

Warming to the Future

BY ROD SMITH

Art often paves the way for science in the public imagination. Victorian novelists Jules Verne and H.G. Wells may have missed a few technological details in their yarns about nuclear submarines and time travel, but their takes on future shock seem prescient now. And the 1936 Flash Gordon movies got everyone onboard for space travel long before John Glenn actually blooped in and out of Earth's atmosphere.

In the late 20th century, the 1982 sci-fi movie *Blade Runner* had a similar impact. It gave many of us our first fictional glimpse of what an evolved climate might look like, long before we met the reality of climate change.

Blade Runner depicted 21st century Los Angeles with a southeast Asian-like climate, stewing in the grip of perpetual monsoon with constant lightning bolts accenting the flares from hundreds of oil refineries dominating the urban landscape. Neither director Ridley Scott nor his literary source, the visionary novelist Philip K. Dick, had terms like El Niño or global warming in their lexicons at that time—and yet the outre-noir tone of their cops'n'androids caper rang true enough to prepare the mainstream sensibility for things to come.

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Over the last couple of decades most of us have come face to face with environmental and even cultural aspects of the changing climate—not just the creeping mercury but longer, drier droughts, heavier rain, and unpredictable conditions in between. A 2006 study by British government economist Sir Nicholas Stern estimated that the various effects of global warming could force the global gross domestic product downward as much as twenty percent, an impact on the scale of the Great Depression and two World Wars.

More recently, the naked truth about accelerated climate change was laid out in a film that one critic dubbed “the best horror movie of the year.” With uncanny timing, *An Inconvenient Truth*, Al Gore's slide-show presentation of global warming, hit theatres just before the NASA/Purdue study. It makes an impressive case for the notion—let's call it a fact—that the atmospheric envelope surrounding our planet is turning into a greenhouse, largely due to carbon dioxide, methane and other emissions from industry and, yes, our beloved cars.

Gore used broad-impact images such as time-lapse photography of shrinking glaciers and the disappearance of the fabled snows of Kilimanjaro, but for wine lovers like you and me he could as well have used the charts of Winkler-Amerine degree-day summaries (categorizing wine regions by the total number of days with average temperatures over 50°F during the growing season) that show how climatic warming has already affected the ripening process, and therefore wine style, in the foremost wine-producing areas. As it turns out, those diagrams were used in one of the hardest-hitting reports on climate change to date.

THE BAD NEWS

One morning last July, a sleepy world clicked on its morning news feed to read that the global wine industry is doomed. A widely-reported study from Purdue University, funded by NASA and published in the Proceedings of the National Academy of Sciences, asserted that global warming will reduce viable wine grape acreage in the United States by more than 80%, and make it impossible to grow high-quality wine grapes in many of the currently outstanding wine regions by the end of this century.

The study's authors concluded, “While increases in heat accumulation will shift wine production to warmer climate varieties and/or lower-quality wines, and frost constraints will be reduced, increases in the frequency of extreme hot days in the growing season are projected to eliminate wine grape production in many areas of the United States.” There may still be a viticultural region along the extreme West Coast, they allowed, but the quality and characteristics of these wines will be altered.

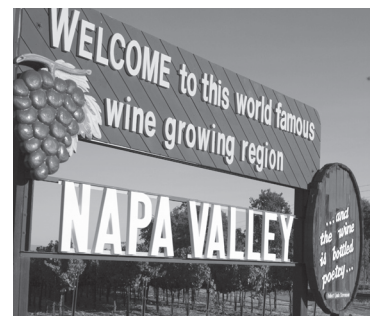


Photo: Jason Tinacci ©2006

Another study published in 2005 by one of the NASA/Purdue study's authors, Gregory V. Jones of the Southern Oregon University Department of Geography, is more specific to the West Coast: “While the exact seasonal characteristics and magnitudes of future climate change is still unknown, the model examined in this study predicts that growing seasons in the Western United States will warm by an average 1.7°C in the next 50 years (2000-2049). This amount of additional warming has numerous potential impacts including changes in grapevine phenological

timing, disruption of balanced composition in grapes and wine, alterations in cultivars grown, alterations in regional wine styles, and spatial changes in viable grape growing regions.”

Whew.

