

Sonoma County, California



SONOMA SUSTAINABLE TOURISM OBSERVATORY

Annual Report 2019

With a special focus on the North Bay Fires

2018 Recap

In 2018 we at Sonoma Sustainable Tourism submitted our first annual report, held our first Stakeholder's Meeting, and met with other Observatories in Madrid. With about half the interviews now done, we will be continuing work on the book about Sustainable Wineries in 2018.

Our 2018 Objectives were to:

- ✓ Continue to develop a strong organizational base
- ✓ Implement the fiscal sponsorship agreement with Inquiring Systems Inc.
- ✓ Hold our first Stakeholders' Workshop
- ✓ Attend a meeting with INSTO in Spain or London
- ✓ Interview approximately 12 sustainable wineries for our planned book
- ✓ Keep the website up-to-date

2019 Plans and Goals

This year the Sonoma Observatory aims to meet our objectives and to closely examine two areas of interest in the County – How art meets tourism and the now-booming town of Healdsburg, which has seen rapid growth and development in recent years. Healdsburg, once a rural agricultural area, began investing in their tourism and wine industry and saw growth to match it. Now, the region is dealing with increasing traffic, noise and smog pollution, and rising home prices. We at the Sonoma Observatory believe Healdsburg is an excellent small-scale snapshot of the effects of tourism seen around the world.

Art plays a huge part in Sonoma County, from the small, individual artisans to the larger city-wide efforts to keep art and character present. We look forward to researching this trend in more depth.

Our Objectives moving forward are:

- Finish and publish the Sustainable Wineries book
- 2nd Stakeholders' Workshop or a series of workshops focused on information sharing
- Monitor tourism's continued rebound after 2017's fires
- Spotlight the intersection of art & culture with tourism
- Spotlight Healdsburg

Data Collection:

Thanks to the wealth of data gathered by government and monitoring sources in the US – California in particular – we intend to focus on two specifics in our monitoring. First, the recovery efforts after the fires and how Sonoma in particular is tackling the issues regarding rebuilding, lack of housing, and the environmental impact the area has experienced. Second, as part of our focus on the tourism industry here, we are working on a book about sustainable wine practices which will allow us to track progress toward the goal Sonoma County has to become the first 100% sustainable wine area in the US.

Geography & Topography

Sonoma County extends over 1,500 square miles and is home to 493,285 people, with approximately 33 percent of the population residing in Santa Rosa. Geographically, Sonoma County features 55 miles of coastline followed by rolling coastal mountains. A deep, flat valley following Highway 101 north-to-south hosts the bulk of the population and metropolitan centers. Continuing east, there are a series of tall, steep, linear mountain ranges, including the Sonoma Mountains, Mayacamas Mountains, and the Girdle, then Napa Valley.

Climate-wise, Sonoma County enjoys a Warm-Summer Mediterranean climate, meaning we tend to get hot, dry summers and wet but mild winters.

Hospitality Industry

The current breakdown of hospitality properties according to the Sonoma County Economic Development Board's 2018 Annual Tourism Report is ~13% Full-Service Lodging Properties, ~21% vacation rentals, ~21% bed & breakfasts, ~33% limited service (for instance, serving only a continental breakfast) and ~12% were classified as campgrounds.

9 Mandatory Issue Areas (+ one we consider important in our area)

Employment

In an agricultural area, farm hands and fruit pickers are the backbone of the labor force. Currently, Sonoma County – and California agriculture as a whole – is hurting for workers. According to a federal survey, 9 out of 10 California farmworkers in 2016 were born abroad, mostly in Mexico, and half were here without citizenship or legal work permits¹. For an industry which relies on foreign labor the changes in immigration policy has been devastating. That, coupled with the tenuous housing industry, high cost-of-living, and the increased pressure on all industries due to the North Bay Fires, has created a very difficult working climate for agriculture. Where ten years ago a labor contracting company might have received 700 applications for the season, now they might see 15. With baby boomers entering retirement and the emerging workforce focusing on other career paths, both agriculture and construction are in need of workers.

The California Farm Bureau Federation's Federal Policy Division conducted a survey in October 2017, with 762 respondents in the farming and ranching fields. 55% said they had experienced employee shortages, and 69% said they had problems when trying to hire seasonal workers. Among those responding approximately 36% grow tree fruit, 30% grow tree nuts and 24% grow wine grapes.

Pay has begun to rise to attract workers to open positions, but only the more affluent growers are able to offer more pay. Wages for crop production in California increased by 13% from 2010 to 2015, twice as fast as average pay in the state, according to a Los Angeles Times analysis of data from the Bureau of Labor Statistics².

¹ <https://www.motherjones.com/food/2018/07/californias-vineyard-workers-wine-labor-shortage-guestworker-visas-immigration-crackdown/>

² <https://www.latimes.com/projects/la-fi-farms-immigration/>

The housing industry has seen effects from the loss of workers as well. With 2,834 homes burned in Santa Rosa alone, rebuilding has been a priority, but many residents have had to leave due to damage or simply the high cost of living. Getting rebuild efforts and new constructions off the ground has proven difficult with a deficit of workers, contributing to the tight housing industry becoming tighter. The Press Democrat estimates as many as 7,000 people may have departed Santa Rosa last year, mostly for other parts of the county, while approximately 1,300 people have left the county entirely³.

