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Redefining apellation boundaries in the Russian River Valley, California

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REDEFINING APPELLATION BOUNDARIES IN THE RUSSIAN RIVER VALLEY, CALIFORNIA

A Thesis

Presented to

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by

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ABSTRACT

REDEFINING APPELLATION BOUNDARIES IN THE
RUSSIAN RIVER VALLEY, CALIFORNIA

by Patrick L. Shabram

Successful viticulture matches the right grape variety to the right environment. Climate, soil, terrain, and exposure are important. American viticultural areas (AVA) were developed by the Bureau of Alcohol, Tobacco, and Firearms (BATF) to regulate geographic names on wine labels. Though environmental features help establish viticultural areas, boundaries of appellations seldom follow geographic attributes. The Russian River Valley AVA has petitioned BATF to expand southward. This AVA is known for its cool climate, production of pinot noir, and soils conducive to viticulture. Study of the climate, soil, terrain, viticultural reputation, and varieties present indicates this appellation is justified in changing its boundaries to areas that better match the appellation's reputed attributes. A more environmentally accurate reformation would eliminate areas from the present AVA and create up to five new appellations in place of one. Five appellations would best represent the diversity of the environment but may be impractical to develop.

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CHAPTER 1

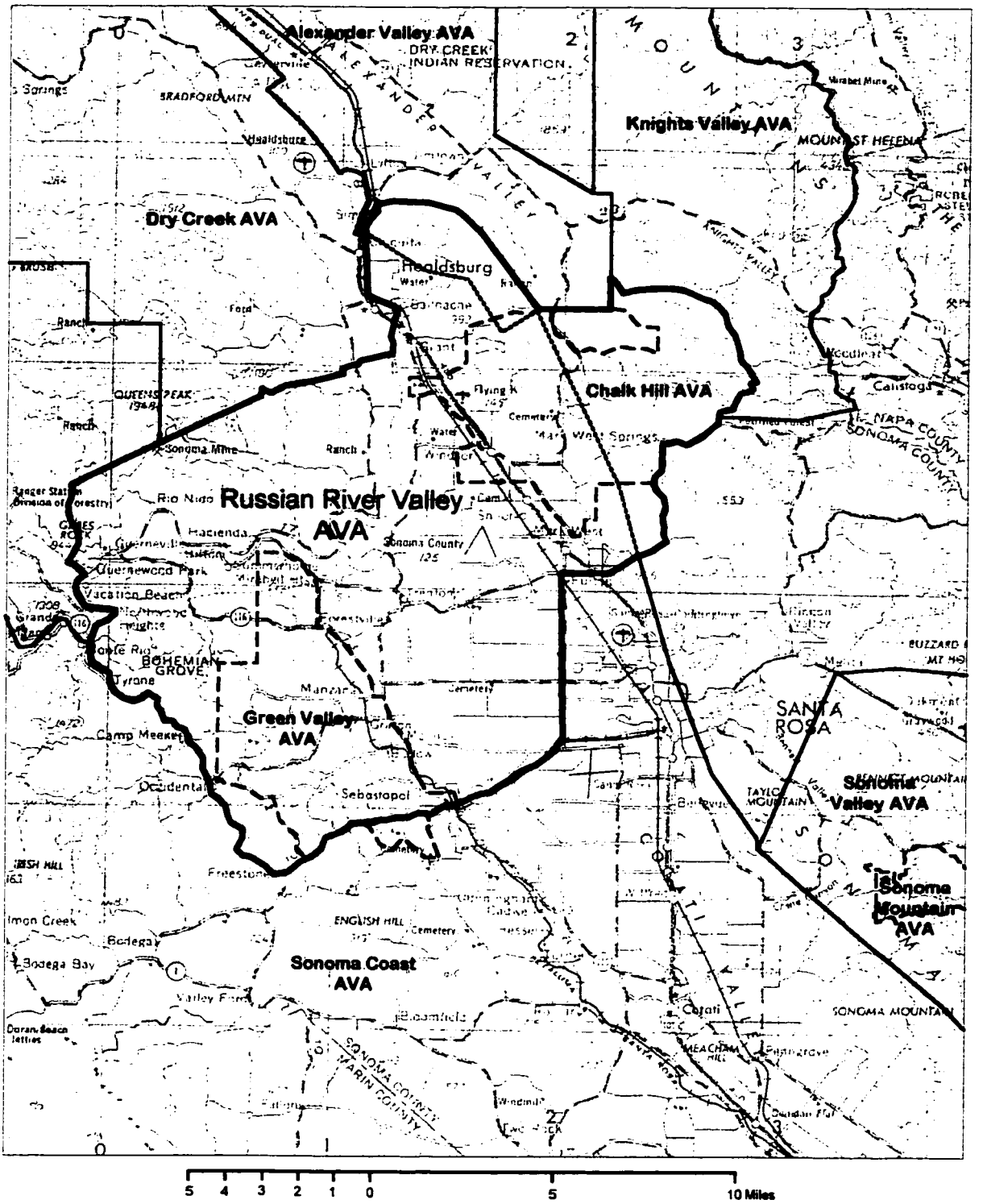
Introduction

The Russian River Valley viticultural area takes its name from a geomorphologic feature in central Sonoma County, California. The area is well noted for its production of the *Vitis vinifera* varieties of pinot noir and chardonnay. With a total area of 96,000 acres, this area is significantly larger than the Russian River Valley itself. This appellation is diverse in both topography and vegetation. The area is marked by western highlands, a large central valley plain, and foothills of the Mayacmas Mountains to the east. Vegetation ranges from mixed shrub and grasslands, to oak filled woodlands and coniferous forests. The boundaries of the Russian River Valley AVA are marked by the Alexander Valley and Dry Creek Valley in the north, Knights Valley in the northeast, the higher elevations of the Mayacmas Mountains to the east, the city of Santa Rosa to the southwest, Highway 12 to the south, the Bohemian Highway to the west and the middle elevations of Queens Peak to the northwest (Map 1).

Designations of viticultural areas resulted from a 1978 decision by the Bureau of Tobacco, Alcohol and Firearms (BATF) to legitimize the use of geographic names on wine labels. Further revising these regulations in 1983, it became necessary for geographic regions other than counties or states to apply and be approved for appellation of origin status before wines could be labeled with the geographic name of that area.

Several criteria are necessary for approval of an American viticultural area (AVA) including identification of physical features that make the area sufficiently different from adjacent areas. BATF approved the Russian River Valley viticultural area in 1983. Recently, the Russian River Valley Winegrowers Association petitioned BATF to extend the current boundaries of the appellation southward. This request came as an increasing number of vines are being planted in the area south of the current boundaries (Oden, 15 Sept. 1997). Since appellations by definition are supposed to be unique, to make this boundary change means the Russian River Valley Winegrowers Association must now demonstrate the internal homogeneity of the proposed expanded area while also proving that the area is different from non-appellation areas outside the proposed expansion. Numerous criticisms of BATF's ability to properly assess the geographical distinction of viticultural areas, especially during the early part of the 1980's when the Russian River Valley AVA was created, suggest numerous avenues for demonstrating the inappropriateness of the original boundaries. Not only have many wine professionals questioned BATF's ability to assess appropriate geographical boundaries, they have also criticized the Bureau for making decisions motivated more by market politics than by viticultural practices. Nevertheless, BATF is requiring the petitioners of the Russian River Valley to provide a much more extensive review before it can approve such an expansion.

Map 1 Russian River Valley AVA and Surrounding Sonoma Viticultural Areas



*Base Map taken from USGS 1:250,000 Santa Rosa map reduced 10%. Current scale is 1:277,778

In 1987, an effort to redefine the boundaries of the Russian River Valley AVA was unsuccessful. The failure came despite testimony of at least one of the original petitioners of the Russian River Valley, another whose expertise was used to create the original appellation, and the one landowner most affected by this move. Still BATF asked for proof that was beyond a reasonable doubt. While previously such testimony had been enough to establish the boundaries, they were no longer sufficient to reduce the size of the appellation. More than likely, BATF is overly concerned with any repercussions to landowners affected by a change in status quo. While this kind of concern may help keep any landowner from being too impacted by changes to appellation designations, it works to undermine the basic principles of the appellation system which in theory applies appropriate geographical identifiers to wine production.

Expanding current boundaries may be easier than excluding an area already established as part of an existing appellation. A recent effort to expand the Paso Robles AVA was successful (Federal Register, 1996). Unlike the Russian River Valley AVA expansion, however, the petition for this expansion came from the affected wineries and included an area that was part of the original petition for creation of this appellation.

The close association between environment and viticulture gives some insight into the appropriateness of the Russian River Valley extension. This study examines the importance of physical geography to viticulture and compares the important attributes of physical geography to both the Russian River Valley AVA and the area of proposed

extension. Such a study should clarify the case for a change to the boundaries of this AVA and outline where these boundaries could be best located.

Importance of Physical Geography to the Wine Industry

The introduction of wine producing grapes to an area nearly always has been the result of human actions; however, physical geography is extremely important to viticultural success. Sometimes the needs for survival of the plant and the environmental characteristics desired by wine producers are not compatible, and viticulture fails. If the local environment permits success, then the physical geography will go further in influencing the grapes by adding subtle characteristics to wine produced from these grapes. These characteristics create the distinctions of wines from different locations.

Historical Diffusion of *Vitis vinifera* in the New World

The two main subgenera of *Vitis* are the *Euvitis* and *Muscadiniae* species. Only a few species make up the *Muscadiniae* genera. All are native to North America, and only one is used to produce wine. The *Euvitis* genera, on the other hand, has several dozen species. Despite the fame of European wine production, the majority of *Euvitis* species are native to North America. The most important wine producer, however, is the Eurasian native *Vitis vinifera.* This species dominates the wine industry in nearly every region of extensive wine production. The high cost of transporting wine, along with the inability to preserve it, often prompted extensive plantings of *vinifera* vines in the New

World throughout the age of European colonization. Countries that did not have their own wine industries looked to their colonies as potential sources for wine. England, for example, wanted to find new locations for wine production that would alleviate the need to import wine from France.

The application of climatology to viticulture has only come of age over the last century, so trial and error had been the method commonly used to establish the new vineyards (de Blij, 1981). More often than not, failure was the result. Efforts in the new colonies along the Atlantic coast of North America in the 17th and 18th centuries serve as classic examples. While wines could be produced from native species, wines made from the desired Eurasian varieties could not. No matter how skilled the viticulturist, *vinifera* would simply not survive. Undoubtedly, this failure was primarily a result of infestation by phylloxera, a louse which nearly destroyed European viticulture upon its introduction to that continent. Ironically, the phylloxera epidemics of Europe further encouraged efforts to establish New World viticulture.

The Spanish had considerably more success in establishing vineyards in Mexico. Drier soils, which drastically limit the growth of phylloxera, are common in many parts of Mexico and *vinifera* was able to succeed. The wineries in Mexico thrived too well, and in 1595 King Philip II ordered the conquistadors not to make any new plantings in fear that Mexico's production would soon rival that of Spain.

The introduction of *vinifera* to California came with Spanish missionaries who were exempt from the Spanish monarch's edict. The grape they used was so closely

associated with missionaries that it became known as the mission grape. The mission grape is considered an inferior wine producing grape, hence, low expectations meant little demand for matching this grape to its ideal climate. Thanks in part to the foresight of several 19th century viticulturists, near disasters from phylloxera, and a depression in wine sales in the mid-1870's, new plantings of better varieties occurred (Carosso, 1976). The mission grape was eventually replaced with other varieties of *vinifera* in all of the better quality wine producing areas.

These early California wine producers had a limited understanding of climatology, botany, or enology. The few producers with wine making experience, usually immigrants, either looked for climates resembling those from which they had gained their previous experience, or looked for places where grapes, any grapes, were able to grow and then planted the varieties with which they were most familiar. Others simply experimented.

Physical Geography and Viticulture

As the hit and miss nature of the spread of *V. vinifera* would indicate, physical geography is a major element in the success of viticultural enterprises. The role of physical geography goes well beyond determining the survivability of the species. The physical environment determines the kind of grape that may be planted, the quality of these grapes, and the kind of wines that may be produced from them.

Most of the wine producing species, and especially *vinifera* grow between the latitudes of 30 degrees north to 50 degrees north or 30 degrees south to 40 degrees south. Production of good quality wines tend to occur in Mediterranean climates, or in marine west coast climates bordering Mediterranean climatic zones. In general, *vinifera* produces the best wine when grown in climates that are prone to long, dry but relatively cool summers. Winter rainfall must be sufficient to recharge soils with moisture before the summer droughts, although irrigation has overcome this last requirement. These generalized climatic regions are only the areas where truly ideal growing conditions exist. Specific varieties of *vinifera* are best understood at a more local scale. The location of many of the more famous wine regions, often found in one or several valleys where climate is heavily influenced by terrain, suggest that generalized conditions alone cannot demonstrate ideal climatic environments.

In addition to climate, vine growth is affected by soil, slope, exposure to sunlight, and the grape variety being planted. The importance of geographic features is echoed in the French concept of *terroir*. *Terroir* suggests that the flavor and character of wine is tied to the physical characteristics of the vineyard or vineyards in which the grapes were grown. In other words, the geography of a vineyard, be it the natural environment in which the grapes were produced or the human induced changes that occurred there, has a direct affect on the wines produced from the grapes of this location. The skill of the wine maker, though important, is limited by the influence of *terroir*.

Recent efforts to define the *terroir* of California viticulture have become popular, primarily from an increased understanding of the importance of physical geography, but also in an effort to make up for the inadequate definition of appellations by BATF. Unique *terroir* can easily be translated into unique wine character by wine makers, partially because the analysis of wine character is not an exact science. Tools to distinguish the chemical variations of wine are not precise enough to define the subtle differences noted by expert wine tasters (Kramer, 1992). Consumers and wine makers alike must depend on the results of taste tests. By defining the unique *terroir* of a wine growing area, wine makers hope to demonstrate the link between place and taste.

The problem with efforts to define *terroir* of the north coast of California is that the concept itself cannot be applied to areas as large as the existing appellations. All the components of viticultural variation -- climate, soil, slope, and exposure -- often vary within small areas. The especially diverse nature of the physical geography of California's coastal valleys creates a nearly limitless number of local conditions that often cross individual vineyards as well as viticultural areas. The climatic variations between Los Carneros and Rutherford in the heart of Napa Valley, separated by less than 10 miles, are even more pronounced than those between Burgundy and Bordeaux which are separated by nearly 300 miles. Yet *terroir* is not used by the French so much to associate the difference between wine regions such as Bordeaux and Burgundy, but to associate the differences between vineyards within each of the regions. This concept

may be used partially to justify the somewhat subjective quality classifications in place there.

Hence, part of the problem in defining viticultural areas is determining the scale at which physical geographic differences will be defined. Though no official hierarchy exists, the viticultural areas of California are in fact defined at several different scales. The Russian River Valley is actually one of a set of viticultural areas that occupy all or part of the Sonoma Coast AVA, which is further a subset of the North Coast AVA. The Sonoma Coast AVA is purely weather based, taking all of Sonoma's coolest and moderately cool locations and grouping them into one viticultural area. The North Coast AVA has no such single identifier. Its climates range from cool to hot, it borders contain more soil types than all of Europe, and nearly every one of the varieties common to California can be grown within its boundaries. The insistent lack of official distinction by BATF between local and regional appellations, however, results in equal connotations when presented to consumers.

Appellations such as the Russian River Valley are considered oversized by many wine experts (e.g., Halliday, 1993, Kramer, 1992), and while the petition sent to BATF for creation of this AVA concentrates on climatic similarities, the area does not exactly follow the climatic features commonly used in describing it. Hence, a thorough examination of the Russian River Valley AVA requires some attention to all those physical components commonly attributed to the success of viticulture -- climate, soil and terrain. Any effort to establish borders should look at the homogeneity of such

environmental components and determine their natural boundaries, at a scale appropriate to an area the size of the Russian River Valley AVA. Only then the extent of the commonality can be used to determine the terminus of the characteristics that best define the viticultural area.

The Importance of Climate

Climate is perhaps the most defining feature of viticulture. According to A. J. Winkler (1962):

> The centuries of experience and research of European growers and enologists have definitely established the effect of climate on wine grapes. Climate influences the rates of change in the constituents of the fruit during development and the composition at maturity.

Though *Vitis vinifera* is versatile enough to grow in many places, most of the world's production of premium wine grapes is limited to specific regions. While grapes grown in areas of little or no seasonal variation lack either the sugar produced by photosynthesis during warm weather, or the acidity that develops in cooler temperatures, extreme seasonal variation can also restrict wine grape production. Many of the consequences of weather extremes are obvious, high heat and drought can wither the vine while *vinifera* is not capable of growing in excessively cold places and yields can be severely damaged by late spring frosts (de Blij, 1981; Lawson, 1976). Disease and pests have as much bearing on climatic preferences as biological adaptation. Summer humidity encourages fungal and viral growth that can often prove fatal or at least detrimental to the vine's ability to produce fruit. Of the many diseases and pests that may attack vines, phylloxera is the

most famous. A native of eastern North America, its introduction to the rest of the world nearly destroyed production in many of the world's most famous wine producing regions. In humid climates, phylloxera attacks the leaf, stems and roots of vines. In drier climates, phylloxera only attacks the root. As most modern *vinifera* plantings are in drier summer climates, phylloxera can be controlled by grafting *vinifera* vines onto phylloxera resistant root stocks, many of which are hybrids of native North American species.

