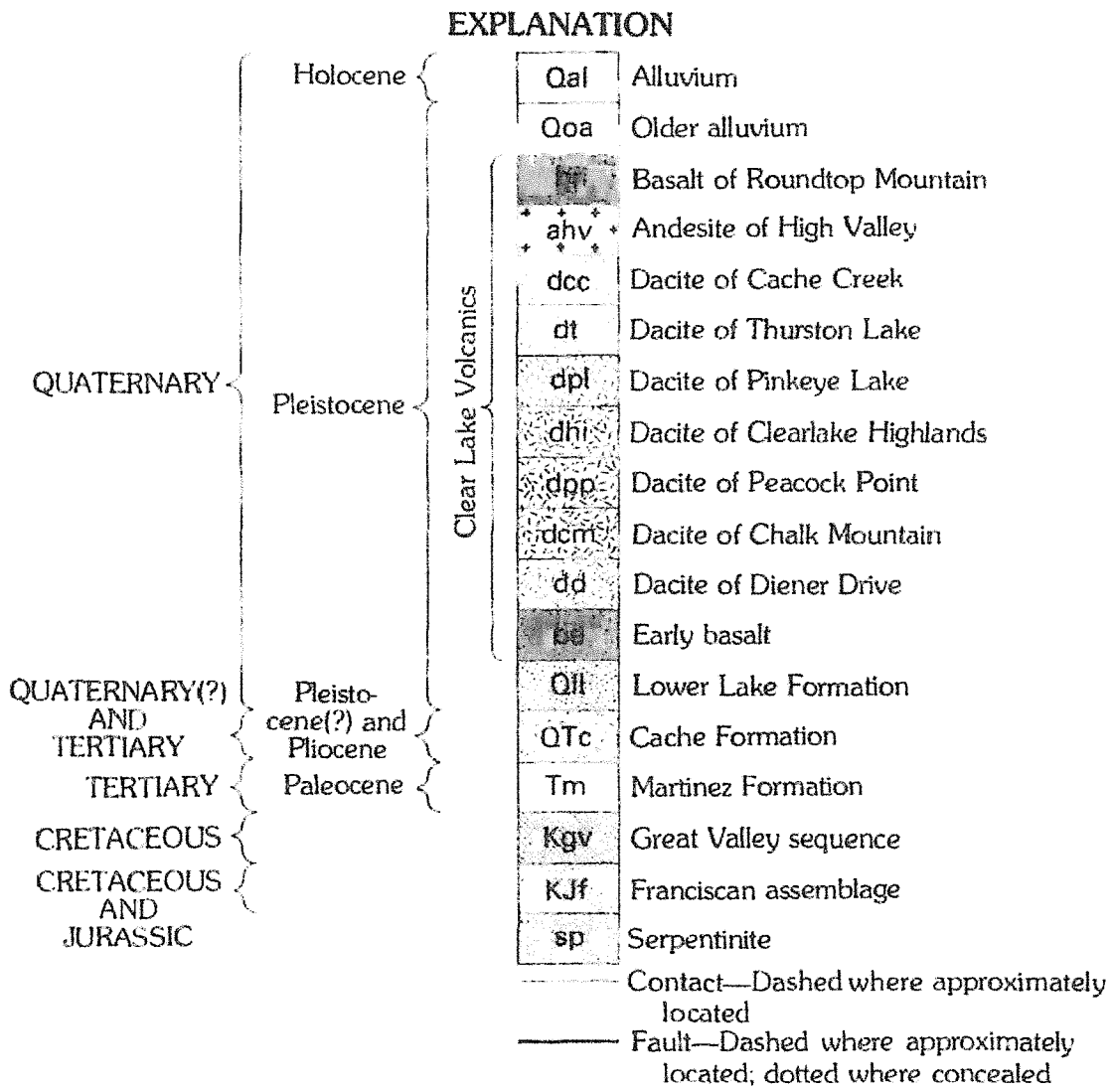

Figure 17 Key for geologic map in Figure 16

North and West

The rocks of the Franciscan Formation identified as KJf underlies the mountains to the north and west of the Long Valley area.

East and South

The Great Valley Sequence identified as Kgv lies to the east and south of the Long Valley area. Further evidence of these differences can be seen by looking at the photograph of a portion of the Geological Map of California[27] in Figure 18. Most of the proposed area lies in the brown shaded section to the right of Clear Lake. This is identified as "QPc - Pliocene and/or

[27] Department of Conservation, Division of Mines and Geology, compilation of Charles W. Jennings, 1977, updated by Carlos Gutierrez, William Bryant, George Saucedo, and Chris Wills, 2010

Pleistocene sandstone, shale, and gravel deposits, mostly loosely consolidated."[28] To the left of this area, the area shaded in reddish orange is identified as "Qrv, recent (Holocene) volcanic flow rocks, minor pyroclastic deposits."[29] These rocks are from the Cenzozoic period.

KJf or Franciscan Complex lies to the west and north of the proposed area. This is described as, "Cretaceous and Jurassic sandstone with similar amounts of shale, chert, limestone, and conglomerate."[30] These rocks are from the Mesozoic period.

Franciscan Complex is also found to the east along with the area identified as urn, "Ultramafic rocks, mostly serpentine. Minor peridotite, gabbro, and diabase, chiefly Mesozoic."[31] A band of these rocks are also found to the south of the proposed area.

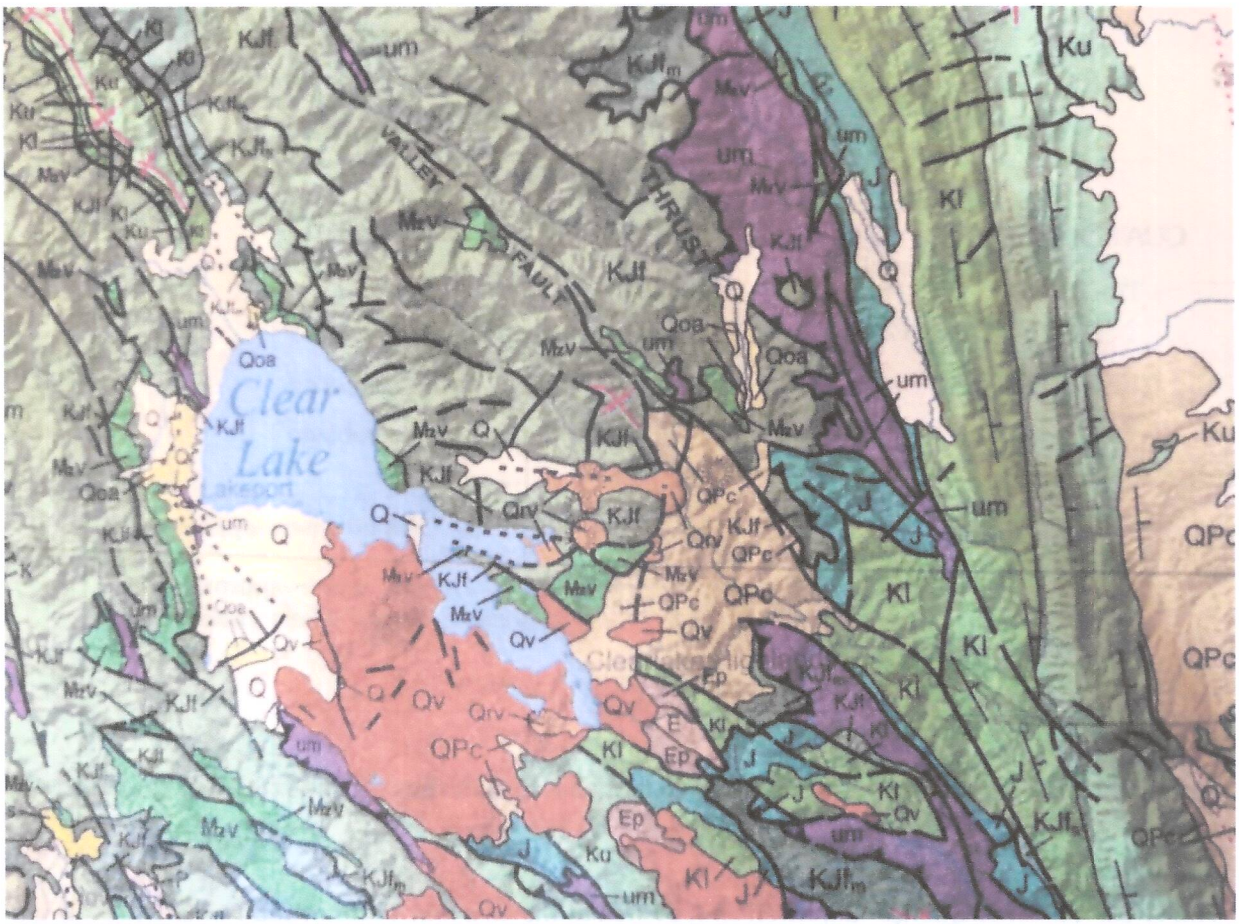

Figure 18 Photograph of a portion of the Geological Map of California showing the area surrounding Clear Lake. The proposed area lies in the brown shaded portion of the map to the right of Clear Lake.

[28] ibid
[29] ibid
[30] ibid
[31] ibid

AVA Geologic Boundary Discussion

Geology was cited as a distinguishing feature for other AVAs in Lake County. The following discussion demonstrates the differences of these areas from the proposed Long Valley area.

Southwest

Big Valley and Kelsey Bench are southwest of the proposed Long Valley area. Both petitions to establish these AVAs included geology as a distinguishing feature.

The area known as the Big Valley District – Lake County is underlain by the Big Valley fault that moved 16 feet in the 1906 earthquake to uplift and dissect surrounding hills.[32] It was once part of the lakebed of Clear Lake. The formation of Mount Konocti caused the lakebed to shrink and the landmass known as the Big Valley to rise above water level.

The Kelseyville Formation was cited as an important geological feature of the Kelsey Bench area. It was defined by M. J. Rhymer as a separate formation from the Lower Lake Formation and the Cache Formation. The Kelseyville Formation is middle Pleistocene in age and contains stratified deposits laid down in an environment referred to as representing lacustrine and flood plain environments (Lake County Flood Control and Water Conservation District, 1967). The Formation is sandwiched between the rocks of the Franciscan assemblage, serpentine, and flows of the Clear Lake volcanic field below and the Quaternary terrace deposits above.[33]

South

Red Hills – Lake County lies to the south of the proposed area. The petition to establish this AVA did not cite Geology as a distinguishing feature. However, the Red Hills area lies within the Clear Lake volcanic fields. The petition notes, "the bedrock underlying most of the proposed Red Hills viticultural area is mapped as Pleistocene Volcanic Rocks of Quaternary Period…"[34]

West

The High Valley AVA lies to the west and south of the proposed Long Valley AVA. In the petition to establish the High Valley AVA, there was a reference to the Cache Formation as being present in the Long Valley area and it was referred to as evidence that High Valley was different from Long Valley. The petition states, "Bordering the easternmost AVA boundary lays a large belt of Tertiary Cache Formation. The Cache Formation is lacustrine in origin… Overall the Cache and Franciscan on the outside of the eastern boundary of the proposed AVA contain physical characteristics not found in High Valley."[35]

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[32] Dana Eker, Wannabe A Clear Lake Geologist, (2005, revised 2007), page 102

[33] Terry Dereniuk, Petition to Establish Kelsey Bench – Lake County AVA, 2011, page 22

[34] Sara Schorske, Compliance Service of America, LLC, Petition to Establish Red Hills Viticultural Area, August 27, 2001, page 5

[35] American Viticultural Area Petition for High Valley AVA, Kevin Robinson et al, Topography and Geology

North
There are no AVAs in Lake County located north of the proposed area.

East
There are no AVAs located directly east of the proposed area in Lake County. Further east, the Capay Valley AVA is located in northwest Yolo County. The petition to establish this AVA did not cite geology as a distinguishing. However, Groundwater Bulletin 118 for the Capay Valley Sub-basin identifies the Tehama Formation as an important water bearing formation for the basin. The Bulletin notes, "The Tehama Formation consists of moderately compacted silt, clay, and silty fine sand enclosing lenses of sand and gravel, silt and gravel, and cemented conglomerate."[36]

Climate

The proposed Long Valley – Lake County has a unique micro-climate. The following discussion will present evidence to demonstrate the attributes of this area and comparisons with the other AVAs in Lake County.

Rainfall

Rainfall in the proposed Long Valley – Lake County area is significantly different than surrounding areas. The Long Valley Groundwater Basin describes rainfall as, "Annual precipitation ranges from 27- to 33-inches, increasing to the west."[37] The "Ground Water of the Lower Lake-Middletown Area, Lake County, California, states, "About 30 inches of rain per year, or about 55,000 acre-feet of water, falls on the 22,000 acres of the Long Valley drainage area." [38]Rainfall data was secured from three locations in the proposed area – Noggle Vineyards and Winery on Old Long Valley Road, Garner Ranch located in the western end of the Valley floor on New Long Valley Road, and Spring Valley on the southeastern side of the Valley floor.