Destination economic benefits

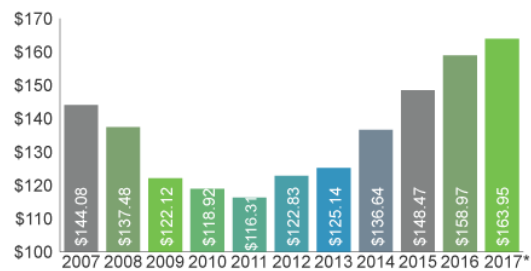
Tourism is one of the biggest drivers of Sonoma County's economy, which in 2016 brought in \$1.93 billion from direct visitor spending. Additionally, Sonoma County generated \$2.1 billion in annual travel-related spending in 2017, \$177.7 million in total taxes (government revenue) collected, and \$43.7 million from total TOT Revenues⁴.

[The graphs below come from [Sonoma County Tourism: https://www.sonomacounty.com/statistics](https://www.sonomacounty.com/statistics)]

TOTAL VISITOR SPENDING
In billions of dollars

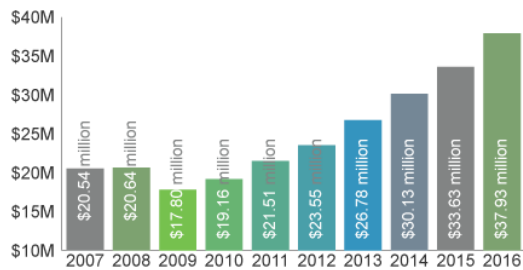


AVERAGE DAILY HOTEL RATE
Sonoma County

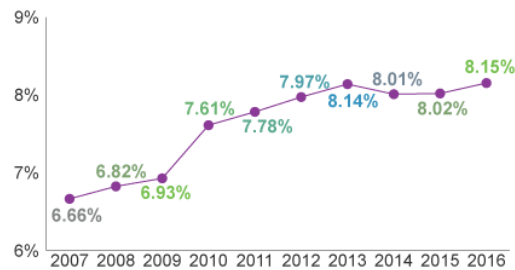


*2017 is the average of Q1 and Q2 data and real value may be affected by wildfires in Q4

TRANSIENT OCCUPANCY TAX REVENUE
In millions of dollars



JOBS SUPPORTED BY VISITOR SPENDING
As a percentage of total employment



Governance

The United States governance system is multi-tiered, consisting of Federal, State, County, and City level agencies. As it relates to tourism, government agencies collect taxes, manage parks, and upkeep infrastructure.

³ <https://www.pressdemocrat.com/news/8772360-181/october-wildfires-force-many-to>

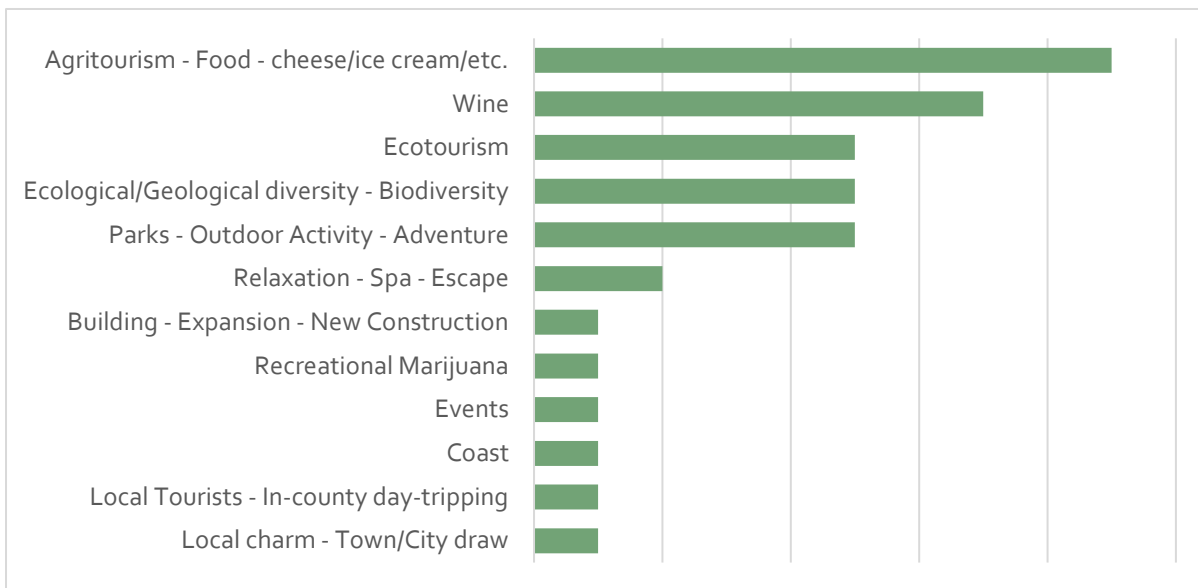
⁴ Information from Visit California / Dean Runyan and Associates "California Travel Impacts by County"

The Sonoma County Tourism Bureau is not government-run; rather it is a private, non-profit marketing and sales organization dedicated to promoting overnight stays and creating a sustainable hospitality economy in the county.

