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NAPA GREEN CERTIFIED VINEYARDS

Regenerating Carbon, Climate and Community

“Wine producers can lead by showing the world what a low-carbon high life – a good life that is compatible with a sustainable environment – looks like.” -Dr. Kim Nicholas

NAPA GREEN VINEYARD – A REGENERATIVE ROADMAP

The Napa Green Vineyard standards were designed by experts to provide a science-based climate action framework and regenerative roadmap custom-designed for viticulture, taking a whole system approach. The standards include regenerative social practices that engage and retain dedicated teams, critical for the transition to and stewardship of regenerative agricultural and business systems.

The Napa Green Vineyard standards are both practice and performance-based, baselining and tracking Soil Organic Matter (SOM), water, energy, fertilizer, Scope 1 & 2 emissions, and estimates of carbon sequestration, to ensure these practices are achieving real results, and continuing improvement over time.

The Napa Green Vineyard standards have six key elements.

- ✓ **Social Justice, Diversity & Inclusion**
- ✓ **Regenerative Ag, Soil Health & Carbon Farm Plans**
- ✓ **Irrigation Assessments & Water Efficiency**
- ✓ **Forest Management for Health & Fire**
- ✓ **Prohibited & Restricted Pesticides**
- ✓ **Climate-Smart Burning & Alternatives**

Uniquely, Napa Green Vineyard isn't just a roadmap of leading practices. Napa Green provides an expert, boots on the ground consulting team that develops custom regenerative Carbon Farm Plans (to enhance soil health, biodiversity, resilience, and carbon storage) and Irrigation Distribution Uniformity Assessments (to maximize water efficiency) for each certifying vineyard property, can support soil sampling and analysis, and runs practical training and education workshops throughout the year. The Napa Green vineyard team are Technical Assistance Providers that can provide valuable, hands-on guidance in the transition to regenerative, climate-smart viticulture.

Each element of the Vineyard standards has a detailed introduction and numerous resources. **To dive deeper on the meaning and substance of regenerative agriculture, and the myriad benefits to taking a whole system approach to building soil and ecosystem health, below and above ground, see the section on Regenerative Ag, Soil Health & Carbon Farm Plans.**



ENROLL
[napagreen.org](https://application.napagreen.org/#/request-vineyard-account)



NAPA GREEN VINEYARD CERTIFICATION A PATH TO BECOME CLIMATE POSITIVE

- 1. ENROLL** <https://application.napagreen.org/#/request-vineyard-account>. If you already have a Napa Green Winery account you still need to register for a Vineyard account.
 - If the same person & email registers for both Winery and Vineyard the two accounts will be linked and once registered you can use your username & password to access both accounts.
 - If a new person registers they will receive an automated email with a username and temporary password for the online portal.
- 2. SUBMIT QUESTIONNAIRE FOR SCHEDULING** Fill out and submit this **questionnaire** to vineyard@napagreen.org and you will be informed of the rough timeline for scheduling your Carbon Farm Plan (CFP) and Irrigation Distribution Uniformity on-site assessments (irrigation assessments have to occur during the irrigation season).
- 3. SIGN IN TO PORTAL** to access the Napa Green Vineyard standards. Go to **Account > Update Password** to set permanent password, and to **Account > My Team** to add other team members and/or Vineyard Management Company. You can also **download PDFs of each section** to share with other team members under “Napa Green Vineyard – Introduction.”
- 4. REVIEW & RESPOND TO STANDARDS** Four of the sections are **standards-based (Social Justice; Regenerative Ag; Irrigation; Forest Management)**. Indicate whether or not you implement these standards by clicking YES | NO | N/A (Not Applicable). You can add notes particular to your operation at the bottom of each page. **SAVE as you go.**
- 5. WORK WITH NAPA GREEN ON PRACTICE-BASED ELEMENTS**
 - **Regenerative Ag, Soil Health & Carbon Farm Plans** Napa Green will work with you to develop CFPs, support soil sampling & analysis, review the CFP opportunities and determine which practices you want to add to the Action Plan and implement over the three-year certification cycle.
 - **Prohibited & Restricted Pesticides** Review and ensure Prohibited Pesticides are not in use and Pesticide Restrictions are being met, or can be met moving forward (variances available for exceptional circumstances). Contact vineyard@napagreen.org if you plan to be **GOLD LEVEL (free from synthetic herbicides and neonicotinoids)**.
 - **Climate-Smart Burning & Alternatives** IF you will be burning vines you will need to implement conservation/low-smoke burning or alternatives by the next burn season (e.g., flame-cap kiln; AirBurner). Step-by-step written guidance, training video, and additional support is in the portal. Chipping is acceptable but releases stored carbon. Please consider climate-smart options for processing all wood waste.



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6. **RESOURCE METRIC CALCULATOR** Ensure you are collecting and recording monthly data on: Electricity Use (**NOTE: We can help you access PG&E data**); Fuel Use; Water Use; Fertilizer Use. Any data that has not previously been collected must begin being collected by the start of certification. This data should be entered in the **Resource Calculator** to baseline and track metrics and carbon footprint over time.
7. **ACTION PLAN** Once you have filled in the checklists for the three standards sections and received your onsite CFP and Irrigation assessments, Napa Green will work with you to develop an **Action Plan** for up to 12 items where you need a longer timeline or budget cycle to complete. Fill in who will take the lead on each item and rough deadlines. **You do not need to complete the Action Plan prior to certification.**
8. **THIRD-PARTY VALIDATION** Select the **Third-Party Auditor** that you would like to work with. They will be given Auditor access to your portal, will review all of your information and let you know any additional documentation that should be uploaded. They will then schedule the onsite review(s). They will submit a certification recommendation to Napa Green.
9. **CONGRATULATIONS, you are a Napa Green Certified Vineyard!** Napa Green Certified Vineyards exemplify agriculture that is giving back to the land and communities.
10. There will be annual **“desk audits”** at the end of years 1 & 2 to review Action Plan progress and collect resource use data. **Recertification** is every three years, and includes working with the team to update Carbon Farm and Action Plans, followed by an independent Third-Party Audit.

****Certified California Sustainable Winegrowing:** If you would like to have your fruit be approved for CCSW-marketed wines you will have to complete an independent third-party audit annually, with added cost. Email vineyard@napagreen.org for more information.*

Wine producers can lead by showing the world what a low-carbon high life – a good life that is compatible with a sustainable environment – looks like. ”

– Dr. Kim Nicholas

CONTINUING IMPROVEMENT

Continuing improvement is core to Napa Green Vineyard certification. Both sustainability and regenerative farming are ongoing learning processes, a path not a destination. We will check in annually on implementation of your Action Plan, add any newly planned activities, and work with you to identify new opportunities and develop a new Action Plan every three years.

VINEYARD MANAGEMENT COMPANIES

If a vineyard management company (VMC) manages >90% of your vineyard operations the company must ensure they comply with the Social Justice, Diversity & Inclusion standards. The third-party auditor will meet with the VMC to review relevant practices and documentation.

STANDARD REVISION

A comprehensive review and update of the standards will be done every two years, and will include consultation with regional growers, vintners, and topic experts.

ENVIRONMENTAL COMPLIANCE

In order to enroll in the Napa Green Vineyard program your property must be in environmental compliance, notably with the Water Board's [vineyard Waste Discharge Requirements](#) (WDR, which applies to vineyards in the Napa River watershed of five acres or larger) and your Erosion Control Plan (if relevant).

Please note that Napa Green will not be facilitating Water Board compliance so vineyard managers should continue to work with [regional organizations](#) and experts to maintain WDR compliance.

Erosion Control Plans: Erosion Control Plans (ECPs) are required for vineyards with greater than 5% slope. Sometimes ECPs get less attention after the first three years of inspections, or even get lost if vineyard ownership has changed. Napa Green asks that you ensure you are aware of the requirements of your ECP, which [can be found online](#). **Your vineyard team should review and discuss your ECP minimum annually to ensure that all of the requirements are being met.**

Creek Stewardship and Setbacks: Healthy riparian corridors provide numerous benefits and ecosystem services including: water quality protection, flood protection, groundwater recharge, and wildlife corridors. Historically, it was often common for vineyard roads to be established alongside stream and creek banks and/or to plant vineyards right up to the edge of riparian areas. These practices are no longer allowed for new vineyard development; however, land use policies have, in many cases, grandfathered narrow or no setbacks.

Vineyards abutting riparian areas can experience the following:

- Greater exposure to Pierce's Disease
- Less sunlight, which can result in lower vigor
- Safety concerns for vineyard workers operating equipment near steep banks.

Given the evidence of the ecological importance of riparian corridors, the management challenges associated with vineyards near creeks, and potential fire risks associated with riparian vegetation, it is important to establish appropriate setbacks.

We recognize that moving a road and/or pulling out an area of vineyard is expensive and requires strategic planning. We recommend that Napa Green members closely review Napa County's [Water Quality and Tree Protection setbacks](#). **Napa Green asks that any members that do not meet [current County setbacks](#) plan and implement these setbacks upon replant of vineyard blocks.** Setbacks vary based on percentage slope, but begin at 35 feet.

In addition, due to the increasing frequency and severity of fires in our region we strongly advise members with properties that abut riparian areas implement [best practices for](#)

understory vegetation management. Core native riparian trees and vegetation, which provide critical habitat, bank stabilization and erosion prevention, and carbon storage, should be protected and maintained.

The Napa County Resource Conservation District is a close Napa Green partner and they are happy to work with you to review and recommend best management practices for watershed and stream, creek and river stewardship.

RESOURCES

These resources and organizations are in addition to the resource links we have embedded throughout this element.

- [Find Erosion Control Plans](#)
- [Post-Fire Restoration: Dos and Don'ts](#)
- [San Francisco Bay Water Board Vineyard Waste Discharge Requirements \(WDR\)](#)

Environmental Compliance – CORE

1. Ensure compliance with the regional Water Board's General Waste Discharge Requirements (WDR) requirements for vineyard properties.

Green Note: *Please note that the Napa Green Land program that recognized erosion control compliance via LandSmart or Fish Friendly Farming ceased to exist in 2021. Napa Green will not be facilitating Water Board compliance so vineyard managers should continue to work with regional organizations or qualified experts to maintain WDR compliance. Napa Green will validate vineyard Waste Discharge Requirements (WDR) compliance with the Regional Water Board.*

2. Have an Erosion Control Plan (if relevant) and vineyard managers are aware of requirements.
3. If vineyards do not meet current County creek and stream setbacks, commit to meet setbacks at replant.

Green Note: *We recommend that Napa Green members closely review Napa County's Water Quality and Tree Protection setbacks. Napa Green asks that any members that do not meet current County setbacks plan and implement these setbacks upon replant of vineyard blocks. Setbacks vary based on percentage slope, but begin at 35 feet.*

CERTIFICATION PROGRAM FEES

FEES ASSOCIATED WITH VINEYARD CERTIFICATION

- I. One-time Application Fee (\$250)
- II. Annual Licensing Fee
- III. Regenerative Carbon Farm Plan (**every 3 yrs**);
- IV. Irrigation DU Assessment (**every 3-4 yrs**);
- V. Independent 3rd Party Audit (**every 3 yrs**)

APPLICATION FEE (One-time): To enroll in the Napa Green Vineyard program there is a one-time application fee of \$250. This covers the staff time to meet with your team lead(s) to familiarize you and get you started with the certification process.

ANNUAL LICENSING FEES: These fees cover a fraction of our expert staff time to facilitate certification and annual desk audits, develop resources, training and education workshops & events, and communicate the climate action leadership of our members. We aim to keep these fees as reasonable as possible. Licensing fees only cover ~35% of our nonprofit budget.

Napa Green Vineyard Annual Licensing Fees (Total Certified Acreage)

0-25 acres	\$500
26-50 acres	\$1,000
51-100 acres	\$1,500
101-250 acres	\$2,000
251-500 acres	\$2,500
501-1,000 acres	\$3,500
>1,000 acres	\$4,500

**Current members invoiced in December. New members invoiced Mar. 1/July 1/Dec. 1 depending on when certification is completed.*

REGENERATIVE CARBON FARM PLAN (every 3 years): Napa Green’s vineyard team has been trained in the Carbon Cycle Institute’s protocol to develop regenerative, whole-farm Carbon Farm Plans (CFPs). These plans review your current beneficial practices that are increasing soil and ecosystem health and storing carbon, and identify additional opportunities to regenerate the soil and vineyard ecosystem and simultaneously maximize carbon capture. If you are certifying multiple vineyards the property information and data will be combined into one report, and assessment costs will reflect economies of scale.

These plans include science-based quantification of your current and potential sequestration. We compare this against your Scope 1 & 2 emissions to determine your vineyard carbon budget. **This information and feedback can be used internally and externally to tell your climate action story.**

IRRIGATION DU ASSESSMENT (every 3-4 years): Our expert vineyard team is trained in the CalPoly protocol to rapidly evaluate the distribution uniformity (DU) of your drip irrigation systems. Delivering the right amount of water, evenly, at the right time is critical to vine growth and grape quality. You receive a report with your DU score and recommendations. Both our team and the RCD can also offer staff trainings to do DU Assessments in-house.