Noggle Vineyards and Winery is located on the bench that lies west of the Valley floor. Elevation is about 1497 feet above sea level. To the west of this location hillsides rise to High Valley. Rainfall data was secured for the rainfall years of 2002/2003 to 2016/2017. The table in Figure 19 shows annual totals recorded at this location with minimum rainfall of 14.65 inches, maximum of 50.4 inches and median of 28 inches annually.

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[36] California Groundwater Bulletin 118, Sacramento Valley Groundwater Basin, Capay Valley Sub Basin, February 27, 2004

[37] California Groundwater Bulletin 118, Sacramento Valley Groundwater Basin, Long Valley Goundwater Basin 5-31, February 27, 2004

[38] J.E. Upson and Fred Kunkel, "Ground Water of the Lower Lake – Middletown Area, Lake County, California", Geological Survey Water-Supply Paper 1297, Prepared in cooperation with the California Division of Water Resources, 1955, page 73

Rainfall for July - June	
Noggle Vineyards and Winery	
700 Old Long Valley Road	
Year	Total Inches
2016- 2017	41.4
2015-2016	29.85
2014-2015	28
2013-2014	16.8
2012-2013	20.5
2011-2012	18.81
2010-2011	38.45
2009-2010	30.9
2008-2009	20.1
2007-2008	22.5
2006-2007	16.2
2005-2006	50.4
2004-2005	38.75
2003-2004	30.08
2002-2003	14.65

Figure 19 Annual rainfall for period of July - June recorded at Noggle Vineyard and Winery

Garner Ranch is located in the western half of Long Valley at 5456 New Long Valley Road at about 1327 feet elevation. Rainfall data has been recorded by the Garner family since the mid-1960s. This portion of Long Valley receives much heavier amounts of annual rain than either the bench area or the Spring Valley area.

The chart in Figure 20 shows rainfall recorded for rainfall year of July – June for 2001/2002 through 2015/2016 rainfall years. The minimum annual rainfall recorded during this period was 8.83 inches. The maximum was 51.98 inches and the median rainfall was 43.82 inches.

Rainfall for July - June	
Garner Ranch	
5456 New Long Valley Road	
Year	Total
2015 - 2016	51.98
2014 - 2015	44.06
2013 - 2014	8.83
2012 - 2013	40.32
2011 - 2012	12.24
2010 - 2011	43.82
2009 - 2010	35.19
2008 - 2009	45.57
2007- 2008	30.44
2006 - 2007	34.65
2005 - 2006	36.45
2004 - 2005	47.76
2003 - 2004	48.95
2002 - 2003	44.01
2001 - 2002	45.53

Figure 20 Rainfall recorded for the period of July - June each year at Garner Ranch.

The final point of comparison is rainfall recorded in Spring Valley at the convergence of Wolf Creek and the North Fork of Cache Creek. Elevation at this location is roughly 1200 feet above sea level. The table in Figure 21 shows rainfall recorded at this location for the years of 2008 – 2017. Minimum rainfall recorded during this period was 15.5 inches; maximum rainfall was 43.15 inches. Median annual rainfall for this location over these years was 24.25 inches.

Annual Rainfall	
Spring Valley	
Recorded at Convergence of Wolf Creek and North Fork, Cache Creek	
Year	Rainfall Total
2017	43.15
2016	29.6
2015	26
2014	15.5
2013	22.5
2012	20.7
2011	40
2010	30
2009	22
2008	22

Figure 21 Rainfall data for Spring Valley area

Importance to Viticulture

Annual rainfall plays a critical role in ensuring sufficient water for irrigation of grapes and recharge of the underlying groundwater. Wine grapes require sufficient water during the growing season to produce and ripen the fruit, with an average of 8 to 11 acre inches per year based on a study of winegrape production in Lake County.[39] Irrigation water is also used for frost protection in the Long Valley area.

Boundary Discussion

Lake County currently has seven recognized AVAs. Average values were computed for the three Long Valley locations and compared with data for these regions. The chart in Figure 22 shows the minimum, maximum, and median values for the three locations in the proposed area and the computed averages for each.

[39] Ryan Keiffer, Agricultural Technician, UCCE Mendocino, Dr. Broc Zoller, PCA, Kelseyville, Vineyard Water Use in Lake County, California, December 1, 2014

Proposed Long Valley Rainfall				
Minimum, Maximum, and Median Annual Rainfall				
Location	Noggle Vineyards and Ranch	Garner Ranch	Spring Valley	Average
Minimum	14.65	8.83	15.5	13
Maximum	50.4	51.98	43.15	48.51
Median	28	43.82	24.25	32

Figure 22 Average minimum, maximum, and median rainfall for Long Valley

Comparative data was drawn from the climate report for Lake County winegrape production.[40] The chart in Figure 23 shows the median, minimum, and maximum precipitation for Lake County AVAs from this report. Average figures for the proposed Long Valley were inserted for comparison.

Comparison of Annual Precipitation for Lake County AVAs			
Location	Median	Minimum	Maximum
Big Valley District	30.6	28.3	38.3
Proposed Long Valley	32	13	48.51
High Valley	33.6	28.3	54.1
Clear lake	33.9	25	65.4
Kelsey Bench	35.1	29.6	41.9
Red Hills	39.4	25.8	64.3
Guenoc Valley	42.8	40.5	44.8
Benmore Valley	44.6	43.7	45.6

Figure 23 Precipitation data for Lake County AVAs

East

There are no AVAs east of the proposed area in Lake County.

South

Guenoc Valley, Red Hills, and a portion of the Clear Lake AVA lie to the south of the proposed area. All of these AVAs receive more rainfall than the proposed Long Valley area.

[40] Gregory V Jones, PhD, Climate Characteristics for Winegrape Production in Lake County California, report for Lake County Winegrape Commission, www.lakecountywinegrape.org, 2014, page 14

West

Benmore Valley, High Valley, Kelsey Bench, and Big Valley District all lie to the west or southwest of the proposed area. Big Valley District is dryer than the proposed area. However, the other three AVAs receive substantially more rainfall than Long Valley.

North

There are no recognized AVAs in Lake County to the north of the proposed area.

Boundary Discussion Based on Rainfall for Groundwater Basins

Bulletin 118 descriptions of groundwater basins include estimates of annual precipitation and provide some indication of rainfall beyond the boundaries of Long Valley. The proposed area is part of the Long Valley Groundwater Basin. Bulletin 118 for this basin (Appendix Exhibit 5, pages 86 – 87) shows the range for annual precipitation as 27- to 33-inches, increasing to the west.

The photo of the map below in Figure 24 was taken from the Lake County Groundwater Management Plan. It shows the northern part of Lake County and the location of the basins that are discussed in this section.[41]

[41] Lake County Groundwater Management Plan, (Lake County Watershed Protection District, March 31, 2006), section 1

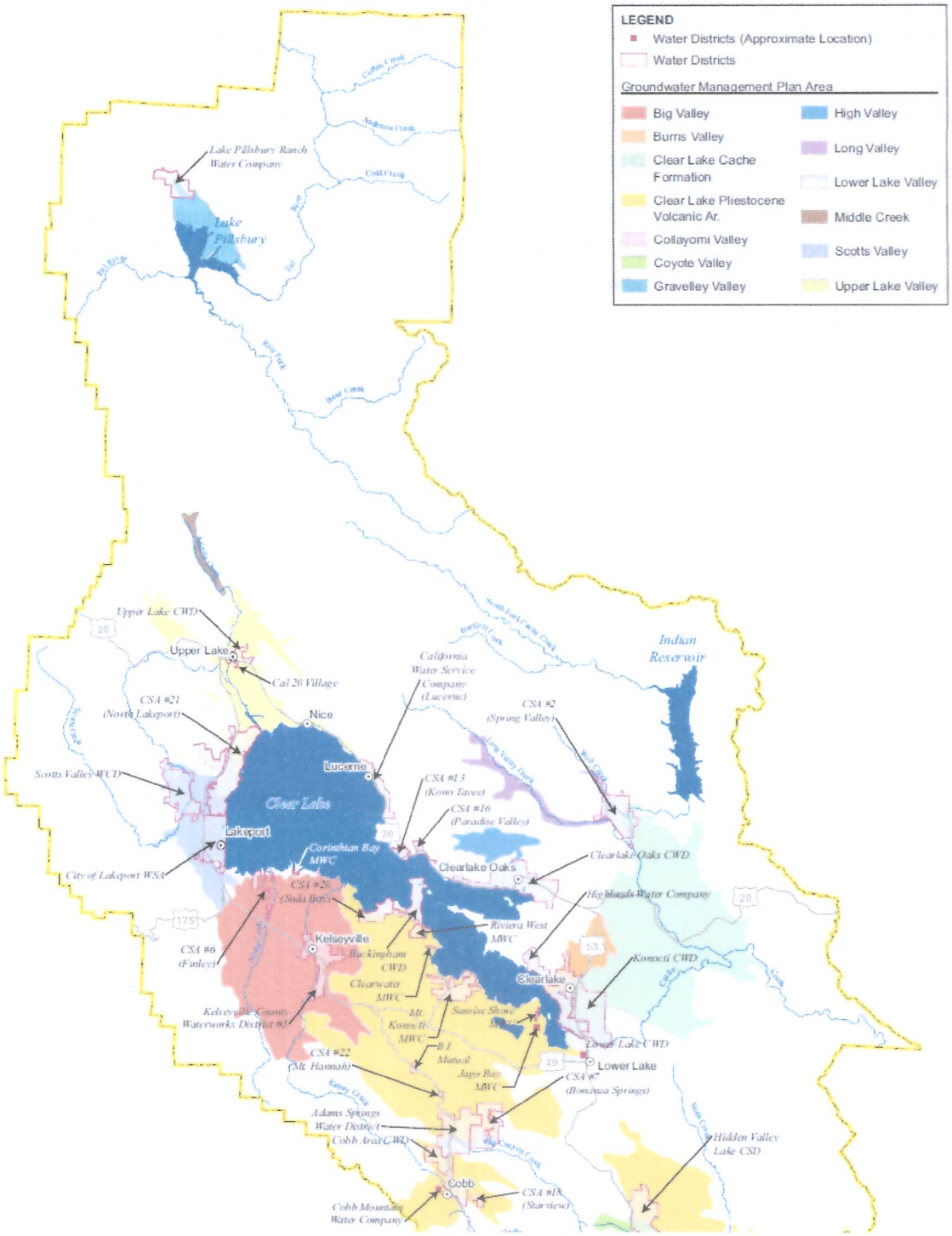

Figure 24 Map showing location of groundwater basins in Lake County

Southeast
The Clear Lake Cache Formation Groundwater Basin lies south and east of the proposed area. Bulletin 118 for this basin estimates precipitation ranges from 25- to 29-inches.

South
The Burns Valley Basin lies to the south of the proposed area. Annual precipitation in the basin is approximately 27 inches.

West
The High Valley Basin lies west and south of the proposed area. Annual precipitation in the valley ranges from 27- to 35-inches, decreasing to the east.

Northwest
The Middle Creek Groundwater Basin lies northwest of the proposed area. This region is much wetter with annual precipitation ranges from 43 to 45-inches, increasing to the north.

Growing Degree Days

Heat summation is calculated as the sum of the mean monthly temperature above 50° F during the growing season of April 1st through October 31st and expressed as degree days. GDD calculations are shown in the tables below for three locations in the proposed area. The first location is Noggle Vineyards and Winery which is located on the bench to the west of the southern end of the Long Valley floor. Average degree days for this site over the period of 2003 through 2016 is 3378, making it Region III.

Noggle Vineyards & Winery	
700 Old Long Valley Road	
Clearlake Oaks, CA	
Year	GDD
2016	3377
2015	3596
2014	3668
2013	3355
2012	3305
2011	2955
2010	2882
2009	3416
2008	3432
2007	3126
2006	3355
2005	3112
2004	3430
2003	4277
Average	3378

Figure 25 Growing Degree Days for Noggle Vineyards & Winery

The second table contains two years of data for the Shannon Ridge vineyards located on New Long Valley Road and one year of data for Cross Springs Vineyard on Old Long Valley Road north of the Noggle property. The Cross Springs data appears to be questionable when considering the location of this vineyard about 0.8 miles north of Noggle Vineyards. (The data for 2016 for Noggle was compared with the same year for Lamperti Vineyard located on the eastern end of High Valley. Growing degree days for the two locations were very similar with temperatures within a few degrees of each other, validating the Noggle data for that year.) The Shannon Ridge Vineyard averages out as a Region IV although the data for 2016 is a Region III and closer to the results for the Noggle property.