Local satisfaction with tourism – Stakeholder’s Survey 2018

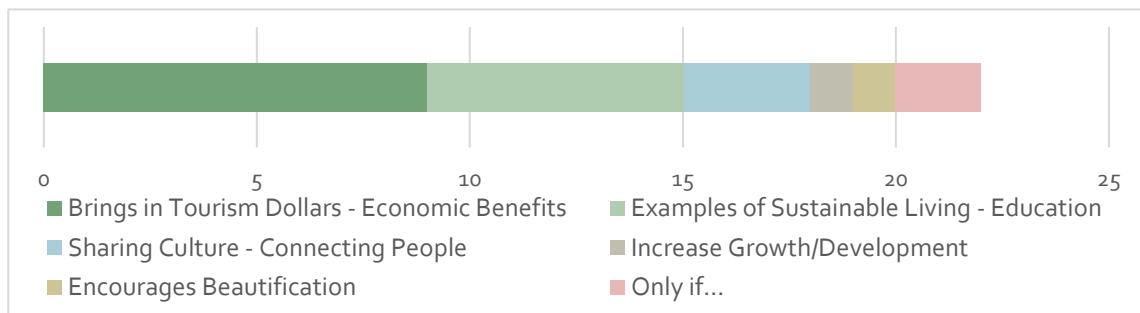
At our 2018 Stakeholder’s Meeting we conducted a survey to measure satisfaction and receive ideas from locals.

We asked, “Where are the biggest opportunities for tourism?” The chart below tallies the responses we received.



When we asked about road/transportation changes, the far and above majority was for better public transit or SMART train improvements. The other responses were for improving ridesharing, better bicycle and walking integrations, incentives for electric vehicles & ZipCars, clearer road signs, connecting Sonoma County with San Francisco, improved road maintenance, and an app or guide for tourism which would include public transit, disincentivizing driving & parking.

Our next question was, “How is tourism a force for good in Sonoma County?” And we received some resounding answers as well as quite a few answers with reservations (Examples of such answers: “Only if it is properly planned”, “[The] economy benefits but with an ecological cost”, “In moderation”).



Lastly, we asked people for what they thought the biggest threats from tourism were.

Traffic was not a surprising top pick – the whole Bay Area suffers from severe traffic at least twice a day Monday through Friday from commuters to & from San Francisco for work – while tourists and visitors add congestion on the weekends.

The next top answer, cost of living, is such a huge issue in the Bay Area -particularly in San Francisco, Silicon Valley, and the North Bay (Marin, Sonoma, & Napa)- that we added it to the 9 issue areas and discuss it at length later in the document.

Traffic - Cars & vehicle pollution - Drunk driving	22%
Cost of Living - Equal Opportunity Employment	19%
Ecological Impacts - Waste – Carelessness	19%
Wine Industry - Monocropping	11%
Overcrowding - Driving Locals Out	11%
Droughts - Natural Disasters	7%
Increase of Urban Landscape - Habitat Loss	7%
Greenwashing - Sustainability issues	4%

Ecological impacts, including car pollution, litter and trash, and human presence in natural areas are also of significant concern.

Tourism seasonality

A year-round industry, the peak season tends to start in May/June and ends in October/November. Last year’s season was cut short due to the fires in early October but has since recovered.

Water management

Sonoma County’s water is managed by a municipal water agency and a part of the Russian River Watershed. All information on current usage, water storage, groundwater, stormwater, etc. can be found here: <https://www.sonomawater.org/water-supply>

Energy management

Sonoma Clean Power – A program available to residents, Sonoma Clean Power offers two different programs according to their website. First, **CleanStart**, which gets its power from a mix of sources - ~45% renewable electricity (wind, solar, geothermal, etc.), ~42% large hydroelectric power, and ~13% general system power. Their **EverGreen** program offers 24/7 local renewables in the form of 100% locally produced, renewable electricity.

Fuel Goal: Sonoma Clean Power also has an electric vehicle buyer assistance program to help Sonoma reach its goal of 10,000 electric vehicles on the road by 2020.

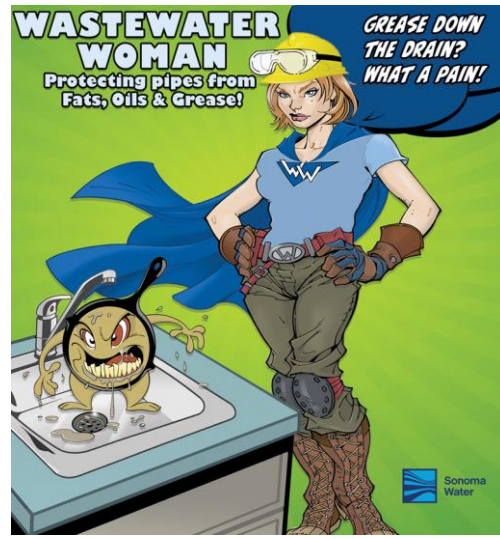
Waste water (sewage) management

Sonoma County treats its wastewater with four steps to turn sewage into tertiary recycled water: primary treatment, biological treatment (secondary), filtration and disinfection (tertiary). Tertiary treated water is not drinking water, but it contains nutrients for the irrigation of crops, vineyards, playgrounds, golf courses, parks, cemeteries, freeway embankments, and street medians⁵.

