Neighborhoods of the Russian River Valley

A Project of the Russian River Valley Winegrowers

This paper is meant to provide the wine professional with a detailed understanding of the Russian River Valley Winegrower's (RRVW) effort to empirically differentiate long-recognized wine grape growing areas in the Russian River Valley American Viticulture Area (AVA).

Local Russian River Valley winemakers and wine grape growers have long understood that their wines and grapes possess different nuances, depending on where in the valley the fruit is grown. Traditionally, these distinctive characteristics were associated with historically recognized Russian River Valley neighborhoods much like Burgundy communes in France.

In 2015, Dr. Roger Boulton, the Distinguished Professor of Viticulture and Enology at the University of California at Davis, became aware of the RRVW effort to answer the question, "Are there specific wine sensory characteristics that can be consistently identified as originating from a particular Russian River Valley Neighborhood?"

When Dr. Bolton learned more about the RRVW initiative, he was intrigued by it and thought that new laboratory equipment at the University could make it possible to conduct this elemental analysis of Russian River Valley wines.

This is the narrative of this Russian River Valley Neighborhoods initiative from the initial organized inquiries by the RRVW to address sensory differences in wines from the different Neighborhoods to the completion of the final University of California at Davis report led by Dr. Boulton, et al.

After completing the analysis, Dr. Boulton remarked during a presentation to the RRVW Board of Directors in 2019 that the study resulted in **"the most compelling scientific evidence that I have seen in my 40-year academic career."**

It is important to the RRVW that this effort is seen as trying to provide answers to understand what many winemakers and growers have understood for decades, and that, as the wine author Virginie Boone, wrote, "This is not a story about new appellations. Nor is it a story about hard and fast lines on a map. It's about clarifying a set of historically understood subregions within the Russian River Valley. It's about helping those who love the region's Pinot noir to dive deeper into its nuances and sensory points of delineation."

The History

In the early history of the Russian River Valley, wine grape plantings were few and widely dispersed over what we now call the Russian River Valley AVA, which was formally established in 1983. Most early plantings were intended for bulk bottlings and the effect of terroir was masked and not well understood.

The pioneering efforts of winegrower trailblazers such as Joe Rochioli, Joe Swan, Tom Dehlinger and others, resulted in the planting of Pinot noir in the 1970s. It is a varietal known to reflect the terroir where it is grown. Pinot noir is currently one of the Russian River Valley premier varietals where it captures and exemplifies the diversity of terroir in the AVA.

According to Winemaker Rod Berglund of Joseph Swan Winery, "One day we all woke up and realized, my god, the Russian River Valley is now known throughout the world. And its signature grape is Pinot noir. A lot of people coming along now thought that it had always been that way. It wasn't. It took a lot of people working very hard, telling their stories, and being able to prove it year after year."

With the success of the Russian River Valley wine community came explosive growth of vineyard acreage, number of wineries and estate and single vineyard designates, so highlighting the diversity of the AVA became more common. Along with this trend, winemakers and wine grape growers began to taste, compare, and explore.

For decades, Russian River Valley winemakers have argued that wines made from grapes grown in different parts of the Russian River Valley, or "Neighborhoods," expressed different and consistently identifiable nuances depending on where the grapes were grown.

These differences were believed to come from the nuances of soil, mesoclimate, aspect and drainage, but could also be masked or highlighted through seasonality, farming and winemaking techniques.

The five original Neighborhoods of the Russian River Valley express these nuances and can be loosely defined by their geography as the Santa Rosa Plains, Sebastopol Hills, Green Valley, Laguna Ridge and the Middle Reach. Eastern Hills is a recent addition and represents the sixth Neighborhood.

These historical Neighborhoods are not recent constructs. The Santa Rosa Plains, for example, appears on maps dating back to the 1800's.

The RRVW has represented growers and wineries since the early 1980s and members have spent years conducting systematic sensory analyses by blind tasting young wines, immediately post-fermentation and before aging. This experienced group comprised of multi-generational winemakers and wine grape growers strongly believe that the perceived differences between these Neighborhoods are real.

The Terroir

The Russian River Valley AVA has over 160,000 acres of land and contains a wealth of mesoclimates. The region itself is distinct due to a layer of marine fog that settles over the vines in the evening, dropping temperatures and retaining acidity in the grapes. It was this fog layer that inspired the original boundaries of the region. And yet, within this perimeter are diverse soil types, various altitudes, and a huge variation

in the heat index. It is not surprising, then, to learn that Russian River growers have been using specific "neighborhood" names to define and differentiate their wines for decades, and in some cases, even longer.