Shannon Ridge Vineyards		**Cross Springs Vineyard**	
4881 New Long Valley Road		**1400 Old Long Valley Road**	
Clearlake Oaks, CA		**Clearlake Oaks, CA**	
Year	GDD	Year	GDD
2016	3399	2016	4269
2015	3858		
Average	3629		

Figure 26 Growing Degree Day data for Shannon Ridge vineyards on New Long Valley Road and Old Long Valley Road

Considering data from all three sites, the average GDD for Long Valley is 3460, Region III.

Importance to Viticulture

University of California Viticulture Professors Amerine and Winkler developed a system of Climate Regions to categorize locations based on degree days. Heat summation uses a baseline temperature of 50° F because there is almost no shoot growth below this temperature. Locations are categorized as Region I with less than 2500 degree days, Region II with 2501 to 3000 degree days, Region III with 3001 to 3500 degree days, Region IV with 3501 to 4000 degree days, and Region V with over 4001 degree days. Their approach is universally accepted as the most important climatic factor in predicting a site's suitability for growing specific grape varieties.[42] The table below[43], taken from report "Climate Characteristics for Winegrape Production Lake County, California" shows the relationship of degree days and suitability for winegrapes.

[42] A J Winkler, James A Cook, W M Kliewer, Lloyd A Lider, General Viticulture University of California Press, 1962, p 61 - 71

[43] Gregory V Jones, PhD, Climate Characteristics for Winegrape Production in Lake County California, report for Lake County Winegrape Commission, www.lakecountywinegrape.org, 2014, page 6

Table 1 – Winkler region growing degree-day limits (Amerine and Winkler, 1944), updated by Jones et al. (2010) to correct for lower limits to Region I and an upper limit to Region V, and types of fruit or wine expected in each class.

Region	Degree-Days (F° units)	Suitability
Region Ia	1500-2000	Only very early ripening varieties achieve high quality, mostly hybrid varieties and some *V. Vinifera*.
Region Ib	2000-2500	Only early ripening varieties achieve high quality, some hybrid varieties but mostly *V. Vinifera*.
Region II	2500-3000	Early and mid-season table wine varieties will produce good quality wines.
Region III	3000-3500	Favorable for high production of standard to good quality table wines.
Region IV	3500-4000	Favorable for high production, but acceptable table wine quality at best.
Region V	4000-4900	Typically only suitable for extremely high production, fair quality table wine or table grape varieties destined for early season consumption are grown.

Figure 27 Relationship of growing degree days to winegrape production

Boundary Discussion

The Long Valley area is the eastern most grape growing region in Lake County. About one-third of the proposed area sits within the North Coast AVA.

North

The North Coast AVA lies to the north of a portion of the proposed area. Growing degree days for the North Coast AVA cover a wide range from 736 to 4034.

South and West

The High Valley AVA lies to the south and west of the proposed area. GDD for High Valley range from a low of 3139 to a high of 3755, averaging 3447. The proposed area GDD range is from 2882 to as high as 4277 with an average of 3460.

East

There are no AVAs in Lake County east of the proposed area. The Capay Valley AVA is located in northwest Yolo County. GDD for this AVA range from 2963 to 4318 compared with the GDD range for the Long Valley area of 2882 to 4277[44].

Differences in GDD for Lake County AVAs are further demonstrated in the table below taken from the report "Climate Characteristics for Winegrape Production, Lake County, California"[45]. The data for Long Valley has been added.

[44] Ibid, Appendix Table 1, page 56

[45] Ibid, page 23

AVA Name		Median	Max	Min
Big Valley District		3245	3281	3171
Benmore Valley		3248	3332	3155
Kelsey Bench		3250	3593	3189
Clear Lake		3267	3811	2799
Guenoc Valley		3481	3796	3420
High Valley		3548	3755	3139
Red Hills		3595	3753	3155
Long Valley		3399	4277	2882

Figure 28 GDD by AVA for Lake County

AVA with-in an AVA

This petition seeks establish the Long Valley – Lake County AVA which lies partially within the larger North Coast AVA. The North Coast AVA was approved under the final rule issued on September 21, 1983. The proposed Long Valley area was in its infancy as a vinicultural area when the North Coast AVA was approved. The first vines on Pomo Ranch, now known as Stonehouse Cellars, had been planted in 1978. Additional vineyards did not go in until 1985, two years after the approval of the North Coast AVA. Today, there are over 140 acres planted to vines and three bonded wineries in the area.

Prior to the revision of the American Viticultural Area Regulations on January 20, 2011, many AVAs within AVAs were approved. The approval of the proposal to establish 7 new viticultural areas within the existing boundaries of the Lodi viticultural area is an example of an instance where this practice was used. Like the widely accepted and internationally understood practice of "nesting" wine appellations, this delineation of the proposed Long Valley AVA within the North Coast AVA would provide substantial information on wine produced from grapes grown in this area for the consumer.

The following discussion demonstrates the similarities and differences between the larger North Coast AVA and the proposed Long Valley. While the distinctions are easily defined, we recognize that the North Coast AVA continues to be a significant growing area that encompasses many different microclimates suitable to viticulture. These growing areas span six counties and cover more than 3,000,000 acres of land. The North Coast AVA is used by numerous wineries including Bonterra, The Hess Collection, Langtry Estate & Vineyard, B R Cohn, Carruth Cellars and many more to identify wine made with grapes from six county area.

Similarities: The Long Valley AVA is similar to the larger North Coast in topography and growing degree days. The topography of the North Coast AVA is described as "flat valleys and

tillable hillsides surrounded by mountains."[46] The topography of the proposed Long Valley includes similar topography with valleys and foothills suitable for planting winegrapes and is surrounded by mountains. Long Valley is a northwest / southeast oriented valley surrounded with foothills and steeper mountains similar to other viticultural areas in the North Coast.

The North Coast AVA petition also cited growing degree days as a climate factors. According to evidence reported for the North Coast, growing degree days ranged from Region II to Region III. The average GDD for the proposed Long Valley is 3460, Region III, consistent with other locations in the North Coast AVA.

Differences: The North Coast petition and final ruling noted average rainfall of 36.2 inches for the region measured at 6 stations in Napa, Sonoma, and Mendocino. Rainfall for the proposed Long Valley was recorded at three locations including Garner Ranch located in the western section on New Long Valley Road, Spring Valley at the confluence of Wolf Creek and the North Fork of Cache Creek, and Noggle Vineyards and Winery. Rainfall at Garner Ranch between 2001 and 2016 averaged 37.99 inches. Rainfall at Spring Valley recorded for 2008 through 2017 averaged 27.15 inches. Rainfall at Noggle Vineyard for 2002 – 2017 averaged 27.83 inches. Looking across all years and all three locations, the overall average rainfall for this area was 30.99 inches, considerably less than the average cited in the North Coast final rule (but consistent with the final rule discussion for rainfall figures for Lake County).

Similarly, Bulletin 118 for the Long Valley Groundwater Basin (Appendix Exhibit 5, pages 86 – 87) which encompasses most of the proposed area for Long Valley notes that the range for annual precipitation is 27 to 33 inches, increasing to the west, again showing the difference from the average rainfall cited in the final ruling for the North Coast.[47]

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[46] Federal Register, 27 CFR Part 9, North Coast Viticultural Area, [T.D. ATF-145; Reference Notice Numbers 360, 404], September 21, 1983

[47] California Groundwater Bulletin 118, Long Valley Groundwater Basin, Hydrologic Region Sacramento River, last update 2/27/04

Boundary Description Long Valley AVA

The proposed Long Valley – Lake County Viticulture Area is located in Lake County, California and is partially within the North Coast Viticulture Area. The area is bounded by the High Valley AVA on the west, the Mendocino National Forest on the North, and the 1400 foot elevation line along the east, State Highway 20 on the southwest, and the 1,200 foot elevation line on the southeast.

Boundaries plotted in a clockwise direction are found on four USGS 7.5 minute series topographic maps, the Clearlake Oaks Quadrangle, (Appendix Exhibit 23, page 118), The Benmore Canyon Quadrangle (Appendix Exhibit 24, page 119), and the Lower Lake Quadrangle (Appendix Exhibit 25, page 120).

The beginning point is at the intersection of the 1600 foot elevation line and State Highway 20, just north of Sweet Hollow Creek, in the northwest ¼ of the southeast ¼ of section 35, T14N, R7W;

From the beginning point, proceed northerly along the meandering 1600 foot elevation line for approximately 4.1 miles to its intersection with the unnamed Salt Creek in section 23, T14N, R7W; then

Follow the unnamed Salt Creek approximately 760' westerly to its intersection with the 1720 foot elevation line in section 23, T14N, R7W; then

Proceed along the meandering 1720 foot elevation line in a generally western direction for approximately 11.3 miles to the intersection of the Mendocino National Forest on the western boundary line of section 12, T15N, R8W; then

Proceed north along the boundary line of the Mendocino National Forest approximately 896' to its intersection with the Sulphur Canyon; then

Follow the Sulphur Canyon Northeast approximately 770' to its intersection with the 1400 foot elevation line, section 12, T15N, R8W; then

Proceed easterly along the meandering 1400 foot elevation line first easterly, then northeasterly, then southeasterly to the intersection of the Mendocino National Forest boundary line, western boundary line, section 36; then

Proceed north along the western boundary of Section 36 to its northwest corner, then East along the northern boundary of section 36 to the intersection with the 1400 foot elevation line; then

Follow the 1400 foot elevation line in a southeasterly direction, following the eastern edge of Long Valley to the southern boundary of section 11, T14N, R7W on the Benmore Canyon Quadrangle map; then

Proceed north along the eastern boundary of the west ½ of the west ½ of section 11 to the northern boundary of section 11; then

Follow the northern boundary line of section 11 in a westerly direction across Wolf Creek to the ¼ section corner of section 11, T14N, R7W; then

South along the ¼ section line approximately 344 feet to the intersection of Doe Trail, then southeast along the centerline of Doe Trail approximately 80 feet to the intersection of the 1400 foot elevation line.

Proceed along the 1400 foot elevation line southeasterly to the intersection of the western boundary line for section 12, T14N, R7W; then

Proceed in a straight line crossing the North Fork of Cache Creek in section 12, T14N, R7W to the intersection of the 1400 foot elevation line in section 12, T14N, R7W; then

Follow the meandering 1400 foot elevation line in a southeasterly direction to its intersection with the northern boundary of the southeast ¼ of section 13, T14N, R7W; then

Proceed westerly along the northern boundary of the southeast ¼ of section 13 to the northeast corner of the northwest ¼ of the southeast ¼ of section 13, continuing southerly along the western boundary of the east ½ of the east ½ of section 13; then

Continuing along the western boundary of the east ½ of the east ½ of section 24 to the southwest corner of the northeast ¼ of the northeast ¼ of section 24, T14N, R07W, continuing easterly along the southern boundary of the northeast ¼ of the northeast ¼ of section 24 to the intersection with the 1,400 foot contour line; then

Follow the 1,400 foot contour line in a southeasterly direction to the intersection with the eastern boundary of the west ¼ of section 19, T14N R06W, then southerly along the eastern boundary of the west ½ of the west ½ to the southern boundary of section 19, then easterly along the southern boundary of section 19 to the ½ corner; then

Southerly along the eastern boundary of the west ½ to the northeast corner of the southeast ¼ of the southwest ¼ of section 30, T14N R06W, continuing easterly along the north boundary of the south ¼ of section 30 to the intersection of the 1400 foot elevation line in the northwest ¼ of the southeast ¼ of said section 30, T14N, R 06W; then

Proceed along the meandering 1400 foot elevation line in a southerly direction approximately 3,700 feet to the intersection of the western boundary of the northeast ¼ of the northeast ¼ of Section 31, T14N R06W; then

Follow southerly then easterly along the western and southern boundaries of the northeast ¼ of the northeast ¼ of section 31, T14N R06W, continuing southerly along the eastern boundary of section 31 to its southeast corner; then

Continue southerly along the eastern boundary of section 06, T13N R06W to the northeast corner of the southeast ¼ of the southeast ¼ of section 06, then west along the northern boundary of the south ½ of the south ½ of section 06 to the intersection of the 1200 foot elevation line in section 06; then

Proceed along the meandering 1200 foot elevation line in a northerly direction to its intersection with the eastern boundary of the southwest ¼ of section 31; follow proceed northerly along the eastern boundary of the southwest ¼ of section 31 to its intersection with State Highway 20; then

Proceed along State Highway 20 in a westerly direction to the point of beginning, in the northwest ¼ of the southeast ¼ of section 35, T14N, R7W.