⁵ <https://srcity.org/1061/Recycled-Water>

Solid waste management

The Sonoma County Waste Management Agency is a joint powers authority whose mission is to implement waste diversion programs as required by State law AB939. They aim to inform local residents and businesses of ways they can help reduce, reuse and recycle their solid waste and properly dispose of hazardous materials. Sonoma Water ran a recent campaign in local papers to raise awareness about what can and can't go down drains. In a series of ads, Wastewater Woman warns against pouring fat and grease down the drain, proper disposal of unwanted medications so they aren't flushed down the drain, and not flushing wipes – because even ones calling themselves flushable are not.



Cost of Living

We chose to include this metric which we believe best illuminates the current economic ecosystem in Sonoma County.

In the Bay Area, and Sonoma County in particular, the cost of living and rent prices continue to rise while the statewide minimum wage lags. Rent prices have spiked in the Bay Area since the end of the Great Recession, with rent prices growing by nearly 50% from 2011 to 2016. Apartment List, a rental listing website based in San Francisco, reports the median two-bedroom apartment in Santa Rosa rented in May for \$1,974 a month, an increase of 3.4 percent from a year earlier. RentCafe, another online rental site, reports an increase of 5.9 percent⁶.

The living wage in Sonoma County for two parents working full-time (at least 35 hours a week) is \$23 an hour each, requiring an annual income of \$81,353 to support two children⁷. Approximately two-thirds of working poor families in the county include two parents and two children. The report was based upon pre-Tubbs fire data and doesn't incorporate the 36 percent increase of median rents since the fire⁸.

As of January 2019, the minimum wage in Sonoma County is \$11 an hour for small businesses, and \$12 an hour for employers with 26 or more employees, and is slated to rise to \$15 an hour by 2023, a number which remains far below the calculated living wage of Sonoma County.

⁶ <https://www.northbaybusinessjournal.com/northbay/sonomacounty/8449498-181/sonoma-county-rent-control>

⁷ The California Budget and Policy Project report - <http://livingwage.mit.edu/counties/06097>

⁸ <https://www.pressdemocrat.com/opinion/7815386-181/close-to-home-what-is>

A Deeper Look At 2017's Fires

Around 10 o'clock pm on October 8th, 2017, in the midst of powerful winds and following the heels of a hot and dry summer, a series of fires broke out across Sonoma, Napa, and Lake counties. Within hours the fires had reached catastrophic levels, aided by hurricane force gusts of wind that could carry live embers for miles. Sadly, before dawn had broken, the fires had made it into populated residential areas, including downtown Santa Rosa, prompting evacuations on a scale never seen in California prior.

The fires continued to rage for more than a week, primarily in uninhabited natural areas, but smoke pollution kept schools closed and people indoors all the way into the South Bay. When all was said and done, 245,000 acres had been burned, 8,900 structures destroyed, and 43 lives tragically lost.

There is no doubt that Sonoma County will be dealing with the environmental and economic repercussions of this disaster for years to come. The rainy season brought concerns about landslides, polluted runoff, and contamination of waterways to the discussion table. With approximately 100,000 people displaced and ~5% of the housing stock lost, the already tight housing market has since suffered from lack of supply to meet the sudden demand.

Two different kinds of fires were responsible for the damages, creating areas of varying damage. Surface fires are fast moving, relatively low heat fires that run through forest floor and grassland, burning dry grasses and surface litter. These fires are a natural part of a forest's lifespan -by burning the built-up leaves and plant detritus, new life is able to sprout from the ashy, nutrient-rich dirt. The second kind of fires are far more dangerous and damaging. Crown fires (or treetop fires) burn much hotter and burn up the trunk of trees, especially deceased trees, flames coalescing at the top where a gust of wind can easily snag hot embers and carry them for miles to where they can ignite a fresh area of land. Due to the infestation of bark beetles throughout the forests of the west, many trees have died but still stand upright, making a perfect vehicle for surface fires to turn into crown fires.

In wine country, only six vineyards were lost. There is some evidence that vineyards – being cleared, maintained land with little vegetation – acted as firebreaks in many areas, slowing the movement of fire. Vineyards are comparatively easy to defend compared to forest land because there is minimal litter on the ground and a total lack of trees to climb. Many vineyards now have scorched vines only along the perimeter of the property, where the fire couldn't continue its travel. Looking into the future, planning vineyards specifically as firebreaks may become more common.

Two of our protected areas -Sugarloaf Ridge State Park and Pepperwood Preserve- saw damage of varying degrees, but the rainy season brought renewal as green sprouts appeared in even the most damaged of areas, demonstrating just how resilient nature is.