Naturally, it's not as simple as it might seem. Heat itself is just one of the factors in play. In a conversation with one of the study's authors, Professor Gregory Jones of Southern Oregon University, it became clear that although increasing heat alone might eliminate wine production in many areas, the mechanisms that might come into play along the California coast are unknown.

Hotter temperatures in most of the world could manifest in an unexpected way in rare and distinctive Mediterranean climates such as California's. What if, for example, superheating of the continental interior draws cold marine air and fog from the coast to cover a wider area than it does now, making places that are hot now significantly cooler? On the other hand, data Jones gathered recently in currently cool, foggy areas raises the possibility that marine fog intrusions may contract and concentrate their effects, pulling the moderate fringe climate zone back toward the coast.

“One of the challenges with California is what's going to happen along the coastal fringe,” said Prof. Jones. “Fog intrusions are driven by heating in the Central Valley. The more the valley heats up, the more the fog can be pulled in. So what is the magnitude of warming relative to the fog line? Will we see cool zones farther inland, or denser fog along the coast? The science isn't clear on that.”

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Jones also pointed out that science has barely begun to find out what the vine itself can do. *Vitis vinifera* has an astonishing ability to take what the climate dishes out and give a balanced crop. “It's been shown that if you plant chardonnay in Panama, the vine will have two growth cycles in one year,” he said. “It will actually set two crops per year.”

Imagine the discussion at a future wine tasting: “The 2051A is superb, but I find the '51B a little flabby, although it may surprise us and age like the '47A.” Factoring in the southern hemisphere, we have a real possibility of four Vintages of the Century in a single year!

THE GOOD NEWS

Such fanciful speculations aside, wine lovers everywhere are wondering, are the greatest vintages of the 21st century already behind us? The short answer is no, but the question opens a can of other questions. Perhaps the salient one is, can tragedy be averted?

The answer to that one is yes, but it's a qualified yes. The wine community can't stop climate change all by itself. The government can't do it just by making policy. No individuals can do it alone. But many scientists believe it is quite possible that everyone, working together, can slow and even arrest global warming by reducing emissions of greenhouse gasses.

This is not just about the continued availability of that soul-satisfying Napa Valley Cab, of course. The global effects of a superheating climate could be catastrophic: cities under water, farmlands inundated, forests turned to deserts, civilization in upheaval, life as we know it becoming life as nobody wants to know it.

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Yet the Purdue study focused on the relatively small world of wine for a reason. Viticulture is perhaps the most climate-

sensitive form of agriculture, making what the wine industry is to climate what the canary in the coal mine is to the miners' air supply—a distant early warning system for trouble. Agriculture is humankind's most extensive deliberate interaction with nature, and viticulture is the most intimate and complex form of agriculture, providing sensual and intellectual pleasures far beyond any mere food crop. And although technology is important in wine production, the ability to produce fine wines is ultimately limited by the availability of high-quality grapes. Moreover, wine is studied with a zealous attention to detail that makes it possible to compare and contrast a wide array of climatic variations and effects over time.

When the NASA/Purdue study hit the media, the wine community was inundated with calls. The PR staff at Napa Valley Vintners, and many individual producers, quickly tired of hearing variations on the exclamation, “Wow, you guys are really in trouble!”

They all had the same incredulous response. “Whaddya mean, you guys?”

Viticulture is to climate what the canary in the coal mine is to the miners' air supply

True, when gas starts leaking in the coal mine, the canary is really in trouble. But how many miners are standing around saying, “Wow,

that canary's really in trouble!?” Don't they take one look at the gasping bird and go on a mission to find fresh air?

There's no nice way to say this: we are in trouble. But not just the wine industry, and certainly not just the Napa Valley wine industry, but all residents of Earth. That most of us don't grasp

the danger is beside the point. We might well be compared with the dinosaurs that were happily munching one another even as the cataclysmic meteor that exterminated them was entering the atmosphere.

With one big difference: unlike T. Rex & associates, we have a chance to do something about it.

The wine producers of Napa Valley have assumed a leadership role in the initial campaign to

get as many Napa vintners and growers as possible involved in trying to head off disaster. Individuals, especially individuals in business, can and must make a difference.