Revision of High Valley Boundary

This petition seeks to revise a portion of the northeastern boundary line for the High Valley AVA to create a contiguous boundary between High Valley and the proposed Long Valley – Lake County AVA in that area. This would add 1,542 acres to the existing AVA. This boundary revision would affect one grower, Fiora Vineyards, dividing his acreage between High Valley and Long Valley. A letter from Don Fiora acknowledging this is contained in Appendix Exhibit 14, page 98. There are no other vineyards currently planted in the proposed area. This request is supported by documentation showing that the soils and elevation for the additional area are similar to the original High Valley AVA petition as well as a letter of support from Clay Shannon, Shannon Ridge Family of Wines (Appendix Exhibit 13, page 97).

Soils

The petition to establish High Valley states, "A considerable amount of Maymen, Hopland, and Mayacama Series soils, which are primarily gravelly loams and gravelly sandy clay loams, are intermixed throughout the southeastern portion of the AVA....The primary soils found throughout the eastern half of the proposed AVA include the Konocti Varient, Konocti, Hambright, Benridge, and Sodabay Series."[48]

The same soils are found in the proposed additional High Valley area. The table in Figure 29 lists the soils found in the proposed area by map unit symbol, map unit name, and general map unit.

Map Unit Symbol	Map Unit Name	General Map Unit
113	Benridge-Konocti association, 30 to 50% slopes	Konocti - Benridge
115	Benridge-Sodabay loams, 15 to 30% Slopes	Koncoti - Benridge
169	Maymen-Etsel-Snook complex, 30 to 75% slopes	Maymen-Etsel
171	Maymen - Hopland - Etsel Association, 15 - 50% slopes	Maymen-Etsel
173	Maymen-Hopland-Mayacama, 30 - 50% slopes	Maymen-Etsel

Figure 29 Soils found in the proposed additional acreage for High Valley

The similarity soils is further demonstrated by the map showing soil units in Appendix Exhibit 10, page 94.

Topography and Geology

The High Valley section on Topography and Geology describes the elevation of the AVA as follows, "The floor of High Valley is at an elevation of 1700 - 1800 feet.... High Valley Ridge rise steeply 500 – 1500 feet above the valley floor... The elevation of the ridge tops ranges from 1800 – 3400 feet..." The elevation of the proposed additional area is consistent with this

[48] Ibid, Soils

description. It follows the 1720 foot elevation along the northern flanks of the High Valley Ridge line facing Long Valley below.

This section of the petition notes, "Bordering the easternmost AVA boundary lays a large belt of Tertiary Cache Formation. The Cache Formation is lacustrine in origin… Overall the Cache and Franciscan on the outside of the eastern boundary of the proposed AVA contain physical characteristics not found in High Valley."[49]

The Cache Formation, identified earlier in this petition in the Long Valley discussion of Geology, is not in the area that is being proposed as an addition to the High Valley AVA. The map below shows the general location of the Cache Formation, lying to the east along the North Fork of Cache Creek in Long Valley. For additional comparison, a map of the High Valley AVA is included in Appendix Exhibit 11, page 95.

[49] American Viticultural Area Petition for High Valley AVA, Kevin Robinson et al, Topography and Geology

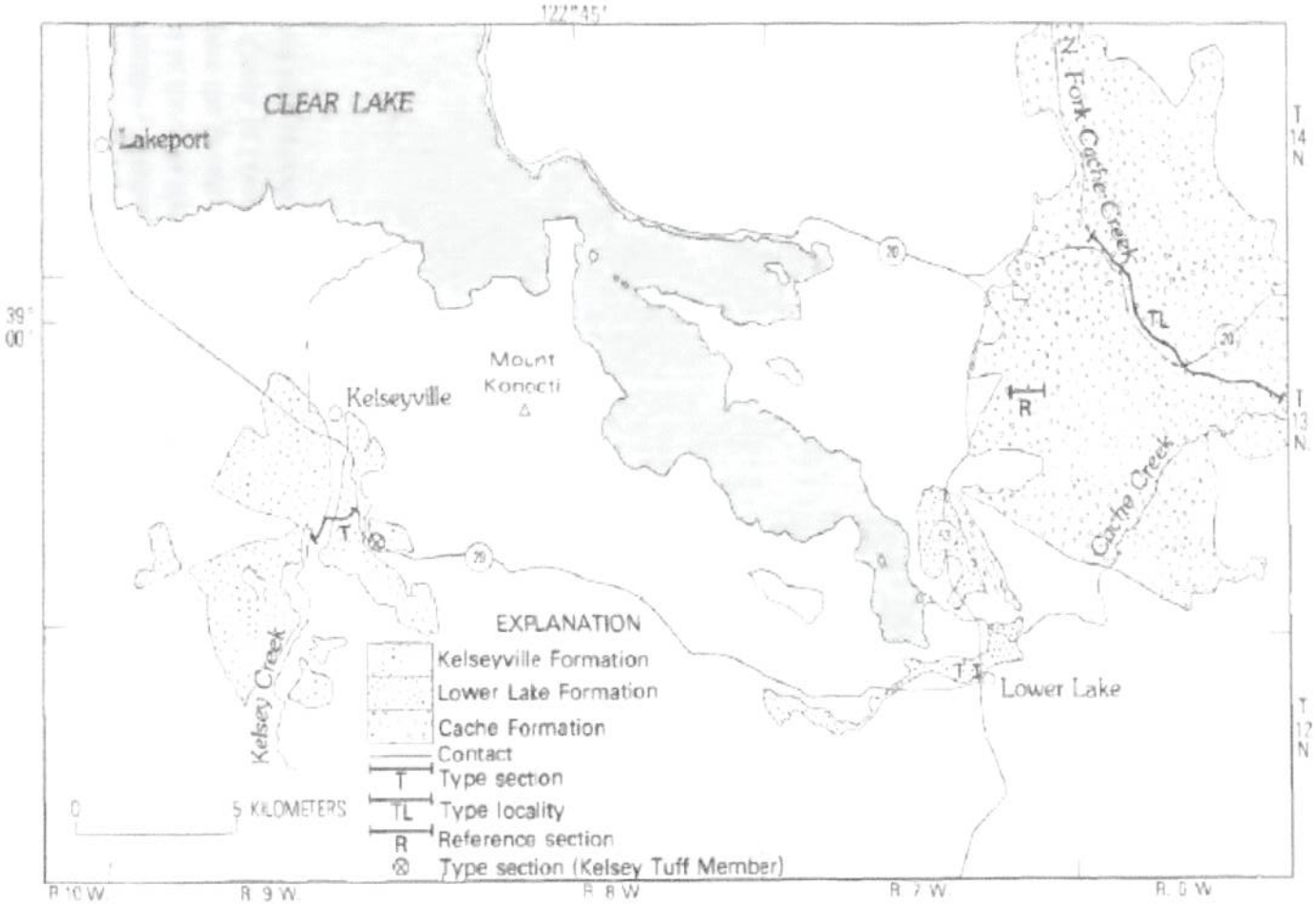

FIGURE 8.—Location map of measured sections of the Cache, Lower Lake, and Kelseyville Formations and the Kelsey Tuff Member of the Kelseyville Formation.

The petition to establish the High Valley AVA also notes that although serpentine is found to the north and east of High Valley, it is not found within the AVA. Serpentine is also not found in the area contained within the revised boundary line. The map below shows the location of areas with ultramafic, ultrabasic, serpentine rocks and soils in the eastern part of Lake County. There are no locations within or near the High Valley AVA or the area proposed as an expansion of the AVA (sections 14, 15, 16, 21, 22, and 23). Appendix Exhibit 12, page 96, contains the full map of these soils and rocks for Lake County.

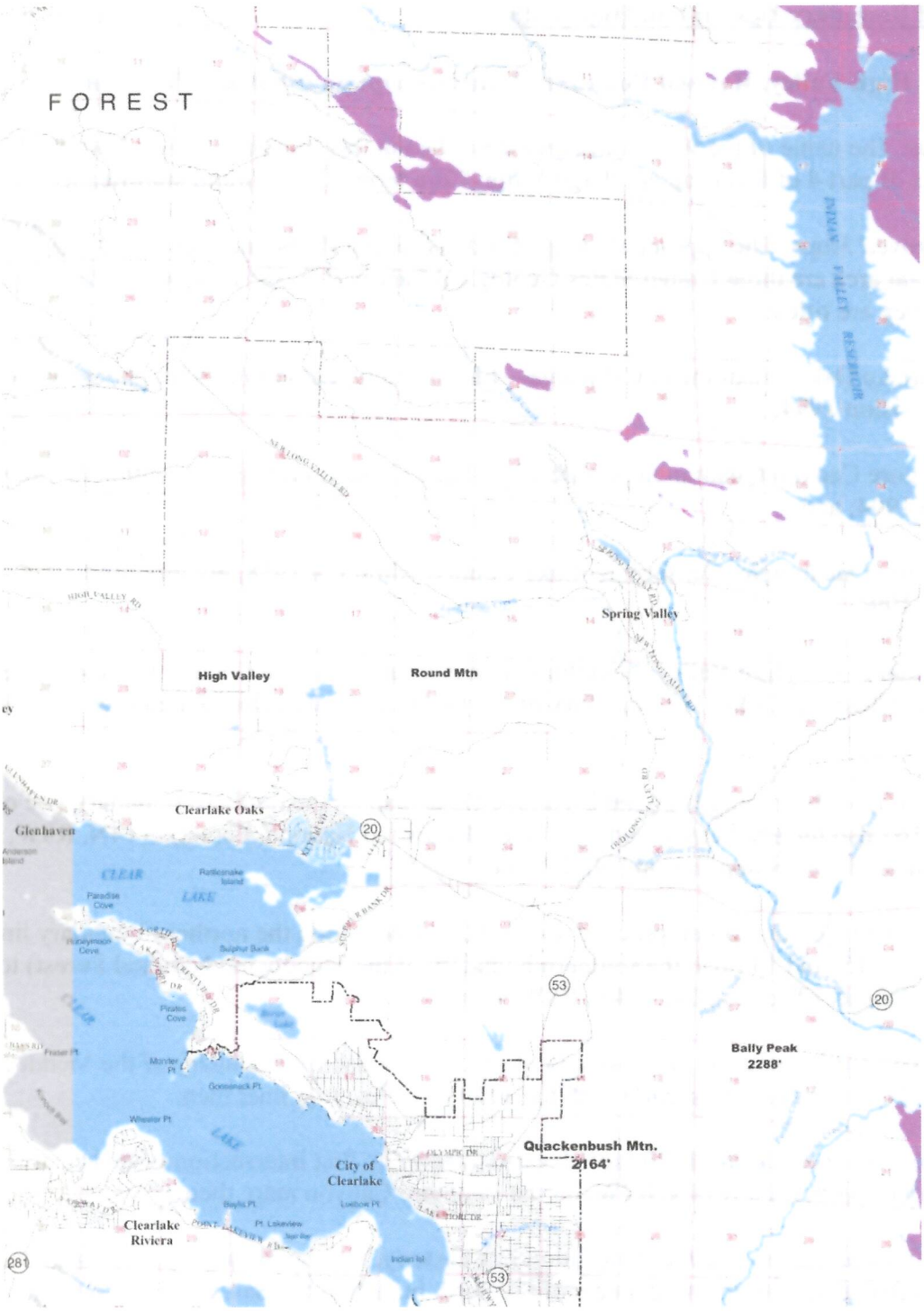

Figure 30 Screen shot of larger map of Lake County showing location of ultramafic, ultrabasic, serpentine soil and rocks shown in purple on the map above. [50]

[50] Lake County Air Quality Management District, http://www.lcaqmd.net/documents/AsbestosFormItems/LCserp.10.14.07.pdf

Revised Boundary Description High Valley

§9.189 High Valley. Revised Boundary Line Description (Shown in blue font)

(a) *Name.* The name of the viticultural area described in this section is "High Valley". For purposes of part 4 of this chapter, "High Valley" is a term of viticultural significance.

(b) *Approved Maps.* The appropriate maps for determining the boundaries of the "High Valley" viticultural area are three United States Geological Survey (USGS) 1:24,000 scale topographic maps. They are titled:

(1) Clearlake Oaks Quadrangle, California—Lake County; edition of 1958; photorevised 1975, minor revision 1994;

(2) Benmore Canyon Quadrangle, California—Lake County; provisional edition of 1989, minor revision 1994; and

(3) Lucerne Quadrangle, California—Lake County; edition of 1958, photorevised 1975, minor revision 1994.