The local microclimate will not only affect the most appropriate viticultural practice, but the very quality of the wine as well. Simply planting varieties in places where they will grow is not enough. The vine also needs to be slightly stressed. This stress affects the character of the wine, taking some of the plant's energy away from the production of the vine and applying it to the grape. Stress also controls the maturation of the grape. Rapid maturation limits the development of acidity and produces grapes that lack the character that can only be produced through timely maturation. Hence, vines are often planted in areas that are less than ideal for their survival. For obvious economic reasons, the climates of these areas must be consistent enough to minimize the number of damaging events. Unfortunately, a stressed vine is also more susceptible to disease (Sullivan, 1996), further complicating the formula for success.

Of the climatic features affecting viticulture, temperature is most often discussed when comparing wine producing regions. Not only are the average and extreme temperatures important, but so is the duration of the highest temperature (Sisson, 20 Sept. 1997), the rate at which the air cools at the end of the day, and the temperature

during the first 30 days after bud break and the last 30 days before harvest (Lawson, 1976). Fifty degrees Fahrenheit is usually indicated as the temperature at which photosynthesis begins. Temperatures between 70 and 90 degrees are considered the peak range for photosynthesis, though these numbers have never been scientifically demonstrated (Sisson, 20 Sept. 1997). The first 30 days after bud break is when buds are most at risk of frost, and temperatures during the last 30 days before harvest will have the greatest affect on the sugar content and acidity of the grapes (Lawson, 1976). Temperatures that are too low result in slower rates of ripening and sugar accumulation, possibly putting the plant at risk of losing its fruit to dormancy or frost. Temperatures that are too high can cause the fruits' sugar to accumulate too quickly while acidity drops rapidly (Lawson, 1976).

Not all varieties ripen at the same rate. Varieties that ripen quicker tend to do better in cooler climates which prolong the ripening stage to allow moderate accumulation of sugar. Varieties that take longer to ripen do better in warmer climates where photosynthesis rates are high enough to permit the fruit to fully mature.

Precipitation and humidity comprise the second climatic component important to viticulture. Since vines do well in areas of dry summers, winter rains should sufficiently recharge the soils with water, although the textures and depths of soils also play important roles. Wine makers previously thought irrigation produced inferior grapes, but the recent success of wines from irrigated fields suggests that irrigation might not only produce premium grapes, but may improve the consistency of the grapes from year to

year. While irrigation may produce grapes of equal quality, it does mean that grapes in areas needing irrigation are put under different conditions than those grapes grown without it. Hence, the need to use irrigation remains a consideration when looking at climatic variables in viticulture. The presence of precipitation during the growing season has several effects. First, the presence of clouds reduces sunlight, hence, photosynthesis (Lawson, 1976). Second, the occurrence of rain within the month before harvest causes the grapes to take on extra moisture diluting the acidity, color and flavor of the grape juice. Third, rain encourages fungus growth such as powdery mildew. High summertime humidity, especially in areas of higher temperatures, also encourages fungal and disease growth.

The Importance of Soil Texture

Europeans, and especially the French, assert that soil is the primary reason for a region's ability to produce fine wines. Though the importance of soil to viticulture is generally accepted and commonly believed to be a distinguishing factor, the exact benefits to the chemical makeup of the wine are neither proven nor understood. Many wine experts agree that soil composition still plays an important role in what often defines an unexplainable component of wines of similar quality; character (Kramer, 1992). Still the correlation between the chemical composition of the soil and that of the wine is too minute to detect using scientific instruments (Ough, 1980).

While the composition of the soil may or may not be important in determining the quality of wine, soil does necessarily have an important bearing on viticulture (Renner, 1990). Many conclusive arguments exist for the importance of well-drained soils. The benefits of well-drained soils are as much practical as they are artistic. Many harmful diseases and parasites, such as phylloxera, are more common in moist soils, and *V. vinifera* will not survive in fully saturated soils. The accumulation of toxins can also be a problem in poorly drained soils (Lawson, 1976).

Texture is important to viticulture since it is directly linked to the moisture capacity of the soil and the amount of precipitation or irrigation needed to allow the vine to survive. The depth of the topsoil will also have some bearing. Generally vine roots will reach a depth of ten feet, but this depth is influenced by the presence of bedrock, hardpan, or a shallow water table (Lawson, 1976). Deeper soils will provide the root system with more access to nutrients and soil moisture. Hence, while insufficient understanding of the relationship between soil composition and quality exists, texture and depth are known to have bearing on the success of viticultural and the amount of human manipulation needed to make a vineyard succeed.

The Importance of Terrain

Like soil, the influence of terrain on viticulture is both practical and theoretical. Steep slopes are generally not acceptable for large-scale viticulture (Sisson, 20 Sept. 1997; Lawson, 1976). Steep terrain typically has shallow soils that carry less moisture.

In areas where viticulture does exist on steep slopes, terracing is necessary to hold sufficient water for the vines to survive. Such vineyards in dry climates must also have access to irrigation. Since water tables tend to be further from the surface, and diverting water from streams to higher slopes can be difficult, irrigation is often not economical. A last impediment of viticulture on steep terrain is the inability of farmers to use mechanical farm equipment making vine cultivation labor intensive.

Gentler slopes offer a different story. Many consider the phrase "vines love an open hill" to be one of the best pieces of advice ever given to growers of wine grapes (Johnson, 1977). The benefits of some slope includes drainage, sun orientation and protection from frost. In the northern vineyards of Germany, west facing slopes are ideal since they can receive the greatest amount of sunlight during the warmest time of the day (de Blij, 1983). Burgundy's Côte d'Or is filled with vineyards facing east to allow the soil to warm gradually with the rising sun (de Blij, 1983). These same benefits of hillside viticulture can be realized in California, though no one benefit takes precedents; vineyards are found on west facing, east facing, south facing, and to a lesser extent, north facing slopes. While every possible orientation of hillside vineyards may utilize a different advantage, one attribute, frost protection, is consistent to all hillside viticulture. Hillside vineyards are less susceptible to frost and extreme cold winter temperatures caused by air drainage (de Blij, 1983).

Sunlight Exposure and Orientation

The last important influence on viticultural regions is the angle and orientation of sunlight. Wine producers who suggest the superiority of their wines based on latitude are usually hoping the consumer will identify similar latitudes to similar climate types. Similar sun angles may be a more appropriate argument. The position of the sun will not only affect the length of the growing season, but also photosynthesis and the rate of cooling as the day comes to an end. Yet the intensity and angle of sunlight are also affected by slope (as indicated above), the orientation of the vineyard, the spacing of the rows, and the spacing between vines. Since this study area covers land with only a minor change in latitude, and since a wide range of viticultural practices causes numerous variations in orientation, an in-depth analysis of solar orientation was not conducted. It is important to note, however, that the intensity of solar radiation is still of importance to this study. In this case, solar radiation is primarily influenced by the infamous fog which commonly blankets much of Sonoma County during the summer growing season.

Grape Varieties and Geography

The final review of any viticultural area would not be complete without a discussion of the varieties commonly planted in the area. The varieties selected are an element of viticultural practice and commonly influenced by market demands as well as tradition. Yet matching the right variety to the right climate often determines the success

of both the vine and the grower. Hence the varieties for which a wine region is most known serve as indicators for the locality.

American Viticultural Areas

The petitioner hoping to establish a viticultural area may be any interested person or group. In order to gain approval as an American viticultural area, the petitioner(s) must provide the following:

> (i) Evidence that the name of the viticultural area is locally and/or nationally known as referring to the area specified in the application; (ii) historical or current evidence that the boundaries of the viticultural area are as specified in the application; (iii) evidence relating to the geographical features (climate, soil, elevation, physical features, etc.) which distinguish the viticultural features of the proposed area from surrounding areas; (iv) the specific boundaries of the viticultural area, based on features which can be found on U.S. Geological Survey (U.S.G.S.) maps of the largest applicable scale; and (v) a copy of the appropriate U.S.G.S. map(s) with boundaries prominently marked. (citation 27 CFR §4.25a)

These rules would imply an exact procedure for establishing a viticultural area based on history, reputation and geography, but the actual process has been criticized for its inability to establish wine producing areas using classic geographical identifiers (Peruzzi, 1983) and for creating appellations that are too large to accommodate all interested parties (Halliday, 1993; Kramer, 1993). BATF has also been criticized for lacking the kind of regulation common to the French appellation model from which this system was based (Kramer, 1993; Moran, 1993).

Environmental perspectives such as *terroir* have more or less been accepted by the AVA system where U.S. appellations serve as geographic identifiers (Moran, 1993). These identifiers are supposed to allow the consumer "to make a more informed choice when buying wine" (Peruzzi, 1983). This rationale suggests that if a consumer can recognize the name of the locality in which the wine was produced, he or she will have a better understanding of the contents of the bottle. Unfortunately the misnomers created by BATF's definitions and approval process defeat this purpose.

The second criterion for establishing a viticultural area (ii) demonstrates the inadequate definition presented by BATF. While "historical or current" evidence is required to prove the boundaries are as indicated in the petition, geographical evidence is not. Rather geographical evidence is required only to establish that the area is unique from adjacent areas. Historical or current evidence, if available at all, is open to interpretation and is commonly associated more with land ownership or previous boundaries that are dependent on factors outside of viticulture. Boundaries to viticultural areas were not previously defined before 1979 because they were not needed. While historical data may prove that an area known as the Russian River Valley produced wines, and that certain wineries are a part of this area, it does not delineate the boundaries of this region. Even if such evidence did exist, it would not necessarily correlate with the geographic features that make the area unique. In the case of the Russian River Valley AVA, 19th century publications showed the Russian River Valley was known for viticulture (The Appellation Committee, 1982). The geographic evidence

showed the area unique because of a "coastal cool" climate, specifically contrasting the Alexander Valley. Robert Sisson, former County Director and Farm Advisor to Sonoma County and expert on the climate of Sonoma County, identified the southern boundary of Alexander Valley "at about the northern Healdsburg city limits" (Sisson, 1981). This geographic information gave way to the final approved boundaries which overlapped the southern Alexander Valley, the very entity from which the Appellation Committee of the Russian River Valley used to geographically distinguish itself.

The United States appellation system is based, for the most part, on the French *Institut National des Appellations d'Origine Contrôlée* system where producing regions have been defined by geographic boundaries. French appellations, however, are essentially administrative districts with strict controls on the vineyards and wineries, regulating everything from the varieties that can be planted to the minimum alcohol content of the wines. While the U.S. system is much less restrictive, it does limit unifying identities to all the wines of an appellation since wineries are open to different viticultural practices including the varieties planted. Hence, French appellations allow a consumer familiar with French wines to not only understand the region in which the wines were produced, but the practices under which they were developed. The U.S. system is intended only to show the area in which the grapes were grown. Despite emphasis on location only, geographical identifiers do not take precedence in appellation designations.

The roles of these appellation systems go well beyond consumer awareness. The U.S. system, like the French system, was developed to protect wineries from a history of wine producers mislabeling their wines to mislead people into believing them to be of a higher quality; a practice that simultaneously undermined the reputation of the more famous regions. Besides protection from unscrupulous imitators, French appellations assure the continued quality of the wines in the given appellations and establish some supply control (Moran, 1993). A secondary role of the American versions is to increase the marketability of the wines. Regardless of viticultural area, any wine produced with more than 75 percent of its grapes coming from a given state or county can label its wine with the name of that political entity. Wines can only list an AVA if at least 85 percent of the grapes have come from a BATF approved viticultural area. Though BATF makes a point of stating in each of its approvals for designation that it accepts "viticultural areas as being distinct and not better than other areas" and that it is not "approving or endorsing the quality of the wine produced" from these viticultural areas, wines labeled with an additional piece of geographic information connotes an exclusive product. Building a new, or relying on an established reputation serves to promote any wine made from grapes of a given area as superior.

Farmers and wineries alike have a definite financial stake in viticultural boundaries as a reputable appellation label not only suggests that most of the grapes used in production of the wine have come from that appellation, but that these grapes were grown under conditions that made the area famous. Appellation boundaries act as

reputation boundaries, and exclusion from a reputable appellation affects the price farmers can charge for their grapes. Grapes grown within the boundaries of a well-known appellations usually bring higher prices than grapes grown outside of these boundaries. Experts commonly agree that Sonoma County versions of the varieties common to the Napa Valley are at a minimum equal in quality to the those of Napa County. Nevertheless, "Napa Valley" is a more famous name, and the grapes from Sonoma County typically command a price that is on average 17 percent less than those from the Napa Valley appellation (Kramer, 1992). In 1997, for example, cabernet sauvignon from Napa County commanded $2,005 per ton compared to $1,784 per ton for Sonoma County cabernet sauvignon (California Department of Food and Agriculture, 1998).

Why Designation is Important: The Role of the Consumer

One aspect that is often overlooked in the history of wine production is the changing preferences of the consumer. As mentioned above, *vinifera* is versatile. It can and does survive in all but the most northern and southern latitudes. The more than 2000 years of experience in the Burgundy region of France is commonly used as an argument for the success of wines produced there. Growers and wine makers from Burgundy are credited with having learned, through centuries old tradition, the best locations for growth of certain varieties of grapes and the best processes for developing wine produced from them. This argument forgets the relatively recent ingenuity of several Champagne

producers including Dom Perignon who was instrumental in developing at least one of the processes for sparkling wine. They also forget the climatic change that undoubtedly has taken place over this time period. Indeed, records of the harvest of grapes have been used to track long term changes in temperature in Europe (Whyte, 1995).

Through trial and error, a plot of ground proves good for a given variety. If this variety persists through many years, then it does so through shifting variables (Johnson, 1971, 1977). Although the location does not change, the local geography does. Hence, the character of the wine produced from this variety has also changed. To say that the character of Burgundian wines has been the same over the last millennium of changing stresses runs counter to the concept of *terroir*. Through the course of climatic change and technological development, the skill of the wine makers and the tastes of consumers must have changed. Reputation has been an important influence in these changing tastes. One cannot quantify or even qualify the differences between wine produced in the famous Bordeaux vintages of 1929 and 1959. Aging would have necessarily affected the character of the wine from both years. The only comparison would be between a wine crushed in 1959 and aged for over four decades and a wine produced in 1929 and left in the bottle for 30 years longer. Nevertheless, consumers continually accept the "better" vintages out of "reputable" wineries as the industry standard for what a fine wine should be. Though the artistic nature of wine production has consistently accepted complex wines as preferable to "flat" wines, certain characteristics are deemed more desirable for certain varieties. Whether the market affects the preferred tastes of wine, or the taste of

the premier wines of the world affects the market, certain wines have been consistently considered more desirable than others. The only tangible explanation for why these wines have been viewed as superior over time has to be location, hence geography has continuously been used as an argument for their distinction (Moran, 1993).

Despite the comparative youth of the U.S. industry, the influence of the market has affected the boundaries of American viticultural areas. The approval process for the Napa Valley AVA serves as a classic example. The original proposal called for the appellation to include the Napa River watershed excluding the southernmost extent near the river's mouth at San Pablo Bay. Out of this proposal came four alternative views on the boundaries of the Napa Valley appellation. The first of these views suggested that the landowners of those properties that were to be divided by these boundaries have the option to include all their property in this viticulturally unique area. The second proposal suggested that the Napa Valley be limited to those areas of the watershed that were below 400 feet in elevation. The third suggestion included valleys east of the Napa Valley watershed. The fourth alternative asked that the southern extent of the boundary be moved south of Suscol Ridge to the Napa County border. Of all these alternative boundaries, the 400 foot elevation line probably made the most sense, primarily because it involves the smallest area, but also because the geographic changes along the valley floor tend to be more gradual than the changes that exist in the two neighboring ranges. Leaving any grape grower out of what is perhaps the best known wine producing area in the Western Hemisphere, however, would have had a dramatic effect on the price those

growers could charge for their grapes, and for those wineries that grow their own grapes, the ability to sell their wine. BATF obviously understood the consequence of excluding vineyards because in its final decision to establish the Napa Valley AVA in 1983, it chose to accept the arguments for including nearby valleys outside of the Napa watershed as well as the area south of Suscol Ridge. Hence, in terms of viticulture, "Napa Valley" was no longer the Napa Valley, an inconsistency that BATF explained by stating "(B)ATF has not attempted to delimit the geological formation known as 'Napa Valley' but identified a grape-growing region which takes its name from a recognizable geographical feature in a grape-growing area" (Department of Treasury, 1981). The Napa Valley AVA, however, stops at the line between Sonoma and Napa Counties. The Carneros district, considered by many to be one of the better defined viticultural areas, crosses the Napa County line and extends well into the southern Sonoma County. Being continuous with the southern Napa Valley, the Sonoma section of Carneros is arguably also part of the "Napa Valley" as defined by BATF, though no one made such an argument. So while BATF may be inclusive in its nature for approval, the inclusion only occurs where the arguments are made.

Hence, the system requires the petitioner, a person or group who has some stake in creating the appellation, to propose the boundaries of the AVA. Others can make arguments for inclusion or exclusion of certain pieces of land. The final outcome is an AVA defined not by those geographical features that set it apart from its surrounding area, but rather an approval process relying heavily on inclusion, and vested interest.