This isn't a new role for the Napa Valley wine community, which has a presence in the American wine world disproportionate to its actual size. California produces about 92 percent of US wine, and although Napa Valley accounts for just four percent of that volume, it weighs in with 21 percent of sales, so its voice is influential.

It has historically been pro-active in protecting its immediate environment. It generated the Napa Valley Agricultural Preserve in 1968, the first such legislation in the U.S. to permanently protect land for agriculture. In addition, it backed a 1990 law requiring a public vote to authorize any conversion of agricultural land in the county to non-agricultural use, and also backed the Hillside Ordinance which regulates agricultural development on slopes above the valley to protect against erosion.

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Napa Green is managed by the Napa County Resource Conservation District in partnership with natural resource

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Napa Valley vintners were closely involved in forming the Napa River Watershed Task Force in 1998, and endorsed the resulting recommendations for vineyard setbacks from streams and forest conservation.

Most recently, the NVV helped launch the Napa Green Farm Certification Program,

consulting firm Laurel Marcus & Associates. The program aims to restore and sustain aquatic habitat, control soil erosion, and improve water quality by implementing Beneficial Management Practices (BMP) and compliance with local, state, and federal environmental regulations, including the Clean Water Act and the Endangered Species Act.

Napa Green participants attend intensive workshops that have been likened to graduate study in environmental stewardship. Following the workshops, each vineyard or property is analyzed in terms of its natural resources, topography, and current management practices. Needed changes are identified and a plan for mitigation/restoration projects is established. Finally, the grower and the program technical director together present the conservation plan for certification by the National Marine Fisheries Service, the Department of Fish and Game, and the Regional Water Quality Control Board. Once the plan is certified, the grower proceeds with implementation and photo-monitoring of progress.

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Formal efforts to move the wine community toward sustainability continue. Meanwhile, the growers and wine producers of napa valley invite everyone, upstream and downstream—from wine production—from companies supplying materials and services to

growers and wineries on one hand, to distributors, retailers, restaurateurs and consumers on the other—to embrace green values that can help mitigate the threat we all face together.

THINK GLOBALLY, ACT LOCALLY

There are several possible responses to climate change. One is denial, and its appeal can't be underestimated. Incredibly, there are still those, including some prominent politicians, who insist that the concept of global warming is a function of Chicken Little Syndrome ("The sky is falling!"). Another form of denial is to say, "It's not our problem—let the government deal with it." Of course, that's countered by a simple observation: in this country, we're all the government.

Outright escape may seem seductive, but let's face it—we can't all move to Canada or New Zealand. Anyway, places that look okay now will have their own problems as icecaps melt and sea levels rise.

It may be tempting to say that technology can solve the problem. That may be true insofar as technology can help us adapt to new conditions created by climate change. Yet technology alone can't defeat the core problem, as demonstrated by the fact that no great wines have yet been produced in California's

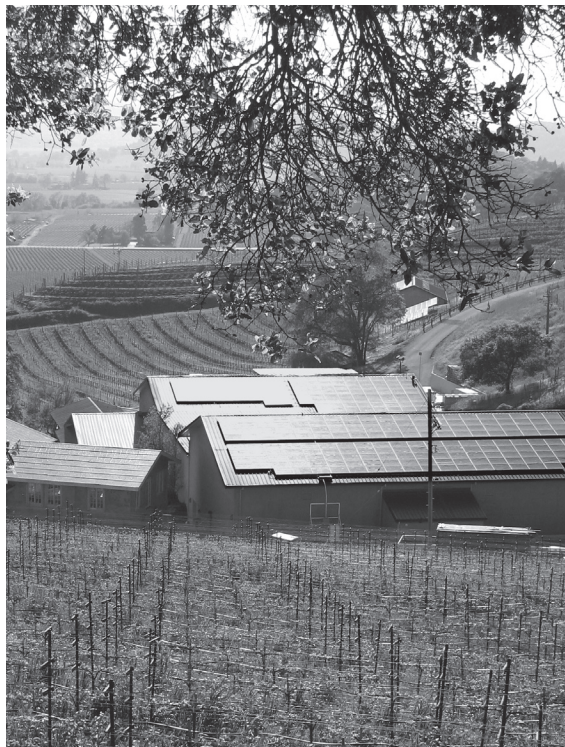
hottest regions. So even as we work to keep vineyards viable in a changing climate, we have to change attitudes and behavior in order to take advantage of technologies that may help mitigate greenhouse gasses.