(c) *Boundary.* The High Valley viticultural area is located in Lake County, California, near the village of Clearlake Oaks. The boundary of the High Valley viticultural area is as described below:

(1) The point of beginning is on the Clearlake Oaks map on the northern boundary line of section 16 (also the southern boundary of the Mendocino National Forest), T14N, R8W, at the intersection of the section line and High Valley Road;

(2) From the beginning point, proceed due east 2.4 miles along the northern boundary lines of sections 16, 15, and 14 (also the southern boundary of the Mendocino National Forest) to the northeast corner of section 14, T14N, R8W; then

(3) Proceed north along the Southwest ¼ of section 12 (also the boundary of the Mendocino National Forest) to its intersection with the 1720 foot elevation line; then

(4) Follow the meandering 1720 foot elevation line to its first intersection with the eastern boundary of section 22, T14N, R7W, on the Benmore Canyon map; then

(5) Continue along the 1720 foot elevation line easterly, then southeasterly, then southwesterly to its intersection with the headwaters of the north branch of the Salt Canyon Creek; then

(6) Proceed easterly approximately 760 feet along the north branch of the Salt Canyon Creek to its intersection with the 1,600-foot elevation line in section 23, T14N, R7W; then

(7) Proceed southerly along the meandering 1,600-foot elevation line 4.1 miles to its intersection with State Route 20, just north of Sweet Hollow Creek, in section 35, T14N, R7W; then

(8) Proceed southwest and then west 1.7 miles on State Route 20 to its intersection with the 1,600-foot elevation line just northwest of BM 1634, Wye, in section 3, T13N, R7W; then

(9) Proceed westerly 15.2 miles along the meandering 1,600-foot elevation line, crossing the Clearlake Oaks map, to the elevation line's intersection with an unnamed intermittent stream in Pierce Canyon in the northeast quadrant of section 20, approximately 0.4 mile east of VABM 2533, T14N, R8W, on the Lucerne map; then

(10) Proceed northerly and then northeasterly along the unnamed intermittent stream in Pierce Canyon and then the stream's northern fork approximately 1.6 miles to the northern fork's intersection with the 3,000-foot elevation line in section 16, T14N, R8W, on the Clearlake Oaks map; and then

(11) Proceed straight northeast 0.15 mile, returning to the beginning point.

Revision of North Coast AVA Boundary

This petition seeks to add an additional 23,690 acres to the North Coast AVA to include the eastern quarter of the High Valley AVA and the eastern - southeastern two-thirds of the proposed Long Valley AVA.

Appendix Exhibit 16, page 100, contains a map of the proposed area showing the proposed boundary line, the current boundary line and vineyard locations. Appendix Exhibit 15, page 99 has a list of vineyards and wineries in the proposed area.

Letters of support for this request are included in the Appendix. (See Appendix Exhibit 19, pages 110 – 111, letter from Peter Windrem, Attorney and winegrape grower in Lake County; Appendix Exhibit 21, pages 115 – 116, letter from Glenn McGourty, University of California Cooperative Extension Winegrape and Plant Science Advisor; Appendix Exhibit 20, pages 112 -114, letter from Debra Sommerfield, President of the Lake County Winegrape Commission.)

The North Coast AVA was approved under the final rule issued on September 21, 1983. The petition to establish the North Coast AVA originally did not include Lake County, but based on evidence presented and comments received during the approval process, the western area of Lake County was included within the final boundary.

The Lake County wine region included about 3,000 acres planted to vines and three wineries when the public hearing for the North Coast petition was held on January 12, 1981. Vineyard locations at that time were around the Big Valley north to Upper Lake and south to Middletown.

Since the approval of the North Coast AVA, Lake County's wine industry has grown substantially. Today, there are over 9,500 acres planted to vine, more than 30 wineries, and additional plantings on the drawing board. Lake County is recognized as a prime growing area with winegrapes bringing average prices that are third highest in California. Lake County has seven established AVAs including Guenoc Valley, Benmore Valley, Clearlake, Red Hills – Lake County, High Valley, Big Valley District – Lake County, and Kelsey Bench – Lake County.

The High Valley AVA was established on August 1, 2005, more than 20 years after the North Coast AVA was approved. As noted above, when it was established, the eastern quarter was not within the North Coast AVA boundary line. High Valley is an east-west transverse valley known for its high elevations, and cooler climate.

The western third of the proposed Long Valley area was included within the boundaries of the North Coast AVA was approved although there was limited viticultural activity at the time. This request seeks to include the remaining acres of the Long Valley AVA within the larger North Coast AVA. This area shares similar climate with other Lake County areas within the North Coast boundary.

The final rule establishing the North Coast AVA described the distinguishing features of this area as climate including growing degree days, rainfall, and coastal influence. The following

discussion is presented to demonstrate why the current boundary for the North Coast should be expanded to include the additional area.

Name Evidence

The proposed additional area is known by the North Coast name. After considering the merits of evidence and testimony, the final rule for the North Coast AVA stated, "ATF finds the evidence shows that the viticultural area is known by the name "North Coast" and therefore meets the criteria of 27 CFR 4.25a(e)(2)(i). AFT finds that Marin, Sonoma, Napa, Solano, Mendocino and Lake Counties are known as North Coast." Evidence included numerous historical references that included Lake County as part of the North Coast.

High Valley AVA and the proposed Long Valley – Lake County AVA did not exist when this rule was issued. Based on testimony from Lake County growers in 1981, the North Coast boundary was drawn using mountain peaks and included the western two-thirds of High Valley and the western third of Long Valley.

Today all of Lake County is generally associated with the North Coast. For instance, Wikipedia describes the North Coast AVA as, "The **North Coast AVA** is an American Viticultural Area in the state of California that encompasses grape-growing regions in six counties located north of San Francisco: Lake, Marin, Mendocino, Napa, Sonoma, and Solano."[51]

The Wine Institute webpage on the North Coast includes a section about Lake County. While noting that western Lake County is included in the North Coast, no distinction is made when describing High Valley as being part of the North Coast. "The western portion of Lake County comprises the North Coast AVA. It encompasses the Clear Lake AVA, which in itself has 168,900 acres of land, the Red Hills Lake County AVA, and High Valley AVA."[52]

Lake County is also included as part of the North Coast in other contexts. The website "Camp California" in the section "Geography" states, "The southern portion of the North Coast is largely urbanized and it includes Sonoma, Napa and Lake Counties."[53]

Distinguishing Features

Cooling Winds

The final rule for the North Coast stated, "While confirming that Lake County does not receive coastal fog, evidence was presented that coastal air flows through gaps in the mountains and

[51] North Coast AVA, Wikipedia, https://en.wikipedia.org/wiki/North_Coast_AVA
[52] "The Appellations of California Wine – North Coast", Wine Institute, https://www.wineinstitute.org/resources/consumerfeaturedstories/article338
[53] North Coast Region, CampCalifornia.com, https://www.camp-california.com/rv-camping-destination/north-coast/

across Clear Lake, cooling the area surrounding the Lake…."[54] The additional area east of the current boundary line for the North Coast AVA is influenced by the cooling winds from the Clear Lake basin, higher surrounding peaks and to some degree, the high level airflows from the Pacific Ocean.

Testimony by Lake County growers during the hearing on the North Coast noted that coastal air flows into Lake County through gaps in the mountains. The website anyplaceamerica.com shows that Lake County has seven mountain gaps. These gaps are described as "low point or opening between hills or mountains or in a ridge or mountain range."[55] Two of these gaps are northwest of High Valley and Long Valley, likely influencing air flow from the west. Figures 31 and 32 below depict the location of the gaps and their proximity to the proposed additional North Coast area.

[54] Ibid

[55] Top Gaps in Lake County, https://www.anyplaceamerica.com/directory/ca/lake-county-06033/gaps/

Clearlake Oaks, CA 3.39 miles
Soda Bay, CA 5.95 miles

Bartlett Mountain Summit (Gap)

Latitude: **39.1346136°**
Longitude: **-122.7769356°**

Elevation: **3934 ft.**

Nearest Cities
Lucerne, CA 3.24 miles
Nice, CA 3.91 miles
Upper Lake, CA 7.45 miles
Soda Bay, CA 9.26 miles
Clearlake Oaks, CA 9.37 miles

Low Gap (Gap)

Latitude: **39.4637698°**
Longitude: **-122.7402724°**

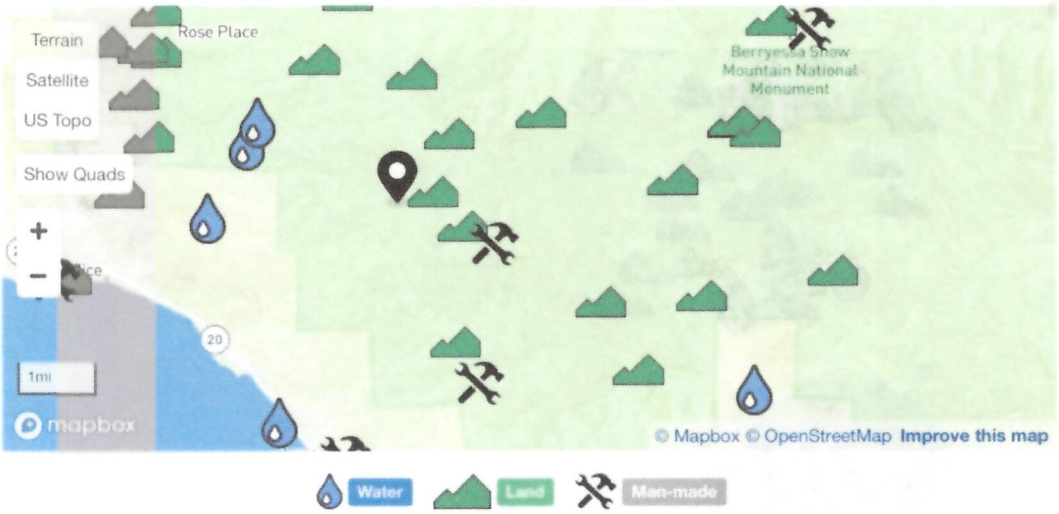

Figure 31 Bartlett Mountain Summit is identified as a mountain gap in Lake County. The black teardrop marker shows the location of the gap and the blue teardrop marker on the lower right of the picture marks the South Fork of Long Valley Creek

Upper Lake, CA 22.59 miles

Low Gap (Gap)

Latitude: **39.1954448°**
Longitude: **-122.8116594°**

Elevation: **3753 ft.**

Nearest Cities
Nice, CA 5.36 miles
Upper Lake, CA 5.71 miles
Lucerne, CA 7.32 miles
Lakeport, CA 11.93 miles
Soda Bay, CA 13.49 miles

Low Gap (Gap)

Latitude: **39.5784905°**
Longitude: **-122.8661108°**

Figure 32 Low Gap noted by the black teardrop lies to the northwest of Long Valley and High Valley

Internet wind maps also demonstrate the flow of air from the Pacific Ocean over Lake County and the proposed area. The screen shot below depicts wind flow from the Pacific Ocean for the North Coast area on August 24, 2018.