The town of Sebastopol, in the western part of the AVA, might be slightly chilly on a day when Healdsburg, a town to the north, is uncomfortably hot. Beyond differences in both daytime and nighttime temperatures, the soils of the valley are a mix of Franciscan, alluvial, and Goldridge, along with volcanic and clay soils. Furthermore, the altitudes and proximity to other features, such as the ocean and the climatic effects from the nearby Petaluma Gap, lead to huge differences in the way vines develop, which has a bearing on how the vineyard is managed and when grapes are picked.

The concept can be somewhat confusing as many people expect distinct boundaries. In the case of the Neighborhoods, they don't exist, since one neighborhood can blur or gradually transition into the next. There are common themes, but natural differences exist that make each Neighborhood unique.

Breaking the large Russian River Valley into neighborhoods can be a valuable tool to highlight the diversity of Russian River Valley wines and the personalities of the people that grow the grapes and make the wine.

Below is a summary of the Neighborhoods that many growers and winemakers in the valley identify along with characteristics of the wines produced in each.

Santa Rosa Plains

The largest neighborhood in the Russian River Valley sits between the city of Santa Rosa to the east and the first ridge of hills, Laguna Ridge, to the west. The Cotati Grade rises to separate the Santa Rosa Plains from the Petaluma Gap AVA to the south while to the north it transitions into the Middle Reach Neighborhood near the town of Windsor.

The Santa Rosa Plains is comprised of three distinct topographic regimes: gently sloping alluvial plains, upland foothills, and low valleys with elevations ranging between 120 and 200 feet above sea level. Once an inland sea about six million years ago, the soils in this area are characterized as alluvial soils with clay, river wash, and heavy loams.

Over the last several million years, the soils of the Santa Rosa Plains were derived from several disparate origins. Dormant volcanos to the east, marine sedimentary soils to the west, and Franciscan complex to the north have eroded and filled the valley floor with a complex mélange. The soils are limited by a clay duripan (hardpan) located two to five feet below the surface; subsurface soil engineering and drainage can be a distinct advantage.

Close to the town of Santa Rosa, fog in the Santa Rosa Plains tends to burn off sooner and daytime temperatures trend higher than Neighborhoods closer to the ocean. Because of the elevation and heavy soils, this Neighborhood tends to be colder in the Spring and vines come out of dormancy later but still are more susceptible to frost. Lower elevations often produce colder nighttime temperatures, as cold air sinks, resulting in one of the largest shifts in diurnal temperature from day to night.

The Santa Rosa Plains is a workhorse for the Russian River Valley and has sometimes been described as the engine of the Russian River Valley.

Sebastopol Hills

The Sebastopol Hills is a series of undulating hills west and southwest of the city of Sebastopol. Generally, the region can be considered as south of Highway 12 (Bodega Highway), east of the Burnside Road ridge, north of the Petaluma Gap and west of the Sebastopol city center itself. In the south, the area is drained by Blucher Creek, the southernmost drainage of the Russian River. To the north, drainage flows to the Atascadero Creek which, via the Green Valley Creek, meets the Russian River just west of Steelhead Beach near the town of Forestville.

The topography and soils are typical of the Wilson Grove Formation, a fine-grained, shallow marine quartz sandstone that formed in an embayment of the ocean three to five million years ago. The Goldridge sandy loam soils of the Sebastopol Hills formed directly from the breakdown of the underlying Wilson Grove formations.

While much of the greater Russian River Valley benefits from the widely sought Goldridge soils, the defining attribute of Sebastopol Hills are its proximity to both the Pacific Ocean to the west and the Petaluma Gap to the south. Both serve to moderate temperature and lead to increased winds when compared to other areas of Russian River Valley.

Sebastopol Hills gets an average of 33 percent more rainfall than the rest of the Russian River Valley. Vineyards planted on this hilly terrain must be managed with care as the sandy loam soil is highly erodible. Subsurface engineering is the norm with many vineyard teams skilled in the installation of "French drains." Crop loads are naturally limited by the soil itself, and difficult springtime weather during bloom often causes shatter. However, while yields suffer during shatter scenarios, quality stands to gain by a more open cluster architecture and smaller berry size.