With 74 percent damage from the fire, Sugarloaf Ridge was the hardest hit. Most buildings were spared, but two outhouses, a water tank, and a bridge were lost. Overall, 3,328 acres of the park's total of 3,900, were damaged from the fire. The park remained closed until February 2018 and later reopened for overnight campers in April.

Meanwhile, the Tubbs Fire burned 2,800 of the 3,200 acres of Pepperwood Preserve, including two staff residences which were completely destroyed. Pepperwood's Barn, which housed a small office, most of their preserve management equipment, and off-road vehicles, were also lost, as was the Hume Observatory.

To quote notes from *Observations on Fire History and Current Recovery*, a presentation by David Ackerly, Ph.D., UC Berkeley. "High-severity areas include Douglas-fir (complete canopy burn) and chaparral. Oak woodlands fared relatively well – a fire can go under the canopy... [This is a] great opportunity to study fire behavior in oak woodlands. Grasslands were high severity (burned completely) but not as intense (with a low amount of fuel, fire can't build up much energy). The fine twigs on the oaks did not burn - this means the fire and the wind burned off the leaves but did not consume much wood. Thin-barked madrones had a lot of overstory damage, but they are vigorous resprouters. Four weeks out from the fire, madrone, soap plants, grasses, and coast live oak were resprouting."

Pepperwood's scientists have been working to conduct time-sensitive assessments of the ecological impacts of the Tubbs Fire on the local grasslands, chaparral, and forests in collaboration with multiple university, federal, state and local agencies as well as sister nonprofit organizations. These agencies have come together to design a set of comprehensive post-fire studies, building off of pilot studies based at Pepperwood's Sentinel Site.

"Staff members and visitors watched with delight and awe as last Fall's charred hillsides turned the most brilliant shades of green any of us can remember. Just as we thought it couldn't get any more beautiful, wildflowers of yellow, blue, red, orange, and seemingly every color of the rainbow began blanketing the meadows. Today, blackened oak trees are sprouting new leaves, and bay laurels that the Tubbs Fire had reduced to nothing but stumps are sprouting new growth at their base."

Primary effects include destroyed/closed hotels, vineyards, wineries, roads, parks, evacuation orders, flight cancellations, and road closures. These are physical barriers barring visitors from being able to come and stay at a location.

Secondary effects come into play once the physical barriers have been removed, when travelers choose not to travel to a region affected by natural disasters. It can be very difficult for an area to shake the perceptions that form secondary disaster effects. Secondary effects can include:

Generalization - When a disaster area is thought to be much bigger or further reaching than it actually is. For instance, of the 1,200 wineries in Napa and Sonoma, approximately six were lost. Coverage of the fire event as it occurred showed flames swallowing buildings and climbing mountain ridges. Many outside the North Bay believed, based on the news coverage, that wine country was destroyed.

Sensitivity - The perception that an area that has just experienced destruction and loss wants time to mourn before getting back to business-as-usual can also be damaging. Outside of evacuation areas, many stores closed due to air quality issues for the first week-and-a-half but found that when they reopened costumers were infrequent. The community craved normalcy, not privacy. Months later,

many stores in the heart of tourism spots found their numbers continued to trail compared to the same period in previous months. Local papers published articles like, *"Death puts a pall on visitors"*⁹ and *"Weeks after wildfires, California wine country is 'as beautiful as ever' — and hurting for visitors"* which speaks to the need for visitors in such a tourism-dependent area.

Fear - If it happened once, it can happen again. With a world of destinations available to them, many travelers opt for a "safer" destination. Sarah Stierch, a freelance writer based in Sonoma Valley wrote just after the fires, "I've spoken with countless winery staff, winemakers, vineyard owners, hotel concierges, and chefs, all who have acknowledged that visitors have been canceling left and right, fearing that they'll witness terrible devastation surrounding the area, and/or bad air quality. One colleague who works at a tour company stated that 75 percent of their business canceled for the month of November due to those fears." Despite the talk of 'total destruction', most of the damage was in the forests and hills of the surrounding areas and not visible to most visitors. To quote 2018's Sonoma County Annual Tourism Report, "Although the blazes left wineries, breweries, downtown areas, outdoor trails, and other popular attractions largely unscathed, hospitality operators grappled with a wave of cancellations in the fires' wake, interrupting what was otherwise a very strong year for Sonoma County tourism. The influx of first responders and the temporary resettlement of displaced residents at county hotels partially offset the reduction in visitor spending at restaurants and retail stores, but growth in tourism revenues slowed substantially in the final months of the year."

Sonoma was featured on the cover of National Geographic's Traveler magazine, just one year prior to the fires, drawing international attention to the destination, and according to Hipmunk, Sonoma in 2015 was the most expensive city in America to book a hotel with an average rate of \$417¹⁰.



⁹ <https://www.northbaybusinessjournal.com/northbay/sonomacounty/8806827-181/north-bay-wildfires-deepen-tourism>

¹⁰ <https://www.hipmunk.com/tailwind/hipmunk-seasonal-hotel-price-index/>

As events like the 2017 North Bay Fires become more frequent – and the Butte Fires of November 2018 tell us Northern California will continue to see fires like these – we will be watching to see the changes and new approaches California takes to land management and mitigation efforts to keep the scale of the fires minimal.