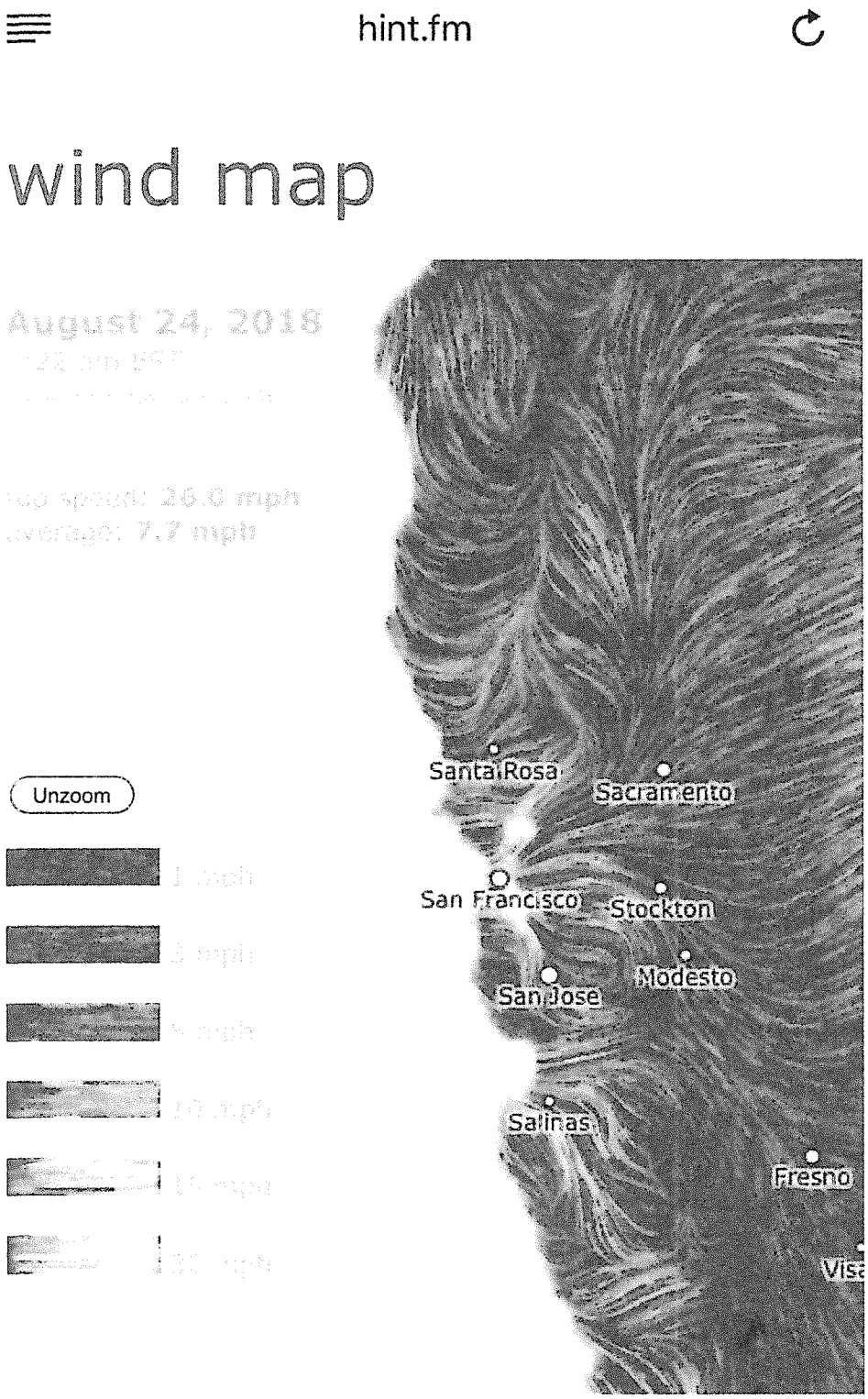

Figure 33 Wind map for North Coast for August 24, 2018. Lake County and the proposed area lie to the upper right of Santa Rosa on this map.

Anecdotal evidence further supports the conclusion that high level air flows influence the climate of Lake County as a whole and the proposed area in particular. California wildfires have brought smoke to the area. In an article published in the Lake County Record-Bee on December 11, 2017, smoke from fires in Southern California was seen hovering over Lake County. "A large mass of smoke from the Southern California wildfires hovered over at an angle in Lake County, reaching as far north of Eureka on Monday afternoon.

According to Lake County Air Pollution Control Officer Doug Gearhart, the thick layer of smoke is expected to cover the rest of the county overnight, with visibility into Tuesday. "With current weather conditions, we might see smoke here off and on for a couple of weeks until the fires are contained."[56] (The full article is included in Appendix Exhibit 17 pages 101 - 103.)

More recent fires in the Long Valley area provide a second example. In late June, 2018, wildfires scorched the area east of Long Valley. In an article in the Santa Rosa Press Democrat, published on June 26, 2018, it was noted, "While the Sunday winds wreaked havoc on firefighting efforts, they also helped pull in a heavy marine layer overnight that brought a welcomed spike in humidity."[57] (A copy of the complete article is included in Appendix Exhibit 18, pages 104 - 109.)

Both of these news stories attest to the impact of the high level air flow on the proposed area.

The Climate Characteristics for Winegrape Production, Lake County, California report states, "Local winds, generated from a region's topography, are very common in viticulture areas worldwide. The most common local winds are the general land-sea breeze (affects coastal regions or those near large bodies of water) and the mountain-valley breeze (affects inland areas with substantial topographical relief), which provides the dry-summer viticulture regions with some relief through late afternoon advection from the coast or down the mountains."[58]

The report goes further to note, "Clear Lake itself provides moderating effects due to the combination of mountain-valley breezes and lake-land breezes. These breezes are created by temperature gradients that develop over the course of the day over the terrain and lake, resulting in fairly consistent winds over the much of the region."[59]

The petition to establish the Red Hills - Lake County AVA cited this phenomena as climate evidence, noting. "As in all parts of California's Coast Ranges, Lake County's climate is

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[56] Tammy Murga, "Smoke from SoCal reaches Lake County", Lake County Record-Bee, http://www.record-bee.com/article/NQ/20171211/NEWS/171219986, December 11, 2017,

[57] Randi Rossmann, Martin Espinoza and Kevin McCallum, "Lake County – Blaze Shifts from Spring Valley", The Santa Rosa Press Democrat, June 26, 2018

[58] Gregory V Jones, PhD, Climate Characteristics for Winegrape Production in Lake County, California, Southern Oregon University, 12/1/2014, page 7

[59] Ibid, page 12

greatly dependent on the interaction of coastal air and local terrain, and microclimates abound."[60]

The petition to establish High Valley likewise talked about the impact of winds, "During the day the surrounding land warms much more quickly than the waters of Clear Lake creating land-heated up-valley winds that rise to the ridge tops.... The reverse of the land-water wind begins in late afternoon and early evening... Air in contact with land surfaces, cools and becomes denser creating downward winds cooling mountain-valley winds can be traced to the cold airflows coming from the mountain slopes and higher elevations such as the Mendocino National Forest..."[61]

The proposed area experiences similar wind patterns. Data was secured for Lake County weather stations for the week of August 20, 2018 from the Western Weather page on the Lake County Winegrape Commission website. Wind data shown in Figure 34 below for the High Valley Ridgeline station showed a pattern of stronger winds in the afternoon hours with the highest gusts predominantly from the west.[62]

Station	Date	Avg MPH	Max MPH	Occurance Time	Gust Dir
High Valley Ridgeline	8/20/2018	5.8	16.5	1847	WSW
Elevation 2,340'	8/21/2018	4.7	17.8	1136	ENE
	8/22/2018	6.1	20.3	1054	ENE
	8/23/2018	6.2	18	1821	W
	8/24/2018	5.2	16.6	1833	WSW
	8/25/2018	6.8	19	1910	WSW
	8/26/2018	6.2	17.7	1843	WSW

Figure 34 Average wind speed, maximum wind speed, and direction of wind gusts for the High Valley Ridgeline weather station at elevation 2,340'.

This data was compared with similar information for other Lake County weather stations for the same time period.[63] Cow Mountain lies to the west of Upper Lake and is at the highest elevation. Not surprisingly, winds at this location are also predominantly from the west.

The Upper Lake station is located at the head of Clear Lake. Kelseyville and Kelseyville South weather stations are located in the Big Valley AVA to the southwest of the

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[60] Sara Schorske, Compliance Services of America, LLC, "Petition to Establish Red Hills Viticultural Area", August 27, 2001, page 15

[62] Brassfield Estates Vineyards Weather Station Network, http://www.westernwx.com/history/lakeco/bfe7day.htm

[63] Ibid, http://www.westernwx.com/history/lakeco/

proposed area. The Wight Way station is on the Kelsey Bench also located to the southwest. The Jones "Climate Characteristics…" report included a study of wind speeds at four stations around Lake County including Upper Lake, Kelseyville, Red Hills, and Guenoc Valley. This report noted, "overall wind speeds, both during the day and night, are higher around Kelseyville and Red Hills compared to Upper Lake and Guenoc Valley."[64] The comparison data below in Figure 35 suggests that wind speeds in High Valley and by proximity of location, the proposed area, are stronger than those for Red Hills and Kelseyville, but enjoy a similar prominence in direction from the west.

Comparison of Winds for Lake County Locations					
Week of August 20, 2018 - August 26, 2018					
Station	**Date**	**Avg MPH**	**Max MPH**	**Occurance Time**	**Gust Dir**
High Valley Ridgeline	8/20/2018	5.8	16.5	1847	WSW
Elevation 2,340'	8/21/2018	4.7	17.8	1136	ENE
	8/22/2018	6.1	20.3	1054	ENE
	8/23/2018	6.2	18	1821	W
	8/24/2018	5.2	16.6	1833	WSW
	8/25/2018	6.8	19	1910	WSW
	8/26/2018	6.2	17.7	1843	WSW
Cow Mountain	8/20/2018	8.8	20.6	1531	W
Elevation 3,535'	8/21/2018	7.3	16.9	1547	W
	8/22/2018	8.1	19.5	1703	W
	8/23/2018	9.3	20.3	1556	WSW
	8/24/2018	7.5	20.6	1719	W
	8/25/2018	10.2	23.9	1715	W
	8/26/2018	9.3	23.6	1637	WSW
Upper Lake	8/20/2018	1.1	9.6		NNW
	8/21/2018	1.4	12.1		SSE
	8/22/2018	1.6	12.3		S
	8/23/2018	1.7	12.1		NW
	8/24/2018	1.1	14.1		WNW
	8/25/2018	1.4	11.4		NW
	8/26/2018	1.6	12.4		SE
Kelseyville	8/20/2018	2.4	15.3		SW

[64] Ibid, page 17

	8/21/2018	2.4	12.7		SW
	8/22/2018	2.7	14		SE
	8/23/2018	3	15.6		SW
	8/24/2018	2.6	13.2		WSW
	8/25/2018	2.4	14.5		SSW
	8/26/2018	2.8	17.8		WSW
Kelseyville South	8/20/2018	2	14.5		W
	8/21/2018	9	16.5		WSW
	8/22/2018	2.5	14.5		WSW
	8/23/2018	2.7	18.5		SSE
	8/24/2018	2.4	14.2		WNW
	8/25/2018	2	12.8		SSW
	8/26/2018	2.6	17.5		WSW
Wight Way	8/20/2018	1.8	13.2	1636	S
	8/21/2018	1.9	12.2	1513	W
	8/22/2018	2	13.3	1106	SE
	8/23/2018	2	13.9	1524	NW
	8/24/2018	1.7	12.2	1430	W
	8/25/2018	1.7	12	1215	NW
	8/26/2018	1.9	13.4	1721	W
Red Hills 1	8/20/2018	2.7	9.1	2215	NW
Elevation 1,790'	8/21/2018	1.5	8.2	1435	ENE
	8/22/2018	2.3	7.8	1945	W
	8/23/2018	2.7	10.7	2055	WNW
	8/24/2018	1.7	9.1	1500	W
	8/25/2018	3.1	13.3	1450	W
	8/26/2018	2.9	12.8	1700	WNW
Guenoc Valley	8/20/2018	1.9	14.5		ESE
	8/21/2018	1.8	12.1		SW
	8/22/2018	1.8	14		SW
	8/23/2018	1.7	13.5		SSW
	8/24/2018	1.6	13.5		SSW
	8/25/2018	1.7	13.5		NE
	8/26/2018	1.8	11.6		SW

Figure 35 Average wind speed, maximum wind speed, gust direction, and time of occurrence (where available) for weather stations in Lake County, week of August 20, 2018

The following comments provide additional evidence supporting the influence of coastal airflow and cooling winds in the proposed area.

Eckhard Kaesekamp, current owner of Knights Valley Grapevine Nursery and former owner of Lake County Grapevine Nursery that was located in the western half of Long Valley, (currently included within the North Coast AVA) reported that he followed the weather forecast for Upper Lake and found it to be very similar to the weather at his location in Long Valley. This was true of temperatures, frost predictions, and winds.[65]

Clay Shannon of Shannon Ridge Family of Wines currently farms the property that was formerly the grapevine nursery. He states that afternoon winds from the west commonly start blowing in the early afternoon.

Michael Noggle, owner of Noggle Vineyard & Winery (currently outside of the North Coast boundary line), reports similar afternoon winds. His property is located on the bench on Old Long Valley Road, outside of the current North Coast AVA. In an email note, Noggle stated, "The prevailing wind that I have observed over the 17 years we have lived here and grown grapes comes from the South West in the afternoon say about 2:30 - 3 pm just about like clockwork. I assume it is from the lake that moves across the division from the downward grade along Hwy 20 from the lake. It could possibly also be from a higher strata from long distance marine influence."

Another testimony on wind in the proposed area was given by Bill Groody, owner of Groody River Films. Mr. Groody served as a consultant to the Lake County Winegrape Commission on a drone video project in early June, 2018 stated, "We has first-hand experience on a Saturday back in June when we were shooting drone videos in several areas of Lake County including Long Valley. The wind was strong everywhere that day, but especially so in Long Valley. I would say it was probably twice the wind speed of an AVA such as Big Valley or Red Hills. It was difficult for us, but the growers tell me that the wind is great for cooling the vines."