The Russian River Valley AVA

The Russian River Valley AVA was created during a time of intense activity in the formation of viticultural areas. In 1983, BATF approved six viticultural areas in Sonoma County alone. The rapid efforts to establish viticultural area boundaries, where no clear cut boundaries had previously existed, resulted in many AVA's initially being ill defined. In evaluating a proposal to expand any single part of the Russian River Valley, one must be aware that much of the area within the current appellation may be inappropriate. Though development of the Russian River Valley AVA boundaries was relatively free of the kinds of disputes between landowners that have plagued the development of other appellations throughout Napa and Sonoma Counties, such disputes may have led the creators of the Russian River Valley AVA to be overly inclusive in its boundary definition. Such an approach has led to some discrepancies. The original approved boundaries include several areas that overlap the Alexander Valley. They also do not match boundaries defined by the Sonoma Coast AVA. The extent of the Sonoma Coast AVA boundaries is significant because, like the Russian River AVA, the distinction between this viticultural area and some of the surrounding areas was based on climate following observations made by Robert Sisson. According to Louis M. Foppiano of Foppiano Vineyards, who was instrumental in the creation of the current boundaries of the Russian River Valley AVA, the originally proposed boundary of the AVA was moved north to include areas that, at the time, were being left out of the earliest Alexander Valley proposal (Foppiano, 7 Oct. 1997). The creators of the Russian River Valley AVA

did not want to leave an island of unclaimed viticulture between the two. The petitioners for the Alexander Valley AVA later revised these boundaries, creating overlapping appellations (Foppiano, 7 Oct. 1997). The Russian River Valley Winegrowers Association also made an effort to make the boundaries between appellations fit perfectly. The petitions matched the Russian River Valley's northwest corner to the boundaries established by Dry Creek AVA. Because of this boundary, the Russian River Valley AVA includes an area north of the true viticultural areas of the Russian River Valley that, primarily due to terrain and inaccessibility, is unfit for agriculture. Foppiano admits more ideal boundaries would follow the ridges of the slopes on the north side of the Russian River Valley, but felt a more "puzzle perfect" fit was desired by BATF (Foppiano, 7 Oct. 1997). The Russian River Valley AVA also includes areas to the east of Healdsburg that are questionable as viticultural areas. In this case, the Russian River Valley Wine Growers Association was trying to use the most recognizable environmental features to delimit the most eastern boundaries. In doing so, this group has left itself open for some obvious discrepancies between the reputation of the appellation and the boundaries of the appellation. Not only is the approximately 10,000 acres questionable for viticulture because of terrain, but the area is well outside the climate zone for which the Russian River is known (Sisson, 20 Sept. 1997).

Chalk Hill AVA

Two appellations contained almost completely within the boundaries of the Russian River Valley AVA offer some distinction within that appellation. The first of these appellations, the Chalk Hill AVA, was created almost simultaneously with the Russian River Valley AVA (see Map 1). This appellation is contained entirely within the Russian River Valley AVA and shares much of the eastern boundary. Originally intended to include Chalk Hill and the foothills west of Windsor, the current boundaries include areas on the Santa Rosa plain, and even an arm that borders the Russian River. The actual hill from which this appellation takes its name occupies only a small corner of the AVA, the summit of which defines a section of the appellation's northwest boundary. Described as "warmer than the greater Russian River Valley and cooler than Alexander and Dry Creek Valley" by BATF (ATF-155, Ref: Notice No. 411), the area could probably be split in two by the microclimatic changes that take place east of the Santa Rosa plain. The parts of this appellation occupying a section of the Russian River floodplain, as well as much of the area occupying the Santa Rosa Plain, offers a classic example of the inclusive nature of BATF. During the approval process, several petitions came from property owners asking that the boundaries be extended west. These landowners had the support of the original petitioners, so BATF saw no reason to deny them their request. Hence, despite being somewhat smaller in size, Chalk Hill still retains some of the environmental variations that are common to AVA's of larger size.

Green Valley AVA

Unlike Chalk Hill AVA, the petitioners of Green Valley AVA appeared to have ignored the current boundary of the Russian River Valley AVA (Map 1). Common borders only extend along two small stretches of the Bodega Highway (Highway 12). The boundaries of Green Valley AVA actually extend south of the highway to include a small section of territory not currently in the Russian River Valley AVA. This appellation includes most of the valleys cut by Green Valley Creek and Atasadero Creek. Included with the valley floors are the immediate slopes at either side of the north/south running Green Valley. The western boundary is particularly poorly defined, running in a series of straight lines that ignore geographic features altogether.

Analyzing a Boundary Change to the Russian River Valley AVA

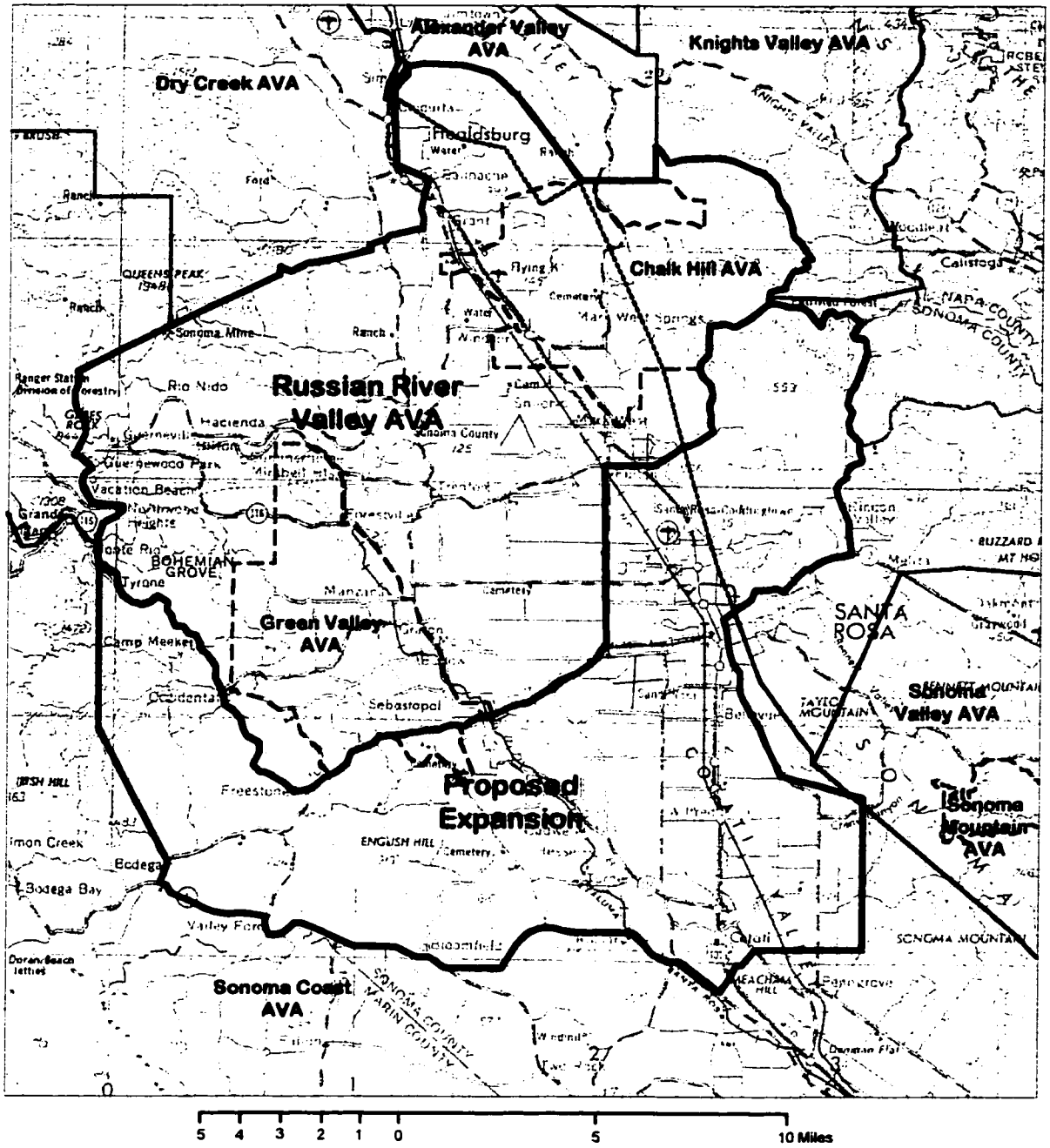
In Summer of 1997, representatives from the Russian River Valley Winegrowers Association wrote a letter to the Bureau of Alcohol, Tobacco, and Firearms requesting an extension of the boundaries to include areas to the south of the existing appellation. BATF immediately rejected this proposal, though due to lack of supporting evidence rather than because it determined the area is not homogenous to the current AVA. This request was primarily a result of expanding viticulture beyond the previous boundaries and a desire by some grape growers in the area to add these vineyards to the Russian River Valley AVA (Oden, 13 Sept. 1997). The Russian River Valley Winegrowers

Association is currently taking steps to meet BATF requirements for a boundary extension.

A close look at the Russian River Valley AVA reveals an area as environmentally diverse as any of its size in the North Coast viticultural region of California. With such diversity, an argument for decreasing the size rather than increasing the size could easily be made. Regardless, to make an appropriate boundary modification the components that define a viticultural region must first be defined for both the current AVA and the area of proposed change. Then the natural boundaries of these components must be identified.

Since physical geography is commonly viewed as the most decisive element of viticulture, an analysis of the local geography must be first and foremost in determining the appropriate viticultural boundaries. This study concentrates on the components of physical geography that are most influential: terrain, climate (including exposure to sunlight), and soils. These components have been reviewed using mostly pre-existing data which are significant enough to establish the varied nature of this region. The common varieties of this area have also been considered, not only to establish reputation and tradition, but as indicators of the physical environment.

Map 2 Proposed Expansion of the Russian River Valley AVA.



CHAPTER 2

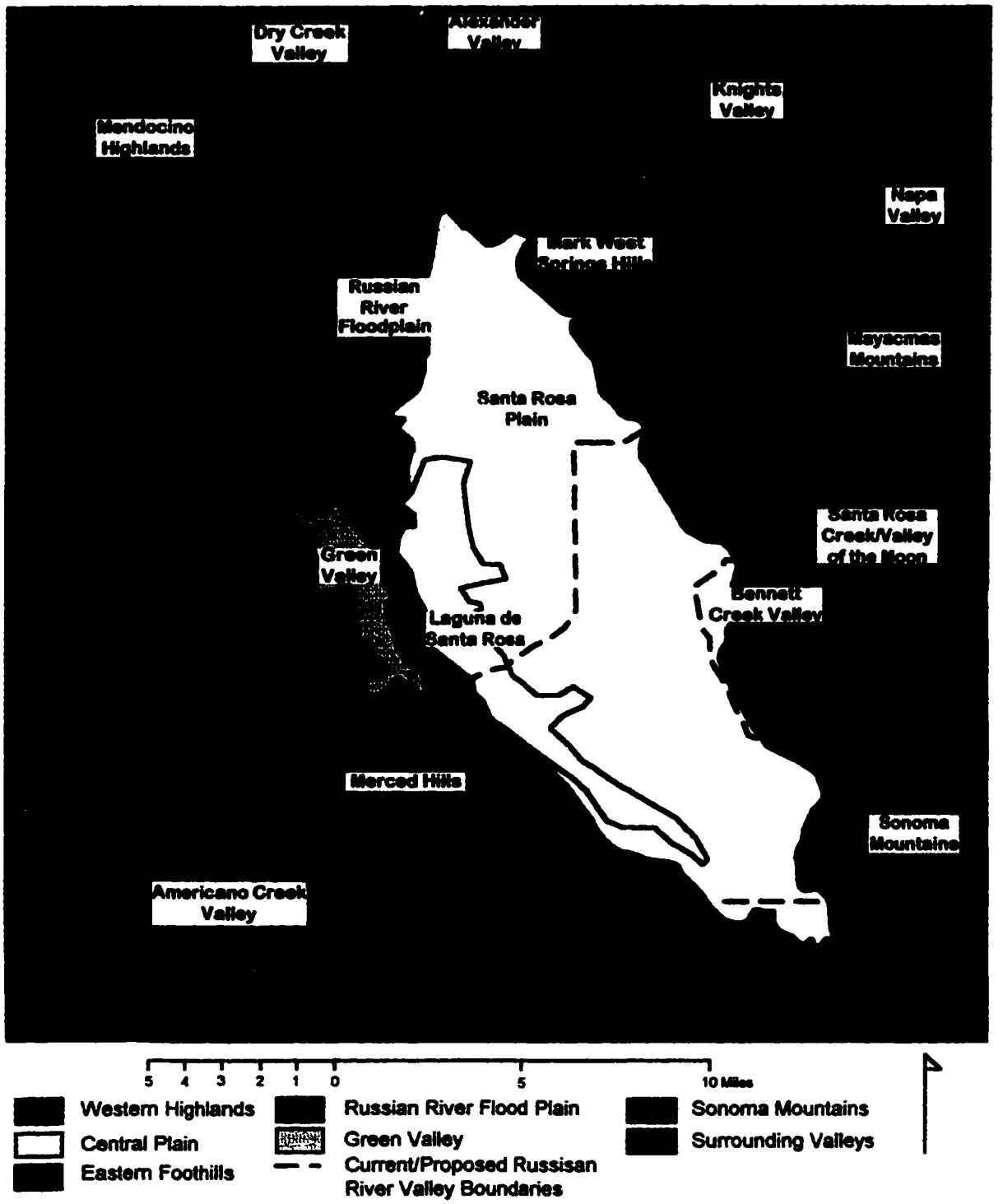
Geographical Analysis of the Russian River Valley

In order to assess climate and soil, local terrain must be introduced first. An understanding of the local terrain will help explain some of the variations in both climate and soil. An introduction to the physical features that are marked by changes in terrain will also provide a baseline for discussion of other components of the Russian River Valley AVA.

This region can be divided into three distinct districts: western highlands, a central plain, and eastern highlands. The western highlands are made up of sections of the Merced Hills and the Mendocino Highlands. The central plain is marked by the Santa Rosa Plain, which also includes the lower lying Laguna de Santa Rosa. The eastern highlands consist of sections of the Mark West Springs Hills/Bald Hills area of the Mayacmas Mountains (Map 3).

There are also two smaller areas worth mentioning. One is the extremely important Russian River floodplain. Much of this floodplain overlaps the northern sections of the Santa Rosa Plain before the river turns west. From here the river and the floodplain cut westward through the Mendocino Highlands marking the Russian River Valley. The other area is Green Valley, a relatively flat alluvial plain along Green Valley Creek which is surrounded on all sides by the Merced Hills.

Map 3 Landforms of the Russian River Valley and Surrounding Areas.



Terrain

Western Highlands

The Merced Hills, located at the southern end of the Mendocino highlands, mark the western edge of the Santa Rosa Plain and the Laguna de Santa Rosa (Map 3). These hills are bordered by steeper hills to both the south and the north. A narrowing band of hills with similar slope and geology extend to the coast, suggesting the appropriate western boundary to these hills would be the Pacific Ocean. The underlying geology comprises a relatively young Pliocene sandstone which wedges itself between broad areas of older sandstone formations. The gentle summits are marked by several fairly wide valleys, suggesting the parent material is of low resistance to weathering. The current Russian River Valley AVA encompasses only the most northern sections of these hills. Until recently, apples were more common in this area than vineyards. The large apple operations previously and currently in existence suggest terrain that does not inhibit large scale agricultural operations. The Russian River Valley AVA section of these highlands includes Green Valley, from which Green Valley AVA takes its name. Despite a vertical drop of only about 300 feet, this valley, which at its widest point is approximately 2500 feet across, isolates the eastern ridge from the higher slopes to the west. Slopes of the Merced Hills section of the Russian River Valley AVA range from less than one degree in the alluvial valleys to just over 50 degrees, with the majority of the area less than 30 degrees.

The steeper slopes northwest of Green Valley create an obvious marker between the Merced Hills and the Mendocino Highlands. These highlands are part of the western ridges of the Coast Ranges. The Russian River makes it way to the sea through these ridges, suggesting the river has consistently cut through the uplifting bedrock. The slopes here are generally above 30 degrees with slopes above 50 degrees common. The steep terrain makes most of this area unsuited for commercial viticulture (Lawson, 1976). The majority of viticulture that does exist is on the Russian River Valley floodplain or on one of its adjacent slopes, primarily on the north valley walls (south facing slopes) which receive more solar radiation.

The area of proposed expansion would primarily add areas described as the Merced Hills. Though the current boundaries only include the northern corner of these hills, the proposed expansion would bring over half of these hills into the appellation. The proposed expansion would also add a significant portion of the Americano Creek Valley to the Russian River Valley AVA.