<p>Regenerative Carbon Farm Plan Onsite Assessment & Report +Review with Team</p> <p>Members.....\$125/hr</p> <p>Member Cost Estimates Small <50 acres ~\$750 Medium 50-100 acres ~\$1,000 Large 100+ acres ~\$1,250</p> <p>Non-Members.....\$175/hr</p>	<p>Irrigation Distribution Uniformity Onsite Assessment & Report +Review with Team</p> <p>Members.....\$125/hr</p> <p>Member Cost Estimates Small Vineyard ~\$625 Medium Vineyard ~\$875 Large Vineyard ~\$1,125</p> <p>Non-Members.....\$175/hr</p>
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Invoicing: You will be invoiced for onsite assessments after a team member has shared your report(s). *Given the time-required and value of these services and reports you will be charged these fees whether or not you complete the certification process.* Invoices are sent via Quickbooks.

SOIL TO BOTTLE DISCOUNT

Members that are comprehensively certified as Napa Green Vineyard and Napa Green Winery will receive 5% discount on both Vineyard and Winery Annual Licensing Fees.

INDEPENDENT THIRD-PARTY AUDIT (every three years): Independent validation that you are meeting Napa Green Vineyard practice and performance-based standards, walking the talk, is critical to marketplace assurance.

Our network of third-party auditors have gone through training in the Napa Green programming, and will validate implementation of practices that our team has not been able to review.

Third-Party Auditor

Independent Validation of Practices

Example: \$150/hr + \$50/hr travel
(Varies by auditor)

Small 4-5 hrs	~\$650
Medium 5-7 hrs	~\$950
Large 7-10 hrs	~\$1,250

**Note, most auditors will provide a flat rate quote once they evaluate the complexity of your operation*

INTERIM DESK AUDITS (*No Added Cost*)

The interim staff desk audits (end of years 1 and 2) will require an update of the Metric Calculator (water, energy, fertilizer, yield), review of Action Plan and regenerative CFP implementation, Pesticide Use Reports, and validation of burning practices (if applicable). The team will let you know if they have any questions and would like to schedule a meeting or call.

RECERTIFICATION

Recertification is every three years. In addition to Annual Licensing Fees, there are two costs associated with recertification.

- I. Expert team consultation to update your regenerative Carbon Farm Plan, and complete Irrigation DU Assessments (if the irrigation system has not been evaluated in 3-4 years)
- II. Third-Party Audit

Using your foundational regenerative Carbon Farm Plan, staff will reassess the vineyard property and revise and update your plan. *This update will take less time to complete than creating the original plan.*

An independent, third-party audit is required every three years and should take less time than the initial certification audit.

SOCIAL JUSTICE, DIVERSITY & INCLUSION

Social equity has always been foundational to sustainable development, but somewhere along the way it has gotten largely lost or sidelined from the conversation. For many, sustainability has become synonymous with the environment. However, we cannot have environmental or economic sustainability without social sustainability. True sustainability requires caring for the health and resilience of our environment, and the health and resilience of our employees and community, all of which contributes to the success and longevity of our businesses.

Why this title? Instead of using the common term of Diversity, Equity and Inclusion (DEI) we intentionally used Social Justice, as it encompasses Equity and goes further. Social justice depends on four essential goals: human rights, access, participation, and equity. Social justice asserts that everyone deserves equal rights, opportunities, and treatment regardless of their race, economic status, sexuality, or gender identity. You can learn more in our Definitions and Resources.

Context: As with much of California, Napa County's agricultural sector faces a number of social challenges and inequities. The [cost of living](#) in Napa County is 24.3% higher than the California average, and 74% higher than the national average, with a severe [shortage in affordable housing](#). Hispanic and Latinx residents make up roughly [35% of the County's population](#), but Hispanic and Latinx workers fill the majority of essential jobs in the agriculture and hospitality sectors. Many of these workers have to live in surrounding counties and commute into the County for work.

The wine industry, the main agricultural sector in Napa County, is grappling with a skilled labor shortage. During the harvest season some farmworkers travel daily from as far away as the central valley to fill seasonal jobs. An increase in [female vineyard workers](#) necessitates the need to ensure respectful and equitable treatment. More and more vineyard owners and management companies are relying on labor contractors and it can be [difficult to verify or audit](#) the worker training and living conditions provided by these contractors. Some vineyard owners are taking advantage of the [H-2A visa program](#), but the paperwork can be overwhelming and there is the challenge of providing housing. There are currently three farmworker housing centers in Napa County, with no additional projects underway to construct additional facilities.

Many farmworkers grapple with a lack of opportunity for upward mobility. Community organizations like the [Napa Valley Farmworker Foundation](#), [UpValley Family Centers](#) and [Puertas Abiertas](#) are working to provide English language and technical training to assist with advancement. However, pursuing these opportunities can be challenging on top of full-time work.

Against this backdrop there are new challenges. Napa County has been hit by devastating wildfires in 2017 and again in 2020, highlighting the need for emergency

preparedness, and raising new questions about safe working conditions (e.g., intense smoke and air pollution), particularly as peak fire season overlaps with harvest. The agricultural industry must continue to pursue and institute best practices for Personal Protective Equipment (PPE) and fair employment protections.

Acknowledging Historic Injustice: As Napa County pursues new opportunities in the 21st century it is also important to look back and recognize and acknowledge the history of this region. The Napa Valley is one of the longest continuously inhabited regions in California. For 10,000 years, this region, known as “Talahalusi,” was home to native peoples. In the 19th and early 20th centuries the Onasatis (often referred to as Wappo) were killed, decimated by smallpox and relocated by early settlers.

As the wine industry began to take a foothold in the mid- to late-19th century Chinese migrant laborers played a central role in planting vineyards and building wineries and caves. They were treated as inferior citizens and heavily discriminated against. At the turn of the century a series of fires destroyed the Chinatown that once stood in St. Helena. Any remaining Chinese community was gone by the time of Prohibition. To move forward we must acknowledge the injustices and wrongs perpetrated in the past, which provide a critical lens to examine current prejudice, racism and injustice in our society.

Napa Green Commitment to Racial and Social Justice: At Napa Green we pledge to continuously examine and deepen our understanding of power imbalances and social biases in our everyday world. We commit to take action whenever possible to build a more just community, and partner with individuals and organizations that share this commitment. We seek to be a visible ally and take public positions not only on social inequities and injustices within our industry and community, but also within the broader social justice movement.

Standard Development: In 2017, Napa Green developed a set of foundational Social Equity standards that covered best practices for HR, Workforce, Neighbors & Community. In December 2020, we formed a Social Equity Working Group with the goal to better address and incorporate region-specific issues, opportunities and resources, and also add standards and resources related to racial justice, industry diversity and inclusion.

We formed this group by reaching out to community organizations and asking them to recommend individuals with direct experience as farm workers, vineyard managers, and/or experience and expertise related to social equity, diversity and inclusion. We received recommendations from the Napa County Farm Bureau, Napa Valley Vintners, Napa County Resource Conservation District, and UpValley Family Centers.

The Social Equity Working Group included regional vineyard managers and farm workers, representatives of community services nonprofits, and leaders working to amplify social equity, justice, and inclusion in the wine industry and other relevant sectors.

DEFINITIONS

BIPOC: Black, Indigenous and People of Color

Diversity: Workplace diversity is accepting and valuing differences between people including those:

- of different races, ethnicities, genders, ages, religions, disabilities, and sexual orientations
- with differences in education, personalities, skill sets, experiences, and knowledge bases

Diversity should be actively cultivated, not only because it is the right thing to do, but also because it is correlated with both profitability and value creation.

Hispanic: Hispanic refers to people who speak Spanish or who are descendants of those from Spanish-speaking countries. In other words, Hispanic refers to the language that a person speaks or that their ancestors spoke.

Latinx: Latinx is a gender neutral term that refers to people of Latin American heritage.

Inclusion: Inclusion in the workplace is a collaborative, supportive, and respectful environment that increases the participation and contribution of all employees. True inclusion removes all barriers, discrimination, and intolerance.

LGBTQIA+: Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, Intersex, Asexual and an array of other sexual and gender identifications.

Social Equity: Equity is defined as “the state, quality or ideal of being just, impartial and fair.” Equity involves trying to understand and give people what they need to enjoy full, healthy lives. It is important to recognize the difference between equity and equality. Equality, in contrast, aims to ensure that everyone gets the same things in order to enjoy full, healthy lives.

Social Justice: Social justice depends on four essential goals: human rights, access, participation, and equity. Social justice means that everyone’s human rights are respected and protected. Everyone has equal opportunities. They aren’t held back by things out of their control like systemic obstacles or discrimination.

Structural Racism: Structural racism (or structural racialization) is the racial bias across institutions and society. It describes the cumulative and compounding effects of an array of factors that systematically privilege white people and disadvantage people of color.

LEADERSHIP & HUMAN RESOURCES

From the top-down businesses need to recognize and acknowledge inclusion and diversity as an enabler of growth. Research has shown that companies that have greater workplace diversity outperform their competitors and achieve higher profits. Committing to diversity and inclusion isn't just right, or good for morale, it actually contributes to business success and longevity.

The Human Resources department represents both an internal and external face of company leadership and culture. From the first moment someone considers working with your team this is your chance to establish your business as equitable, just and accountable.

****Please note that if you contract with a vineyard management company you must ensure that they meet all Social Justice, Diversity & Inclusion Standards. The independent, third-party auditor will audit this element of the standards with the VMC.*

Regulatory Compliance – CORE

This is not a comprehensive list of regulatory compliance measures, but emphasizes some of the compliance actions critical for Social Equity. Compliance should be validated by the head of Human Resources (HR).

1. Agree to comply, at a minimum, with California policies and regulations for health and safety, which includes OSHA regulations, COVID-19 standards, safety trainings, Injury and Illness Prevention Program, Heat Illness Prevention Plan.
2. Company policy dictates that pay increases are determined on an equitable basis, considering work performance, seniority, and level of training OR collective bargain agreements, without bias based on gender, ethnicity, racial, or sexual preference, and this is confirmed by workers.
3. Relevant employees are certified to apply pesticides and complete required CA DPR-approved annual continuing education. Limit worker exposure to chemicals (e.g., pesticides and herbicides) and ensure all appropriate PPE is available. Maintain records of all relevant licenses and certifications.
4. When considering a Farm Labor Contractor (FLC) verify the following:
 - o Federal, State and County Agricultural Commission registration;
 - o Proper licensing;
 - o Workers' Compensation Experience Modification rating;

- o Compliance with OSHA standards;
 - o Housing standards (where applicable).
5. Businesses with five (5) or more employees provide Sexual Harassment training within six months of hiring, and again every two years. Establish safe and anonymous channels to report harassment and assault.

Green Note: *Some insurance companies, including MIV Insurance Services, offer Sexual Harassment and other employee training opportunities. Supervisors must receive two hours of training, and all other employees must receive one hour of training. Even temporary and seasonal employees must be trained. Training must include a component on the prevention of abusive conduct as well as a component on harassment based on gender identity, gender expression and sexual orientation.*

Culture of Equity & Inclusion – CORE

These standards are required.

1. Have a Diversity, Equity and Inclusion [commitment/statement](#).

Green Note: *Examples of wine industry Diversity & Inclusion statements: [Constellation Brands](#), [E&J Gallo](#). We have created a [basic template](#) that you are welcome to leverage and adapt for your organization.*

2. Proactive policy to prevent or address any pay disparities between men and women and/or white and BIPOC employees in comparable roles.

Green Note: [California Equal Pay Act](#): Effective January 1, 2017, Governor Brown signed a bill that added race and ethnicity as protected categories. California law now prohibits an employer from paying its employees less than employees of the opposite sex, or of another race, or of another ethnicity for substantially similar work.

3. Prioritize qualified candidates from historically underrepresented groups, including women and BIPOC, for management and leadership positions.

Green Note: Consider [setting a goal such as 50% female](#) and BIPOC representation in leadership roles by 2025. For example, Treasury Wine Estates has set a goal to increase females in leadership roles to 50% by 2025: <https://www.tweglobal.com/careers/inclusion-equity-and-diversity>

Culture of Equity & Inclusion – ELECTIVE

1. Leverage available Diversity, Equity, and Inclusion resources within the wine industry to create or have employees participate in educational courses and mentorship programs.

Green Note: The [Diversity in Wine Leadership Forum](#) is a resource that offers a list of organizations and events with a core commitment to diversity and equity within the wine industry.

2. Have a public Land Acknowledgement that recognizes the original Indigenous inhabitants of the vineyard property.

Green Note: You can utilize the [Native Land interactive map](#) to find the original Indigenous Peoples inhabitants. Here is a resource on creating a Land Acknowledgment statement:

<https://nativegov.org/news/a-guide-to-indigenous-land-acknowledgment/> Here is an example of a brief Winery Land Acknowledgment: <https://www.wildflowerwineryventura.com/>

Employment Practices & Labor Contractors – CORE

These standards are required.