Poet/conservationist Gary Snyder observed, “We may not transform reality, but we may transform ourselves. And if we transform ourselves, we might just change the world a bit.” In other words, think globally and act locally.

At this point we don’t have to transform ourselves all that much—just change some of our habits, and the way we live in the world. The easiest thing to do is vote with our dollars, and vote GREEN, supporting companies and policies that are trying to make a difference. In business and at home we can adopt practices and materials that reduce our collective contribution to the greenhouse gasses which threaten to alter our environment in a negative way forever.

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Increasing awareness of that notion is the working premise Ideal Bite, a website that emails a weekly tip on green living to its subscribers. The founders of Ideal Bite, Heather Stephenson and Jennifer Boulden, have identified a large segment of the population they call Light Green, which can potentially have a dramatically positive effect in the fight against global warming. Light Greens are hard to describe, say Stephenson and Boulden, but they “are beyond boycotts; drive their SUVs to Whole Foods; voted for Kerry and Schwarzenegger; drink organic wine after yoga; and look for ways to live richly while saving the world.” Such consumers, probably including most wine lovers, “are guided by their conscience and vote with their dollars,” making them a powerful force for change.



The operative term is “light footprint”. We all have daily opportunities to make choices, large and small, which can have a positive effect.

“It’s the right thing to do for the environment,” said one partner, “but our biggest reason for going solar was that it made good business sense.”

For example, simply lowering the consumption of electricity translates directly into less energy required by utility companies to generate power. The no-brainer here is simply turning off lights when they aren’t needed, and using lower-wattage bulbs for those that are. But consider the many other reasonably convenient habit modifications that can lower juice consumption.

Did you know that up to 40 percent of the electricity consumed by a typical household is the “phantom load” that keeps electronic equipment in action-ready sleep mode? Simply turning off the power strip those media players and TVs are plugged into can make a big difference, in both personal savings and greenhouse gas emissions.

So can taking advantage of natural light. Since most offices run during the day, it makes sense to use windows and skylights for general illumination and position desks close to windows. Hallways and storerooms don’t need to be lit or heated like workspaces.

Try flexing your economic muscle to expand your sphere of influence. Apply eco or green criteria when purchasing supplies and equipment by choosing recycled paper and reconditioned printers and copiers. You can also encourage or even require purveyors and suppliers to meet the same environment-friendly standards.

And just say no to junk mail, which wantonly consumes trees, our first line of defense against greenhouse gasses. For example, a company called Green Dime offers to eliminate your personal junk mail for ten cents per day—and they’ll even plant one tree per month in your name.

SUNLIGHT INTO JUICE

The low-hanging fruit in this effort is photovoltaic technology that turns sunshine into electricity. It’s widely available, increasingly affordable—especially with subsidies and rebates now offered by virtually every state, along with federal tax credits—and it can have a dramatic effect

on the climate. Some skeptics argue that the returns on an investment in solar power are realized too slowly. On the other hand, investments in buildings and vineyards don't return on investment for a long time, either. So why not go solar?

Once again, the wine community is leading by example. One case in point: the main wine warehouse for Napa Valley producers is solar-powered. That example is easily emulated. Every distributor has a warehouse, and a warehouse roof is ideal for mounting solar panels. In fact, the typical warehouse photovoltaic installation produces excess power which utilities in most states will buy back from the producer.

The roster of Napa Valley wineries powered by the sun is lengthening rapidly. To choose just one example, a family-owned winery recently installed a 129-kilowatt grid-tied solar power system that generates as much power as 20-30 average homes would use. The family says their system will keep more than 7 million pounds of greenhouse gasses out of the atmosphere--but they allow that the primary motivation for going solar was dollars and cents. The cost of the system was dramatically reduced by a rebate from the state and federal tax credits, and once the system pays for itself the winery will essentially be running on free electricity. "It's the right thing to do for the environment," said one partner, "but our biggest reason for going solar was that it made good business sense."

