

Grazing Sheep

in California Vineyards

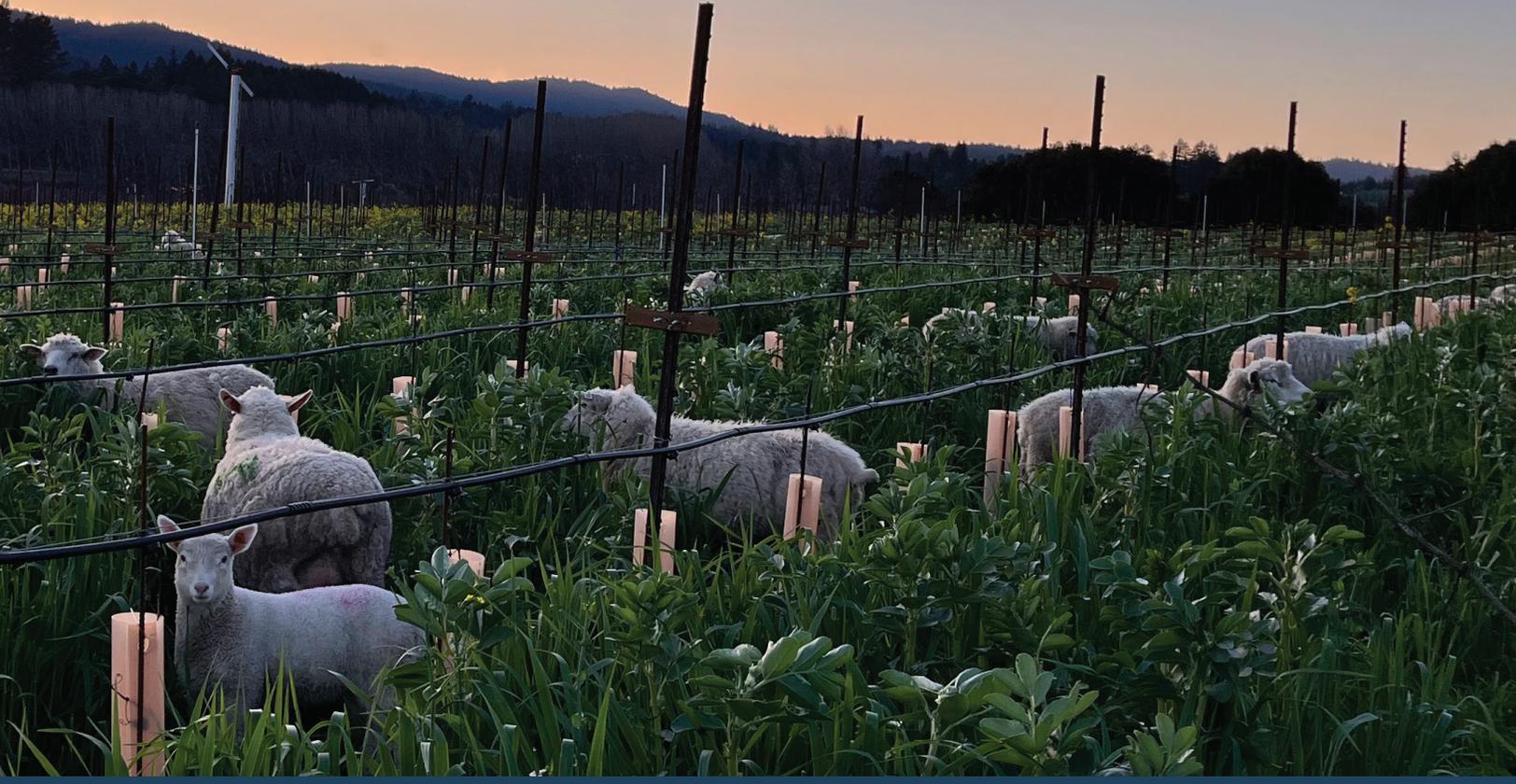


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INTRODUCTION



HIGH WIRE V-TRELLIS SYSTEM WITH HIGH IRRIGATION AT PAICINES RANCH ALLOWS FOR SHEEP TO MOVE EASILY BETWEEN ROWS. PHOTO BY K. MULVILLE

When managed responsibly, sheep grazing can be a powerful tool in the vineyard to manage vegetation, reduce costs, decrease synthetic fertilizer use, herbicides and other inputs while boosting soil health and biodiversity. Grazing sheep in your vineyard will require changes to your current management practices, but you can start to see improvements in soil health within only a few seasons of introducing sheep. Every operation is different and you will need to fit the management practice into the context of your site, goals and available resources. Land managers can use this guide for grazing in combination with a variety of other soil health practices to achieve their management, financial and environmental objectives.

This best management practices guide has been developed through collaboration between vineyard managers, extension specialists, graziers, Community Alliance with Family Farmers, the Agroecology Lab at UC Davis, the Ecdysis Foundation and the Napa Resource Conservation District to facilitate integrating sheep into vineyard systems. We recognize that grazing sheep in vineyards is not a new practice, and there is an abundance of local and Traditional Ecological Knowledge (TEK) which informs how this practice is implemented in California. Most of the vineyard managers we interviewed for the development of this guide utilized grazing in combination with other soil health practices. This speaks to their commitment to harnessing the ecological co-benefits of grazing sheep.

