

# Wine Growers vs Climate Change

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vineyards may be useless.

Grapes have a complex reaction to heat. “You need a degree of heat to get through the ripening phase, get sugar accumulation, and get the ideal amount of development of some of these secondary compounds like anthocyanins and tannins—all the things that make wine exciting and interesting and have good mouthfeel,” notes UC Davis viticulturist and ecologist Elisabeth Forrester, who wasn’t involved in the new paper “Grapes suffer when temperatures exceed certain levels.”

Fruit damaged by extreme heat waves is less tasty. Sugars concentrate when grapes are desiccated at higher temperatures. Sugar boosts alcohol. Wine will get drunk faster due to climate change. Gambetta says, “Depending on who you are, where you come from, this can be bad. If a region has always defined a style, that will change the wine.”

High temperatures break down the volatile compounds that becomes gas, or the wine’s “nose”. “The profiles tend to get pushed to what sensory scientists would call the ‘cooked’ side of the spectrum: “jammy”, or like cooked fruit,” adds Gambetta. “This may be good. Some prefer these wines, which is fine. So it all depends on regional identity.”

For winemaking, warm days and moderate nights heat and cool grapes. Climate change is disrupting that cycle. “It’s actually the nights that are warming faster than the days,” says Forrester. No late-night fruit chilling. Daytime temperatures above optimum, destroys numerous essential chemicals.

Even without drought, higher temperatures dehydrate plants. Winemakers receive less grape juice due to lower yield. Drought lowers output. Gambetta says, “Over the past 100 years, Bordeaux, where I work, has had pretty steady rainfall.” Rising temperatures reduce agricultural water consumption.

Vineyards can be over-watered. Supercharged rainstorms and worldwide floods result from warming air holding more moisture. Grape roots lose oxygen if precipitation remains in a vineyard.

Even with 14 inches of rain a year, Mediterranean grapes like grenache can produce great yields and wines without irrigation. A vine may withstand a drought by defoliating or producing less. Because it won’t hurt the vine, it can recuperate after rain.

Wine-growing regions are suffering from more frequent and severe droughts due to climate change. “In 2022, which was outrageous by all definitions in Europe—in Portugal, and parts of Spain—they had seriously stunted vines, defoliated vines,” Gambetta adds. “Then you can get into this dangerous territory where you have not only catastrophic effects that season, but carryover effects to subsequent seasons.”

The review paper goes on to say “We estimate a substantial risk of unsuitability (ranging from moderate to high) for 49-70% of existing wine regions, contingent on the degree of global warming.”

With a 2°C global warming increase over pre-industrial levels, Southern California may no longer be suitable for wine production. Increasing temperatures by 2–4 degrees Celsius would place the region at “high risk of unsuitability.” The West Coast of the US produces 10% of the world’s wine and most of North America’s, so this is a big deal to the California wine industry.

“Overall, the net suitable area for wine production in California could decline by up to 50% by the end of the 21st century,” experts said. “Similar risks exist for Mexico, the southwestern United States and those regions of the east coast south of New Jersey.” Much of southern Europe has seen these same shifts and indicators.

Climate change could also spread insects and illnesses that affect farming and public health. Downy mildew and other grapevine issues are less frequent in drier regions, but outbreaks will emerge early and spread faster.

Adaptation to climate change is “mandatory,” say the scientists. Winemakers must choose grapes that thrive in diverse and changing climates and seasons. It’s vital to wine quality and global availability.

Scientific studies reveal that environmental factors affect acidity, alcohol, and pH. Wines have increasing alcohol and pH levels, but lower acidity, making the wine’s microbiology more unstable. The study suggests an “increased risk of microbiological spoilage”, leading to “overripe and/or cooked fruit aroma”.

Scientists say worldwide climate change plans are insufficient. In 2024, we already have record-breaking temperatures and a range of meteorological extremes, from out-of-season warmth to massive blizzards. The hottest year ever was 2023, and 2024 is barely started.

The global average temperature is 1.35 degrees Celsius greater than pre-industrialization averages. This does not mean we have exceeded the 2-degree Celsius barrier that scientists say might have dire repercussions, but we are close. The worldwide average was 2 degrees Celsius above the pre-industrial average for the first 12-month period in a row, so it’s on its way.