Recovery from the Fires

Sonoma’s Center for Environmental Inquiry and Pepperwood Preserve have begun rigorous analyses of the effects and restoration of lands after a fire.

Living with Fire in California’s Coast Ranges Symposium was held from May 7-9, 2018 at Sonoma State University (SSU), in Rohnert Park, CA, as a partnership between the [California Fire Science Consortium](#), [Pepperwood](#), [SSU](#), [CAL FIRE](#), the [Sonoma County Forest Conservation Working Group](#) and local public and private agencies.

The goals of the symposium were to foster a public dialogue about the ecology of fire in the California Central Coast Ranges and its relationship to humans, ecosystems, and natural resources, to discuss patterns and trends in wildfire over time and the factors influencing those trends, and to explore what agencies, communities, and citizens can do moving forward to enhance community resilience to fire.

The webpage <https://www.pepperwoodpreserve.org/livingwithfire/> contains all information related to the event, including videos and downloads of the presentations given. We believe this to be a valuable resource for other regions dealing with ever-increasing fire hazards.

Additionally, throughout early 2018, Pepperwood released a series of blog posts – Fire Ecology for Non-Scientists series. The first is on [The Fire Triangle & Fire Behavior](#), the second on [Renewal for Pepperwood’s Trees and Shrubs](#), the third on [Fire Followers](#), the fourth on [Fire and Wildland Animal Habitat](#) and the fifth, called [And Now the Upside – Ecological Benefits of Fire](#). We’re including links to each, just click the blue text and it should open in a separate browser page.

Tourism, One Year Later

The North Bay Business Journal interviewed Claudia Vecchio, president and CEO of Sonoma County Tourism, for the one-year anniversary of the fires. Ms. Vecchio took over the organization on November 1st, 2017, after the retirement of the previous official that May. Faced with the challenge of reviving Sonoma County after the fires, she shared the current state of things one year later and what has been done to recapture visitors.

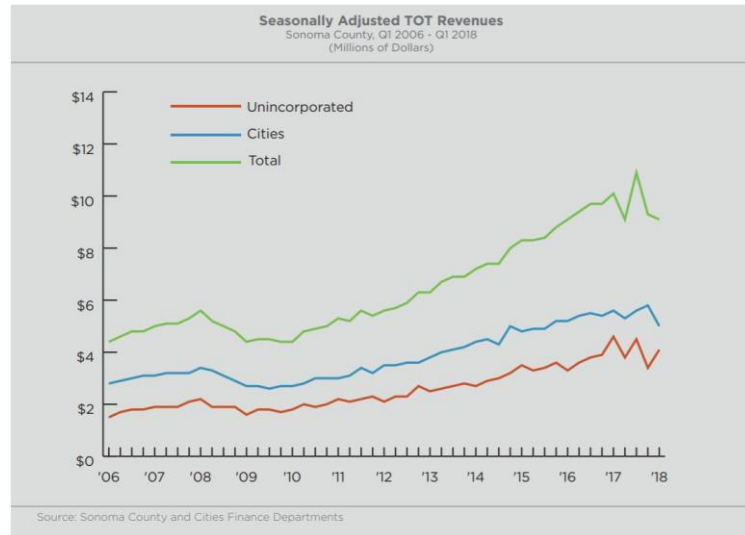
“To start, Smith Travel Report of hotel occupancy and rate shows an industry in great shape, but that single metric is far from the full story.

Year-over-year (as of July) Sonoma County’s hotel sector is showing an almost 7% gain in occupancy, a 4.3% gain in the average daily rate and an 11% increase in revenue per room. The taxes generated through the transient occupancy tax have been very strong, helping to ensure solid funding for all the programs supported through taxes generated by guests in lodging properties.¹¹”

¹¹ <https://www.northbaybusinessjournal.com/northbay/sonomacounty/8806827-181/north-bay-wildfires-deepen-tourism>

The Fountaingrove Inn, Santa Rosa (124-rooms) and the Hilton Sonoma Wine Country, Santa Rosa (250-rooms) both burned, causing other hotels in the area to take that load, bolstering their rates.

“Revenues were variant in 2017, particularly in quarter four as a result of the October wildfires. First quarter 2018 revenues exhibited similar patterns in first quarter 2010 and 2015, with a decrease in cities and an increase in unincorporated revenues. Damaged and destroyed hotels from the fires will have effects on TOT revenue in the near future.” – 2017 First Quarter Transient Occupancy Tax Report¹².



Of the recovering industries, Ms. Vecchio explained that it was restaurants which were struggling most to bounce back after the fires. A wealth of restaurants coupled with fewer visitors and locals visiting them has struck the industry hard, especially once first-responders departed.

Climate Change on the Horizon

“Holding back the sea requires technology; a retreat requires the management of human expectations. That’s probably why we’ll hold back the sea in a lot of places, even where it’s not environmentally advantageous” ~ James Titus, EPA Researcher

Climate-change responsiveness and resilience

This is an issue on a global scale, but how countries, states, counties, cities, and communities are impacted and the changes that are necessitated by it differ based on region and population.