ECONOMIC BENEFITS

INPUT AND LABOR SAVINGS

Utilizing sheep to manage vegetation in vineyards can reduce labor, equipment and input costs. With grazing, there is a decreased need for mowing and an increase in the efficacy of herbicide sprays and undervine cultivation. There are also strong associations between grazing and a reduction in the use of synthetic fertilizers and herbicides. (Table 1)

Common economic benefits:

- Elimination of 1-3 mowing passes
- Reduction in 1 herbicide application
- Increased efficacy/decreased use of pre-emergent herbicide

A few managers have lessened or eliminated the use of harmful herbicides (see quotes):

“We’ve actually eliminated herbicides and you see the grasses really start to migrate back over and it doesn’t take long for it to come back.”

Charlie Hamilton, Vineyard Manager and Viticulturist, Pressley Vineyards

“Having biodiversity on your property is a huge boon by allowing you to have less inputs, which means you have less expenses, you have healthier people, you have a healthier community.”

Kristin Belair, Director of Winegrowing and Sustainability, Honig Vineyard and Winery



**SIDE-BY-SIDE VIEW OF GRAZED VINEYARD; GRAZING DECREASES THE NEED FOR MOWING/HERBICIDE USE.
PHOTO BY K. MULVILLE**

“While we find far greater environmental and economic benefits from grazing in vineyards where we stack other practices such as no-till and permanent cover crops, we are also operating under the assumption that a post-harvest grazing pass in the fall in conventional vineyards, can improve the efficacy of pre-emergent herbicides, allowing us to hopefully use softer materials and less of them over time.”

Maria Zumkeller, Technical Vineyard Manager, LangeTwins Family Winery and Vineyards

TABLE 1

Treatment	No syn fertilizers	No syn herb	No syn/ copper fungicides	No syn insecticides	Organic amendments	No-till tractor row	Winter cover crops	Permanent ground cover
<i>Dormant Grazing</i>	64 ± 26%	79 ± 22%	50 ± 27%	71 ± 25%	57 ± 27%	50 ± 27%	100%	43 ± 27%
<i>Dormant + Growing Season Grazing</i>	67 ± 28%	92 ± 16%	67 ± 28%	83 ± 22%	17 ± 22%	67 ± 28%	100%	42 ± 29%
<i>No Grazing</i>	26 ± 18%	35 ± 20%	26 ± 18%	39 ± 20%	74 ± 18%	30 ± 19%	100%	4 ± 9%

TABLE 1. THIS TABLE FROM OUR RESEARCH (SW23-949) SHOWS THE PERCENTAGE OF VINEYARDS (N=49) UTILIZING GENERAL VINEYARD MANAGEMENT PRACTICES BASED ON WHETHER OR NOT THEY USE SHEEP TO GRAZE (TREATMENT COLUMN). IT EXAMINES USING SHEEP TO JUST GRAZE DURING VINE DORMANCY COMPARED TO VINEYARDS USING SHEEP TO GRAZE DURING THE VINE DORMANT SEASON PLUS THE VINE GROWING SEASON. FOR EACH MANAGEMENT PRACTICE THE TABLE DISPLAYS THE PERCENTAGE OF VINEYARDS USING OR NOT USING THAT MANAGEMENT PRACTICE. THE ERROR (+/-) IS EXPRESSED AS THE 95% CONFIDENCE INTERVAL.

As shown in Table 1, grazing was strongly associated with a reduction in the use of synthetic fertilizers and herbicides. There was a moderate association between grazing while vines are dormant and a reduction in organic amendments and tillage in the tractor row. When vineyards could integrate dormant and growing season grazing, there was a stronger association between grazing and the reduction in tractor row tillage, organic

amendments, and herbicide usage, demonstrating the benefits of grazing in multiple seasons. In general, grazing allows producers to manage the vineyard floor while promoting more permanent ground cover which protects the soil and the vines. *As managers see improvement in soil health and biodiversity, the economic value of this practice is more evident.*

CASE STUDY



HIGH DENSITY GRAZING IN SOLANO COUNTY
PHOTO BY C. HAMILTON

Solano County, dormancy and post harvest pass:

This 50-acre vineyard is grazed for about 7 days with 1000-1250 sheep from a neighboring ranch (20-25 sheep/acre). This arrangement reduces the cost of transporting sheep to the vineyard and between paddocks since no moveable fencing is used. An on-site grazer is employed to manage the flock in the vineyard. They aim for 2 passes each year: post-harvest and post-pruning/pre-budbreak. This vineyard has eliminated the use of herbicides during the growing season, and notes that pre-emergent applications are more effective due to a cleaner vineyard floor. At other times during the year, synthetic herbicides, fungicides and insecticides are used in this conventional operation.