1. For businesses with 13 or more employees there is a written and implemented Management and Human Resources Business Plan, which should include:
 - o Company mission, vision, and values
 - o Sustainability commitment (covering Environment, Equity, and Economics)
 - o Company strategy for hiring and onboarding
 - o Employee performance management and employee relations strategies
 - o Compensation and benefits
 - o Record keeping policies
 - o A schedule for the plan to be reviewed and updated

Green Note: This is a resource intended to support continuity in Human Resources management, and is distinct from the Employee Handbook, although there may be some overlap in the language or resources.

2. For business with 13 or more employees require that staff in management

positions attend implicit bias trainings/workshops. Businesses may be able to leverage trainings offered by community organizations, such as the Napa Valley Vintners.

Green Note: *Organizations that offer implicit bias trainings include: Diversity in Wine Leadership Forum ([Do The Work series w/ Dr. Akilah Cadet](#)); [Soil and Shadow](#); CircleUp Education; some insurance companies also offer trainings.*

3. For staff whose first language is Spanish, all core resources are provided in English and Spanish and are explained verbally to employees.
4. Recognize varying technological skills and access and provide important information via multiple convenient communication methods.
5. For businesses with seven (7) or more employees all employees are provided with an [Employee Handbook](#) (may be provided electronically), which should include:
 - o Company mission, vision and values
 - o Sustainability commitment and certification(s)
 - o Compensation, Benefits, and Incentives
 - o Non-Discrimination and Anti-Harassment policies and trainings
 - o Accident and emergency procedures, including procedures during a natural disaster

Green Note: *Emergency procedures should account for circumstances when electricity and cell phone coverage are compromised.*

6. All new employees receive workplace orientation and tour.
7. Have evidence of conducting annual performance reviews.
8. Provide competitive hourly wages and salaries for the region.

Green Note: *May want to reference the latest Wine Industry Salary Survey Report from Wine Business Monthly.*

9. Cover at least 50% of health insurance premium for full-time employees.

Green Note: *Under the Affordable Care Act law rules, a company with 50+ full time equivalent employees must offer ACA compatible coverage to full-time employees or face a penalty. The employer is required to fund at least 50% of the employee's premium.*

10. Share information via newsletters and/or other communications channels about family support and social services in the community.

Green Note: Examples include resources and services from community organizations like UpValley Family Centers and Puertas Abiertas; Childcare resources/referrals; Nutrition, Health and Wellness resources/referrals; Housing Opportunities information and resources.

11. Have a written contract with Farm Labor Contractor(s).
12. Offer a benefits package to full time employees in excess of government requirements, which includes three or more of the following (indicate those that apply):
 - o Retirement plan
 - o Paid sick leave
 - o Paid vacation
 - o Profit sharing
 - o Annual pay increases
 - o One or more electronic devices (e.g., cell phone, laptop)
 - o Company vehicle
 - o Employee housing
13. Farm Labor Contractors' safety training programs are reviewed or audited annually (requiring that they provide documentation), and additional safety training is provided as needed.

Green Note: One grower recommendation is to anonymously interview FLC workers, which provides additional insights into the practices of the FLC.

14. Require that at least one member of the on-the-ground vineyard team have a **Private Applicator Certificate** so they can supervise workers that are not licensed applicators. When using new pesticides (or new to applicators) provide training on proper use and application. Review California DPR pesticide approval annually (e.g., Weed Slayer).
15. Vineyard managers conduct, or have external experts lead, frequent (at least quarterly) employee safety trainings throughout the year. Document safety training dates, attendance, and solicit and incorporate employee feedback.
16. When workers are changing tasks or using new equipment provide additional training. If it has been some time (6+ months) since doing certain tasks or using equipment provide a refresher on practices/use and safety reminders.
17. Clear and trusted procedures are established for employees to communicate

concerns and share grievances.

Employment Practices & Labor Contractors – ELECTIVE (Must Implement 4 of 11)

1. Hire farmworkers year-round, which leads to more knowledgeable and skilled workers, dedicated to the success of the business.
2. Cover 100% of health insurance for full-time employees.
3. Offer dental and vision coverage for full-time employees.
4. Offer seasonal workers benefits (e.g., health insurance, sick leave).
5. Participate in an annual salary survey (e.g., Wine Business Monthly, CAWG) and benchmark compensation against regional average.
6. Within the last year, the farming operation provided bonuses to employees (e.g., holiday bonus check, harvest bonus, wine, gift cards, etc.).
7. Formal surveys or other feedback collection process is in place to measure employee satisfaction and other issues.
8. Inform staff regularly about **alternative transportation opportunities and incentives** and encourage them to use alternative transportation.
9. Business is working privately or collaboratively to increase farmworker and/or affordable housing.
10. Won an award related to social equity and/or health and safety (e.g., Best Places to Work; OSHA Star).
11. Certified **B Corporation**.

Green Note: *B Corp certification requires an even more rigorous set of policies and evidence around employment and workforce leadership. Napa Green exceeds the B Corp environmental performance standards.*

<https://www.bcorporation.net/en-us/certification/>

WORKFORCE HEALTH, SAFETY & WELLBEING

This section emphasizes the broader context of health and safety, beyond compliance, safe practices and procedures, and best practices for wages and benefits. Employees are more engaged and dedicated when they feel the business is invested in their broader welfare. This is about creating a culture where your team understands the business cares for both their physical and mental wellbeing.

Workforce Health, Safety & Wellbeing – CORE

These standards are required.

1. Enable a reasonable work pace (allow each employee to work at their own pace, not being rushed).

***Green Note:** Evidence shows employees are actually more productive when not concerned about being rushed.*

2. For women working in male-dominated settings ensure safe working environment and protection (e.g., self-defense training).
3. Provide seasonal training on critical safety topics (as relevant):

***Green Note:** Companies such as Boesch & E&J Gallo are offering hazard pay and disaster insurance to compensate their vineyard workforce during times of natural disaster.*

- o Emergency fire plan
 - o Smoke safety measures
 - o Working in extreme heat (Note: Napa Green recommends that workers not be required to work in extreme heat conditions)
 - o Harvesting at night
 - o Hazard pay
 - o Disaster insurance
4. Company policy that workers will not be required to work in evacuation zones.
 5. Minimum annually, organize a formal teambuilding activity (e.g., post-harvest party, holiday party, spontaneous rewards during the growing season).
 6. Protect employees by not engaging with ICE, Customs and Border Patrol, or similar bodies that will undermine a safe, trusted and secure work environment, unless required by law.

7. For wineries with 13 or more employees share a letter of **Commitment Against Modern Slavery** with core vendors (those with whom you work on a regular basis). Maintain record of written communications.

***Green Note:** Napa Green is evaluated annually by distributors and associations including the Nordic monopolies (e.g., Systembolaget), LCBO, SAQ, and the Sustainable Wine Roundtable for added recognition and market access for our members. While Modern Slavery may not seem relevant to our region, addressing this issue is critically important in international evaluations of our standards. Modern slavery includes exploitation of workers for commercial gain, and forced labor, among other injustices. Particularly if you have an international supply chain or work with vendors across borders, it is important to share and emphasize this commitment, and ask if they can share relevant policies and protections against modern slavery.*

*Consider developing a **procurement policy** for working with vendors. Here is an example of a Modern Slavery statement:*

<https://www.berkmann.co.uk/modern-slavery-act/>

Workforce Health, Safety & Wellbeing – ELECTIVE (Must Implement 2 of 6)

1. Recognize and acknowledge employees for safe job performance. Incentives could include safety certificates, or annual recognition ceremony for employees with excellent safety performance.

***Green Note:** Positive recognition of employees who demonstrate safety practices and contribute to safety awareness has been proven to be effective.*

2. Establish employee health & wellness programs and incentives (e.g., monthly wellness stipend, internal friendly competitions & rewards, \$100 annual reimbursement for National Park passes and/or athletic competitions).

***Green Note:** In 2020, Clif Family won the California Sustainable Winegrowing Green Medal award for their **commitment to Community leadership**, including exemplary employee health & wellness programs.*

3. Provide paid time off for community volunteering (including at children's schools).
4. Company policy that workers are not required to work in extreme heat conditions.
5. Provide hazard pay for farmworkers performing tasks in smokey conditions or fire-adjacent locations.

Green Note: *Gallo has started paying farmworkers and contractors in Sonoma County 1.5 OT pay while working in hazardous conditions.*

6. Have disaster insurance that covers workers who aren't able to work due to natural disasters and are therefore not receiving paychecks.

Communication, Training & Advancement

We have worked with businesses where staff is constantly turning over, as well as businesses where almost everyone has worked there for over 10, 15 or 20 years. This is a clear indicator of whether or not open communication, support for staff and their individual needs, continuing education and opportunities for advancement are embedded in company culture.

We always emphasize, “Sustainability is a path, not a destination.” When you are committed to being a sustainable business investing in your employees through ongoing training and education is crucial. These priorities and investments accrue dividends, and not just in staff retention and dedication. [Companies that invest in ongoing employee training report improved performance and higher profit margins.](#)

Training, Continuing Education and Advancement – CORE

These standards are required.

1. Written policy that full-time vineyard crew attends at least two training workshops or educational programs each year. Full-time operational leaders/managers attend at least three workshops/programs. Costs are covered if applicable. Keep records of employee name, workshop/event & topic(s), and date.

Green Note: *This includes applicable webinars and workshops hosted by Napa Green, Napa County Resource Conservation District, the Farmworker Foundation, and industry events like RISE, Unified, Rootstock, Sustainable Ag Expo.*

2. Encourage and incentivize (as needed) ESL, computer and other training essential for career advancement.

Green Note: *The Farmworker Foundation is an excellent resource for these trainings: <https://www.farmworkerfoundation.org/education.html>*

3. Create paths for advancement from farm workers to vineyard management to winery production. During performance appraisals (whether verbally or written) ask employees to share their career goals and progress.

Training, Continuing Education & Advancement – ELECTIVE (Must Implement 1 of 4)

1. Provide opportunities for employees to develop language skills in English/Spanish during work hours.

2. Once a year, invite vineyard workers to an educational tasting & dialogue with winemaking team on how grape quality and characteristics have translated in the wines.
3. Organize opportunities for winery employees to meet with vineyard management and do a vineyard tour, as well as opportunities for the vineyard team to meet with winery management and do a cellar tour.

Green Note: *Seghesio Family Vineyards implemented this practice and found there was significant employee interest and engagement.*

4. Encourage employees to participate in [Leadership Napa Valley](#).

Sustainability Engagement – CORE

These standards are required.

1. Staff is assigned to manage ongoing implementation of the Napa Green Vineyard certification; there are quarterly status updates and continuing improvement meetings.
2. Hold monthly/quarterly staff “tailgates” (or combine with other regular staff meetings) to share sustainability priorities and progress (including specific goals or targets). Request staff input and suggestions for continuing improvement. Document meeting dates and attendance.
3. Employee onboarding includes communication and resources on Napa Green programming, sustainability and environmental stewardship priorities and activities.

Green Note: *Any team members implementing practices related to Napa Green Vineyard standards need an introduction to the certification and commitments. This can be led by Napa Green team lead.*

4. The importance of recycling is a part of employee orientation and training and the vineyard operation recycles metal, paper, cardboard, glass, and plastic in designated recycling containers. [Training from either Upper Valley Disposal or Napa Recycling](#) is documented every two years.

Green Note: *Both UVDS and NRWS offer free staff trainings. For Upper Valley reach out to Eva Robledo, Eva.Robledo@wasteconnections.com. For Napa Recycling reach out to Naama Brenner-Abramovitch, naama@naparecycling.com.*

5. Regularly share sustainability/environmental stewardship continuing education and training opportunities (this includes online webinars and workshops) and encourage attendance when practical, covering costs if applicable.

Green Note: *Some examples of low/no-cost trainings and workshops: Napa Green events, [Strength in Diversity Achieving Meaningful Change for Business Success in the Wine Industry](#); [Sheep in the Vineyard Workshop Recordings](#); [Porto Protocol Climate Talks](#)*

Sustainability Engagement – ELECTIVE (Must Implement 1 of 4)

1. Have a recognition, incentive, or bonus program for employees that make notable contributions to improve resource efficiency (saving water, energy, reducing waste – some operations tie to specific KPIs).
2. Within the last year, the farming operation participated in on-site research in an area of sustainable viticulture, through collaboration with researchers, scientists, and/or local organizations (e.g., Resource Conservation District, UC Cooperative Extension).
3. Owners/managers actively participate in grower and/or vintner associations and/or community nonprofits (e.g., participate on boards, committees or working groups) to stay informed of and influence industry sustainability issues and trends.
4. Have a sustainable management outline/plan you update at least every three years that includes:
 - o Future vision for your company and how your company will grow sustainably;
 - o Resource conservation/efficiency goals and targets including specific activities, practices, and/or policies;
 - o How your company will enhance or contribute to the community and positively impact the environment.

NEIGHBORS AND COMMUNITY

With so much of Napa County's economy tied to the wine industry there is amplified community attention to industry practices. Sometimes community advocates unfairly take aim at the wine industry for regional challenges, such as increased traffic, for which there is no silver bullet and requires systemic changes. Other times community members spotlight valid concerns where the industry can continue to take a leadership role, such as Napa River restoration or farm worker housing.