“One thing is certain,” the researchers concluded, “climate change will drive major changes in global wine production in the near future.” Being able to adapt to these adjustments is going to be vital.

Vineyards may customize irrigation. This is more expensive and may strain local freshwater supplies: Drought requires more water for everyone. Europe’s heat waves will still threaten all farming.

Warming may move vineyards north. According to the latest analysis, northern Europe and North America may need 80 to 200 percent more winemaking land, depending on climate. Winemaking is booming in Oregon, Washington, and southern UK.

Climate change will interrupt activities in such places too. Days-long heat waves topping 110 degrees Fahrenheit have hit the Pacific Northwest. Huge West Coast wildfires have already scorched vineyards.

Supply chain difficulties and climate change are rising wine prices. The bark of cork trees is gathered often to manufacture corks. Teams cannot safely remove bark from drought-stricken trees. Bottle glass prices are rising for wine as well.

Scientists examine plant cooling strategies to help vineyards adapt. Crops under grapes cool the fruit. A vineyard floor’s exposed soils heat up and reflect heat back into the canopy, according to Forrester. “I think we’re just beginning to understand the impacts of some of these truly extreme events because they’re recent and becoming more frequent.”

Winegrowers may amend plants but not weather. Heat wave water loss is reduced by reducing leaf biomass, while “canopy management” shades berries with leftover leaves. In several places, winegrowers are testing drought- and heat-tolerant grape varieties. Adding deeper root systems helps plants get soil water.

Gambetta says, “Changing the variety is a huge, huge lever, because varieties have huge variation in how they behave.” Much easier said than done. Bordeaux has a long tradition of great wines and a stable climate. New variants have been extensively studied. “Has there been an uptake? Growers alter? Gambetta replies no, they don’t. “They can’t just make a new wine and say, ‘Hey, listen, here’s my new wine,’ and expect it to sell well. Since these identities underpin whole regions.”

The grape paradox. Winemakers aim for the consistency their fans demand. Since they’re hardy, grapes may grow anywhere, from Bordeaux to Napa to Chile and South Africa. “It just is a plant that grows in a huge swath of climates,” adds Gambetta. “But climate change will pose serious challenges, especially to these traditional wine-growing regions.”

# What is an Oregon AVA?

## 23 Wine Regions in Oregon and What it Means

By Rusty Savage

Oregon is home to 23 federally recognized grape growing areas, known as American Viticulture Areas or AVAs. These wine regions are the backbone of the Oregon wine industry.

**Columbia Gorge AVA.** There are no nested AVAs inside the Columbia Gorge AVA.

**Columbia Valley AVA.** There are two nested Oregon AVAs inside the larger Columbia Valley AVA.

The Rocks District of Milton-Freewater AVA

Walla Walla Valley AVA

**Rogue Valley AVA.** There is one nested AVA inside the larger Rogue Valley AVA.

Applegate Valley AVA

**Snake River Valley AVA.** There are no nested AVAs inside the Snake River Valley AVA.

**Southern Oregon AVA.** The Southern Oregon AVA is home to the Rogue Valley, Umpqua Valley, and their respected nested AVAs.

**Rogue Valley AVA**

**Umpqua Valley AVA.** There are two nested AVAs inside the larger Umpqua Valley AVA.

Elkton AVA

Red Hill AVA

**Willamette Valley AVA.** There are eleven nested AVAs inside the larger Willamette Valley AVA. (Not listed here)

In North Douglas county, the Umpqua Valley is home to the Umpqua Valley AVA, nested within the Southern Oregon AVA. This is mainly the region encompassing the greater Roseburg area and on the north and northwest portion of this wine region, are the Red Hill AVA to the north and west and the Elkton AVA in the north and western region. Some of the outstanding qualities of these 3 AVA regions are listed below and may well foretell the future significance and influence on future wine production.

**Umpqua Valley AVA,** Douglas County, Established 1984

Umpqua Valley continues to evolve as new winemakers discover the area, bringing with them a passion for innovation and world-class wine.