Santa Rosa Plain/Laguna de Santa Rosa

The Santa Rosa Plain is a broad tectonic trough that has been filled with alluvium. The southern extent of this plain is usually referred to as the Cotati Valley, a feature that is only distinguishable from the rest of the Santa Rosa Plain by a poorly defined break in drainage basins. Santa Rosa is located in the middle eastern section of this plain. With a population of more than 125,000, it is the largest city in the area. The

population of Santa Rosa grew by 3.3 percent between 1990 and 1994 (US Department of Commerce, Census Bureau, 1997), during a time when population growth in much of the rest of the state had slowed considerably. The continued robust growth of this city has led many to encourage vineyard plantings on the Santa Rosa Plain to block a change in agricultural land use to residential (Hearty, 14 September, 1997; Theis, 7 Oct. 1997). The western edge of the Santa Rosa Plain is marked by the Laguna de Santa Rosa. This low lying area is essentially an internal drainage basin that floods almost yearly. The floodwaters here will sometimes reach a height where water runs into one of several nearby creeks (Hearty, 14 Sept. 1997). The frequency of flooding in the Laguna makes it both unsuitable for housing and for viticulture. The northern section of the Santa Rosa Plain is not as clearly defined as its other edges. Though a definite increase in slope is noticeable at the northern end, the relatively flat Santa Rosa Plain is connected to the Russian River floodplain in several locations. While the Santa Rosa Plain would appear the most logical course for the river, the lower elevation of the river channel and a small, broken ridge, have prevented the river from taking such a drastic change in direction. In times of floods, however, Russian River floodwater has been known to spill onto the Santa Rosa Plain via one of several tributaries (Hearty, 14 Sept. 1997). As the Russian River turns west through the Mendocino Highlands, the flat floodplain, though narrowing, is wide enough in many places to provide some of the most famous viticultural landscapes of the area.

The southern boundary of the current Russian River AVA follows Highway 12, cutting the Santa Rosa Plain in half at approximately the location where the change in watersheds occur. The boundary does not include the city of Santa Rosa, however. The proposed boundary would include nearly all of the Santa Rosa Plain to the southern Cotati Valley. The proposed boundary would also include most of the city of Santa Rosa, even though large scale viticulture is unlikely to take place here.

Eastern Highlands

The Mark West Spring Hills to the east of the Santa Rosa Plain are essentially foothills of the Mayacmas Mountains (Map 3). No clearly defined boundary exists between these foothills and the mountains to the east, though the Bald Hills, occupying the northeast corner of the Russian River Valley AVA, are at over 1400 feet and are significantly higher than the adjacent terrain to the west. Most viticulture in this area is in the lower elevations. Although not as steep as the Mendocino Highlands, the slopes in this area are not very uniform, ranging from about 5 to 70 degrees. The steeper slopes make much of this area impractical for viticulture (Sisson, 20 Sept. 1997).

The area of proposed expansion would add almost the entire stretch of the Mark West Springs foothills to the Russian River Valley AVA. This expansion would also add one large and several smaller ridges which, like the Bald Hills, are well over a thousand feet in elevation. The irregular and diverse slopes in this addition would be similar to ones located within the current boundaries.

Climate

As is the case with viticulture in general, climate is the most defining element of the viticultural regions of Sonoma County (Sisson, 20 Sept. 1997, Lawson, 1976). While topography divides the Russian River Valley AVA, climate is a unifying feature. The primary climatic component affecting this area is the coastal fog common to Northern California. This fog delivers summertime temperatures that are cooler than those common to most other California climates. This coastal fog is the result of moist air being drawn inland to areas of low pressure caused by convectional uplift in the warmer interior valleys. As this air moves across colder upwelling water along the coast, moisture in the air condenses creating a fog bank that can be spotted at or near the California coast for nearly the entire summer. The coastal mountains are often high enough to stop the fog's advance, though gaps in these mountains, such as the Russian River Valley, allow the fog to move further inland. This fog invades Sonoma County in three places, from San Pablo Bay to the south, through the Petaluma Wind Gap, and along the Russian River Valley. Midday solar radiation in the Santa Rosa Plain is usually strong enough to burn off this advancing fog bank by midday, but cooler temperatures in the late afternoon allow the fog to return. This fog usually does not burn off again until late the next morning.

The loss of the afternoon and early morning sun drastically reduces the amount of solar radiation available. So important is fog to the climate of Sonoma County, that

Robert Sisson spent more than three decades observing the fog intrusions into the county (Lawson, 1976). Sisson used his observation to map the areas of long term fog and the average area of maximum daytime fog intrusion (Map 4). These observations have been center pieces in several efforts to define the climatic variations of Sonoma County, including one by Sisson himself.

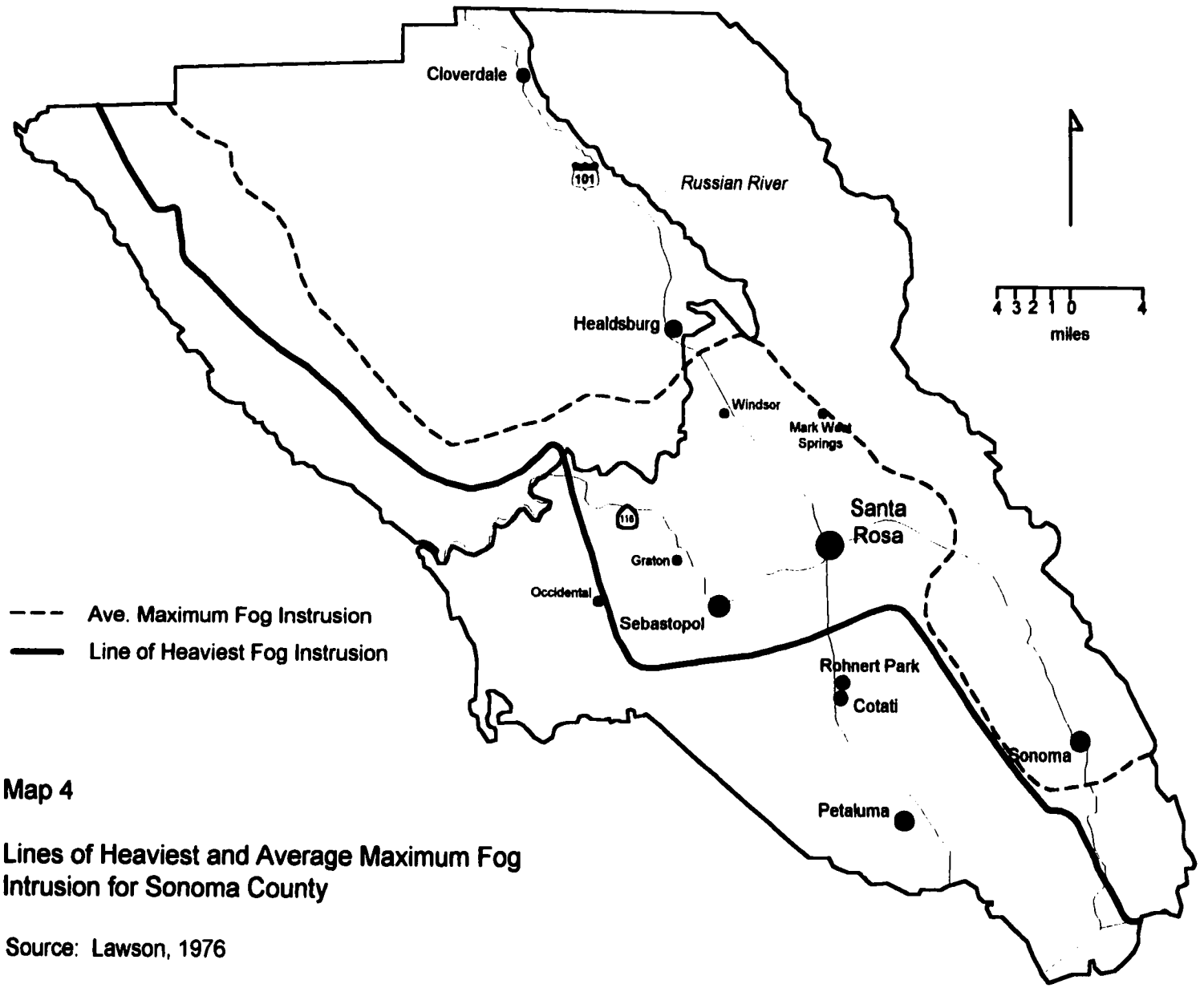
Sisson's model is an alternative to the overly used model established by A. J. Winkler and M. A. Amerine. The Winkler-Amerine model breaks the state into viticultural "regions" based on heat summations. These summations, referred to as "degree days," are defined as the total number of degrees for the mean daily temperature that is above 50 degrees F during the possible growing season (Winkler, 1962). Hence, if the mean temperature for any given day is 70 degrees, then the total accumulation of degree days would be 20 for that day. Winkler and Amerine then used increments of 500 degree days to define five sets of regions based on heat summations, with Region I being the coolest, and Region V being the warmest (Table 1).

Table 1

Heat Summations of Some Californian and European Cities At or Near Well-Known Viticultural Areas (degree days are in parenthesis)

Region I (<2500)	Region II (2500 - 3000)	Region III (3000 - 3500)	Region IV (3500 - 4000)	Region V (>4000)
Geisenheim (1719)	Bordeaux (2500)	Livermore (3260)	Florence (3530)	Naples (4010)
Oakville (2300)	Sebastopol (2519)	Calistoga (3360)	Stockton (3715)	Palermo (4140)
Beaune (2400)	Santa Rosa (2610)			Fresno (4680)
Champagne (2449)	Santa Barbara (2830)			Bakersfield (5030)
	St. Helena (2900)			

Source: Winkler, 1962; de Blij, 1983; Amerine et al., 1980.



Map 4

Lines of Heaviest and Average Maximum Fog Intrusion for Sonoma County

Source: Lawson, 1976

The entire Sonoma coast, and those areas affected by the cooling effects of the fog, are almost always listed as Region I. All areas not listed as Region I are designated as Region II climates. Unfortunately, this classification has been used to define areas as small as single vineyards. The original intent of the classifiers was to provide breakdowns of climate over the state and not for microclimatic variation (Sisson, 20 Sept. 1997). Using this classification for anything other than crude regional evaluation has several drawbacks. A major drawback is that this classification assumes that all temperatures above 50 degrees are equally beneficial to photosynthesis (Sisson, 20 Sept. 1997). For simplification of calculation, the data is also usually compiled using mean monthly averages and then multiplying by the number of days in a month. These means are usually based on the average of the mean daily maximum and the mean daily minimum. An area with relatively consistent temperatures throughout much of the day may be grouped with an area where the high temperature is seldom sustained for more than an hour. Another drawback is the age of much of the original data. The work of Winkler and Amerine started in the 1930's and many of the figures for heat summations developed during their early work remain in use today. One example where the age of data can have a negative effect is seen in the classification of the city of Sonoma, originally defined as a Region I climate by Winkler (Table 2). The data Winkler used, from the U.S. Weather Bureau (Winkler, 1962), are not consistent with more recent data. Several factors may have contributed to the discrepancies. First, the increased population

of Sonoma is possibly creating an urban heat island[1]. This effect will not influence surrounding viticulture, though it does point out the effect that slight variation caused by factors as simple as the placement of a weather station can have on this classification scheme. A second factor is the location of the weather stations. If such variations can occur between two stations located at or near the same city, then it becomes necessary to select a station that best represents the area. A third possibility in the temperature discrepancies is climatic change, though such a change is difficult to prove conclusively given the first two variables mentioned above.

Table 2 demonstrates that seemingly small variations in climate or climatic records can result in large differences in accumulated degree-days. This table compares the climatic data provided by Winkler to data from two additional sources. The first set of data is from a booklet outlining the weather of Sonoma County published in 1964 and prepared by E. Robert Elford of the U.S. Department of Commerce, Weather Bureau. The second is a 1997 source found on the Western Regional Climate Server. Winkler originally labeled Sonoma as a Region I, but Elford's data, coming from the same government agency as Winkler's, suggest that Sonoma has a Region II climate. The last source suggests Sonoma is a Region III. While unlikely that the climate of Sonoma has changed so drastically, such variation in climate over a very short distance is not uncommon to northern California.

[1] Urban heat islands are created when vegetation is replaced by asphalt or concrete which tend to store heat. Conduction produces a warmer air mass which may linger over a city, making temperatures within the city's center a few degrees warmer than in surrounding areas.

Table 2

Temperature Data for Sonoma, California from Three Different Sources

Source	Duration	Apr	May	Jun	Jul	Aug	Sep	Oct	Degree Days*
Winkler	Unknown	55.4	57.8	62.0	64.7	64.4	64.0	60.2	2,360
Elford	30 Years	55.9	59.7	65.7	69.0	67.8	66.6	60.3	2,850
Western Regional Climate Center	1952 - 1997	56.6	61.4	66.9	70.0	69.6	67.9	62.1	3,135

*Winkler apparently further simplified his calculations by counting each month as having only 30 days, a practice that is consistent with a description given in General Viticulture (1962). Using this method, the actual degree days using Winkler's data should be 2,355 and not the 2,360 degree days reported by Winkler. This discrepancy is likely the result of a rounding error. For the purpose of this study, Winkler's practice of counting each month as having 30 days has been followed to ensure consistency.

Sisson's model is applied primarily to Sonoma County. Where Amerine and Winkler used total heat summations based on high temperatures above the growing threshold, Sisson used an accumulation of hours between 70 and 90 degrees during the growing season to distinguish climatic areas. The 70 to 90 degree range was chosen because many believe these temperatures to be the most stimulating to photosynthesis, though, as noted above, this assumption has never been scientifically proven (Sisson, 20 Sept. 1997). Climatic regions for Sonoma County are broken down into "marine", "coastal cool" and "coastal warm" and represented not so much by numbers as by a map developed on Sisson's finding (Map 5). A comparison of this map to the fog line observed by Sisson shows a near match.

At least one other model, developed by Carol Ann Lawson (1976), attempted to delineate the climatic regimes of Sonoma County. This model incorporated "moisture and energy endowments, temperature extremes, and modifying effects of fog" (Lawson,

1976). Again, Lawson's climatic distinctions show a clear relationship to the fog intrusion line drawn by Sisson, though it should be noted that much of Sisson's data were used to establish this model. Despite the thoroughness of her study, the results are somewhat suspect because they use data that were taken over only a ten year period. Unfortunately, no other known documented use of this model with more current data is available.

The model drawn by Lawson (1976) is consistent with Sisson's in suggesting two major climatic inconsistencies in the current boundaries of the Russian River Valley AVA, the northern section overlapping the Alexander Valley AVA, and the Bald Hills area of the Mayacmas Mountains. The area overlapping Alexander Valley is better defined as marginal between the "coastal cool" and "coastal warm" climate types. In some years of deeper fog intrusion, this area is subject to "coastal cool" climates (Sisson, 20 Sept. 1997). Nevertheless, the area is more typically "coastal warm", something that is portrayed both by the viticultural practices and the attitude of the farmers in this area. The warmer Bald Hills area appears as even more of an issue. Not only is the eastern portion of this area beyond the area of normal fog intrusion, but the upper elevations are often above the fog that does penetrate the eastern foothills.

With the exception of portions of the Mark West Springs Hills and the far eastern and northern sections of the appellation, nearly every attempt at defining variations of climate show the Russian River Valley AVA as being within a cooler climate. The lower ridges west of the Bald Hills, and the extreme north areas overlapping the Alexander Valley AVA are both considered marginal climates that may, in any given year, fall into

the Region I or "coastal cool" climatic zones (Sisson, 20 Sept. 1997). Yet even in the cooler years, these areas are warmer than most of the rest of the Russian River AVA (Sisson, 20 Sept. 1997).

Table 3

Comparative Mean Temperatures During the Growing Season at Weather Stations in Central Sonoma County.