As a large and visible industry, it is critical to foster good relationships with neighbors and engage with the broader community. This outreach also creates opportunities to grow community awareness about what it means to be a Napa Green Certified sustainable vineyard, and the breadth, rigor and impact of the standards our members implement.

Neighbors & Community – CORE

These standards are required.

1. Consider ways light, noise, and traffic from operations may impact neighbors and make efforts to mitigate these impacts.

***Green Note:** If you are representing a Vineyard Management Company, please answer this question at an operational level.*

2. Have a process for receiving, considering, and addressing neighbor/community feedback, questions, and concerns.

Neighbors & Community – ELECTIVE (Must Implement 2 of 7)

1. Communicate with neighbors about Napa Green certification and other sustainability practices through events, tours, website, etc.
2. Conduct worker trainings regarding neighbor and community communications.
3. Participate in community forums about sustainability and issues related to vineyard and winery operations.
4. Employees volunteer on a community board or committee.
5. Participate in advisory or industry collaborations/partnerships to work on (Mark those that apply):
 - o Traffic and enhancing alternative transportation opportunities

- o Affordable worker housing
 - o Water monitoring and conservation
 - o Sustainable land use planning
 - o Community Health
 - o Enhancing educational opportunities
6. Participate in voluntary Napa watershed river/creek and riparian habitat restoration projects.

Green Note: *Examples include Rutherford Reach restoration, Oakville to Oak Knoll restoration, Upper Napa River restoration, Carneros Creek restoration.*

7. Have protected land from future development through official Land Trust conservation easement.

ADDITIONAL RESOURCES

These resources and organizations are in addition to the resource links we have embedded throughout this element.

Organizations

California Farmer Justice Collaborative: CFJC unites farmers of color and allies across California, seeking opportunities, political and beyond, to grow our collective representation and sustain our traditional agricultural knowledge. We work alongside small farmers across the state with a focus on California's ethnically diverse farmers and ranchers who may have limited access to government programs.

CircleUp Education: CircleUp Education's mission is to cultivate happy, thriving, and stress-free cities, organizations, and schools by developing a less oppressed, racist, and divided world for future generations we will never know through custom training, consulting, coaching, and tools that are intentionally designed to interrupt implicit bias, restore community wellbeing, resolve conflict and misunderstandings, and inspire deeper connection and inclusion.

Diversity in Wine Leadership Forum: The Diversity in Wine Leadership Forum is a resource that offers a list of organizations and events with a core commitment to diversity and equity within the wine industry.

Napa Valley Community Foundation: NVCF works side-by-side with donors and nonprofits to identify and solve the most pressing problems in our Valley. They invest in youth, fight poverty, champion community, provide assistance for disaster recovery, and increase the quality of life for everyone. NVCF has distributed more than \$90 million in grants since its inception.

Napa Valley Farmworker Foundation: The mission of the Napa Valley Farmworker Foundation is to support and promote Napa Valley's vineyard workers through education and professional development. The Foundation was established in 2011, the first grower-supported organization of its kind in the United States. The Farmworker Foundation provides a variety of programs annually that focus on developing skills in adult literacy, vineyard operations & safety, leadership & management, mentorship, and family life.

National Minority Supplier Development Council: The NMSDC advances business opportunities for certified minority business enterprises and connects them to corporate members.

Puertas Abiertas: Puertas Abiertas works hand in hand with Latinos to inspire and achieve healthy living, self-sufficiency, and opportunities for leadership and community engagement.

Soil and Shadow: We help leaders and teams thrive, so they can have the social impact we all need. Our whole system approach (the Social Fertility Framework), inspired by principles of building soil health, addresses DEI strategy through the lens of individuals, their relationships as a team, how those relationships inform company culture and procedures, and how that culture influences their customers and constituents. This weaving of education about systemic oppression, power analysis, racism, and other content with more general leadership, team and organizational development supports a holistic approach.

UpValley Family Centers: The UpValley Family Centers operates as a Family Resource Center, which is endorsed by the California Department of Social Services as a best practice for serving families and strengthening communities. Taking a prevention-focused, community-responsive approach, our services are culturally sensitive and aim to help families and communities build on the strengths they already possess to create a future of opportunity for themselves.

Women's Business Enterprise National Council: The Women's Business Enterprise National Council (WBENC) is a leading non-profit organization dedicated to helping women-owned businesses thrive. We not only provide the most relied upon certification standard for women-owned businesses, but we also offer the tools to help them succeed.

Information, Articles & Studies

- [**A Call to Action for the Wine Industry: Diversity Organizations Need Your Support**](#)
- [**Actionable Items for the Wine Community**](#)
- [**2020 Wine Industry Gender Equality Study**](#)

REGENERATIVE AG, SOIL HEALTH & CARBON FARM PLANS

What is Regenerative Agriculture?

At its core regenerative agriculture is about farming for soil health and diversity below- and above-ground, building resilience and quality. As growers build the underground “brain” of microbial and fungal networks, improve water infiltration and retention, use cover crops to add nutrients and attract beneficial insects and birds that control unwanted pests, bring animals into the vineyard to serve as natural tillers and fertilizers, plant hedgerows and trees that can further enhance diversity, water, and carbon storage, they **create farms that are more and more self-regulating, needing less and less human intervention and inputs.**

Ultimately, this cultivates a farm with a healthy immune system, producing on average higher-quality crops, more resilient to pests, disease, and the increasingly frequent and intense weather extremes.

“This model of agronomy has the potential to produce disease- and insect-resistant and high-yielding crops, regenerate soil and public health, and reverse climate and ecological degradation.”

- John Kempf, Advancing Eco Agriculture

Climate-Smart & Carbon Farming: Regenerative farming is essentially synonymous with climate-smart agriculture and this concept of “carbon farming” - implementing management practices that increase carbon sequestration or storage on a farm property, while simultaneously increasing soil and ecosystem health.

Domestically, agriculture accounts for 10.6% of greenhouse gas emissions (GHGs). But agriculture also has the opportunity to play a critical role in drawing down emissions fast enough to forestall some of the worst impacts of climate change. The Intergovernmental Panel on Climate Change has identified “nature-based solutions,” including many regenerative carbon farming practices, as **among the top five most effective strategies for mitigating carbon emissions by 2030.**

Agriculture is the ONE sector that has the ability to transform from a net emitter of CO₂ to a net sequesterer of CO₂ — there is no other human managed realm with this potential.

-Carbon Cycle Institute

A 2020 study on “*The role of soil carbon in natural climate solutions*,” found that **protecting and building soil carbon accounts for 25% of the global potential of natural climate solutions.**

A 2024 study, [“Quantifying soil carbon sequestration from regenerative agricultural practices in crops and vineyards.”](#) reviewed an array of global studies that quantified soil carbon sequestration for seven regenerative practices: agroforestry, cover cropping, legume cover cropping, animal integration, non-chemical fertilizer, non-chemical pest management, and no tillage. The study found that **all seven practices increased the carbon sequestration rate, and that combining or layering these practices is likely to further enhance soil carbon storage.**

Further, because winegrapes are a perennial crop, a 2021 study of [“Soil organic carbon sequestration rates in vineyard agroecosystems under different soil management practices.”](#) found that **the soil carbon sequestration potential of implementing regenerative vineyard practices could be up to four times higher than for other types of annual crops.**

There has been a slough of media coverage focused solely on the climate change mitigation potential of regenerative carbon farming, often questioning whether projected rates of carbon drawdown can truly be achieved. Soil science is still evolving and much remains that we don’t know about the world beneath our feet. However, what we do know is there is no downside to implementing regenerative farming practices. It’s exciting that this is a proactive role that farmers can play in mitigating and adapting to climate change, but regardless of the ultimate increases in soil carbon, the broader agroecosystem dividends are unequivocal. Any conversation about the potential climate-smart benefits of regenerative agriculture needs to emphasize the scientifically proven advantages of increased:

- Soil Organic Matter (SOM) and soil health
- Water infiltration and retention
- Microbial, fungal, plant, and animal diversity
- Resilience to drought, high heat, and, conversely, intense, rapid rain events
- Resilience to disease and pest pressure

All of which enhance terroir – the particular character of the soil, ecosystem, and climate in which winegrapes are grown.

THE SIX PRINCIPLES OF SOIL HEALTH

There are six commonly agreed principles of soil health, which are core to regenerative agriculture. While there is not yet any absolute agreed definition of what qualifies as regenerative agriculture, there is no question that if you want to build a regenerative agroecosystem these principles should be used as a guide:

- Context
- Limit Disturbance (Including chemical disturbance)
- Armor the Soil
- Build Microbial & Plant Diversity

- Maintain Living Roots Year-round
- Integrate & Manage Animals

CARBON NEUTRAL AND CLIMATE POSITIVE TARGETS

Napa Green Certified Vineyards must work to become **carbon neutral within two certification cycles (six years) and carbon negative (or climate positive) within three certification cycles (nine years)**. Napa Green will baseline and track your Scope 1 & 2 vineyard emissions (from fuel and electricity use) and pair this with your onsite carbon sequestration to determine if you are drawing down more carbon than you are emitting.

We recognize exceptions to the carbon neutral and negative targets may arise due to circumstances beyond grower control, as well as evolving scientific understanding of carbon sequestration in our specific climate and soils.

According to Marin Carbon Project research, sequestration of just one metric ton per hectare on half the rangeland area in California would offset 42 million metric tons of CO₂e, an amount equivalent to the annual greenhouse gas emissions from energy use for all commercial and residential sectors in California.

- Carbon Cycle Institute

What is a Regenerative Carbon Farm Plan?

Napa Green's vineyard team has been trained in the Carbon Cycle Institute's protocol to develop regenerative, whole-farm Carbon Farm Plans (CFPs). These plans review all of your current beneficial practices that are increasing soil and ecosystem health and storing carbon, and identify additional opportunities to regenerate the soil and vineyard ecosystem and simultaneously maximize carbon capture in a given property.

One of our Napa Green vineyard team members will walk your property with you, baselining existing practices, noting vineyard and land details. They will then develop a custom CFP report, which they will review with you. You then pick and choose which practices to implement based on your operations and goals. Napa Green Vineyards must commit to implement or expand at least two regenerative practices during each three-year certification cycle. Your plan will cover the following opportunities:

- Cover crops
- Compost
- Reduced Tillage
- Grazing
- Reduced pesticide & fertilizer use
- Hedgerows
- Bird boxes and perches

- Pollinator Habitat
- Forest Restoration

COMET Planner: The Carbon Farm planning process leverages the USDA and CDFA's **COMET Planner**, which provides science-based estimates of the amount of carbon that can be sequestered by implementing or expanding regenerative practices on your property. Your custom CFPs give you valuable insight into the carbon sequestration associated with your current management practices, and outline an array of opportunities to implement or expand practices, with estimates of the added carbon sequestration benefit.

It is important to note that COMET Planner is not able to quantify the benefits of all of the above practices, such as forest restoration or reduced fertilizer use. Your plan will provide quantification where available, as well as additional opportunities and recommendations.

To learn more about COMET: [*The Science Behind COMET and Carbon Farming*](#)

SOIL SAMPLING

Carbon storage is site specific and tied to soil types, microclimates, historic farming practices, and other factors. To cross-validate the on the ground impacts of regenerative farming practices, Napa Green Vineyard certification requires soil sampling (minimum every three years) and testing of both chemical and physical indicators of soil health. This is particularly important as even two side-by-side vineyard properties can have remarkably different results based on soil types and historic practices.

Given that the COMET models continue to be refined based on the latest science, the Napa Green CFPs will be updated every three years. Napa Green Vineyard certified members will help to inform the understanding of carbon cycling in our unique agricultural setting.

NITROUS OXIDE EMISSIONS

Unfortunately, there is not yet a tool, including the COMET tools, which allows ready accounting for nitrous oxide emissions (N₂O) associated with the application of nitrogen fertilizers (**N₂O is 300 times more potent than carbon dioxide or CO₂**). Napa Green will be tracking fertilizer application and we will do our best to account for this in the vineyard emissions inventory.

It is essential to practice Integrated Nutrient Management, to identify when and if the vines need nutrients. **Growers should use both soil pH and petiole testing to help target fertilizer applications, recognizing that there can be discrepancies between soil and plant indicators.** The needed nutrients may be present in the soil but pH or other factors could be preventing plant nutrient availability. The goal is to maximize the efficiency of fertilizer use, and keep any fertilizer onsite and in the soil.

REGENERATIVE FARMING STANDARDS

Regenerative Farming Standards – CORE

These standards are required.

1. Each vineyard property being certified has received a Carbon Farm Plan assessment and management has/will review the CFP report with Napa Green staff and determine carbon farming commitments for the first three years of certification.
2. Soil sampling has been conducted in the past 12 months in adherence with Napa Green requirements.

Green Note: Please reference the [Soil Sampling Requirements and Guidelines](#). Until funds run out Napa Green has up to \$300 in matching funds available for soil analysis - contact Sierra Minchaca, sierra@napagreen.org. For each certifying vineyard we need a baseline soil analysis and new analysis minimum every three years.