Sonoma County is not exempt. Issues like Sea level rise, drought, and erratic climate conditions which lead to more large storms will be a focus in the San Francisco Bay Area during the next decade.

Climate change is the warming of the planet as a whole, with differences in local weather and climate from the historical record observed. This means most places will become warmer and drier alongside an increase in both the number and severity of storms, with more frequent temperature drops and spikes and more frequent occurrences of ‘extreme’ weather. California, evidenced by recent and unprecedented drought, is likely going to become warmer and drier whilst experiencing more frequent storm-level events. The same is true for Sonoma County.

¹² <http://sonomaedb.org/Data-Center/Industry/>

In Sonoma County, one of the biggest tourism drivers is wine tourism. Sonoma's 467 wineries annually generate \$1.25 billion wine-related tourism, have a \$13.4 billion total economic impact, and 54,000 jobs¹³. With drought conditions expected to become the norm, the industry will likely struggle with lower crop yields and harder working conditions. Wildfires are also fed by drought, and Sonoma County has seen quite a few in the past decade. Every year for the past decade or so wildfires break out in Northern California.

An increase in storm-level events is also predicted and has already been evidenced over the past few years. Northern California doesn't see events such as hurricanes and tropical storms, but rainstorms can sweep across the dry California earth, causing property damage – and more damaging - urban runoff. Not only responsible for flooding, runoff also causes significant pollution of streams and rivers with oils and gasoline, chemicals, sediment and nutrients used for agriculture. Nitrogen in particular causes toxic algal blooms which have occurred in the Russian River and caused a significant amount of problems, including loss of tourism.

Sea Level Rise

Climate change is also causing glacial melting. As previously landlocked fresh water enters the oceans, ocean currents are disrupted along with weather patterns, and global sea level rises. Sea level rise had been extensively studied and scientists are now urging cities to start preparing for it. The California Ocean Protection Council paid for an extensive study of sea level rise in California¹⁴, which states that as of now, the California coast is already seeing issues associated with sea level rise such as extensive coastal flooding during storms, periodic tidal flooding, and increased coastal erosion.

King tides – caused by the positions of the Earth, sun, and moon in relation to each other – can mimic sea level rise and tend to back up the Petaluma River, according to a Sonoma County planning manager. Because the Petaluma River is actually a 13-mile tidal slough that empties into San Pablo Bay it is particularly sensitive to tidal forces. The tides also back up the Russian River, causing flooding at Duncans Mills, which is only about 4 miles from the ocean.

County officials are preparing for a possible 6-foot rise, which would result in flooding at Bodega Bay, Duncans Mills, Jenner and other areas.

In Sonoma County, the threat would be from two sides. The western facing coast side would see flooding up rivers and streams and loss of beaches – but the main point of damage would be from the San Francisco Bay, which would follow the Petaluma River upstream to the heart of Petaluma, causing devastating flooding of streets, businesses, and homes. Highways 101, 37, 121, and 12 would all be flooded in places, shutting down routes used both daily by commuters traveling to San Francisco and the majority of visitors.

¹³ [Presentation to the Sonoma Valley Stakeholders June 27, 2017](#)

¹⁴ <http://www.opc.ca.gov/updates-californias-sea-level-rise-guidance/>

Fires as they relate to Climate Change:

Climate Change impacts both the frequency and ferocity of wildfires in California. These past few years, the records have been broken each year. The most destructive wildfire in California history became the Tubbs Fire of October 2017 and that same year the record for the largest fire was also broken by the Thomas Fire in December in Southern California. In 2018, tragically, both records were broken again, the Mendocino Complex fire of July becoming the largest in the history of the state – almost doubling the size of the Thomas Fire. The Camp Fire in Butte County, which burned the towns of Paradise and Magalia to the ground has become both the most destructive and the deadliest, with 86 human lives lost. With wildfires here becoming faster, more unpredictable, and harder to contain, the effect a warmer globe is having on California is becoming clear.

With the multitude of effects climate change is producing, there are a few that are causing the main effects we're seeing on wildfires. First, referred to as "climate" or "precipitation whiplash", our Mediterranean climate becomes more extreme, shifting between torrential downpours and droughts where we used to just have a rainy season and a dry season¹⁵. After intense, storm-driven wet seasons lasting approximately three months, vegetation – non-native grasses and weeds, mainly – spring into life, blanketing our landscape in green. Once the rain ceases and the dry season begins, those fast-growing non-natives dry out and die, creating perfect kindling. The more rain we get, the more fuel for future fires in the late summer and fall. At that point, it doesn't take much to ignite the parched landscape. The wet season in Northern California used to begin around late September to October, and now it doesn't begin until well into December. This means that when the dry Santa Ana winds (or Diablo winds as they're called in the Bay Area because they blow over Mt. Diablo) come whipping through, the land is primed for ignition⁹.

According to the U.S. Forest Service, "Since 2010, an estimated 129 million trees have died in California's national forests due to conditions caused by climate change, unprecedented drought, bark beetle infestation and high tree densities." These deceased trees, still standing, are perfect fuel for a wildfire. Like dry tinder, they catch easily, allowing fire to travel up them quickly where high wind can catch embers and carry them miles to catch another location ablaze.