Vines are planted on all aspects of the hillsides, sometimes close to 360 degrees on a given site where the angle of the sun plays a huge role in fruit character. Sebastopol Hills is planted almost exclusively to Pinot noir with only small amounts of Chardonnay and just a few dozen acres of other varieties, such as Syrah and Pinot Gris.

Green Valley

First established in 1983, Green Valley is the only Russian River Valley Neighborhood which is a federally recognized AVA. Since 2008, wines from this Neighborhood are more commonly labeled as "Green Valley of Russian River Valley." As an approved AVA, unlike the other Neighborhoods, Green Valley has formal borders that include Highway 116 on the east, the town of Occidental in the west, the Russian River to the north, and Highway 12 (Bodega Highway) to the south. Green Valley includes the towns of Graton, Occidental, Forestville, and Sebastopol.

Fog is the trademark of Green Valley. Along with its southern neighbor Sebastopol Hills, the Neighborhood has ready access to the marine weather that enters through the Petaluma Gap and moves northwards. Green Valley has exceptional diversity. The elevation of a vineyard site is of importance influencing how the fog from the coast behaves and affects the site.

The western portion of Green Valley is at a higher elevation with increased sunlight. Because of this, it has drier soils and earlier fog burn-off that encourages bud break in the Spring and ripening in Fall. The lower, eastern portion of the Neighborhood is at a lower altitude where the cooler air lingers. It has more water retention in the soil, more fog intrusion with later burn-off, and much cooler (and frost prone) springtime temperatures, especially at night.

The predominant soil type is Goldridge that covers about 60 percent of Green Valley's acreage. The soil has a dark, yellowish, fine, sandy loam top-surface over a subsoil of golden yellow, sandy loam and fractured sandstone. It is derived from the remains of an ancient inland sea that slowly emptied into the Pacific three to five million years ago. Goldridge provides good drainage and exceptional natural chemistry for grapevines to thrive.

Grape growing in Green Valley dates back to 1836 and today there are over 100 growers stewarding 19,000 planted acres.

Laguna Ridge

Situated between the Santa Rosa Plains to the East and Green Valley of Russian River Valley to the west, Laguna Ridge is a north to south running line of hills, south of the Middle Reach. It is near Forestville, a narrow strip that has deep, well-draining sandy Goldridge and Altamont soils, with some Franciscan at its northern end, and is sometimes called the "Golden Triangle." It overlooks the Laguna de Santa Rosa, where water drains and then pools during winter rains.

The weather is greatly influenced by the drainage of air from the western hills to the valley floor. This drainage results in milder weather in the Spring allowing the soils to warm earlier resulting in earlier bud break than much of the surrounding area. Frost is less of a problem due to the air drainage. With an earlier bud break, hang time is often extended. This softens the acidity and results in rounder, softer tannins. The fruit profile in Pinot noir ranges from deep red to sometimes darker fruit, often with a hint of black tea and sometimes oriental spice.

Joseph Swan Vineyards and Dehlinger Winery were some of the first to plant Pinot noir in the Laguna Ridge after Prohibition on the advice of Andre Tchelistcheff, who referred to it as "middle-cool."

Middle Reach

The most northern neighborhood in the Russian River Valley, this was the first region in the valley to gain widespread recognition due to the early Pinot noir plantings in the 1960's by the Rochiolis, Bacigalupis, Davis Bynum, and other viticulturalists.

One of the warmest of the neighborhoods, Pinot noir and Chardonnay tend to see early bud break and as a result ripen early. The Pinot noir here is almost always the first to be harvested. This Neighborhood stretches below Healdsburg and flanks the Russian River on both sides. The areas along the river and to the south are informal boundaries. Some would say it stops where the river makes its turn and heads toward the ocean, others would have it continue along Westside Road until it reaches River Road, a few miles east of Guerneville.

The topography of this Neighborhood is delineated by the benches on both the east and west side of the Russian River. The soil types in the Middle Reach are varied and often change within vineyards. The western side is dominated by soils derived from the underlying Franciscan mélange, a grouping of jumbled up sandstone, shale, and other rocks that were transported on a tectonic plate from trenches in the ocean floor and deposited on the edge of the continent around 100 million years ago. Along the river there are the usual flood plain deposits with deep, well-drained gravel terraces. As you get further away from the river, the benches and sloping hills are dominated by Josephine loam with red color and high amounts of iron.