3. When planting new vineyard blocks or replanting existing blocks implement at least three of these climate-smart adaptations:
 - New trellising for improved shading
 - Best row orientation to prevent heat stress
 - Drought-resilient rootstock
 - Dry-farm or below reduced-deficit irrigation
 - Secondary drip line
 - Incorporate pre-plant compost
 - Incorporate pre-plant compost & biochar blend
 - Plant perennial cover crop blends to support no-till management

4. None of the prohibited pesticides are in use, and all of the restrictions for pesticide/herbicide use are being met.

Green Note: Please reference the [Prohibited & Restricted Pesticides element](#). Note that Roundup/glyphosate use must be phased out by Jan. 1, 2026. You can make a case for a variance based on extreme economic hardship, but limited variances will be granted, and will only extend the timeline for phaseout.

5. There is dedicated pollinator habitat on each certified vineyard property.
6. The vineyard has: Bluebird/Owl/Bat boxes and Raptor perches (if trees or other

natural perches aren't present).

Green Note: Consider working with the [Napa Wildlife Rescue's Barn Owl Maintenance Program](#), which will install, monitor and maintain owl boxes for a fee. NWR works with Tom Clark, who makes bluebird, bat and other bird boxes as well.

Regenerative Farming Standards – ELECTIVE (Must Implement 1 of 6)

1. The vineyard property has hedgerows.

***Green Note:** The benefits of hedgerows can include: Enhanced weed control; Soil erosion control; Increase biodiversity and wildlife habitat; Attract beneficial insect populations that serve as natural predators on adjacent crops; Pollinator habitat; Air and water quality protection; Carbon storage and sequestration*

2. Eliminate synthetic herbicide and tillage under-vine in established blocks.
3. Utilize grazing for weed control and other soil benefits.
4. Do not use synthetically derived nitrogen in the vineyard.
5. Use an electric tractor for vineyard activities.
6. The vineyard electricity account is enrolled in MCE Deep Green.

***Green Note:** All customers of Marin Clean Energy (MCE) are enrolled in "Light Green," meaning 60% of grid electricity is provided by California wind and solar. For a small premium of \$0.01/kWH you opt into "Deep Green," meaning 100% of grid electricity comes from CA wind and solar, eliminating emissions from electricity production.*

SOIL SAMPLING AND TESTING

Soil sampling is essential to effectively and efficiently manage soil health and vine nutrition. Soil testing also establishes a baseline of Soil Organic Matter (SOM, including carbon) and other important soil health indicators, and tracks changes over time. Note that soil sampling is most effective when the soil is moist (November-April) so we recommend soil sampling in the winter/spring. You should sample at the same time of year each time. Most growers sample in late winter, around bud-break. If it is not currently soil sampling season, this item can be added to your Action Plan.

Integrated Nutrient Management: Soil samples should also be used to identify when and if the vines need nutrients. Growers should use both soil tests and petiole testing to help target fertilizer applications, recognizing that there can be discrepancies between soil and plant indicators. While petiole samples can provide a snapshot of vine nutrient content, soil samples can help identify systemic nutrient and pH imbalances. This larger context can help target fertilizer application, reducing material use and cost.

- When you receive your Carbon Farm Plan onsite assessment the Napa Green staff can assist with identifying the best locations for soil sampling, and may be able to support testing of physical parameters such as water infiltration and aggregate stability.
- If you would like support in planning soil sampling please reach out to vineyard@napagreen.org to schedule a brief call to review your block map(s) and determine the best locations. Once you have identified where best to sample you will need to conduct your own soil sampling for lab tests. [RCD Soil Sampling Guidance](#), [Cornell Cooperative Extension: Soil Sampling in the Vineyard](#).

Soil Sample Requirements: Napa Green requires each vineyard to sample three blocks (6 soil samples) within their first year in the program and every following certification period (3 years). These samples will be 3 undervine and 3 in the alleys, with each sample to be tested made up of at least 10 subsamples from a given block and soil type.

For vineyards under 10 acres or several vineyard locations of similar soil types and management, contact vineyard@napagreen.org.

For testing of physical parameters: You can either wait for your onsite assessment or complete these tests in-house.

Number of Samples: The number of samples is dependent on the consistency or variability of soil types and topography on your properties. We ask for sampling beneath the vines and in the row middles. You'll need to do at least two soil samples per vineyard block. Typically, for large vineyard properties you will at most need to take a few dozen samples.

	Required	Recommended
Lab Test	Organic Matter, Macronutrients, CEC, pH (Most standard tests)	Micronutrients, texture, bulk density, respiration
On-site/ Physical test	Aggregate stability, water infiltration	Bulk density, compaction

Labs:

- **A&L Labs (Modesto)** will test required chemical parameters
- **DellaValle Lab (Fresno)** will test required chemical parameters
- **Ward Labs (Nebraska)** has more holistic tests available such as the Haney test
- **Cornell Soil Lab (New York)** will test required chemical parameters
- **Regen Ag Lab (Nebraska)** performs the Haney test, with an optional add-on of a Biome Makers test

There are many analysis labs; this is not a complete list of lab options. It is important to use the same lab year over year to accurately track changes in nutrients and soil carbon. If you are already working with a lab, continue to do so.

Haney Tests: We recommend Haney testing, which gives a truer indicator of soil biological health by also looking at nutrient availability and microbial activity. Learn more: <https://www.noble.org/regenerative-agriculture/soil/how-to-measure-soil-health-with-the-haney-test/>

Note on Compost: *It is essential to track the amount of nutrients being added to the soil relative to the amount you need. If you purchase compost any high-quality producer should provide compost nutrient data – be sure to review. If you make your own compost you should sample and send to a lab for testing.*

ADDITIONAL RESOURCES

These resources and organizations are in addition to the resource links we have embedded throughout this element.

Organizations

- **Agrology**: Sequester more carbon and continuously monitor threats. Our Predictive Agriculture Platform makes it easy to be more regenerative, quantify soil carbon, and stay ahead of threats like drought, pest and disease outbreaks, smoke taint, extreme temperatures, and more.
- **Bioneers**: For 30 years, Bioneers has acted as a fertile hub of game-changing social and scientific innovators with breakthrough solutions for the world's most pressing environmental and social challenges. Resources include **Carbon Farming** and **Regenerative Agriculture**.
- **Carbon Cycle Institute – Carbon Farm Planning**: The Carbon Cycle Institute's mission is to stop and reverse climate change by advancing science-based solutions that reduce atmospheric carbon while promoting environmental stewardship, social equity and economic sustainability.
- **Napa County Resource Conservation District – Carbon Farm Plans**: Napa RCD empowers the community to voluntarily conserve, protect, and restore natural resources in a landscape that supports agriculture, urban areas, and wild lands.
- **North Coast Soil Hub**: This network includes: farmer-to-farmer workshops, long-term experimental demonstrations, and this website as an information sharing platform.
- **UC Division of Agriculture and Natural Resources (UCANR)**: True to the mission of the land grant universities, UC Agriculture and Natural Resources connects the power of UC research in agriculture, natural resources, nutrition and youth development with local communities to improve the lives of all Californians. Resources include Climate Smart Agriculture.
- **UC Statewide Integrated Pest Management Program**: UC ANR translates research into action — creating management strategies for a safer, more climate-resilient California.

INFORMATION, ARTICLES & STUDIES

Compost

- [Compost Tea: a Power Shake for the Vineyard](#)
- [Napa Recycling – Organic Compost](#)
- [US Composting Council](#)

Cover Crops

- [Cover Cropping in Vineyards: A Grower's Handbook](#)
- [UC Solution Center for Nutrient Management – Cover Crops](#)
- [SAREP Cover Crop Database](#)

Hedgerows

- [Hedgerows and Farmscaping for California Agriculture](#)
- [Hedgerows and Pollinator Habitat](#)
- [NRCS Conservation Practice Standards - Hedgerow Planting](#)

Natural Climate Solutions

- [Intergovernmental Panel on Climate Change: Special Report on Climate Change and Land](#)
- [Natural Climate Solutions for the United States](#)
- [The role of soil carbon in natural climate solutions](#)

Grazing

- [Carbon sequestration and soil health outcomes in California integrated sheep-vineyard system](#)

IRRIGATION ASSESSMENTS AND WATER EFFICIENCY

Efficient, targeted irrigation has a cascade of benefits for a grower's bottom line and the quality of the grapes on the vine. Ensuring vines get the right amount of water at the right time:

- Maximizes grape quality
- Optimizes grape yields
- Minimizes operational costs and improves labor efficiency
- Reduces disease and pest risks
- Leaves more water in the ground and waterways

Our Changing Climate: Premium wine [grape growers worldwide](#) are evaluating how current and future climate changes may impact viticulture, and identifying proactive steps they can take to increase resilience. Here in California reduced precipitation, drought, increased frequency of high heat days, and reduced snowpack to feed our waterways in the summer and fall, when water is needed most, are among the most significant results of climate change. Here in Napa County portions of the Napa River and its tributaries that used to have water year-round are now dry for large portions of the year. Maximizing the efficiency of vineyard irrigation and frost protection is essential to the resilience of the wine industry and the Napa River watershed.

Groundwater Sustainability: Napa County has developed a [Groundwater Sustainability Plan](#), with a significant focus on vineyard water management. The Plan will initially focus on recommended best practices, but if there is evidence of groundwater decline some recommendations will become regulatory requirements. Napa Green Vineyard certification is likely to be recognized as meeting regulatory goals, and this may include County/government financial incentives. Details should be finalized in 2025.

With the [Governor's Executive Order N-7-22](#), there are new limitations for approving permits for new or alter wells, and other [counties are placing moratoria on well drilling](#). Now is the time for growers to get ahead of tightening water regulations, installing meters to baseline and track water use, and implementing proactive measures to maximize water use efficiency.

Premium wine grape growers already practice regulated deficit irrigation, allowing for a strategic level of vine water stress that is tied to increased fruit quality. Along with this best practice, there are expanding opportunities and technologies to maximize the performance of irrigation systems, track water use, and fine tune irrigation timing and amount (as is highlighted in the case studies). Additionally, as recycled water (reclaimed municipal or industrial wastewater which has been treated, and can be reused for a variety of purposes) becomes more available, premium growers such as Opus One and Domaine Carneros use this valuable resource to meet their irrigation needs in a given season.

One of the goals of sustainable winegrowing is increased attentiveness to the microclimates of the vineyards and intentional block-by-block management, which often results in improved resource management.

WATER EFFICIENCY STANDARDS

Water Efficiency Standards – CORE

These standards are required.

1. Indicate all sources of water:
 - Surface Water (if yes, describe below whether you have a water right or where you are in the process of obtaining a water right.)
 - Groundwater
 - Municipal Water
 - Reclaimed / Recycled Water (municipal purple pipe)
 - Reclaimed / Recycled Water (onsite)
 - Harvested Rainwater; Pond (describe water source)
 - Storage Tank (describe water source)
2. Install a flow meter or meters to track water use. Record monthly usage in online Resource Calculator, which will allow you to baseline usage (if you haven't already) and track changes over time.

Green note: *We recognize that the cost of installing water meters has risen dramatically in recent years. We are developing a list of installation vendors, and if your piping system is straightforward (pipe is easily accessible with a good pipe run) someone on your team may be able to self-install. See for example: <https://www.youtube.com/watch?v=Js9Fzoe9JwI> We are also working to develop a pool of matching grants/financial incentives to install meters.*

It is critical to baseline and track water use to identify opportunities to improve efficiency and maximize grape quality. We ask that you install a water meter ASAP, preferably within the first year of certification. However, if this presents a significant financial burden your Action Plan timeline may be up to three years. Note that metering water use may soon be a regulatory requirement, so it is best to get ahead of the curve, while also benefiting from understanding and better controlling your water use.

3. Monitor well level at the end of the rainy and dry season.
4. Analyze well water quality in alternating years.
5. If there are pond(s) on the property, they are maintained to prevent leakage.
6. If you have not had an Irrigation Distribution Uniformity Assessment within 3- 5 years, work with Napa Green or RCD staff to complete a current assessment. Irrigation assessments are customized for each grower and provide rapid

evaluation of irrigation efficiency and uniformity throughout the vineyard. Growers receive a report with recommendations to maximize efficiency and irrigation system performance, linked to vine health and fruit quality. Please contact vineyard@napagreen.org to schedule an assessment during the irrigation season.

Green Note: Distribution Uniformity (DU) refers to how evenly the irrigation system is delivering water throughout the vineyard block.

7. Irrigation is scheduled and applied according to plant needs as determined by both visual observations AND soil moisture and plant stress monitoring and management tools.
8. Irrigation emitters are checked and replaced as needed before and during irrigation season.
9. Flush hose lines on a regular basis, and conduct end of season system maintenance to clear lines.
10. Is water used for frost protection?
11. Passive frost protection methods are utilized (e.g., Mow cover crop and keep it short during the frost season; Install or remove “air barriers” to optimize air drainage and prevent pooling of cold air). Water is only used as a frost management tool in areas where alternative practices are not feasible.
12. The frost protection system is turned on based upon the factors of temperature and humidity (wet-bulb temperature or forecast dew point) and turned off as soon as danger has passed.
13. Is water used for heat control?
14. Policy not to use water for heat control except when crop is threatened. Must document water used for heat control and severity of crop threat.