Removing all the dead trees as a fire prevention tactic has been discussed, though the fiscal cost would be enormous. Currently, the forestry service – a federal agency – lacks the funding and manpower to undertake such an endeavor. Randy Moore, Regional Forester of the U.S. Forest Service, Pacific Southwest Region, explained in an interview with ABC News, "To increase the pace and scale of this important work, we need to fix how fire suppression is funded. Last year fire management alone consumed 56 percent of the Forest Service's national budget. As fire suppression costs continue to grow as a percentage of the Forest Service's budget, funding is shrinking for non-fire programs that protect watersheds and restore forests, making them more resilient to wildfire and drought."¹⁶

¹⁵ <http://newsroom.ucla.edu/releases/california-extreme-climate-future-ucla-study>

¹⁶ <https://abc30.com/record-129-million-trees-dead-in-california-due-to-drought-bark-beetle-/2770243/>

Currently, California's Tree Mortality Task Force (TMTF) has felled or removed over 860,000 dead trees, or .66% of the total number of deceased trees. The TMTF is made up of more than 80 local, state and federal agencies and private utility companies. As fires continue to grow and increase in frequency – costing more in both dollars and lives – we hope that forest management will become a priority.

Flooding and high-magnitude storm events:

Effects of prolonged drought on flooding are twofold. First, parched ground is poor for water infiltration, leading to increased runoff and less recharge to the groundwater supply. This means after prolonged drought conditions, high-intensity rain events lead to flash-flood events, mudflows, and streams jumping their banks.

Second, a warmer atmosphere can hold more water vapor, making more rain events high-intensity. Warm air expands, and therefore has a higher capacity for the amount of water it can hold. Warm air is also more efficient at evaporation, leading to more water turning to vapor. Such a large increase in water vapor causes storms to carry more water as vapor, which is dumped during storm events as rain or snow. Thus, more storms are termed as “extreme” rain or storm events, as many more inches of rain fall than the previous average.

In addition to the water vapor increase, climate change is likely to change prevailing wind and storm track patterns over the Pacific in a way that favors both wetter California winters in some years and drier winters in other years, says Daniel Swain in his article *Increasing precipitation volatility in twenty-first-century California*¹⁷.

Sonoma County Solutions:

Currently, Sonoma County (along with much of California) is taking a two-tiered approach to Climate Change.

On the one hand, by doing what we can to mitigate damaging pollution and energy usage in Sonoma County, we can minimize our contribution to the issue. On the other hand, because we have passed the critical carbon dioxide tipping point in our atmosphere, climate change cannot be halted, only slowed. Therefore, Sonoma County has begun looking at actions it can take to prepare and adapt to the changes we will be witnessing over the next 50-100 years.

The Regional Climate Protection Authority, RCPA, was formed in 2009 to coordinate countywide climate protection efforts among Sonoma County’s nine cities and multiple agencies. The RCPA aims to create local solutions to complement State, Federal, and private sector actions – all showing that a better future with lower emissions is possible.

On May 8, 2018, the Board of Supervisors of Sonoma County adopted the Climate Change Action Resolution. Taken directly from the County of Sonoma’s website, the Resolution states: “Sonoma

¹⁷ Daniel L. Swain et al. Increasing precipitation volatility in twenty-first-century California, *Nature Climate Change* (2018). DOI: [10.1038/s41558-018-0140-y](https://doi.org/10.1038/s41558-018-0140-y)

& <https://phys.org/news/2018-04-california-whiplash-drought.html#Cp>

County agrees to work towards the RCPA's countywide target to reduce greenhouse gas emissions by 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050.

Sonoma County has adopted the following goals to reduce greenhouse gas emissions, and will pursue local actions that support these goals:

- Increase building energy efficiency
- Increase renewable energy use
- Switch equipment from fossil fuel to electricity
- Encourage a shift toward low-carbon transportation options
- Increase vehicle and equipment fuel efficiency
- Encourage a shift toward low-carbon fuels in vehicles and equipment
- Increase solid waste diversion
- Increase capture and use of methane from landfills
- Reduce water consumption
- Increase recycled water and graywater use
- Increase water and waste-water infrastructure efficiency
- Increase use of renewable energy in water and wastewater systems
- Reduce emissions from livestock operations
- Reduce emissions from fertilizer use
- Protect and enhance the value of open and working lands
- Promote sustainable agriculture & viticulture
- Increase carbon sequestration
- Reduce emissions from the consumption of goods and services; and

Sonoma County will continue to work to increase the health and resilience of social, natural, and built resources to withstand the impacts of climate change and has the goal of increasing resilience by pursuing local actions that support the following goals:

1. Promote healthy, safe communities
2. Protect water resources
3. Promote as sustainable, climate-resilient economy
4. Mainstream the use of climate projections

For more information about this Resolution, see <https://rcpa.ca.gov/projects/climate-action-2020/>. Many of Sonoma's goals also support the United Nation's Sustainable Development Goals.

If you have any comments or questions about the information in this document, contact us at our website: www.Sonomasustainabletourism.org