Station	Climate	Apr	May	Jun	Jul	Aug	Sep	Oct
Graton	Coastal Cool	54.9	59.4	63.8	65.9	65.8	64.4	59.6
Healdsburg	Marginal	58.2	63.2	68.2	70.5	70.2	68.7	62.9
Cloverdale	Coastal Warm	57.8	63.6	69.9	72.8	72.6	69.6	63.6

Source: Western Regional Climate Center, 1997

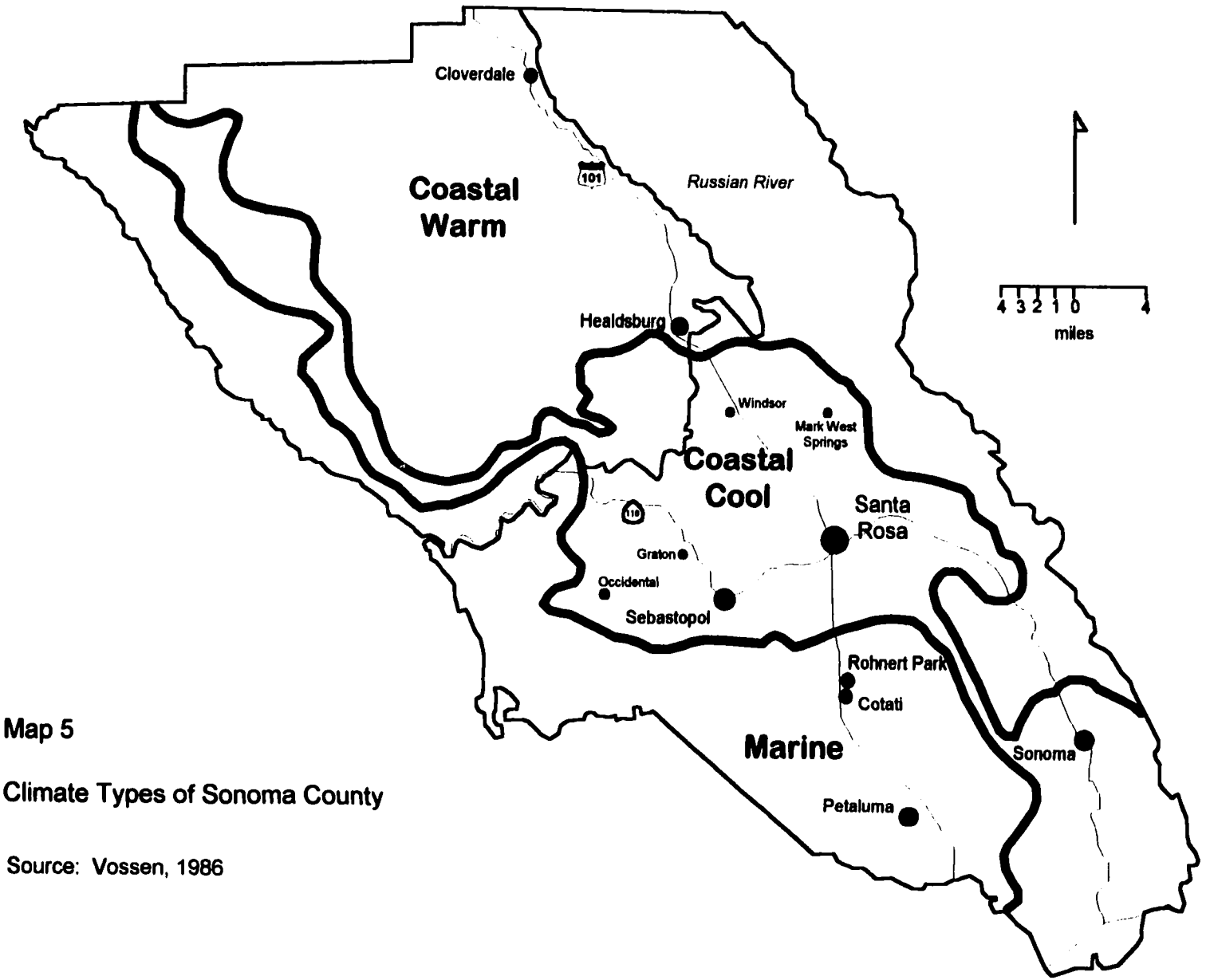
The discrepancies between the areas of warmer climates are fully noticeable when comparing the boundaries of the Russian River AVA with those of the Sonoma Coast AVA. The Sonoma Coast AVA was based almost entirely on the areas classified as either "marine" or "coastal cool". The line dividing the Sonoma Coast AVA from the rest of Sonoma county approximates the generally accepted boundaries between "coastal cool" and "coastal warm." Given the importance of the cooler climate to the Russian River Valley reputation, one would expect the eastern boundaries of these two appellations to approximate each other. They do not (Map 6). This discrepancy was noted by Sara Schorske, a wine consultant, who not only petitioned to establish the Sonoma Coast AVA, but also petitioned to adjust the boundaries of the Russian River Valley AVA since both appellations were supposedly established on the basis of being

"coastal cool" (Schorske, 18 Dec, 1997). Even today an issue remains as to the extent of the fog intrusion. The boundary of the Sonoma Coast AVA does not form an exact match to maps based on Sisson's observations. The map based on Sisson's data shows the distinction between "coastal cool" and "coastal warm" following Martin Creek to an elevation of about 1000 feet, then approximately following this elevation south to an area just east of Mark West Springs. Although this map does not show much of the Bald Hills area as meeting the description of "coastal cool", it does include areas not considered cool by Schorske's petition. A likely explanation is that this area, like the transition between the Russian River Valley and Alexander Valley, is of a marginal climate. The mixture of coniferous and oak woodlands common to the Mark West Springs Hills would support this hypothesis. The successful grape varieties present, which tend to prefer slightly warmer climates, would also support this hypothesis (see discussion of varieties below).

In support of the Schorske petition to redraw the Russian River Valley AVA, statements to BATF suggesting that the current appellation boundaries were not accurate in terms of climate came from Robert Sisson, Louis Foppiano, one of the original Russian River Valley petitioners, and Mark Lingenfelder of Chalk Hill Winery. Despite these statements, BATF still requested "actual thermograph readings or other objective geographical evidence that the original boundary of the Russian River Valley was incorrect" (Federal Register, 1987). As no thermographic data existed, the proposal was withdrawn.

The western section of the Russian River Valley AVA is of the opposite extreme of the "coastal cool" climate type, and several areas are identified by the Sisson map as being "marine". "Marine" climates, as defined by Sisson, are areas where persistent summertime fog results in climates that are too cool for viticulture (Lawson, 1976). Though vineyards do exist in this area, they are usually limited to protected valleys (for example, sections of the Russian River Valley) or at elevations above 1000 feet. Vineyards above 1000 feet in elevation are often above, or almost above, the fog drastically reducing the limiting factors caused by consistent fog cover (Theis, 26 Feb. 1998). Hence, a few isolated microclimates within the "marine" climate zone are conducive to viticulture. The most western vineyards on the Russian River floodplain are also within the region generally identified as "marine". Despite the successes of viticulturists exploiting these microclimates, Sisson's assumption generally appears to be correct; several efforts at viticulture in the "marine" climate of Sonoma County have produced marginal results at best.

For the most part, the proposed boundary extension would include areas of "coastal cool" climate within the zone marked by the common extent of fog intrusion. The exceptions are the eastern Mark West Spring Hills, and the western and southern regions that are often referred to as "marine" climates. Where "marine" climates currently only occupy a small section of the western part of the appellation, this climate type would be much more predominant with the proposed expansion.

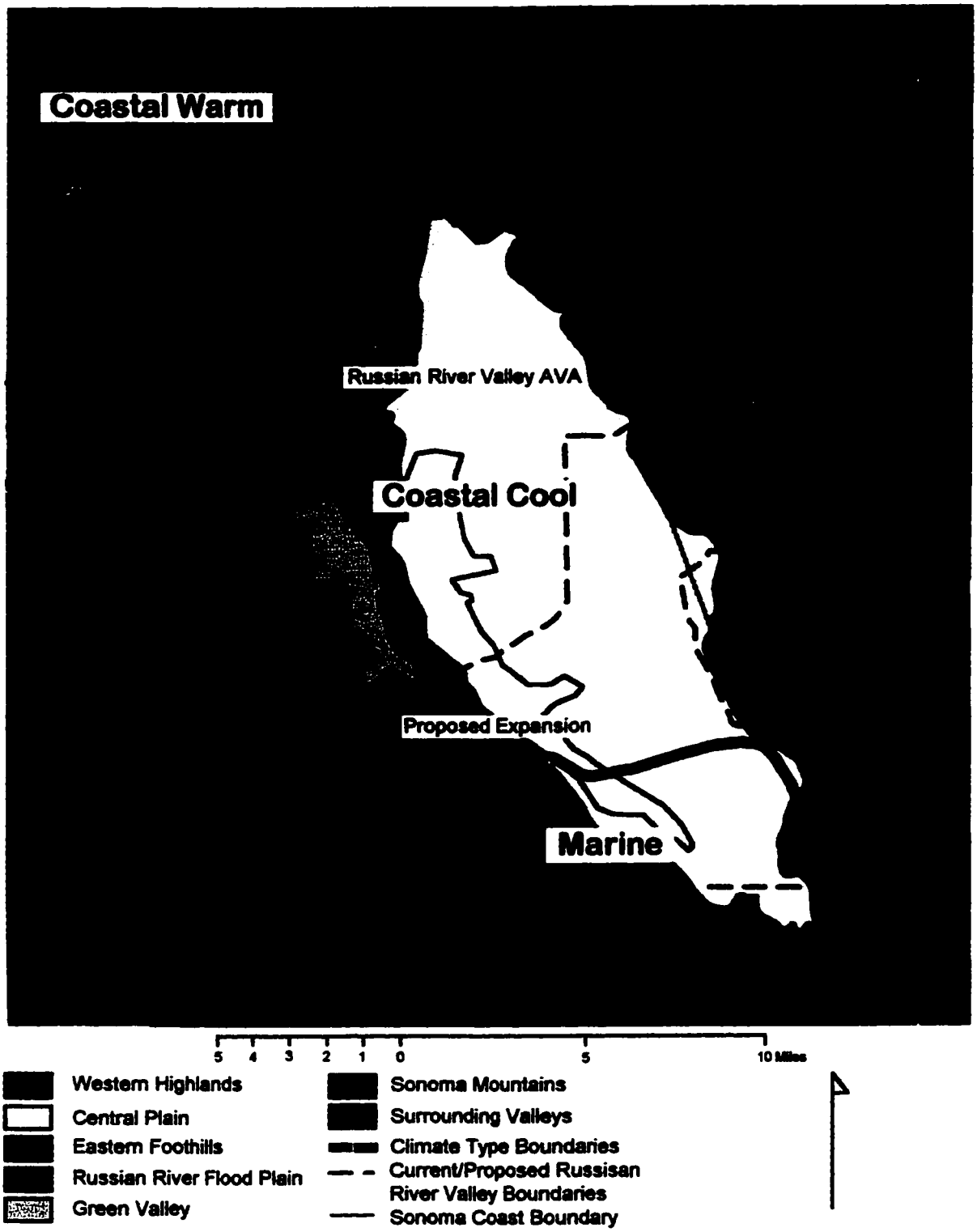


Map 5

Climate Types of Sonoma County

Source: Vossen, 1986

Map 6 Climates of the Russian River Valley AVA



Soils

When evaluating the regional soil geography, the vast diversity of soils in the coastal ranges and valleys of Northern California must be considered. Napa County, for example, has more soil types than all of France (Clarke, 1995). The abundance of soil types has often frustrated those searching for a definition of their local *terroir*, especially since *terroir* is often translated to mean "soil" (Moran, 1994). The Soil Survey of Sonoma County by the Department of Agriculture, Soil Conservation Service and Forest Service (DOA) makes note of the diversity of soils in Sonoma County and identifies soil associations for study over broad areas of the county. A soil association is a "landscape that has a distinctive proportional pattern of soils" (U.S. Department of Agriculture, 1990). This study concentrates on soil associations as laid out in "General Soil Map: Sonoma County, California," a map found in the Soil Survey. Use of this map as a basis for identifying the soils of the Russian River Valley AVA is best justified by this statement by the DOA (1990):

> A map showing soil associations is useful to people who want a general idea of the soils...who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use.

A closer look at the soils of each locality will undoubtedly show vineyards cut by differing soil types. Such an in-depth analysis of soil is beyond the scope of this thesis. Only where an important differential exists or where soil type is relatively homogenous, such as in the Russian River floodplain, are individual soil series discussed.

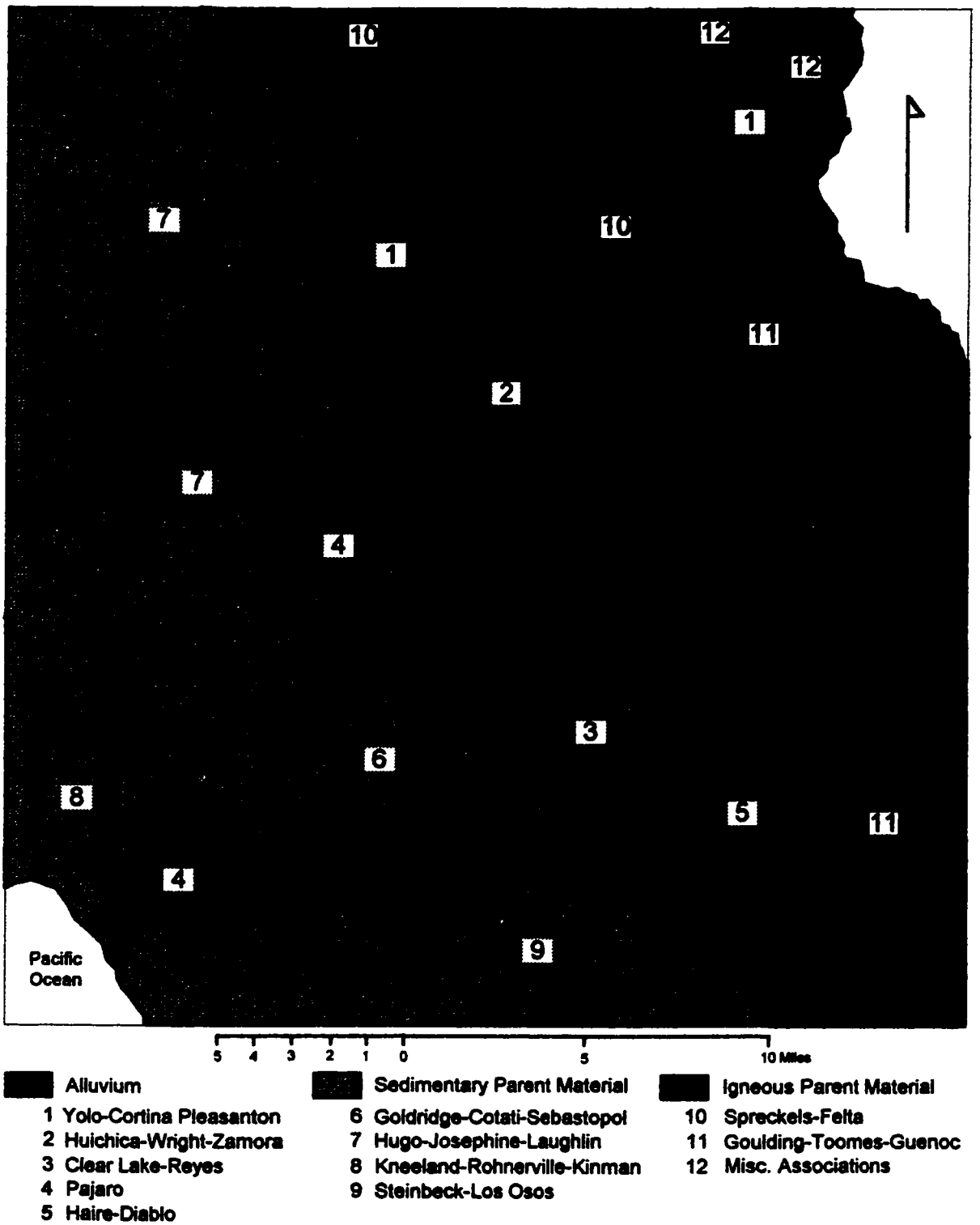
The use of soil associations is also appropriate because texture, in particular the ability of the soil to drain moisture, and depth is given greater relevancy to viticulture than is soil structure and mineralogy. Like terrain and climate, the texture and depth affect the conditions to which the vines are exposed, while composition arguably affects only the character. As is the case with topography, however, the soil associations of the Russian River Valley can be broken into three basic sections that are indicative of corresponding parent material. This parent material effects composition as well as texture. Hence a review of the basic soil texture in the Russian River Valley AVA also includes a correlation to composition.

The basic soil associations of the Russian River Valley AVA predictably follow the terrain and geology of this area. The soils can be divided into three basic sections: those of the western highlands, the central valley, and the eastern highlands. As is the case with terrain, two smaller areas require additional analysis; Green Valley and the Russian River floodplain (Map 7). Like topography, these three districts are cut short of their logical conclusion by the southern boundary of the Russian River Valley AVA.

Soils of the Santa Rosa Plain/Laguna de Santa Rosa

The Santa Rosa Plain is marked primarily by the Huichica-Wright-Zamora association and the Clear Lake-Reyes association. Common to basins and low terraces, the Huichica-Wright-Zamora association occupies the majority of the Santa Rosa Plain.

Map 7 Soil Associations of the Russian River Valley AVA and Surrounding Areas of Sonoma County.



These soils were "formed in a mixture of cold weathered basic alluvium and sedimentary alluvium" (Department of Agriculture, 1990). Huichica-Wright-Zamora soils tend to be moderately well drained with some instances of poorly drained soils (Department of Agriculture, 1990). Excluding the Laguna de Santa Rosa, this association occupies the plain outside the Russian River floodplain to an area just north of Five Creek, approximately 3 miles north of the city of Cotati. The current boundary of the Russian River Valley AVA slices through the bottom portion of the Huichica-Wright-Zamora association area. The proposed expansion would extend the boundaries beyond the limits of this association. The soils of the expanded area are predominately Wright series, however, and tend to be deeper in the proposed area than the predominately Huichica series within the current boundaries. Wright soils are somewhat poorly drained, making them not as desirable for viticulture.

The Clear Lake-Reyes association is common to the Laguna de Santa Rosa. "The soils of this association formed in alluvium derived from plant remains mixed with sedimentary and volcanic rock material" (Department of Agriculture, 1990). In the case of the Laguna de Santa Rosa, almost all this association is represented by Clear Lake series soils. This section of predominantly Clear Lake soils follows a narrow strip south to where Five Creek flows into Laguna de Santa Rosa. From here, a large block of Clear Lake series soils is found. This area is not in the current Russian River Valley AVA, but it does occupy much of the proposed expansion on the Santa Rosa Plain. Clear Lake soils tend to be clayey, hence poorly drained.

A block of Haire-Diablo association soils can also be found near the Sonoma Mountains to the west of Cotati. These soils are a mixture of alluvial soils derived from sedimentary rocks. They range from well drained to moderately well drained. As is currently the case with the Huichica-Wright-Zamora association, the proposed boundary expansion would essentially dissect this soil region in half.