Green Note: IF water is being used to address heat extremes, Napa Green recommends the use of misters during extreme heat events rather than irrigation in advance of extreme heat events, as misters are more efficient. Note that misters can be rented rather than permanently installed.

15. Do you use trucked water for vineyard irrigation? If yes, must have a plan to eliminate dependence on trucked water within three growing seasons (e.g., improved irrigation efficiency; onsite recycled water; municipal recycled water).

Green Note: The use of trucked water is not sustainable, both from an emissions and cost standpoint.

ELECTIVE MEASURES (Must Implement 3 of 10)

1. Have an Irrigation Management Plan that pairs real-time weather and vineyard water stress indicators with on-the-ground observations to precisely target irrigation timing and amount in different vineyard blocks.
2. Currently practice dry farming. *This practice receives three credits.*

Green Note: *Three credits means this counts for three of your Elective Measures.*

3. If planting or redeveloping a vineyard, plan for Dry Farming.

Green Note: *Vineyard-specific information and resources on dry farming from the [California Ag Water Stewardship Initiative](#).*

4. Use reclaimed/recycled water for vineyard irrigation (not trucked).
5. Upon replant, use rootstocks and/or grape varieties that are more drought and heat tolerant.
6. Use remote, real-time sensor systems (e.g. Tule, Ranch Systems, Fruition, HotSpot AG, Agrology, Arable) and/or other advanced technologies like NDVI to target irrigation timing and amount in different vineyard blocks.

Green Note: *SWEEP grants can be used to fund these technologies. Also of note, [OpenET](#) provides daily satellite-based estimates of evapotranspiration.*

7. Utilize passive tools for heat control such as shade cloth, and for new/replanted vineyards, improved trellising and orientation.

Green Note: *[Study Finds Changing Trellis Systems Can Protect Wine Grapes, Preserve Quality](#)*

8. Practice conservation tillage OR no-tillage to retain soil moisture and reduce compaction from heavy equipment.
9. Use a compost:biochar blend to increase soil water retention, nutrient retention, and plant availability.

Green Note: *You can learn more about biochar in the Conservation Burn & Alternatives element. Additional resources: [Sonoma Biochar Initiative](#); [Results of](#)*

the Oasis Vineyard compost & biochar trial; Two day webinar on all things Biochar

10. The pump used for irrigation or frost protection system has a Variable Frequency Drive (VFD).

Green Note: *SWEEP grants can be used to upgrade pumps. Please contact vineyard@napagreen.org if you'd like assistance applying for a SWEEP grant. The application window is typically at the start of the year.*

CASE STUDIES: USING TECHNOLOGY TO IMPROVE QUALITY & EFFICIENCY

Chateau Montelena Winery

Tule Technologies was developed and tested in partnership with University of California-Davis. Owner Tom Shapland emphasizes that Tule measures Actual ET (the amount of water each vineyard block uses) along with vine stress, providing block-specific measurements. Chateau Montelena Winery in Calistoga, CA was one of the early adopters of this technology back in 2013. Winemaker Matthew Crafton notes,

“Once the vines show visual symptoms of stress the root cause has already taken hold. Decisions are reactionary. Tule shows us vine stress through water status considerably before the vines exhibit visual stress, accelerating the feedback loop and allowing us to tailor irrigation in real-time based on current conditions.”

Chateau Montelena has 100 acres of estate vineyards broken into several blocks. Crafton had two favorite blocks so they installed Tule sensors in those two blocks to establish the timing and patterns of water stress that were leading to the desired quality of fruit. After a complete vintage, Chateau Montelena was then able to begin applying this knowledge to another two blocks that were consistently underperforming - experiencing excessive vigour and delivering low-quality fruit. Using data from the premium vineyards Crafton was able to feed targets and parameters into the online system for how much stress they wanted to see over time, using this to time irrigation, and fine-tuning over a few growing seasons. Now a former problem block makes estate fruit every year, and what was the worst block is now the highest performer. Crafton says,

“This system has paid for itself twenty times over in terms of quality improvements, not to mention we significantly ramped down our water use.”

Tule is a service-based system, meaning growers don't own the sensors but rather purchase the data they provide. Each Tule sensor is \$1500 USD per year, which covers hardware installation, maintenance and repair, and software and data delivery. Sensors can measure 5+ acres depending on the uniformity of the block. Across 100 acres Chateau Montelena uses seven sensors for strategic data collection.

CASE STUDIES: USING TECHNOLOGY TO IMPROVE QUALITY & EFFICIENCY

Pine Ridge Vineyards

Our Ranch Systems weather stations combined with the Tule sensors have significantly reduced water use as well as labor. And with precision irrigation, the fruit quality dramatically improves.
- Gustavo Aviña, Vineyard Manager, Pine Ridge Vineyards

Gustavo Aviña, vineyard manager for Pine Ridge Vineyards, first installed a Tule Sensor system at one of their up-valley vineyards and spent a year comparing the data against pressure bomb readings. The numbers matched up, leading Aviña to install Tule systems at all of the estate vineyards eliminating the need for time intensive pressure bomb readings.

Aviña was facing a particular challenge at their Las Posadas vineyard, which is furthest from the winery. This is typically the last vineyard picked and during harvest it was difficult to send someone up to start and stop the irrigation on a precise time table. Irrigation would occasionally be delayed because the team was too busy down valley, often relying on the pre-set schedule to guide irrigation versus feedback from the vineyard about overall need.

The Pine Ridge team decided to install a combined Tule and Ranch System with automated irrigation. Today Aviña starts and stops irrigation at the Las Posadas vineyard from his computer, providing the vines with the right amount of water at the right time. This also allows him to irrigate at night when desired, reducing evaporative loss. In the process, they've cut water use, improved labor efficiency and fine-tuned the Las Posadas vineyard to produce the highest quality fruit.

ADDITIONAL RESOURCES

These resources and organizations are in addition to the resource links we have embedded throughout this element.

Tools & Technology

- Pressure Bombs and Porometers
 - [PMS Instrument Company](#)
 - [Soilmoisture Equipment Corp.](#)
 - [METER Group – Leaf Porometer](#)
- Soil Moisture Sensors
 - [Aquacheck](#)
 - [Davis Instruments](#)
- Wireless Sensor Systems
 - [Fruition Sciences – Sap Flow](#)
 - [Ranch Systems – RanchMaster](#)
 - [Tule Technologies](#)

Information, Articles & Studies

- [Are Flying Vineyard Drones Creating Better Wine?](#)
- [Irrigation and Scheduling Toolkit for Grapegrowers](#)
- [Using Soil Moisture Sensors for Vineyard Irrigation Management](#)
- [Water Use and Plant Stress Monitoring Method Comparison](#)

FOREST MANAGEMENT FOR HEALTH & FIRE RESILIENCE

Forests are not only our largest terrestrial carbon sink – they are also home to 80% of the world’s on-land diversity, and they are critical to water capture and groundwater recharge. Because forests store so much carbon there can be a misperception that more trees always equal better. In fact, what we need are healthy forests, which means a balanced density of native trees and plants. Healthy forests experience lower intensity fires with less tree mortality, meaning higher carbon retention and ecosystem function.

A 2024 study by NASA found that the emissions from Canada’s 2023 wildfires was “comparable in magnitude to the annual fossil fuel emissions of a large industrialized nation.” And that does not account for the emissions of all of the other global wildfires.

The 2018 study on Natural Climate Solutions for the United States found that reforestation and improved forest management were the top two solutions to effectively store or sequester carbon. While both reforestation and restoring and preserving healthy forests are important, the latter provides immediate and significant carbon storage over the next 10-20 years. Several young seedlings will take decades to store as much carbon as a single mature oak, pine or other native tree.

WHY WE NEED ECOLOGICAL FOREST RESTORATION

Historically, through Indigenous management, much of California’s forests experienced regular, controlled fires – preventing over-density and the buildup of undergrowth and ladder fuels, facilitating forest and grassland regeneration. After these fires, the majority of the trees on the landscape would persist. Native tree species co-evolved with fire as part of their life cycle, with some species even requiring fire for seed germination.

But for over 100 years, fire has been suppressed. Simultaneously, there has been a spread of invasive species, such as French Broom. Here in California, this has led to millions of acres of unhealthy, high-risk forests, more prone to megafires. Here in Napa County, many forested lands that were once oak-dominated are now out of balance, with an extreme over-density of firs. Restoring the health of our forests will not only reduce fire risk and increase resilience, it is one of the most powerful ways we can restore the health of our watershed and recharge groundwater, and continue to provide livable habitat for wildlife.

“It creates a vicious cycle: When forest restoration is put on hold, the risk of megafires increases. When megafires happen, it reduces the funds available to better manage our forests.”

- David Edelson, The Nature Conservancy

\$\$\$ CHALLENGE & SOLUTIONS

So why isn't there more fire-fuel thinning and proactive forest restoration? One core challenge is that of the ~200,000 acres of forest in Napa County it is estimated that over 70% of this forested land is privately owned, without ready access to the significant funding being made available to reduce fire risk on county, state, and federal lands. Fire fuel and tree thinning can be prohibitively expensive. Nonetheless, solutions have to be found to proactively manage private forests and increase fire resilience, so we don't continue to face the loss of lives, infrastructure, vineyards, and crop that we experienced in 2017, 2019, and 2020. This is made doubly important by the fact that many vineyard owners are now paying astronomical sums for fire insurance, or are unable to be insured.

At Napa Green, we are constantly working to stay up to date on any and all available sources of technical assistance and funding.

Technical Assistance: For smaller areas of forested land, there are avenues of technical assistance and support available. The Napa County Resource Conservation District can visit properties and help to guide and prioritize fire-fuel thinning activities. [Napa Firewise](#) has extensive resources. You may also be able to attend a [UCANR Forest Stewardship Workshop](#). In addition, both Napa Green and these partner organizations may be able to connect you with peers who have already undertaken significant work on their properties, faced the learning curve, and have valuable insights. Examples include Seavey Vineyard, Schramsberg Vineyards, Snowden Vineyard, and the Clean Burn Company.

North Bay Forest Improvement Program: If you own a significant area of forested land (e.g., 100 acres or more) it may make sense to get a full-scale Forest Management Plan. You can apply to the North Bay Forest Improvement Program and you may be able to access funds that will cover 75% of the cost of having a forester prepare an FMP. Note there are only a few licensed foresters in Napa County, so capacity is another challenge. However, once you have an FMP it then gives you access to forest improvement implementation funds.

CAL FIRE Grants: CAL FIRE offers [grant opportunities](#) in a number of different funding categories. For small landholders, the most appealing grant applications include neighbors – fire doesn't stop at property boundaries so engaging neighbors and developing a collective forest management plan is appealing to CAL FIRE. Recent legislation has added grazing as a funded forest treatment.

Long-Term Maintenance: Forest management is a significant investment, and it is not a one-time action. Forest fuel loads need to be managed on a regular basis, sometimes annually. Forest management plans and guidance will outline the activities to create a healthier, more resilient forest, but, to ensure the efficacy of this investment in your land, there needs to be a commitment to ongoing maintenance.

BIOCHAR > BLACK CARBON

Burning wood and other biomass generates black carbon, which is the second largest contributor to climate change after carbon dioxide. The processing of wood waste is another critical consideration of forest management. Traditional open burns create extensive smoke and emissions, and do not create any value-add product. Larger wood waste that is collected by or delivered to regional waste management groups ultimately has to be hauled 100+ miles to be processed at a biomass facility, generating transportation emissions.

This is why Napa Green has worked with experts to create a [Step-by-Step Guide for Conservation/Low-Smoke Burning](#), and has also developed a list of regional [Climate Smart Burn Contractors](#) that can come to your property with flame-cap kilns and/or air curtain burners to help you process wood waste with dramatically less smoke and emissions, and generate value-add biochar, which stores carbon for 100 or more years. Several Napa Green members have worked with [Napachar](#) (e.g., White Rock and Tres Sabores) and [Clean Burn Company](#) (e.g., Stag's Leap Wine Cellars), and there are others. Note that the Clean Burn Company also has a crew (many off-season wildland firefighters) that can be hired to do fire fuel thinning and forest management, along with clean burning.

Chipping: Chipping prevents emissions from burning, but ultimately stored carbon is released from chipped wood. Depending on your goals, generating biochar creates a long-term carbon store that can be combined with compost for added benefit.

PRESERVATION STANDARDS

Preservation Standards – CORE

These standards are required.

1. If you have forestland on your property, manage your forest to maximize forest health and minimize wildfire risk (e.g., [selective thinning](#), [grazing understory](#), [prescribed burn](#)). Before implementing fuel reduction treatments, leverage regional expertise for guidance. Please contact Ben Mackie (ben@napagreen.org) and he will connect you with the right contacts at the Napa RCD and/or NRCS.

Green Note: Review the *Natural Resources Conservation Service relevant Conservation Practice Standards* and consider participating in a [UC Agriculture & Natural Resources Forest Stewardship Workshop](#).

2. Commit to preserve trees/forest onsite (unless trees need to be removed for safety, including targeted fire fuel reduction). If property is being developed or new vineyards are being planted this must be planned to prevent the removal of mature trees. Submit, in advance, the reasons for removing any trees. Must replant locally where ecologically beneficial (preferably onsite), with native species (oaks with oaks), at a rate of 3:1 (three plantings for every tree removed).
3. Maintain defensible space around vineyards and production locations.