Importance to Viticulture

In the report "Climate Characteristics for Winegrape Production in Lake County, California", Jones describes the importance of wind in growing winegrapes. "The role that the wind plays in the growth of the grapevine and the production of fruit is mainly through the effects on vine health and yield, but can also play a role on the heat budget of a vineyard. This is manifested in both a physical nature, through direct contact with the vines and through physiological effects of photosynthesis disruption (stomata closure) and reduced disease infestations (Winkler et al. 1974)." [66]

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[65] Email communication from Keith Brandt, Bella Vista Farming on conversation with Eckhard at Unified Wine & Grape Symposium, January, 2017

[66] Ibid, page 7

Growing Degree Days

Grower comments noted in the final rule establishing the North Coast AVA stated, "...western Lake County is influenced by the ocean, and enjoys Region II and III climates, with Upper Lake at 2967 degree days, and Kelseyville with 3367 degree days. Middletown, also in western Lake County, is slightly warmer in Region IV with 3742 degree days. To the east of the mountain ranges west of Clear Lake, the climate is characterized as Region IV and warmer, similar to the Central Valley."[67] Data from locations in the proposed addition to the North Coast demonstrates that the area is a Region III, consistent with other areas in the North Coast AVA.

The map in Figure 36 is taken from the report Climate Characteristics for Winegrape Production in Lake County, California[68] by Gregory V Jones, PhD, depicts growing degree days for Lake County and Lake County AVAs.

[67] Ibid

[68] Gregory V Jones, PhD, Climate Characteristics for Winegrape Production in Lake County, California, Southern Oregon University, 12/1/2014, page 23

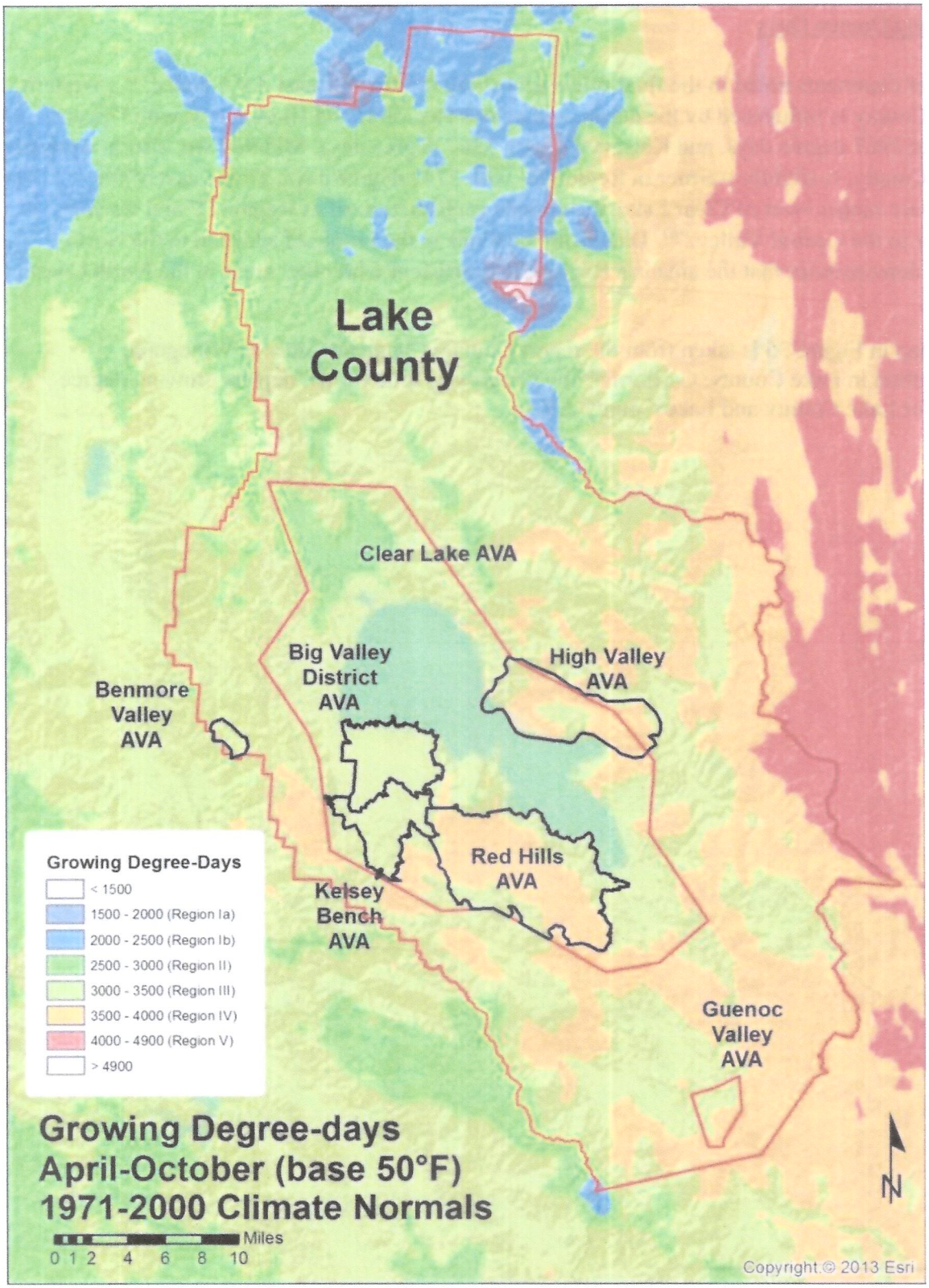

Figure 36 Map showing growing degree days for Lake County AVAs

The chart below shows the ranges for each of the AVAs on the map. The report notes, "values such as those summarized for the Lake County AVAs in Figure 14 (referenced here as Figures 36 and related data in Figure 37) range from a high Region II in the coolest zones (2799 GDD) to high Region IV (3811 GDD) in the warmest zones of the Clear Lake AVA. For the AVA median GDD values the area would be classed as mostly a Region III or very low Region IV."[69]

AVA Name		Median	Max	Min
Big Valley District		3245	3281	3171
Benmore Valley		3248	3332	3155
Kelsey Bench		3250	3593	3189
Clear Lake		3267	3811	2799
Guenoc Valley		3481	3796	3420
High Valley		3548	3755	3139
Red Hills		3595	3753	3155

Figure 37 Minimum, maximum, and median GDD for Lake County's established AVAs

The proposed addition to the North Coast includes the eastern quarter of High Valley as well as the eastern-southeastern portion of Long Valley and lands to the south. This area is predominately the darker green, noting it as a Region III for growing degree days as defined by Amerine and Winkler.

High and low daily temperature data has been kept by Michael Noggle of Noggle Vineyards and Winery for his property located at 700 Old Long Valley Road since he purchased the site. The property is located on the bench on Old Long Valley Road that sits above the southern end of Long Valley. Growing Degree Day calculations based on average temperature above 50° F for the months of April through October are shown in the chart below. The average GDD is 3378, further demonstrating that this area is a Region III.

Data for 2016 is available for two additional locations in the proposed area. The Lamperti Vineyard is located in the eastern quarter of High Valley. The GDD for 2016 for that location was 3240, a Region III.

The Cross Springs Vineyard, also owned by Shannon Ridge is located at 1400 Old Long Valley Road, about 2 miles north of the Noggle property. The GDD for 2016 for this location totals 4269. This result is questionable as high temperatures for some of the days are as much as 20 degrees hotter than the Noggle property which is about 0.8 miles south of Cross Springs Vineyard. Data for all three locations is shown in the chart in Figure 38 below.

[69] Ibid, page 23

Noggle Vineyards & Winery		Cross Springs Vineyard		Lamperti Vineyard	
700 Old Long Valley Road		1400 Old Long Valley Road		1900 & 2150 Round Mountain	
Clearlake Oaks, CA		Clearlake Oaks, CA		Clearlake Oaks, CA	
Year	GDD	Year	GDD	Year	GDD
2016	3377	2016	4269	2016	3240
2015	3596				
2014	3668				
2013	3355				
2012	3305				
2011	2955				
2010	2882				
2009	3416				
2008	3432				
2007	3126				
2006	3355				
2005	3112				
2004	3430				
2003	4277				
Average	3378				

Figure 38 Growing degree day data for three locations in the proposed additional area for North Coast AVA.

Importance to Viticulture

University of California Viticulture Professors Amerine and Winkler developed a system of Climate Regions to categorize locations based on degree days. Heat summation uses a baseline temperature of 50° F because there is almost no shoot growth below this temperature. Locations are categorized as Region I with less than 2500 degree days, Region II with 2501 to 3000 degree days, Region III with 3001 to 3500 degree days, Region IV with 3501 to 4000 degree days, and Region V with over 4001 degree days. Their approach is universally accepted as the most important climatic factor in predicting a site's suitability for growing specific grape varieties.[70] The table on page 35[71], taken from report "Climate Characteristics for Winegrape Production Lake County, California" shows the relationship of degree days and suitability for winegrapes.

[70] A J Winkler, James A Cook, W M Kliewer, Lloyd A Lider, General Viticulture University of California Press, 1962, p 61 - 71

[71] Gregory V Jones, PhD, Climate Characteristics for Winegrape Production in Lake County California, report for Lake County Winegrape Commission, www.lakecountywinegrape.org, 2014, page 6

Boundary Discussion

East

There are no AVAs in Lake County east of the proposed area. The Capay Valley AVA is located in northwest Yolo County. GDD for this AVA range from 2963 to 4318 compared with the GDD average for the proposed additional area for the North Coast AVA[72].

Rainfall

The final rule stated, "ATF has received evidence that rainfall in western Lake County averages 38.9 inches at 5 stations, ranging from 28.9 inches at Clearlake Highlands to 62.2 inches at Middletown. This rainfall is similar to that of Mendocino County, which averages 39.7 inches at 3 stations, and to Sonoma County which averages 34.7 inches at 5 stations."[73]

The Lake County climate study included rainfall data for Lake County's established AVAs. According to the report, "Lake County also has moderate precipitation variability over the region with higher annual amounts along the Mayacamas Mountains to the southwest and in the more elevated regions of the north end of the county… For the AVAs in the region their median annual precipitation values range from 33.6 inches in High Valley to 44.6 inches in Benmore Valley. However, wide ranges over the AVAs are seen with some areas in High Valley, Kelsey Bench, Big Valley District, Clear Lake and Red Hills AVA getting less than 30 inches per year."[74] The chart in Figure 39 shows minimum, maximum, and median rainfall for the AVAs in Lake County from the climate study. Figure 40 has the corresponding map from the same study.

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[72] Ibid, Appendix Table 1, page 56

[73] Federal Register, 27 CFR Part 9, North Coast Viticultural Area, [T.D. ATF-145; Reference Notice Numbers 360, 404], September 21, 1983

[74] [74] Gregory V Jones, PhD, Climate Characteristics for Winegrape Production in Lake County, California, Southern Oregon University, 12/1/2014, page 13 & 14

AVA Name	Median	Max	Min
Big Valley District	30.6	38.3	28.3
High Valley	33.6	54.1	28.3
Clear Lake	33.9	65.4	25
Red Hills	39.4	64.3	25.8
Kelsey Bench	35.1	41.9	29.6
Guenoc Valley	42.8	44.8	40.5
Benmore Valley	44.6	45.6	43.7

Figure 39 Minimum, maximum, and median rainfall for Lake County AVAs[75]