**Location**

Umpqua Valley sits between the Coast Range to the west and the Cascades to the east, with the Willamette Valley to the north and the Rogue Valley, south. Named for the legendary fishing river that runs nearby, the appellation stretches 65 miles from north to south, and is 25 miles from east to west.

**Climate**

The Umpqua Valley can successfully grow both cool and warm varieties. It’s comprised of three distinct climatic sub-zones: 1) The northern area around the town of Elkton enjoys a cool, marine-influenced climate. It receives around 50 inches of annual rainfall, making irrigation unnecessary. Pinot Noir and other cool-climate varieties thrive here. 2) The central area to the northwest of Roseburg has an intermediate climate where both cool and warm varieties do well. 3) The area south of Roseburg is warmer and more arid, similar to Rogue and Applegate valleys to the south, making irrigation a necessity. Warm-climate varieties, including Tempranillo, Syrah and Merlot flourish here.

**Soils**

Umpqua Valley soils are as varied as the climate. Generally, they are derived from a mix of metamorphic, sedimentary and volcanic rock; though more than 150 soil types have been identified in the region. The valley floor levels have mostly deep alluvial or heavy clay materials, while the hillsides and bench locations have mixed alluvial, silt or clay structures — all

excellent for winegrowing.

**Topography**

The complex topography of the Umpqua Valley is a result of the collision of three mountain ranges of varying age and structure: Klamath Mountains, Coast Range and Cascades. Many say the area should not be thought of as a single valley, but, rather, more accurately the “Hundred Valleys of the Umpqua” because it is made up of a series of interconnecting small mountain ranges.

**Varieties Grown**

Albariño, Baco Noir, Cabernet Franc, Cabernet Sauvignon, Chardonnay, Dolcetto, Gewürztraminer, Graciano, Grenache, Malbec, Merlot, Muscat Canelli, Pinot Blanc, Pinot Gris, Pinot Noir, Riesling, Sauvignon Blanc, Semillon, Syrah, Tempranillo, Zinfandel.

**Elkton AVA,** North Douglas County, Established 2015

Winegrowing in Elkton dates to the early ’70s when Ken Thomason began planting cool climate whites and Pinot Noir. The first winery was established in 2000. Currently, there are six licensed wineries and 8 commercial vineyards, totaling 96.5 planted acres.

**Location**

Located in North Douglas County, the AVA is 33 miles from the Pacific Ocean, with the Cascade Range to the east, Willamette Valley to the north and Rogue Valley to the south. A part of the Umpqua Valley AVA, it is named for the town of Elkton and claims the northernmost and lowest elevation region in the Umpqua.

**Climate**

Elkton Oregon is the coolest and wettest region within the larger Umpqua Valley and produces different varieties and different wine styles than the rest of the larger AVA. Elkton enjoys a cool, marine-influenced climate with a longer growing season than the rest of the Umpqua. The region receives about 50 inches of rain each year.

**Soils**

The AVA is dominated by the coastal mountain geology, lying over a combination of sedimentary, volcanic and metamorphic rock from the middle Eocene. More than 50 different soil series or complexes are present, made up of mostly residual clay and/or silt loam soil or cobble-rich alluvial deposits from the Yamhill and Tyee formation, and the Umpqua River terrace.

**Topography**

Elkton Oregon contains a wide range of terrain dissected by the broader meanders of the Umpqua River. The majority of the AVA falls below the 1,000-foot contour and includes the river bottom land — elevation 130 to 160 feet — as well as river terraces and foothills near the river — also 130 to 160 feet.

**Varieties Grown**

Baco Noir, Chardonnay, Gewürz., Pinot Gris, Pinot Noir, Riesling, Syrah.

**Red Hill AVA,** Douglas County, Established 2005

The Applegate and Scott families, pioneers of Southern Oregon, settled at the foot of Red Hill in the mid-1800s. Jesse Applegate planted Douglas County’s first established vineyard in Yoncalla in 1876.

**Location**

Red Hill Douglas County is a sub-appellation of the Umpqua Valley near the small town of Yoncalla, which lies about 30 miles north of Roseburg and parallels Interstate 5. It encompasses 5,500 acres

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