Green Note: Napa Firewise has resources and funding to help create defensible space: <https://napafirewise.org/defensible-space-guide/>

4. Maintain and enhance riparian areas for wildlife habitat, erosion control, creek/river health, and carbon storage. Do not remove more trees and shrubs than necessary for maintenance. If you are concerned about dry riparian habitat serving as a pathway to spread fire please contact the Napa County RCD for resources and recommendations (Bill Birmingham, Program Manager, bill@naparcd.org).

Preservation Standards – ELECTIVE (Must Implement 2 of 8)

1. Get an evaluation from the Napa County RCD to see if your property is a good candidate to participate in [Napa RCD tree planting and stewardship events](#).
2. Apply for funding from the North Bay Forest Improvement Program. This program will provide ~75% cost share to work with a registered professional forester to develop a CA Cooperative Forest Management Plan. Having an official FMP makes you eligible for additional implementation funding.

Green Note: Alex Wilbank, the Forestry Project Manager with the Napa County RCD, can help to answer questions about the program and application process - alex@naparc.org.

3. Utilize climate-smart burning techniques/technologies to process fire fuel thinning (e.g., Conservation/Low-Smoke burn; Flame-cap kiln; AirBurners BurnBoss).

Green Note: Using these climate-smart burn techniques and technologies reduces air pollution by anywhere from 75-95% compared to a traditional open burn. If trees are hauled to Napa Recycling & Waste Services they are chipped and sent out of the county to biomass facilities for burning, adding to emissions. See resources in the Conservation Burn & Alternatives element.

4. Participate in voluntary Napa watershed river/creek and riparian habitat restoration projects.

Green Note: Examples include Rutherford Reach restoration, Oakville to Oak Knoll restoration, Upper Napa River restoration, Carneros Creek restoration.

5. Have land protected from future development through official Land Trust conservation easements.
6. Support and/or participate in volunteer opportunities with the [Napa Communities Firewise Foundation](#) to help reduce the risk and impacts of wildfires thorough fire fuel reduction and community education.

Green Note: [Interactive Map of Napa Fire Safe Councils](#)

7. Partner with organizations like [One Tree Planted](#) or [American Forests](#) to plant trees in California.
8. Enroll executive credit cards in [Plant Your Change](#).

ADDITIONAL RESOURCES

These resources and organizations are in addition to the resource links we have embedded throughout this element.

Organizations

- **Fire Safe Councils of Napa County:** NCFF's mission is to reduce the risk and impacts of wildfires through fire fuel reduction and community education in Napa County. The Napa County Fire Department offers a **free chipping service**.
- **North Bay Forest Improvement Program (NBFIP):** is a regional cost-share program that provides technical and financial assistance to private landowners in the development of Forest Management Plans and implementation of forest management practices. Email **forestry@naparcd.org** to learn more about NBFIP and other technical and financial support that may be available.
- **Indigenous Peoples Burning Network:** The Indigenous Peoples Burning Network (IPBN) is a support network among Native American communities that are revitalizing their traditional fire practices in a contemporary context.
- **University of California – Agriculture & Natural Resources:** UC Agriculture and Natural Resources connects the power of UC research in agriculture, natural resources, nutrition and youth development with local communities to improve the lives of all Californians. Resources include **Forest Stewardship Workshops**, **Forest Vegetation Management** and **Your Family Forest**.
- **Napa Wildlife Rescue:** NWR supports and advocates for wildlife through in order to promote sustainable and healthy ecosystems in Napa County for the present and future generations.

Information, Articles & Studies

- **Napa County Community Wildfire Protection Plan**
- **Native Approaches to Wildfire Management Could Revitalize Communities**
- **Quiet Fire**
- **Re-Oaking the North Bay Strategic Plan**
- **To Manage Wildfire, California Looks to What Tribes Have Known All Along**
- **Toward a Carbon Neutral California**
- **Tree Growth Never Slows**
- **USDA Forest Service: Wildfire Risk Communities**
- **Wildfires and Forest Resilience: the case for ecological forestry in the Sierra Nevada**

PROHIBITED & RESTRICTED PESTICIDES

Pesticides (the general term used to encompass herbicides, insecticides, fungicides, etc.) are selected and used to control pests and, because they are inherently toxic to biological systems, can present risks to applicators, other workers and sometimes impact non-target animals and the environment. Scientific evaluation and understanding of the impacts and risks of the cornucopia of pesticides continues to evolve. Importantly, agricultural workers do have to be trained and licensed to apply pesticides, which is not true for commercial and residential use. Nonetheless, there are still unknown environmental and human health risks tied to the widespread use of many pesticides.

Farming for Soil

The Napa Green Vineyard certification (est. 2021) was developed as a regenerative, whole systems roadmap specifically for viticulture. Limiting soil disturbance, including the phase out of chemical inputs, is core to regenerative agriculture. Roundup and many other synthetic chemical applications undermine and damage microbial and fungal networks, the underground “brain” that services the vines. Moving away from pesticides and cultivating diversity builds stability and resilience. Farmers who farm for soil health build:

- Water and nutrient retention
- Resilience to pests and disease
- Resilience to drought, high heat, atmospheric rivers, and other weather extremes
- Store/sequester more carbon in the soil
- And ultimately grow higher quality grapes

The diversity of our soil types is part of what makes the Napa Valley uniquely suited to viticulture, and is intimately tied to the concept of “terroir” – that winegrapes are an expression of place. If growers aren’t farming for soil health they are undermining terroir.

Roundup, Glyphosate, and the Suite of Herbicides

The Napa Green Vineyard standards are reviewed, edited, and continually improved every two years. In the course of the 2023 review the Napa Green Team, a diverse grower Pesticide Working Group, and the Napa Green Board of directors reached majority consensus that as Napa Green and its members continue to evolve as leaders it is time to phase out the use of Roundup, and ultimately the use of all synthetic herbicides. In November 2023 Napa Green announced that members must:

- Phase out the use of Roundup and Glyphosate-based products by Jan. 1, 2026
- Phase out all synthetic herbicides by Jan. 1, 2028

This has been met with positive media and consumer response, including:

[Why Napa Green's Glyphosate Ban is Such a Big Deal | Napa Green's Roundup ban underscores controversy behind Sonoma County's 'certified sustainable' vineyards](#)

Roundup/Glyphosate: Roundup is the most prolifically used herbicide in the world. According to the EPA, roughly 280 million pounds of Roundup are applied to agricultural land in the U.S. each year, and that does not account for residential or commercial use. The International Agency for Research on Cancer (IARC) has classified Glyphosate, the active ingredient in Roundup, as “probably carcinogenic to humans.” Bioaccumulation of Glyphosate is occurring in our environment, our foods, and our bodies, with unknown risks. Long-term, unprotected exposure to Roundup has been tied to development of Non-Hodgkin's Lymphoma. The proliferation of the use of Roundup has been linked to precipitous decline in invertebrate populations - the Monarch butterfly (due to destruction of milkweed habitat) and honeybee populations have both been directly affected.

Synthetic Herbicides: There is a lack of public awareness that there is a suite of herbicides being used for agriculture, in part trying to address the increasing weed resistance to Roundup. Here in Napa County the Pesticide Use Reports show a significant decline in the amount of Roundup application, but simultaneously show a rise in the use of alternatives such as Lifeline (active ingredient glufosinate). In some cases, growers turn to 2-3 other herbicides to try to match the effectiveness of Roundup. These lesser-known herbicides often have equal or greater environmental and human health risks. For example, alternatives like Shark and Inspire Super persist in the environment, are harmful if inhaled or absorbed through skin, tied to dermal cancer risk, and toxic to fish and other organisms. Eliminating the use of Roundup alone is not a silver bullet.

Costs of Herbicide-Free

One of the main resistances to phasing out glyphosate and other herbicides is increased labor and equipment costs. However, the costs of herbicides and fertilizers have risen dramatically, so increased labor demands can be offset by reduced supply chain purchases. In addition, leaders like Grgich Hills Estate, a Napa Green member, have shown that regenerative organic farming can be cost-effective. According to an analysis by Brotemarkle Davis & Co. LLP accounting firm, the average annual per acre cost of vineyard management in the Napa Valley is \$14,800, with \$3,800 in depreciation. At Grgich, they spend \$11,000 per acre, with only \$1,300 in depreciation due to the longer life of their vineyards.

Weed Management Toolkit

When we looked for a roadmap for going herbicide-free we didn't find it all in one place, so we created a custom **[Weed Management Toolkit](#)** to support Napa Green members and other perennial growers looking to cultivate healthier soils and regenerative farm

systems. This Toolkit includes by-the-numbers Case Studies; list of Weed Management Tools and their pros & cons; upcoming Events & Workshops; and a long list of Resources.

Request for Variance

Growers will have the opportunity to submit a request for variance making a case for cost-prohibitive exceptions due to rocky soils, heavy slopes, and/or narrow vine rows. These requests will be considered by a Peer Review Committee that includes the Napa Green Vineyard Program Manager. Any variances will be granted on a select basis, which is to say we do not anticipate granting more than a small number of variances – there is by no means an absolute offramp due to the conditions listed above. For the limited number of growers that may receive a variance it will only extend their herbicide-free transition timeline.

Why not organic?

Napa Green does not require adherence to NOP or CCOF organic standards. However, once members phase out synthetic herbicides and adhere to the additional pesticide restrictions our growers are 80-90% of the way to organic. The pesticides still allowed for use primarily relate to mildew pressure, and some high risk pests and disease like vine mealybug and red blotch.

Growing organic grapes (i.e. not using synthetic pesticides) is just one relatively small piece of a whole-systems approach to sustainable winegrowing. You can be organic and not be caring for your workers, overusing fuel, water, and electricity, have heavy bottles and high greenhouse gas emissions. Certified Made with Organic Grapes only looks at the farm. And full organic certification does not include environmental stewardship requirements in the winery or production. It is critical to take a whole systems, soil to bottle approach, with the phase out of chemical inputs as one key element.

Gold Level

Napa Green will continue to provide an added level of “Gold Level” recognition for growers that are already herbicide- and neonicotinoid-free. We will reevaluate the Gold Level designation as we approach the January 2028 deadline requiring phase out of all synthetic herbicides.

Neonicotinoids

The California Department of Pesticide Regulations has [dramatically limited the use of neonicotinoids](#) for wine grapes and other small fruit crops, with new restrictions effective Jan. 1, 2024.

- For soil application, the maximum allowable rate is 0.2 lbs. ai/A/season.

- For foliar application, the maximum allowable rate is 0.1 lbs. ai/A/season.
- When using both soil and foliar application methods or multiple neonicotinoid active ingredients, the combined maximum application rate must not exceed 0.3 lbs. ai/A/season

In addition to these regulations Napa Green does not allow the spray/foliar application of neonicotinoids, due to the risk to pollinators. Application must be limited to injection/fertigation.* In addition, growers must use the BeeWhere program to mitigate risks to bees/beneficials.

**Allowances may be made for the spray of Assail (Acetamiprid) when critical thresholds are reached for leafhoppers.*

Maximum Residue Limits

The U.S. EPA and comparable organizations in other countries have set Maximum Residue Limits (MRLs) for acceptable levels of pesticide residues that can be detected for wine grapes and other agricultural commodities to prevent human health risk. In order to export wines to other countries, detectable residues, which are randomly sampled, cannot exceed each country's MRLs. The stringency of these thresholds is one indicator of the relative risks of each regulated pesticide.

Given both practical market and relative risk considerations, the MRLs for the U.S., Canada and the European Union were evaluated and informed this list.

How was this list developed?

This list was developed through extensive background research and analysis, as well as input from a Pesticide Working Group. We compared the pesticide restrictions of the four other west coast sustainable winegrowing programs (California Certified Sustainable Winegrowing; Sustainability in Practice (SIP); Lodi Rules; LIVE (in OR and WA)). We analyzed three years of winegrape Pesticide Use Reports from the Napa County Agricultural Commissioner's Office, looking at what pesticides are in use in Napa County, and to what extent. This research validated that a limited number of high-risk pesticides are used by grape growers in Napa County, and many of these are only applied selectively by a small number of growers.

List Revision

The Napa Green Pesticide Working Group will continue to meet biennially to discuss and consider new best practices, resources and science that will inform any revisions or additions to this list.

PROHIBITED & RESTRICTED PESTICIDES LIST

Please see the Prohibited & Restricted Pesticides [DETAILED SPREADSHEET](#). Note there is one tab for Prohibited Pesticides and another for Restricted Pesticides. This spreadsheet includes suggested alternatives, risks to human health and environment, MRLs and more. Please see our [WEED MANAGEMENT TOOLKIT](#) for case studies and extensive resources to support the transition away from synthetic herbicides.

Variances

Please note that a variance can be requested for exceptional circumstances, but variances are rare. Requests will be considered by the Napa Green vineyard team and a group of advisory growers, and may include a visit to the property. Our team can also connect you with a mentor to help implement non-toxic solutions. Submit request for variance and documentation to vineyard@napagreen.org.