Eastern Hills

The Eastern Hills Neighborhood is the eastern-most section of the Russian River Valley, generally defined as east of Highway 101, and is perhaps the most diverse of the six Neighborhoods. It has a wide range of growing degree-days in any given year, from its southernmost vineyards near or even in the city of Santa Rosa to the Chalk Hill district in the North.

The Eastern Hills has the least amount of fog influence in the Russian River Valley. It has gently rolling to steeper hillsides on the flanks of The Mayacamas range to the north, as well as transitional hills and valleys to the south. All provide protection from wind, fog, and sea influence.

Perhaps the most variable and complex soil types of the Neighborhoods that range from heavy Huichica clay loam, to ancient uplifted Franciscan parent material, to diverse volcanic soils of several types.

The Experiment

The goal of the eventual University of California at Davis experiment was to "report the use of element profiles to distinguish commercial Pinot noir wines from five sub-regional appellations or neighborhoods within one American viticultural area (AVA)."

Prior to the formal University experiment, the RRVW initially trying to answer the question, "Are there specific wine sensory characteristics that can be consistently identified as originating from a particular Russian River Valley Neighborhood?"

To do this, the RRVW assembled 30 distinguished winemakers that tasted through samples of Russian River Valley Pinot noir from different areas throughout the valley. Pinot noir was selected for the sample because of its reputation as a signature varietal in the AVA. It also clearly reflects distinct terroirs. Each wine was tasted shortly after malolactic fermentation and before other influences, such as oak, were introduced to the wine. The winemakers tasted the samples blind and kept notes.

This local effort showed that results of the tastings were subjective, and it was exceedingly difficult to express perceived differences with different opinions. The results were ultimately inconclusive. A participant in these initial tastings contacted Dr. Roger Boulton, the Distinguished Professor of Viticulture and Enology at the University of California at Davis, to ask him for his thoughts on how to move forward.

Dr. Boulton was intrigued by the desire of the RRVW to answer this question about elemental differences and realized its uniqueness. He proposed a laboratory-based chemical analysis using new equipment that allowed for testing chemical composition in wine with much more accuracy that before.

Past studies looked at elemental differences between countries and wine regions; however, limited information was available for elemental differences of wines made from the same cultivar and coming from within one wine region under commercial practices. These elemental differences composed the physical "fingerprints" of the wines and are indelible and unaffected by winemaking processes. Dr. Boulton proposed an experiment that would leverage this new analytical capability and try to answer this unique question.

Once Dr. Boulton and his team became involved, a more formal process of discovery about the distinctiveness of the RRV Neighborhoods began to take shape in 2015. The RRVW asked their member

wineries for twenty-five mono-varietal wine samples from the 2015 vintage that were unfiltered, unfined, not treated, and had no barrel contact.

Five samples per Neighborhood, each from a different vineyard and identified by a numeric code known only to the organizing group, were sent to Dr. Boulton.

The 2015 preliminary results demonstrated that wines from each of the five Neighborhoods showed distinctly different elemental fingerprints. All were unique despite different viticultural and enological practices.

A subsequent sampling and analysis from the 2017 vintage, that also included a sixth neighborhood, Eastern Hills, confirmed these results, but with an even higher correlation. These correlations provided exceptionally strong evidence of the distinctiveness of each Neighborhood and the consistent impact on the grape characteristics.

Pioneering Study, Historic Results

On May 30, 2020, the journal *Molecules* published a report by The University of California at Davis with the results of the study that Dr. Boulton proposed several years earlier to try and answer the question about elemental differences among wines of the Russian River Valley Neighborhoods. The report is titled, "The Use of Macro Micro, and Trace Elemental Profiles to Differentiate Commercial Single Vineyard Pinot noir Wines at a Sub-Regional Level." (See link in "Additional Materials")

According to the report, **"there has never been an attempt to discriminate wines produced in a single AVA in California or the Unites States."** This study applied an elemental analysis to investigate the geographic authenticity of single cultivar (Pinot noir) of wines, originating from five Neighborhoods within the Russian River Valley AVA in Northern California, over two vintages (2015 and 2017)." [*Molecules*, p. 3]

The formal University of California at Davis study led by Dr. Boulton and published in *Molecules* concluded:

"Overall, distinct elemental fingerprints were found across both vintages, separating all Neighborhoods from each other. These results provide further evidence for distinct geographical wine regions within the Russian River Valley AVA, in addition to sensory differences experienced and explored by the Neighborhood Initiative, a group of Russian River Valley winemakers looking into regional branding of the different Neighborhoods." [*Molecules*, p. 6]

(*See attached map*)

Dr. Boulton, the Distinguished Professor of Viticulture and Enology at the University of California at Davis, remarked during his presentation to the RRVW Board of Directors in 2019 that the study resulted in "the most compelling scientific evidence that I have seen in my 40-year academic career."