One of the most outstanding examples of a completely environment-friendly facility was recently built, not surprisingly, by one of the first California vintners to champion organic, dry-farmed vineyards. Last year he completed a new hospitality center and upgraded the winery according to standards which, he says, give the facility a "zero carbon footprint."

In addition to being entirely powered by the sun, the offices and hospitality center are certified by Leadership in Energy and Environmental Design (LEED), a green building rating system established in 1988 by the U.S. Green Building Council. The standards address five areas: sustainable site; water efficiency; energy and atmosphere; materials and resources; indoor environmental quality. Currently, LEED certification applies to commercial buildings, but a home certification is in the works (similar to Ecohomes in the UK), to be unveiled in 2007, so conceivably in the not-too-distant future new homes will be built to LEED standards.

Another energy-saving innovation in the new facility is geothermal power. Beneath the parking lot are nearly two dozen bore holes with interconnected pipes that circulate fluid from the building's heat-exchange unit through earth that remains at a constant

temperature (around 60°F) year-round. The building can be heated or cooled from the base temperature with a negligible expenditure of energy.

Pushing the conceptual envelope just slightly, it's even possible that in the near future those of us who visit the Napa Valley to enjoy great cuisine with the local wines will be contributing directly to alternative energy sources that may power tractors, trucks, and the engines that power frost-control propellers mounted in the vineyards.

Last fall UC Davis announced a program to turn leftovers into vehicle fuel. The Biogas Energy Project will process some eight tons daily of leftover food from upscale restaurants in an "anaerobic phased solids digester" to produce hydrogen and methane gasses. These clean energy gasses can be used to produce electricity, heat, and fuel. Won't we all feel a little better about saying no to that next tray of yummy potato-caviar bites if we know the leftovers might save a cult Cab vineyard from frost?

Ultimately, of course, because great wine is impossible without high-quality grapes, the challenges posed by accelerated climate change will have to be met in the vineyard. But it's not as though grape growers will suddenly have to spring into action and do something. They've been doing something all along; the only thing that changes is the focus of their efforts.

Viticulture has been continually adapting to the climate, and weather cycles within it, since the first vines were cultivated, selected, trained, and pruned. Napa Valley growers, working with scientists at UC Davis and other academic centers, are constantly working to improve the vine's response to its environment, and will continue to do so as conditions change. For example, after many years of learning how to optimize the structure and density of the leaf canopy toward an ideal ripening process, growers will be able to make whatever adjustments may be required by shifting temperature patterns. Meanwhile, new plant material is being developed to deal with an altered environment in which insects, fungus, and heat spikes are more problematic than they have been in the past.

In other words, wine fans need not despair, even in the long run. Our children and grandchildren should be able to discover the pleasures of Napa Valley wines for themselves in due time. California's coastal wine regions are unlikely to just dry up and blow away. As the authors of the Purdue study pointed out, "The projected decrease in potential winegrape-producing area is based on current vine stock characteristics and does not consider advances in viticultural technology or management, both of which may extend winegrape production in the current distribution." Orientation of plant breeding toward heat-resistant vines, along with viticultural techniques to moderate the effects of increased heat, may well obviate the threat.

Of course, that assumes getting control of global warming and mitigating its potentially disastrous effects. Technology won't matter if the entire Southwest becomes a blazing desert subject to cataclysmic flooding.

At some point in the relatively recent past, humans began to affect their immediate surroundings, turning little places in the grand ecology into domestic niches. Who cultivated the first gardens, deliberately choosing and arranging plants? We find ourselves living through a similar leap in progress, equally extraordinary (as if any aspect of evolution could be called ordinary), the point at which the evolution of our species merges with that of our host planet. In a real sense, each of us holds Earth in our hands, just as surely as we hold a glass of Napa Valley wine.



Photo: Jason Tinacci ©2006

Essay commissioned by the Napa Valley Vintners

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Napa Valley Vintners

Now in our seventh decade, the Napa Valley Vintners (NVV) nonprofit trade association is the sole organization responsible for promoting and protecting the Napa Valley Appellation as a winegrowing region second to none in the world. Respect for our history reinforces our commitment to the preservation and enhancement of the Valley's land, wine, and community for future generations. We address the shared interests of our more than 270 members and aspire to be the essential organization for all Napa Valley vintners.



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