Note on Prohibited Pesticides

We chose to include all of the prohibited pesticides from other west coast sustainable winegrowing programs, even if they are not in use in Napa County. The intention is to forestall any questions about why they were not included.

GOLD LEVEL – OPTIONAL

GOLD Level: Herbicide AND Neonicotinoid* Free

For those members that achieve Gold Level certification an additional gold sign validating “HERBICIDE FREE | BEE KIND” can be added to “Napa Green Certified Vineyard” signs, and there will be additional PR recognition.

Note that **Bee Better Certified prohibits the use of Neonicotinoids*

CASE STUDY: MONARCH TRACTOR

When discussing reduced herbicide use or organic farming, a common argument made is that more tractor passes are required, which increases emissions and the carbon footprint of vineyard operations. However, that no longer has to be the case as electric tractors are entering the market that are competitive with, or even outcompete, conventional tractors. The [100% electric Monarch Tractor](#) has been developed here in our backyard, and the development team includes Napa Valley Vintner and Monarch Co-Founder and Chief Farming Officer, Carlo Mondavi.

A Monarch Tractor in operation for 1,000 hours a year will prevent 53 tons of Greenhouse Gas (GHG) emissions into the atmosphere annually, when compared to a diesel tractor. Monarch also includes a digital plugin that can share your real-time emissions offsets on your website or in your tasting room.

The Monarch Tractor can be driven by an operator, just like a conventional tractor, or drive itself autonomously, freeing up workers for other tasks. There are two power options – 2WD and 4WD – with 10+ hours of operational run time. Monarch Tractor is currently conducting pilots in vineyards to determine how long the tractors can run with different attachments and on varying slopes. Each tractor is programmed for owner properties and actively “learns” as it operates in the vineyard. For safety when running autonomously, the tractor senses workers and stops until they are no longer in the path.

The cost of the Monarch Tractor is no obstacle, either. The [Carl Moyer program](#) provides incentives to trade out conventional tractors for electric models, and depending on the type of tractor you are trading out, can cover anywhere from 50-85% of the cost of a Monarch Tractor. Better yet, the Monarch Tractor team has dedicated members to help do the paperwork for you. With or without subsidy support you will see annual operational and emissions savings; you can find your estimated saving with their [online savings calculator](#).



The battery, which can be swapped by one person in under ten minutes, is charged using standard car charger plugs (J1772).

ADDITIONAL RESOURCES

These resources and organizations are in addition to the resource links we have embedded throughout this element.

WEED MANAGEMENT TOOLKIT: Napa Green case studies and extensive resources to support the transition away from synthetic herbicides

Organizations/Technology

- **HeavyConnect:** Mobile Technology to Streamline Farm Operations
- **Monarch Electric Tractor & Under-the-Vine Weeder**
- **UC Year-Round Integrated Pest Management Program for Wine Grapes**

Birds, Bees and Butterflies

- **Aloft Napa Valley (Bird boxes & Bee keeping)**
- **Bee Better Certified**
- **The Birds of Prey That Stand Guard Over California's Vineyards**
- **Farmers for Monarchs**
- **Napa Wildlife Rescue – Barn Owl Maintenance Program (BOMP)**
- **UC Bee Precaution Pesticide Ratings**

Funding Opportunities

- **California's Healthy Soils Initiative**
- **Carl Moyer Program (Funding available to upgrade agricultural equipment)**
- **Sustainable Agriculture Research and Education (SARE) Grants**

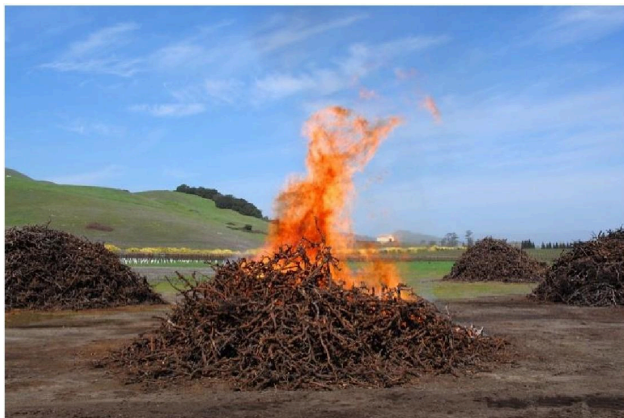
Information, Articles & Studies

- **Sheep in the Vineyard**
- **The Monarch Challenge**
- **Why a Leading Central Coast Vineyard is Transitioning to Organic Production**

CLIMATE-SMART BURNING

Conservation burning is the minimum Napa Green Vineyard required method to burn pulled vines and other non-treated wood "waste." Chipping and reuse for mulch and dust suppression is acceptable, but it is important to note that wood chips gradually release most of their stored carbon, while conservation burning re-fossilizes wood to create biochar that can store carbon for hundreds or even 1,000's of years. This section also outlines other regionally available alternatives that produce even less smoke and GHG emissions, and produce more biochar (e.g., flame-cap kilns and air curtain burners).

What is Conservation Burning?



Conservation burning is an alternative pile management and burn technique that reduces smoke and greenhouse gas emissions, generates biochar, and reduces soil damage from burns. **It has been estimated that conservation burning, when managed properly, can reduce burn pile smoke pollution by 75-85%, with a significant reduction in carbon emissions as up to 50% of the vine carbon load is stored in the biochar created by the burn.**

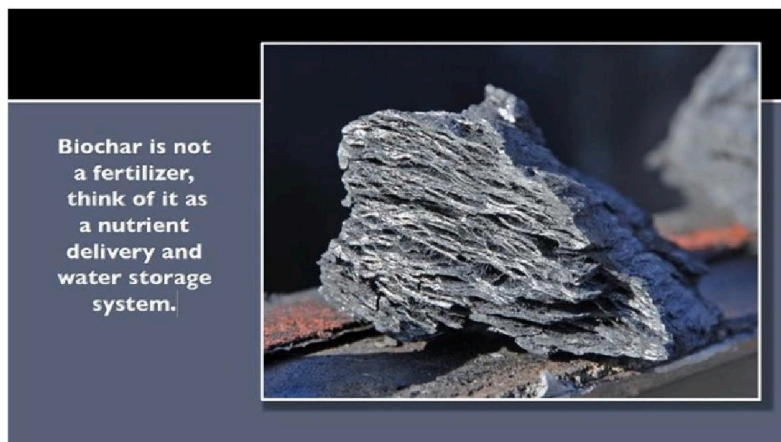
Conservation burns burn faster, make neighbors and the Air District happy, and in the end, you get a product that you can use with compost to increase nutrient and water retention and availability.

Key Adjustments: Conservation burning may require that you change your burn location (have a dedicated location rather than in the field, to reduce soil damage). It also requires waiting longer to burn to let the pile dry out and reduce the moisture load (<20%).

Demonstration Workshops: In partnership with the Sonoma Ecology Center and Napa County RCD, Napa Green will be hosting 1-2 Conservation Burning demonstration workshops each year. We have also created a [demonstration video](#) of both a conservation burn and flame-cap kiln burn.

What is Biochar?

The Intergovernmental Panel on Climate Change has identified biochar as one of the top five natural solutions to fight climate change. Biochar is re-fossilized wood that is as close to pure carbon as possible, and provides long-term (centuries to millennia) carbon storage. Even more compelling, the primary purpose of biochar is as a soil enhancement. When inoculated and applied with compost, biochar serves as a nutrient and water retention and delivery system, significantly increasing water and fertilizer efficiency, especially in degraded or sandy soils. Research has shown that biochar can increase plant growth and yields. A recent study in Monterey County found that a new vineyard planted in soils amended with compost and biochar produced more fruit using the same amount of irrigation, and maintained grape quality.



Raymond Baltar, Director of the Sonoma Biochar Initiative, describes biochar as "a honeycomb container into which nutrients are placed to be used as a soil amendment." [In a TEDx talk](#), Wae Nelson, a mechanical engineer, says that when microorganisms encounter biochar it is "like coming across luxury condos."

Benefits of Biochar:

- Long-term carbon storage
- Turn wood waste into a valuable resource
- Increase soil fertility and agricultural yields
- Improve soil structure, aeration and water storage
- Increased plant resilience in drought conditions
- Reduce use of synthetic fertilizers and pesticides
- Reduce nitrous oxide (NO₂) and methane emissions from soils (as much as 50-80% from farms using conventional fertilizers)
- Reduce nitrate and pesticides leaching into waterways
- Support local, distributed energy production & distribution

The best time to add a biochar/compost blend is when replacing or planting a new

vineyard. The more depleted/degraded the soils the more benefits of applying biochar. Always handle when wet and band it into the vine rows (do not broadcast).

See our list of regional [Climate Smart Burn Contractors](#)

Processing your own pulled vines and wood waste will rarely produce sufficient biochar to blend with compost for full vineyard application. Supplemental biochar can be purchased from [Pacific Biochar](#) (based in Santa Rosa), or [Earthworks Biochar](#).

Biochar Resources

- [Sonoma Biochar Initiative](#)
- [Napachar](#)
- [Climate Smart Burn Contractors](#)
- [Vineyard Field Trial with Biochar and Compost Oasis Vineyard](#)
- [Napa Green Feature Article: The Benefits of Biochar](#)
- [Pacific Biochar](#)
- [Earthworks Biochar](#)
- [Scaling Biochar Forum – Links to all presentations](#)

CONSERVATION BURN HOW TO

If you are not able to attend one of our conservation burn workshops, or want expert guidance for your first conservation burn, we recommend working with Raymond Baltar and his fire team from the Sonoma Ecology Center to conduct your first onsite conservation burn. This team will fully facilitate a conservation burn training. Consider collaborating with interested neighbors to organize the demo conservation burn so you can distribute costs and maximize the value of the training.

Demonstration/Training Costs: \$2,000-3,500 depending on how much labor they need to provide

Contact: Raymond Baltar, rbaltar@sonic.net

Napa Green and the Napa County RCD have worked with this team to create a video and written guidance for conducting conservation burns:

- **VIDEO: [Conservation Burn AND Flame-Cap Kiln Burn with Step-by-Step Explanation](#)**
- **PDF: [Conservation Burn Step-by-Step Guidance](#)**

Conservation Burn Resources

- [Conservation Ag Burning – One-page overview](#)
- [Full video of conservation burn in Paso Robles \(2019\)](#)
- [Sustainable Winegrowing and Vineyard Team podcast interview on Conservation Burning and Biochar](#)
- [Vineyard Team overview of Conservation Burn Technique](#)

FLAME-CAP KILNS

The benefits of flame-cap kilns are that, when operated correctly, they are even more effective at reducing air pollution and smoke than conservation burns, and they can produce up to 2x as much biochar. Using a flame-cap kiln is more labor intensive as it requires removing any metal wire and continually feeding the fire.

Several Napa Green members have worked with Napachar: <https://napachar.com/>

If you ultimately wanted to purchase your own flame-cap kiln they are roughly \$2,000 and have straightforward setup, as well as tear down for storage.

[Wilson Biochar](#) has flame-cap kiln resources and Ring of Fire Kilns available for purchase (based in Oregon).

AIR CURTAIN BURNERS

Air curtain burners are larger-scale burners that create a curtain of air “ceiling” that traps smoke, reducing pollution and GHG emissions, and can generate biochar. Air curtain burners can be brought onsite and into forested areas to process pulled vines and fire fuel thinning (including trees and stumps). Several Napa Green members have worked with the [Clean Burn Company](#). CBC has one of the AirBurners CharBoss, designed specifically to generate biochar.

Air curtain burners come in a range of sizes, from [BurnBoss](#) and [CharBoss](#) (CBC has several), to [FireBox](#) (Pina Vineyard Management), to TigerCat [Carbonizers](#) (for large-scale forest management).

[Regional Climate Smart Burn Contractors](#)

CASE STUDY: OPUS ONE – AIR BURNER AND BIOCHAR

Opus One stopped burning prunings and grapevines in 2003 to minimize the impact on air quality in Napa Valley. The vineyard team became aware of low-smoke burning techniques and the creation of biochar in 2015. After observing low-smoke burns, the team conducted their own burn in 2017. They were encouraged by the impressively understated plume of smoke and the small pieces of biochar, which looked like black truffles. They were named To Kalon Truffles. Like truffles, they facilitate the uptake of water and nutrients to grapevines. Unlike truffles, they receive nothing in return.

The team saw a FireBox demonstration in February 2020 and were impressed by the quality of the burn, the safety, and potential to create biochar. In April of 2020, Opus One pulled 12 acres of vineyard. They allowed the vines dry the required minimum of 60 days. The Firebox burner has to be put in a cleared area and is 20' long by 10' high. Piña provided the machinery and Opus One's team helped with managing the burns over six days.

The air flow burner is more time intensive than a traditional burn, and requires monitoring for fire prevention. They started the burn with dry wood and propane. Once started there was constant air flow and the air curtain kept all of the particles below. They burned from 10 am to 2 pm. At the end of each day they added soil and the following morning the team cooled down with some water and removed biochar. Then airflow could restart the burn. Over six days they burned nearly 33,000 vines and produced 30 tons of biochar. The team invited others to observe the burn on-site, ask questions, and think about how they might protect air quality in the Napa Valley.