Soils of Mendocino Highlands/Merced Hills

Two primary soil associations can be found in the Mendocino Highlands/Merced Hills section of the current Russian River Valley AVA. The boundary between these two areas approximately follows the boundary between the areas dominated by slopes of 5 to 30 degrees (the Merced Hills) and the area predominantly above 30 degree slopes (Mendocino Highlands). The current boundaries dissect sections of both soil associations. The southern boundary of the proposed area adds a section of a third soil association.

The Mendocino Highlands of the Russian River Valley AVA is primarily composed of the Hugo-Josephine-Laughlin association. These soils are "well-drained, gently sloping to very steep gravelly loams" common mainly to mountainous areas (Department of Agriculture, 1990). Hugo series soils are predominant. Hugo soils are especially gravelly and well drained and usually occur in areas above 800 feet in elevation (Department of Agriculture, 1990).

The current boundary of the appellation dissects the northern arm of the Goldridge-Cotati-Sebastopol association. This association is comprised of moderately to well drained soils of "fine sandy loams and sandy loams." This section tends to be of the Goldridge series, moderately drained sandy loams of 3½ to 5 feet in depth, with Sebastopol series soils found in the hills just west of Laguna de Santa Rosa. Sebastopol series soils are also sandy loams with a depth of 3½ to 4½ feet, but they tend to be better drained than the Goldridge series soils.

The one exception to these soils is in Green Valley where Pajaro and Bluchers soils common to the Pajaro association are present. These soils are somewhat poorly drained with loams and sandy loams underlined by alluvial sediments. Both soil types have depths of greater than five feet.

The Merced Hills section of the proposed addition would add a significant area of the Goldridge-Cotati-Sebastopol association to the appellation. It would also add the northern section of an area dominated by Steinbeck series soils of the Steinbeck-Los Osos association and an area of Kneeland-Rohnerville-Kinman association. Steinbeck-Los Osos soils are primarily moderately to well drained loams with clay loam subsoils, with depths ranging from 20 to 60 inches. Kneeland-Rohnerville-Kinman soils are well drained to moderately well drained loams. Also included in the expansion area is a part of the Americano Creek Valley. Like Green Valley, this area is marked with the presence of Pajaro association soils.

Soils of Mark West Springs Hills/Bald Hills Area

The Mark West Spring Hills and the Bald Hills, like the Mendocino Highlands and the Merced Hills, are marked by different soil associations. The Spreckels-Felta association closely follows the area marked by the Mark West Spring Hills with the exception of an arm of this association that extends into an area of the Mendocino Highlands between the Alexander Valley and the Dry Creek Valley. These soils are well drained, very gravelly loams to clay loams. The Bald Hills section of the Russian River Valley AVA dissects a small section of the Goulding-Toomes-Guenoc association common to many of the western ridges of the Mayacmas Mountains, though the soils in this area are actually composed of Forward, Laniger, and Yorkville soils. Forward series soils are composed of well drained gravelly loams with underlying "gravelly sandy clay loam subsoil" and rhyolite rock and tuff (Department of Agriculture, 1990). Laniger series soils consist of well drained loams, 18 inches to 45 inches in depth with underlying rhyolite and rhyolitic tuff. Yorkville series soils are moderately well drained clay loams with clay subsoils. These soils are 24 to 60 inches deep and, like the Laniger series, are of igneous parent material. While extending the southern boundaries to include all of the Spreckels-Felta association, the northwest section of this proposed area includes soils primarily of the Goulding series. These soils are well drained clay loams of a depth of 12 to 24 inches and underlain by metamorphosed igneous rock.

Soils of the Russian River Floodplain

Especially important to Russian River Valley viticulture are the famous soils of the Russian River floodplain. These soils are primarily of the Yolo-Cortina-Pleasanton association, in this case, a very localized soil type with an extraordinary influence on viticulture. The soils of the Yolo-Cortina-Pleasanton association are "formed in alluvium derived from mixed sedimentary rock and basic rock" (Department of Agriculture, 1990). As the area is a floodplain, the soil here is highly fertile, and many other agricultural products thrive on these rich alluvial deposits. These soils tend to be deeper than 5 feet (usually closer to eight feet) and are bound by an under bed of particularly gravelly soil which mark previous river channels. Though Yolo soils are the most common, Cortina soils (sandy loams) are also present on the higher floodplains. The Yolo-Cortina-Pleasanton association is not found anywhere within the proposed addition.

Table 4

Soils of the Russian River AVA and Area of Proposed Expansion

Soil Type	Feature/Location	Parent Material	Drainage	Depth
		Central Valley of Appellation and Proposed Expansion		
Huichica-Wright-Zamora association, predominantly Huichica	Santa Rosa Plain	alluvium	moderate	25 to 40 inches
Clear Lake series	Laguna de Santa Rosa, Expanded Boundaries	alluvium	poor	about 40 inches
Huichica-Wright-Zamora association, predominantly Wright	Expanded Boundaries	alluvium	poor	10 to 20 inches
Haire-Diablo association	Expanded Boundaries	alluvium, sandstone, shale	well to moderate	25 to 60 inches
		Western Highlands		
Hugo-Josephine-Laughlin association, predominantly Hugo	Mendocino Highlands	sandstone	good	30 to 60 inches
Goldridge-Cotati-Sebastopol association	Merced Hills, Expanded Boundaries	sandstone and other sedimentary rock	good	42 to 60 inches
Pajaro association	Green Valley, Expanded Boundaries	alluvium	moderately poor	60 inches
Kneeland-Rohnerville-Kinman association	Expanded Boundaries	sandstone, shale	well to moderate	16 to 60 inches
Steinbeck-Los Osos association	Expanded Boundaries	sandstone	well to moderate	18 to 60 inches
		Eastern Highlands		
Spreckels-Felta association	Mark West Springs Hills, Expanded Boundaries	igneous rock	good	22 to 60 inches
Forward series	Bald Hills Area	rhyolite	good	20 to 40 inches
Laniger series	Bald Hills Area	rhyolite	good	18 to 45 inches
Yorkville series	Bald Hills Area	rhyolite and other igneous rock	good	24 to 60 inches
Goulding series	Expanded Boundaries	metamorphosed rock	good	12 to 24 inches
		Russian River Floodplain		
Yolo-Cortina-Pleasanton association	Russian River Floodplain	alluvium	good to excessive	5 to 10 feet

Grape Varieties

The relationship between geography and varieties of wine grapes has only recently dominated viticultural analysis despite the centuries old understanding in Europe that certain vines are better adapted to some areas than others. While the association between environment and variety is commonly mentioned by viticulturists and wineries, the importance of wine varieties as geographical identifiers is often overlooked. The reason varieties are seldom used as geographic identifiers may be due to the fact that while geography affects the success of given varieties, different varieties do not have differing affects on their surrounding environment. A second reason, especially true in New World viticulture, is that the ultimate decision as to which grapes are to be planted where has been closely related to cultural and economic factors. History, preference, and markets have had significant influence on such viticultural practices.

A favorable reputation is not easily given to a viticultural area without some success. Success should not occur unless the viticulturists present have in some way succeeded in selecting grapes that are appropriate to a given area. Once this reputation is established, and the right variety has been found for an area, then little motivation exists for changing these practices, and indeed, market savvy would warrant exploitation of such a reputation.

As early as 1938, A. J. Winkler saw the economic benefits to matching the right variety to the right environment. In that year, Winkler made comments targeting the

common practice of producing several different varieties of wine at a single winery, a practice still common today. According to Winkler, the production of multiple varieties "prevents the establishment of a reputation for a given region" (Winkler, 1938).

Mapping the number or distribution of grape varieties in the Russian River Valley, or most areas of California, is impossible without a thorough farm to farm survey. Even then, the words of growers would need to be accepted as fact; distinguishing different varieties just by looking at the leaves or grape clusters can be a daunting task. Hence, reputation, not statistics, becomes the primary method for determining the importance of any variety to an area.

Studying the reputation of viticulture over space can provide a sign post for noting geographic variation. Perhaps the world's two most famous viticultural areas, Burgundy and Bordeaux, have distinction in both climate and reputation which make them comparison posts for many other viticultural areas. Burgundy is famous for production of some of the world's best pinot noir, pinot blanc, and chardonnay, all used in both still and sparkling wines. Bordeaux, on the other hand, is known for production of cabernet sauvignon, merlot, sauvignon blanc and semillon. The varieties common to Burgundy are known as cool climate varieties, and appropriately reflect the cooler climate of the Burgundy area. The same climatic link is true of Bordeaux where grapes preferring slightly warmer climates are common.

Grape growers in the New World do not have the long tradition familiar to growers in Burgundy. A definite evolution of the more famous wine producing regions,

however, has shown an increasing coordination of varieties with preferred climate types. Hence, the cooler microclimates of Napa and Sonoma counties are increasingly producing more pinot noir and chardonnay, and less of the warmer weather varieties. The reverse is true in the warmer microclimates of these two counties. This pattern is reflected in the industry where several wineries have chosen to produce only one or two varieties. Those wineries that do produce more than two varieties have recently made efforts to show that the grapes used for a specific wine come from areas suited for that variety.

The Russian River Valley AVA is known for its chardonnay and pinot noir; the latter is considered by many experts to be among the best in the world. Though nearly every review of the Russian River Valley wine producing area will refer to the fame of the region's chardonnay, pinot noir is consistently given special attention. Russian River Valley's pinot noirs have even been compared to "some of the best of Burgundy" (Bullard, 1991). So well-known are the pinot noirs from this region, that a discussion by a panel of experts on the best place in California for production of pinot noir focused on three viticultural areas; the Carneros district of Napa and Sonoma Counties, the Santa Maria Valley of Santa Barbara County, and the Russian River Valley (Boyd, 1996). This attention may be caused by the lack of excellent growing areas for a grape that is considered somewhat difficult to produce. While chardonnay also prefers a cooler climate, its range of acceptable environments goes well beyond that of pinot noir. Hence, chardonnay production is not necessarily as strong an environmental indicator as

pinot noir. Given the reputation of Russian River Valley pinot noirs, and the abundance of limiting factors to its success, its production serves as a good indicator of the viticultural boundaries of this area.

The reputation of the Russian River Valley AVA contrasts sharply with that of the nearby Alexander Valley and Dry Creek appellations. As noted earlier, both of these viticultural areas are considerably warmer. The varieties for which both of these viticultural areas are well known are cabernet sauvignon, merlot, and zinfandel. The variance in climate is indicated by a variance in viticultural reputation. Growers in the north and northwest sections of the Russian River Valley AVA, however, are also more prone to plant cabernet sauvignon and merlot than pinot noir, reflecting the warmer climate in these locations compared to much of the rest of the Russian River Valley appellation. The practice of growing cabernet sauvignon and merlot is true of the section where the Russian River Valley AVA and Alexander Valley AVA overlap. The wineries and vineyards of this area are also much more prone to associate themselves with the Alexander Valley AVA. The website for Seghesio Family Vineyards suggests that its San Lorenzo Ranch vineyard, located in an area where the Russian River Valley and Alexander Valley AVAs overlap, is in an area that "up to five years ago, was considered part of the Russian River Valley" (Seghesio Family Vineyards, 1997). The somewhat loose association to the Russian River Valley may be due in part to the fact that over half of this vineyard is planted with chardonnay grapes. Nevertheless, this association was not desired enough to pursue an accurate assessment of the Russian River Valley AVA

boundaries. A map showing the location of its vineyards also fails to show the two appellations overlapping. The desire of these wine makers and grape growers to associate themselves with the Alexander Valley is not a reflection on the Russian River Valley but rather the favorable reputation of Alexander Valley cabernet sauvignon and zinfandel. In the case of Seghesio, much of its reputation rests on the success of its zinfandel wine.

In the viticultural areas of the Mark West Springs Hills and the area northeast of these hills, warm climate grapes are much more likely to be planted than are pinot noir, even within an area classified as "coastal cool" by the Sisson map (but not by Sara Schorske). Chalk Hill Winery, for example, has over half its production in cabernet sauvignon and sauvignon blanc, with the remaining half in chardonnay (from a Chalk Hill Winery brochure, date unknown). Even though the area is best described as a marginal climate, a notable movement towards increased production of cabernet sauvignon, sauvignon blanc, and especially merlot is obvious. Another area to note is the area northwest of the Bald Hills summit, where Silver Oak has several vineyards. Silver Oak is one of California's most famous producers of cabernet sauvignon.

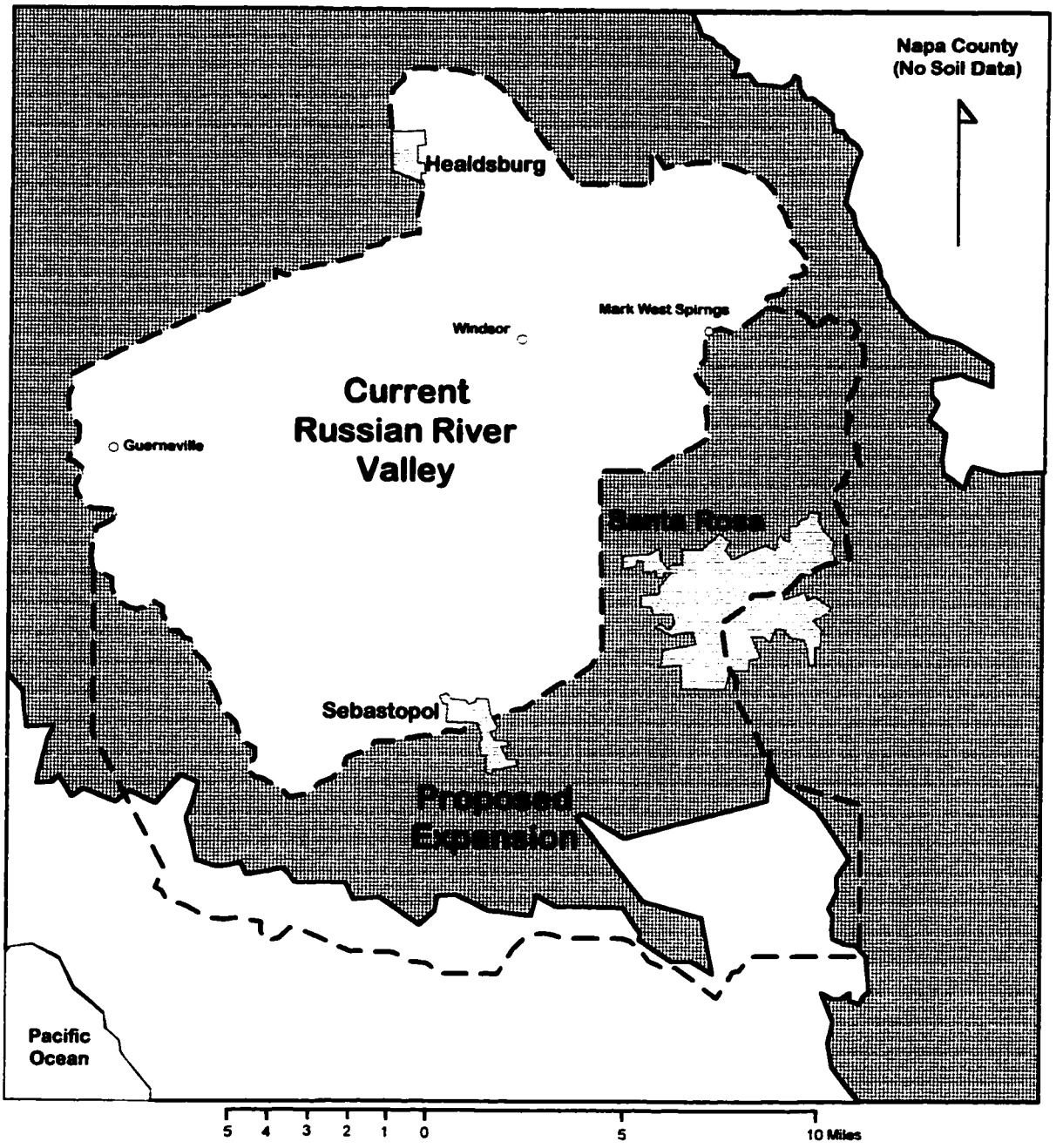
CHAPTER 3

Identification of the Boundaries of the Russian River Valley

Though many of the geographical attributes that can be applied to the Russian River Valley AVA are essentially dissected by the appellation's boundaries, the adjusted appellation boundaries as currently proposed by the Russian River Valley Winegrowers Association would do more of the same. In a few cases, the expansion would add new attributes to this AVA, and these too would be dissected by appellation boundaries. A more reasonable expansion would be to draw boundaries that, wherever possible, followed current climate patterns, terrain and soil types to their apparent conclusions.