The RRVW and its members are proud to be the early sponsor of this historic, ground-breaking study that showcases the diversity of the Russian River Valley and confirms the distinctiveness of its historically recognized Neighborhoods through rigorous scientific research.

The study provides the scientific data that perhaps helps to explain the distinctiveness winemakers and wine grape growers in the Russian River Valley have known for decades.

And while the report provides a sense of finality to these early observations from the RRVW perspective, it is only the beginning of a "voyage of discovery" as the RRVW looks to educate wine community professionals and the public to learn more about the Russian River Valley Neighborhoods and to start their exploration!

The point of contact at Russian River Valley Winegrowers for any questions about the Russian River Valley Neighborhoods is Jesslyn Jackson, Executive Director, at 707.360.2907and jesslyn@rrvw.org.

The Russian River Valley Winegrowers is a community of winemakers and farmers dedicated to producing exceptional wines that showcase the diversity of the Russian River Valley Neighborhoods. Our members are committed to preserving natural resources and the authentic farming heritage of this premier wine region known for award-winning Pinot noir.

Additional Materials:

Results of the University of California at Davis study published in Molecules on May 30, 2020:

https://www.mdpi.com/1420-3049/25/11/2552

Russian River Valley Winegrowers Website

https://russianrivervalley.org/

Russian River Valley Winegrowers Neighborhoods informational materials and map

https://russianrivervalley.org/discover/neighborhoods

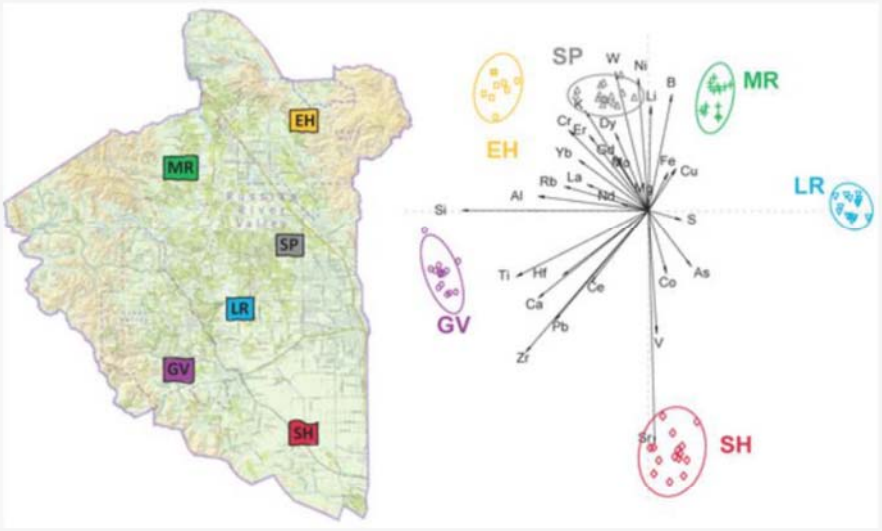
Recent articles:

Forbes, "UC Davis Study Confirms that Russian River Valley Neighborhoods have Fingerprints," October 2020:

https://www.forbes.com/sites/jillbarth/2020/10/30/uc-davis-study-confirms-that-russian-river-valley-vineyard-neighborhoods-have-fingerprints/?sh=443227e456de

Beverage Industry Enthusiast, "A Scientific Case for Fingerprinting Terroir in a California AVA," August 2020:

https://www.winemag.com/2020/09/08/russian-river-valley-terroir/



Graphical abstract

"Overall, distinct elemental fingerprints were found across both vintages, separating all Neighborhoods from each other." [*Molecules*, p. 6]

EH – Eastern Hills
MR – Middle Reach
SP – Santa Rosa Plains
LR – Laguna Ridge
GV – Green Valley
SH – Sebastopol Hills