[75] Ibid, page 14

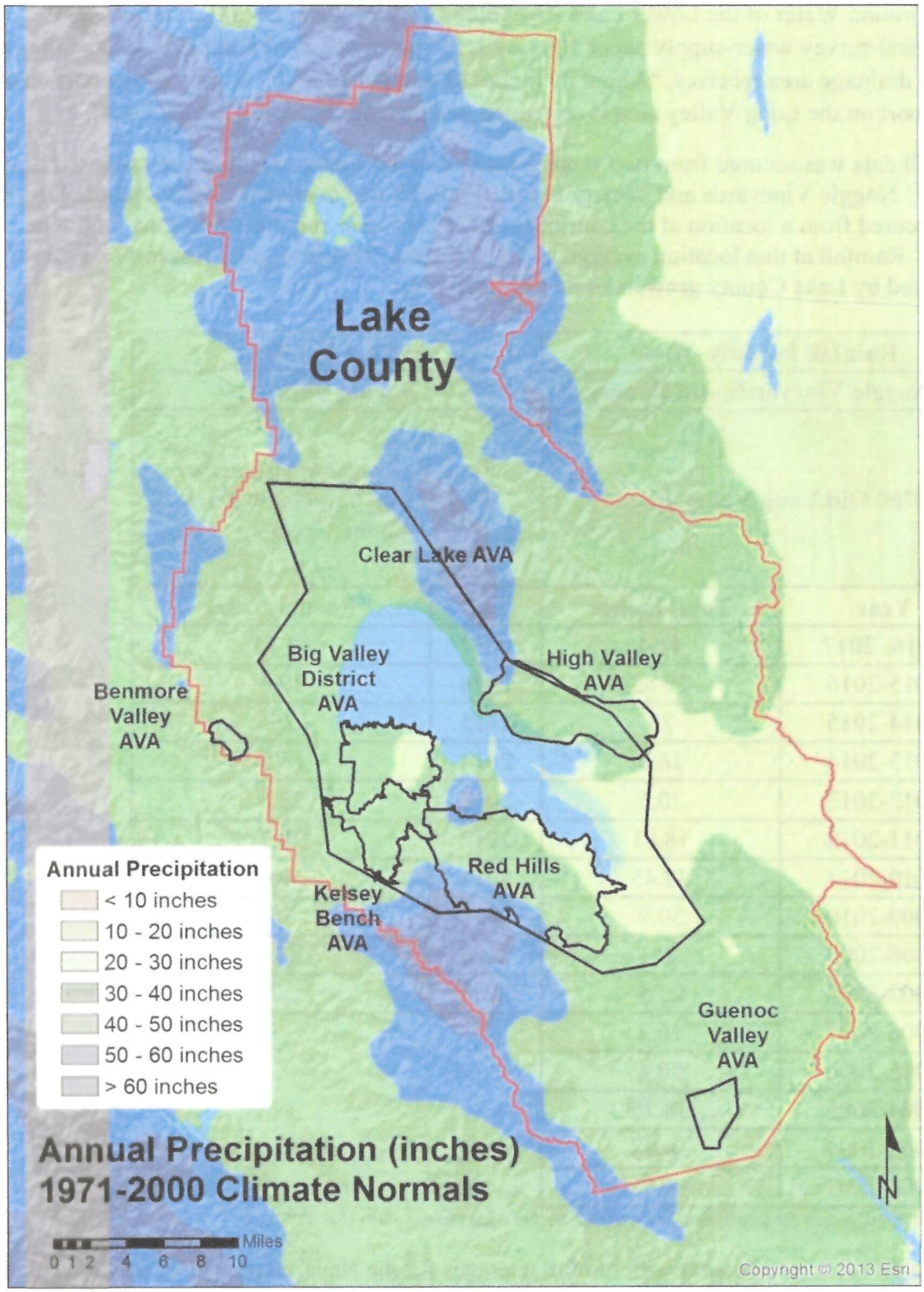

Figure 40 Map showing annual precipitation for Lake County AVAs[76]

[76] Ibid, page 14

The "Ground Water of the Lower Lake – Middletown Area, Lake County, California" geological survey water-supply paper 1297 by J. E. Upson and Fred Kunkel notes that the Long Valley drainage area receives, "About 30 inches of rain per year".[77] A copy of the portion of this report on the Long Valley area is contained in Appendix Exhibit 4, pages 78-82.

Rainfall data was secured from two sources located in the southern half of the proposed Long Valley. Noggle Vineyards and Winery reported rainfall that averaged 27.826 inches. Data was also secured from a location at the confluence of Wolf Creek and the North Fork of Cache Creek. Rainfall at that location averaged 27.145 inches. This is slightly lower than data presented by Lake County growers in original petition.

Rainfall for July - June		**Annual Rainfall**	
Noggle Vineyards and Winery		**Spring Valley**	
700 Old Long Valley Road		**Recorded at Convergence of Wolf Creek and North Fork, Cache Creek**	
Year	**Total Inches**	Year	Rainfall Total
2016- 2017	41.4	2017	43.15
2015-2016	29.85	2016	29.6
2014-2015	28	2015	26
2013-2014	16.8	2014	15.5
2012-2013	20.5	2013	22.5
2011-2012	18.81	2012	20.7
2010-2011	38.45	2011	40
2009-2010	30.9	2010	30
2008-2009	20.1	2009	22
2007-2008	22.5	2008	22
2006-2007	16.2		
2005-2006	50.4		
2004-2005	38.75		
2003-2004	30.08		
2002-2003	14.65		

Figure 41 Rainfall data for locations in the southern half of Long Valley

Putting this data into context with rainfall averages for the Napa, Sonoma, Mendocino counties reveals that the proposed area's rainfall is consistent with neighboring counties in the North Coast AVA. The following data is presented to demonstrate this point. Mendocino County

[77] Ibid, page 73

reported the highest average rainfall with a range of 40 to 49.76 inches while Sonoma County had a wider range with a low of 26.58 inches to a high of 56.95 inches. Napa County averages varied from a low of 20.39 inches for the city of Napa to a high of 41.31 inches for Anguin. There were only two Lake County cities included on this website. Both show average rainfall of 31.5 inches.

Source: U. S. Climate Data		
https://www.usclimatedata.com/climate/california/united-states/3174		
County	City	Average Rainfall
Sonoma	Petaluma	26.58
	Santa Rosa	30.98
	Sonoma	31.49
	Windsor	36.32
	Healdsburg	42.13
	Cloverdale	43.16
	Geyserville	46.08
	Occidental	56.95
	Bodega Bay	N/a
Napa	Napa	20.39
	St Helena	36.67
	Calistoga	40.95
	Anguin	41.31
Mendocino	Ukiah	40
	Point Arena	41.85
	Ft Bragg	43.42
	Willets	49.76
Lake	Clearlake	31.5
	Lower Lake	31.5

Figure 42 Average rainfall for locations in Sonoma, Napa, Mendocino and Lake Counties

For comparison, rainfall data was secured for seven weather stations located throughout Lake County. Although data was not available for all stations for all years, it provides additional data showing a range for annual rainfall 23.68 inches to 44.6 inches.

Rainfall Comparisons							
Western Weather Group for Lake County Winegrape Commission							
Year	Upper Lake	Scotts Valley	Bell Hill West	Kelsey-ville	Kelsey-ville S	Guenoc	Middle-town S
2017	40.49	33.67	38.55	N/A	31.97	49.6	49.48
2016	41.43	40.9	21.22	25.49	30.28	36.23	50.97
2015	20.53	20.21	19.72	19.8	15.09	14.73	29.35
2014	38.34	34.75	33.41	N/A	28.23	21.59	48.61
2013	N/A	N/A	N/A	N/A	14.71	N/A	N/A
2012	41.08	38.54	27.45	25.74	31.72	N/A	N/A
Average	36.37	33.61	28.07	23.68	25.33	30.54	44.6

Figure 43 Annual rainfall for weather stations in Lake County

The data in this section demonstrates that the rainfall for the proposed additional area is consistent with other regions in the North Coast.

Importance to Viticulture

Annual rainfall plays a critical role in ensuring sufficient water for irrigation of grapes and recharge of the underlying groundwater. Wine grapes require sufficient water during the growing season to produce and ripen the fruit, with an average of 8 to 11 acre inches per year based on a study of winegrape production in Lake County.[78] Irrigation water is also used for frost protection.

Boundary Discussion

East

Indian Valley Reservoir lies to the west of the proposed area. Rainfall data for rain years 2006 through 2013 was secured for the Indian Valley Reservoir Gage near Clearlake Oaks. The chart below shows average rainfall for this station of just over 22 inches per year, significantly less than the proposed area.

Rainfall at Indian Valley Reservoir Indian Valley Reservoir Precipitation Gage near Clearlake Oaks U S Department of the Interior / U S Geological Survey http://wdr.water.usgs.gov		
Year	Water Year	Calendar Year
2006	36.91	27.03
2007	15.38	13.73

[78] Ryan Keiffer, Agricultural Technician, UCCE Mendocino, Dr. Broc Zoller, PCA, Kelseyville, Vineyard Water Use in Lake County, California, December 1, 2014

2008	19.97	20.26
2009	17	17.2
2010	28.15	36.14
2011	30.56	19.93
2012	13.97	24.33
2013	17.54	
Average	22.435	22.66

Figure 44 Calendar year and water year rainfall data for Indian Valley Reservoir[79]

Rainfall for the proposed additional area averages 27.1 to 27.8 inches per year, more than the rainfall received at the Indian Valley Reservoir location to the west.

Boundary Discussion

The North Coast boundary line in Lake County was drawn based on testimony and evidence presented in the 1981 public hearing. At that time, viticultural activity in Lake County was in its infancy with about 3,000 acres planted to winegrapes, all located in the western part of the County.

Since the approval of the North Coast AVA, as previously noted, acreage planted to winegrapes in Lake County has more than tripled with more vineyards in the planning stages. The High Valley and Long Valley AVAs have both been part of this development. Based on the successful production of high quality winegrapes and wine by vineyards in these areas, and the demonstrated climate factors, the boundary line as proposed including these areas is both appropriate and correct. Following the same logic as the original boundary as well as recent revision approved with the recognition of the Petaluma Gap AVA, the proposed boundary line is drawn in a straight line from mountain peak to mountain peak.

[79] U.S. Department of the Interior, U.S Geological Survey, https://waterdata.usgs.gov/ca

Revised Boundary Description North Coast AVA

§9.30 North Coast Revised Boundary Line Description (Shown in blue font)

(a) *Name.* The name of the viticultural area described in this section is "North Coast."

(b) *Approved maps.* The appropriate maps for determining the boundaries of the North Coast viticultural area are five U.S.G.S. maps. They are entitled:

(1) "San Francisco, Cal.", scaled 1:250,000, edition of 1956, revised 1980;

(2) "Santa Rosa, Cal.", scaled 1:250,000, edition of 1958, revised 1970;

(3) "Ukiah, Cal.", scaled 1:250,000, edition of 1957, revised 1971;

(4) "Tomales, CA," scale 1:24,000, edition of 1995; and

(5) "Point Reyes NE., CA," scale 1:24,000, edition of 1995.

(c) *Boundaries.* The North Coast viticultural area is located in Lake, Marin, Mendocino, Napa, Solano, and Sonoma Counties, California. The beginning point is found on the "Santa Rosa, California" U.S.G.S. map at the point where the Sonoma and Marin County boundary joins the Pacific Ocean.

(1) Then follow the Pacific coastline in a generally southeasterly direction for 9.4 miles, crossing onto the Tomales map, to Preston Point on Tomales Bay;

(2) Then northeast along the shoreline of Tomales Bay approximately 1 mile to the mouth of Walker Creek opposite benchmark (BM) 10 on State Highway 1;

(3) Then southeast in a straight line for 1.3 miles to the marked 714-foot peak;

(4) Then southeast in a straight line for 3.1 miles, crossing onto the Point Reyes NE map, to the marked 804-foot peak;

(5) Then southeast in a straight line 1.8 miles to the marked 935-foot peak;

(6) Then southeast in a straight line 12.7 miles, crossing back onto the Santa Rosa map, to the marked 1,466-foot peak on Barnabe Mountain;

(7) Then southeast in a straight line for approximately 10.0 miles to the peak of Mount Tamalpais (western peak, elevation 2604 feet);

(8) Then northeast in a straight line for approximately 5.8 miles to the confluence of San Rafael Creek and San Rafael Bay in San Rafael;

(9) Then north and northeast following San Rafael Bay and San Pablo Bay to Sonoma Creek;

(10) Then north following Sonoma Creek to the boundary between Napa and Solano Counties;

(11) Then east and north following the boundary between Napa and Solano Counties to the right-of-way of the Southern Pacific Railroad in Jameson Canyon;

(12) Then east following the right-of-way of the Southern Pacific Railroad to the junction with the Southern Pacific in Suisun City;

(13) Then north in a straight line for approximately 5.5 miles to the extreme southeastern corner of Napa County;

(14) Then north following the boundary between Napa and Solano Counties to the Monticello Dam at the eastern end of Lake Berryessa;

(15) Then following the south and west shore of Lake Berryessa to Putah Creek;

(16) Then northwest following Putah Creek to the boundary between Napa and Lake Counties;

(17) Then northwest in a straight line for approximately 11.4 miles to the peak of Brushy Sky High Mountain (elevation 3196 feet);

(18) Then north in a straight line for approximately 7.6 miles to Red Rocks.

(19) Then northwest in a straight line for approximately 4.3 miles to Chalk Mountain.

(20) Then northwest in a straight line for approximately 6.0 miles to Evans Peak;

(21) Then northwest in a straight line for approximately 5.0 miles to Pinnacle Rock Lookout;

(22) Then northwest in a straight line for approximately 8.0 miles to Youngs Peak (elevation 3683 feet);

(23) Then northwest in a straight line for approximately 11.2 miles to the peak of Pine Mountain (elevation 4057 feet);

(24) Then northwest in a straight line for approximately 12.1 miles to the peak of Sanhedrin Mountain (elevation 6175 feet);

(256) Then northwest in a straight line for approximately 9.4 miles to the peak of Brushy Mountain (elevation 4864 feet);

(266) Then southwest in a straight line for approximately 17.6 miles to the confluence of Redwood Creek and the Noyo River;

(27) Then west following the Noyo River to its mouth at the Pacific Ocean;

(28) Then southeast following the Pacific Ocean shoreline to the point of beginning.