Since all three of the Sisson model climate types are represented by the current Russian River Valley AVA boundaries, then climate alone cannot be used as a defining factor if the current characteristics of this appellation are to be used to delimit the expanded appellation. A combination of climate, terrain, and soil must be considered. Such criteria set apart several areas that do not fit any profile currently contained within the Russian River Valley AVA (Map 8). Most of these areas are small, though one significant area is the southern Santa Rosa Plain. Here a combination of "marine" climate, little slope, and predominance of Clear Lake soil is found that cannot be identified anywhere else within the current AVA. The area of the appellation that does contain a "marine" climate is in a more mountainous area, hence of greater microclimatic variation. Another area that should be excluded from expansion is the

Map 8 Areas Similar to Localities within the Current AVA Boundaries

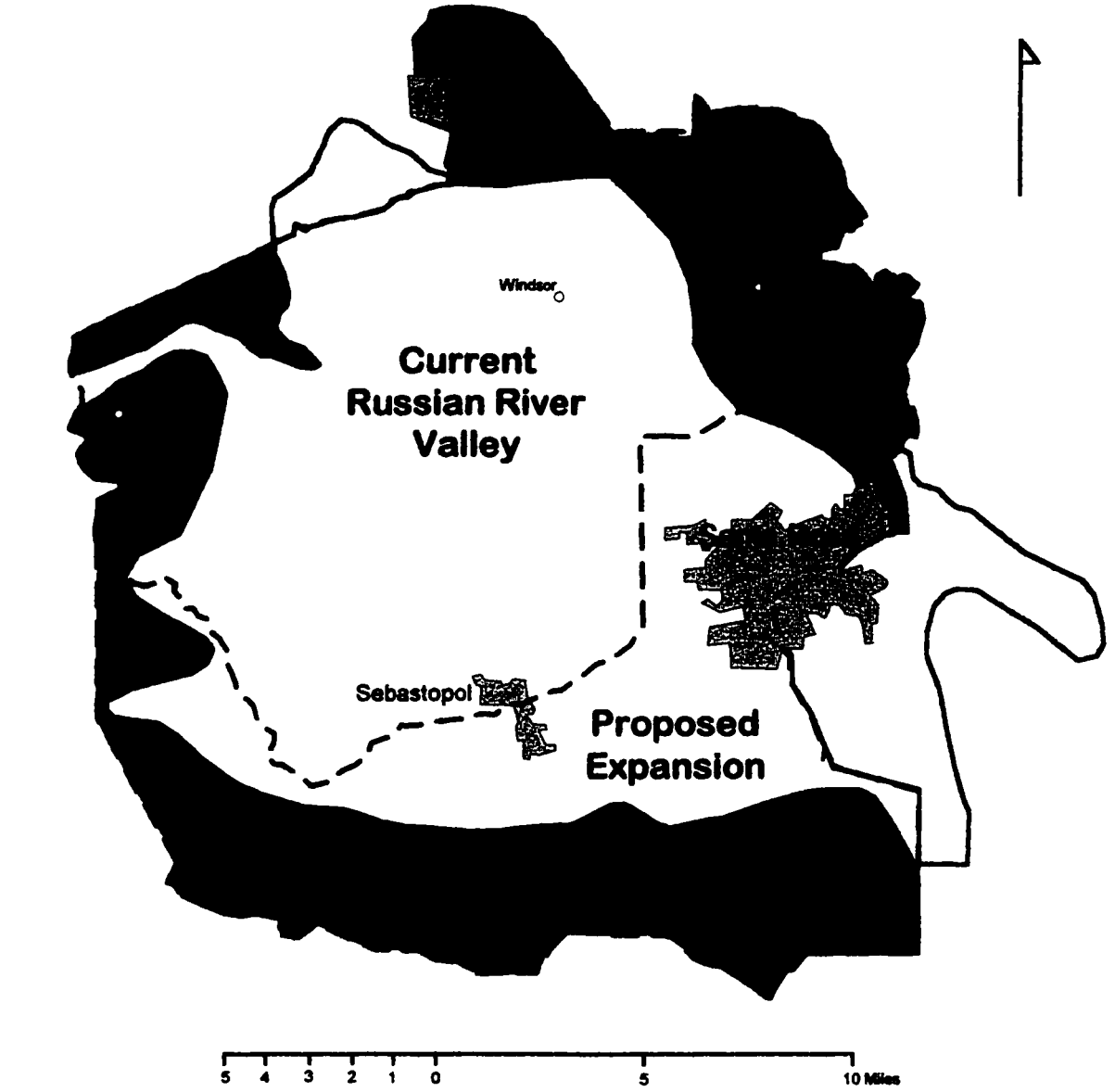


Americano Creek Valley. Here soil and slope match that of Green Valley, but climate does not.

Unfortunately, the diversity of the Russian River Valley AVA makes the current boundaries not very compelling; the current appellation boundaries do a poor job of distinguishing the unique attributes of the Russian River Valley AVA from the surrounding areas. Much of the area east and northwest of the appellation have attributes matching areas within the boundaries. The soils present continue to support this observation. For example, the presence of Forward, Laniger, and Yorkville soil types east of the Bald Hills, combined with steep terrain and warm climates, resemble the characteristics of the Bald Hills. Even though this area is questionable for viticulture and well outside the climate and soil type of the areas for which the Russian River Valley is known, it is similar to areas within the current boundaries.

More defining criteria establishing any sort of boundary change would be to include those components for which this appellation is best known, its "coastal cool" climate and its production of pinot noir, and compare them to surrounding areas. This definition is consistent with the Russian River Valley AVA petition to BATF, which used a statement from Robert Sisson distinguishing the "coastal cool" climate of that appellation from the "coastal warm" climate of the Alexander Valley. Map 9 shows the areas that truly reflect the Russian River Valley's most known attributes. Several areas within the Russian River Valley do not meet these criteria. BATF, however, has shown an unwillingness to remove any area already within an approved appellation.

Map 9 Areas with Characteristics Matching the Russian River Valley Reputation



The above criteria would greatly limit the area within the proposed expansion. Especially limited would be the southern and southwestern sections. The northeast area would also be eliminated from the proposed expansion, but an area east and southwest of Santa Rosa not currently included in the proposal by the Russian River Winegrowers Association could be included.

One criterion missing from this evaluation is the presence of Santa Rosa, where housing and businesses take precedence over vineyards. Though such an inclusion may not be advisable, the possibility of large scale viticulture developing within this urban area is still possible, and, however unlikely, still more probable than viticultural development within the most rugged areas of the Mendocino Highlands. For that reason much of the outskirts of the city may be included. Most urban areas should be excluded, however. If viticulture does develop in the urban center of Santa Rosa, it would undoubtedly come under different environmental conditions from the rest of the Russian River Valley AVA.

Those areas within the Russian River Valley AVA that do not meet the requirements listed above have also been identified (Map 9). The extreme west has been identified because of climate. Here a "marine" climate exists based on data from Sisson whose own statement supported creation of the Russian River Valley based on its "coastal cool" climate. The northwest section, north of the Russian River floodplain is questionable because of climate type and terrain. Not only is much of the area considered "coastal warm," but a large part is unfit for viticulture. The area around Healdsburg is questionable also because of climate. This area is more likely indicative of

the Alexander Valley AVA which also includes much of this area within its boundaries. The Bald Hills area of the Mayacmas Mountains has been identified because of both terrain and climate. Again, a "coastal warm" climate and terrain not suited for large scale viticulture is present. The lower elevations of the Mark West Springs foothills are questionable, even though much of this area is identified as "coastal cool". Not only have several wine industry professionals suggested that this area might not be as cool as originally indicated, but the success of grapes preferring warmer climates seems to support these accusations. Several areas where viticulture has only recently developed have also been included with this section. The local vegetation, dispersed oaks with small stands of coniferous trees, and this area's position inland from the areas of the heaviest fog intrusion suggest that like the other marginal climates in the area, it would be less suited for pinot noir production.

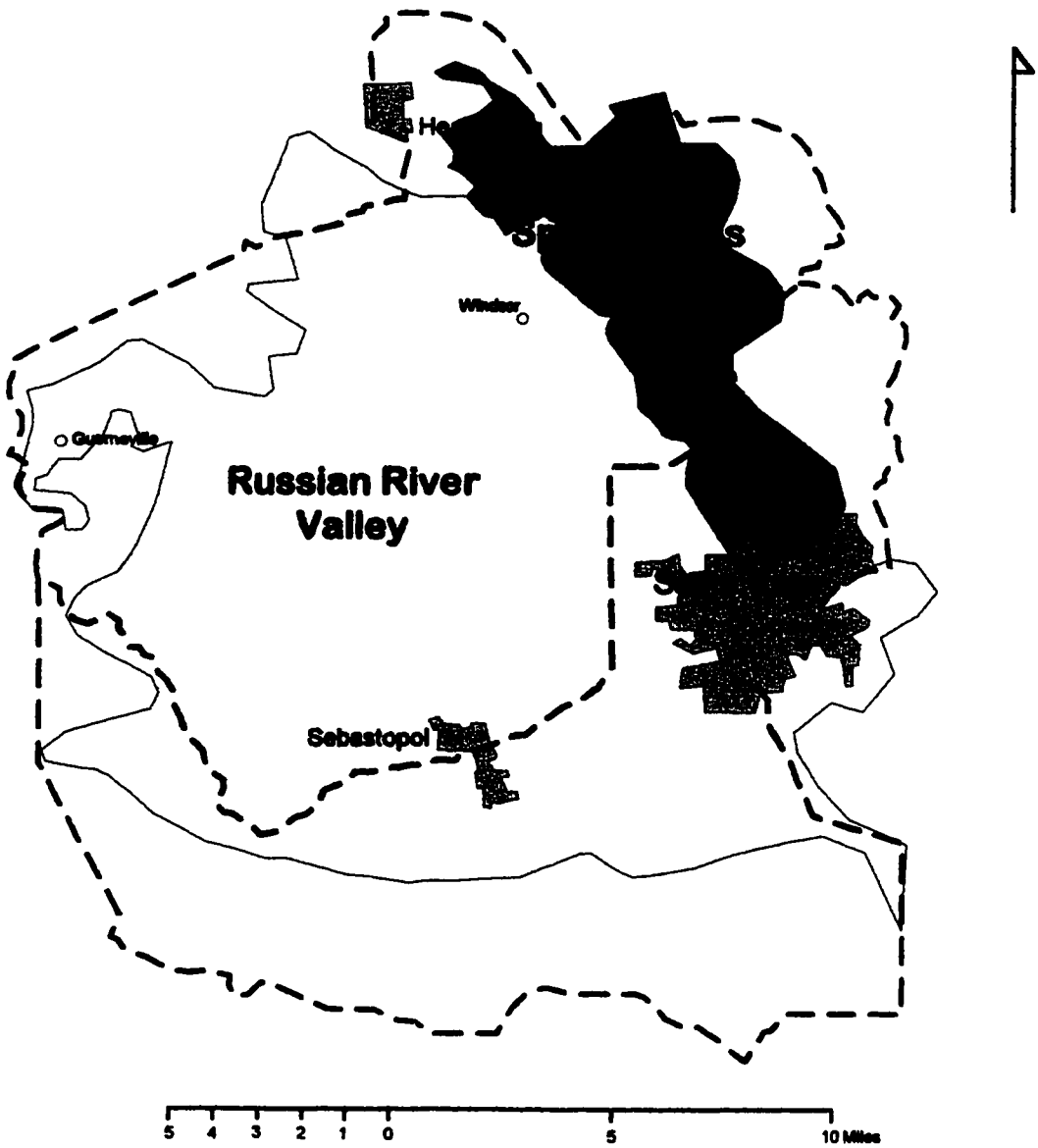
While the boundaries defined in Map 9 are created out of an attempt to restrict expansion to the characteristics consistent with the most known attributes of the Russian River Valley AVA, they do not suggest the most ideal transformation for this viticultural area. Unless diversity of a similar nature is enough to establish the homogeneity of the Russian River Valley AVA, the boundaries are inappropriate in terms of viticulture. Ideally, this area would be divided into a minimum of two, and up to five separate appellations depending on the primary criteria selected for their establishment. All of these areas would exclude those higher elevations of the Mendocino Highlands and the Mayacmas Mountains that are impractical for large scale viticulture.

Redefinition - Scenario One

Considering the importance of climate and the pinot noir grape variety to the reputation of this area, then at least two viticultural areas are recommended (Map 10). Such a division would create an appellation that more closely follows the geographic identifier which served to define it as a unique region, its "coastal cool" climate. The central and western section of the Russian River Valley AVA could be expanded to the south to include all the areas of the Merced Hills and Santa Rosa Plain that are commonly classified as "coastal cool". The marginal climates of Healdsburg and the areas north of Healdsburg would be eliminated from this appellation. The second appellation, separate from the Russian River Valley AVA, would be the Mark West Springs Hills where merlot, cabernet sauvignon, and sauvignon blanc are predominant. Designation of the Chalk Hill AVA has already distinguished this area from the rest of the Russian River Valley AVA, though the western boundary of this appellation does not accurately convey this distinction. The Bald Hills should also be eliminated from the appellation because of terrain and because, unlike the Mark West Springs Hills, the area is certainly outside the "coastal cool" climate type (Sisson, 20 Sept. 1997). The Mark West Springs Hills appellation could be extended south along the western edge of the Mayacmas to include other marginal climates. Even though viticulture is able to exist in areas marked as "marine" where microclimatic variation permits the success of wine

grapes, inclusion of much of these areas would increase the amount of area inside the appellation that is questionable for viticulture. Some exceptions should be made where known variations allow wine grape production in areas adjacent or close to the classified coastal cool climatic zone, for example, the Russian River floodplain around Guerneville.

Map 10 Two Appellation Scenario



Redefinition-Scenario Two

If a strong emphasis on climate, with a moderate emphasis on terrain and soil are to be used as indicators, then replacing the current Russian River Valley AVA with three separate appellations is recommended (Map 11). Though use of terrain and soil falls outside the "geographic features" used to support the original appellation, the distinctions of the western highlands, central plain, and eastern foothills cannot be denied. In addition to the change in slope, the soil types vary in a simple, but distinguishable manner. Soils derived from sedimentary rock are predominant in the western highlands while soils of igneous parent material are predominant in the eastern highlands. The Santa Rosa Plain and the Russian River floodplain are both marked by alluvium.

The distinction in climate type approximates the change in slope along the eastern edge of the Santa Rosa Plain. This match is not purely coincidental; these foothills act as a barrier to much of the coastal fog. Hence, the distinction between the Mark West Springs Hills and the rest of the Russian River Valley AVA would remain the same as that indicated entirely by climatic variation. The eastern edge would be better defined using the already determined line between the Spreckels-Felta association and the Forward, Laniger and Yorkville soils of the Bald Hills area. While this line is still a gradual rather than a finite boundary, it does not vary from season to season as does climate.

The distinction between the Santa Rosa Plain would follow change in slope on its eastern and western edges and climate type to the south. The low slope and the alluvium

of the Russian River floodplain would probably make this area better defined by the appellation represented by the Santa Rosa Plain. The low lying areas east and southwest of Santa Rosa, where soil association and climate type match those of the Santa Rosa Plain, should also be included in this appellation.

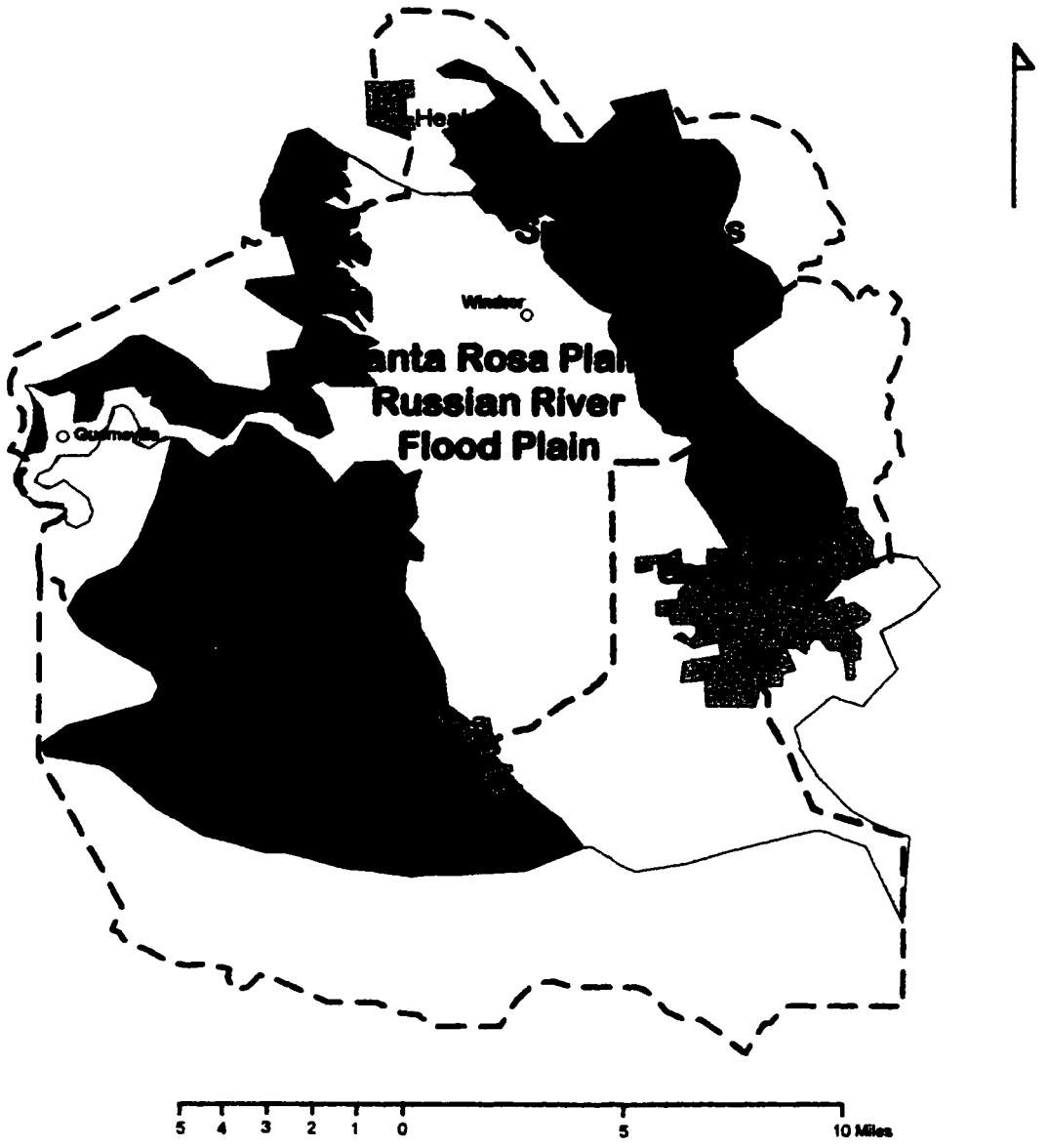
The last appellation would be the western highlands appellation including the Merced Hills and sections of the Mendocino Highlands. As mentioned earlier, most of the Mendocino Highlands should be left out of this appellation. In addition to unfavorable terrain, much of this area is classified either as "marine" or "coastal warm". The areas that should be a part of this appellation include the slopes adjacent to the Russian River Valley where terrain is more favorable and climate type is consistent to the "coastal cool" classification. Since the Russian River floodplain would essentially dissect a Western Highlands appellation, a limited amount of overlap would be needed to meet BATF requirements that appellations be continuous (see discussion of overlapping appellations below).

Table 5

Summary of Viticulture Under a Three Appellation Transformation

Appellation Area	Sisson Climate Type	Slope (degrees)	Soil
Santa Rosa Plain Laguna de Santa Rosa Russian River Floodplain	Coastal Cool	0 to 10, usually <5	alluvium
Merced Hills Mendocino Highlands	Coastal Cool	0 to 70, usually 5 to 30	sedimentary parent material
Mark West Springs Hills	Marginal Cool to Warm	5 to 70, generally <50	igneous parent material

Map 11 Three Appellation Scenario



Redefinition-Scenario Three

With anything greater than a moderate emphasis on terrain and soil, along with the continued emphasis on climate, then five appellations would be advisable (Map 12). In this case the Mark West Springs Hills appellation would remain the same as under the three appellation scenario. Adjustments would need to be made to the other two areas, however. Specifically, two additional appellations would need to be carved out of the western highlands and Santa Rosa Plain appellations.

One of these additional appellations would be restricted to the Russian River floodplain. The soils of the Russian River floodplain are much deeper and better drained than are the soils of the Santa Rosa Plain. These soils, in addition to climate, are commonly recognized as major reasons for the success of pinot noir in the Russian River Valley (Hinkle, 1995).

The second appellation would be defined by Green Valley, which is marked by low slopes and alluvium. Like the Chalk Hill AVA, Green Valley AVA makes some distinction here. The current appellation is also too large, however, and includes ridges on either side of the valley, hence areas of different slope and soil type. The five appellation scenario outlined here would restrict the Green Valley viticultural area to the bottom of this valley where Pajaro association soils are predominant.

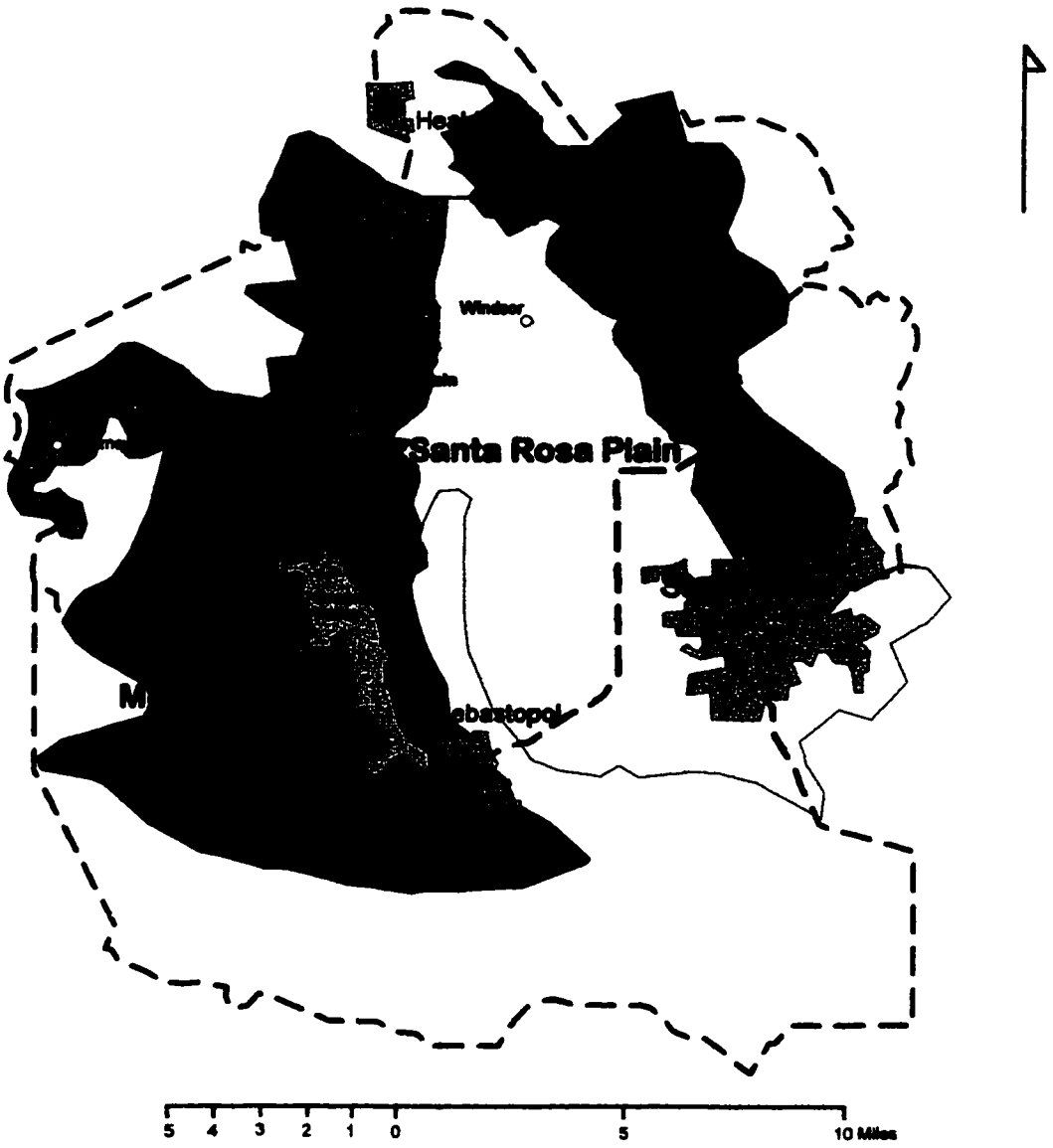
With a greater emphasis on soils, the Laguna de Santa Rosa and a large area south of the current appellation boundary should be excluded from the Santa Rosa Plain appellation. The poorly drained soils contrast with the moderate to well drained soils

found elsewhere on the Santa Rosa Plain. Since most of these soils are considered questionable for viticulture, no need exists to create a new appellation. The distinction between the northern Laguna de Santa Rosa and the rest of the Santa Rosa Plain is very localized, however. The generalizations of the soil associations may not be sufficient enough to make distinctions here, especially since the area is adjacent to an area of intense viticulture, much of which overlaps an area indicated with Clear Lake-Reyes association soils by the Soil Survey. Boundaries here would have to take local viticultural practices into consideration. As such a localized study is beyond the scope of this study, the current boundaries drawn under the five appellation scenario follow soil association designations.

One unfortunate consequence of the five appellation scenario is that the Green Valley appellation would be contained entirely within the western highlands appellation, while the Russian River floodplain appellation would essentially dissect its northern section. The consequence of the Green Valley appellation is less of an issue than the Russian River floodplain. Creation of this appellation would simply put a mapped hole in the western highlands appellation. The Russian River floodplain, however, isolates a section of the western highland making it not continuous to the rest of the appellation. An option would be to overlap the two appellations. The Russian River floodplain does mark an area of different viticultural characteristics. Hence this scenario would be less than ideal.

An option that could resolve issues brought about by the creation of the Russian River floodplain and Green Valley appellations is to make these sub-appellations of the larger viticultural area. This alternative would create a hierarchy that more closely follows the French appellation system (Peruzzi, 1983; Rutherford and Oakville Appellation Committee, 1989). This kind of hierarchy was proposed by the Rutherford and Oakville Appellation Committee, an organization that unsuccessfully tried to create the sub-appellations of Oakville Bench and Rutherford Bench while simultaneously petitioning the creation of the Oakville and Rutherford AVAs (Rutherford and Oakville Appellation Committee, 1989). Though their proposal was not approved, this approach is not entirely unprecedented. California law requires the use of "Napa Valley" on the label of any wine produced within the Napa Valley AVA, even if the wine was produced in one of the appellations contained entirely within the Napa Valley AVA (Wine Institute, 1998). Though BATF developed its appellation system so that all AVAs are considered at one level of organization, this special requirement develops a two name labeling system for the Napa Valley AVA that in practice resembles an appellation/sub-appellation hierarchy. A disadvantage to a sub-appellation approach, however, is that the western highlands appellation would contain areas that, in terms of soil and slope, are inconsistent to the appellation as a whole.

Map 12 Five Appellation Scenario



CHAPTER 4

Conclusion

The diversity of the Russian River Valley can be seen in its terrain and soils. Even its climate, the most important element of the Russian River Valley viticultural fame, is only consistent in the central and western sections of this appellation. The diversity of this area suggests division into three major and two minor districts. The boundary expansion to the Russian River Valley extends the areas of the three major geographical areas and in terms of terrain, adds more of the same. Hence, the expansion of the Russian River Valley AVA can be justified, though not exactly along the lines proposed by the Russian River Valley Winegrowers Association.

If just matching characteristics outside the Russian River Valley AVA is enough to warrant expansion, then the size of this appellation could be increased remarkably. Not only does this defeat the purpose of appellations, but it increases the area that is either unfit for agriculture or is inconsistent with the Russian River Valley AVA's most noted characteristics. A more reasonable approach to expansion would be to add adjacent areas that match the reputation and character for which this appellation is noted. This area covers some, but not all of the area proposed by the Russian River Valley Winegrowers Association. The area would also include locations west and southwest of Santa Rosa which are not a part of the expansion proposed by the Russian River Valley

Winegrowers Association and an area northwest of the appellation that overlaps the current Dry Creek AVA.

Just because an expansion such as the one described above is warranted does not mean that the ideal appellation designation would be achieved under such a scenario. In terms of physical geography and viticultural practice, the areas within the appellation would better be defined as two, three, or five separate viticultural areas. Since viticultural areas are developed on one or several different criteria, the determining factor between two, three, or five appellations would depend on the definition most desired by wine makers in each of these appellations. This decision involves scale. The more environmental criteria met, the smaller the appellation.

Five viticultural areas, despite possible repercussion from overlapping areas, may bring the greatest level of meaning to each of the Russian River Valley districts. Under this scenario, the closest association of climate, soil, terrain and variety would be achieved. Such a match would be especially important to areas such as the Russian River floodplain since climate and soil are commonly credited with the success of pinot noir.

A five appellation scenario would also be the most difficult to establish. Nearly all of the wineries within the current AVA boundaries would be affected in some way, creating a petition and approval process that might best be described as a bureaucratic nightmare. In addition to the geographical evidence detailed in this study, the historical interpretations would need to be addressed to match BATF requirements. This scenario may also affect reputation by diluting the use of names for each of the regions especially

during the early life of these appellations. This marketing setback, no matter how temporary, may encourage opposition to any plan to redraw the AVA boundaries. Nevertheless, such a division would be the most ideal step towards achieving BATF's supposed goal of providing consumers with a greater understanding of the contents of a bottle of wine based on the geographic identifiers placed on the label.

Either one of the two additional scenarios, the creation of two or three different appellations, more closely resembles the true viticultural identity of this region than the currently proposed boundaries and would be a marked improvement in matching physical geography to the reputation and viticultural practices in place. The two appellation scenario would achieve what the founders of the Russian River Valley AVA had intended, at least in theory, the creation of an appellation based on the "coastal cool" climate of the area. If growers and wine makers are to continue their arguments for the importance of soil, or their pursuit of applying the concept of *terrior*, then at a minimum the three appellation scenario should be adopted. In other words, if climate alone defines an appellation, then as a group, arguments for benefits of other geographical features of a given area are greatly limited.

An unfortunate truth to development or change in viticultural areas is that geography, the single most important element in the success of a viticultural area, has often been only moderately considered. The ultimate decision to change the boundaries and layout of the Russian River Valley AVA relies more on BATF's willingness to cooperate and the ability to build a consensus of the parties involved. A redefinition of

this appellation will also require an understanding by the growers and wine makers of the characteristics that are most desirable as geographic identifiers.

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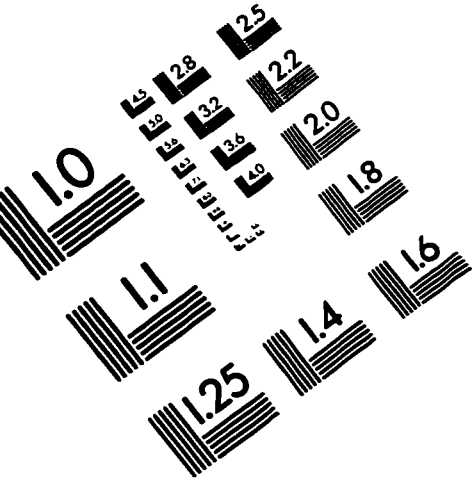
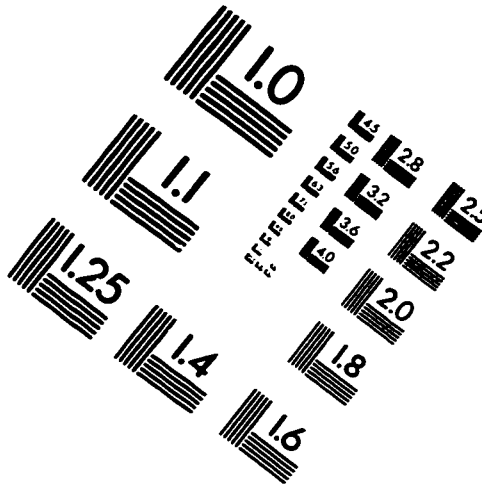
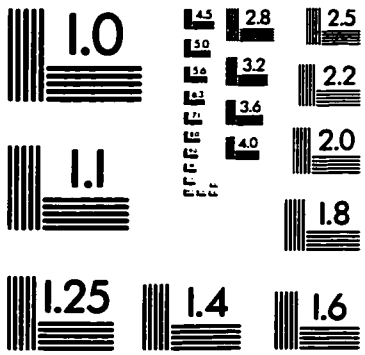
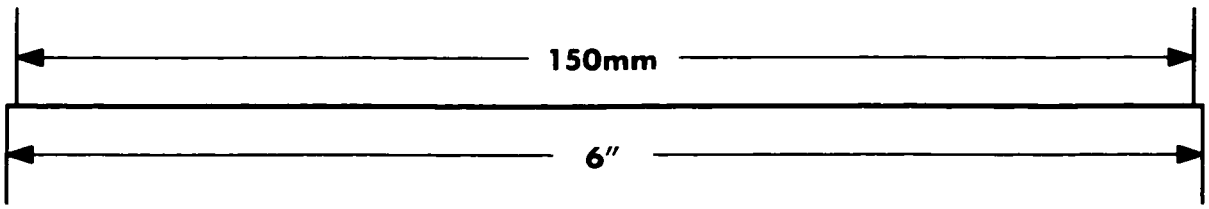
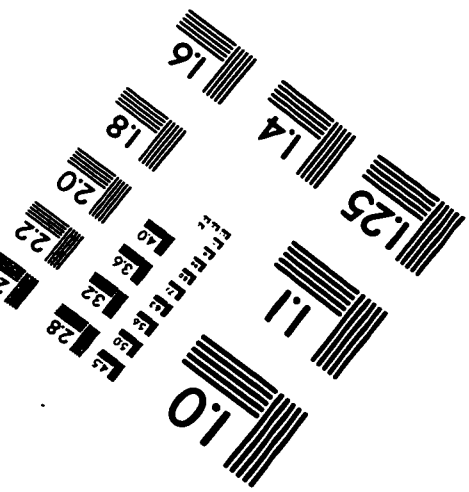
IMAGE EVALUATION TEST TARGET (QA-3)

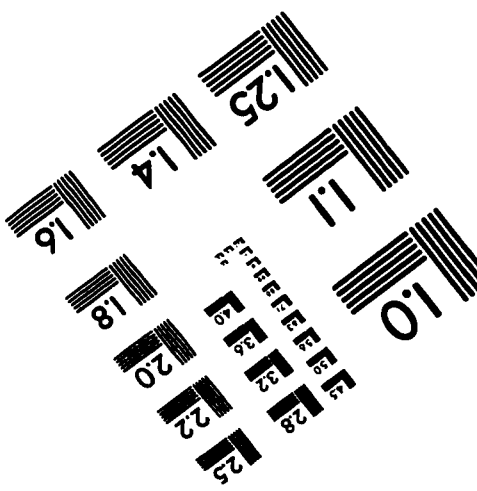












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