MARKETING POTENTIAL

In addition to the economic benefits related to input reduction and labor savings, some vineyards also find the marketing potential of sheep valuable. Sheep can be helpful in telling the story of a vineyard's growing practices or dedication to sustainability. Having sheep grazing in the vineyard can draw in additional customers by providing an element of levity and joy when staff and customers see them in the field. Grazing can also offer opportunities for value-added products such as meat and wool products.

“Every time I see the sheep laying down, they just make me smile. So besides the practical part of what they do, they just crack me up. It’s also great for our customers. Customers just love seeing animals.”

Tyler Nelson, Nelson Family Vineyard

ECOLOGICAL BENEFITS

VEGETATION MANAGEMENT

With the use of well-managed grazing to control vineyard floor vegetation, you can reap additional ecological and soil health benefits.

The most common goal when using sheep in vineyards is resident vegetation management and/or cover crop termination. As a benefit, ground cover can be managed by sheep before a tractor can get into a wet field without fear of getting stuck or damaging the vineyard.

“The soils are too wet for tractor work in January, as it would lead to significant compaction.”

Guillermo Perez, Vineyard Manager,
Stag’s Leap



RESIDENT VEGETATION GRAZING IN A CONVENTIONAL VINEYARD. PHOTO BY C. HAMILTON

CASE STUDY

Napa County, Dormancy pass:

This organic and regenerative 360 acre vineyard sows cover crops and aims for 2 grazing passes during dormancy each year. After harvest, the vineyard applies compost, then seeds a diverse cover crop mix in November. The vineyard brings in sheep when the cover crop is 12" tall, usually between December and February, depending on weather. The contract grazer sets up multiple 3 acre paddocks with 200-300 sheep which graze for 24 hours in each paddock (65-100 sheep/acre). Each grazing event is meant to stimulate cover crop regrowth and prolong its vegetative state. After grazing they roller crimp or mow (6" above ground) the cover crop to terminate it and leave a thick layer of residue over the soil and leave roots in the soil. They appreciate that the sheep effectively eat under the vines, an area difficult for them to manage since they don't till or use herbicides.



GRAZING RESIDENT VEGETATION IN NAPA VALLEY - SPRING 2025
PHOTO BY L. AGUILAR

In addition to vegetation control, this vineyard uses grazing to maximize soil health benefits. They make sure that the sheep don't graze more than 50% of the cover crop shoots in order to promote vigorous above and belowground regrowth, carbon release into the soil and healthy soil structure and fertility. They graze sheep before the plants set seed to allow for more photosynthates to go to plant root systems, and more root exudation and turnover¹. This organic matter consequently feeds soil microbes and improves nutrient cycling.

¹Long-term integrated crop-livestock grazing stimulates soil ecosystem carbon flux, increasing subsoil carbon storage in California perennial agroecosystems, K.Brewer, et al.



COVER CROPS ARE SOWN IN FALL TO INCREASE SOIL HEALTH, AND GRAZED IN THE SPRING TO TERMINATE. PHOTO BY S. BATES

COVER CROP MANAGEMENT FOR GRAZING

Cover crops are a great way to improve soil health, but are not necessary for sheep grazing. There are many resources which can guide you in implementing this practice in order to harness their benefits, which include:

- Increased soil stability and reduced runoff and erosion
- Reduced compaction
- Weed suppression
- Better water percolation and infiltration rates
- Increases in soil organic matter
- Increases in beneficial insects and pollinators
- Sequestration and storage of carbon into the soil

If you sow cover crops, you will want to ensure they have sufficient time to establish before introducing sheep to the vineyard in order to maximize their benefits. However, certain cover crops, namely mustard, can become too fibrous for sheep when mature. If you are not intending to mow, and want to rely solely on sheep to terminate cover, it is advised to introduce sheep while the cover crop is still supple and more easily digested by sheep. Resident vegetation, along with common diverse cover crop mixes - consisting of legumes, grasses and brassicas - are safe and palatable for sheep.

An example of a common cover crop blend that works well for sheep in vineyards is:

Le Ballister's Plowdown Mix: Bell Beans, Magnus peas, Dundale Peas, Common Vetch, Barley, Oats

Examples of cover crop species and their co-benefits are:

- Cowpea, sunn hemp and common oat - harmful nematode populations reduction
- Sheep fescue, triticale and other forage varieties that leave a thick mulch layer - weed suppression
- Egyptian clover, bird's-foot trefoil, subterranean clover and other legumes - fix nitrogen
- Buckwheat and alyssum - attract a glassy winged sharpshooter parasite. Other flowering cover crops can attract other beneficial insects

There are grants that can help cover the cost of cover crop seed if this is a practice you want to try. See Resources Section below.

SOIL HEALTH

Sheep droppings are rich in nitrogen and organic matter, which feed the soil and vines throughout the season, resulting in increased soil organic matter. With an increase in soil organic matter (which can be measured through lab analysis), soils are known to have:

Improved aeration

- providing more oxygen for roots to grow and microbes to breathe

Increased water cycling abilities

- greater water infiltration rates - water seeps into soil faster during rain events
- greater water holding capacity - soil holds on to water longer, helping during the dry season

Increased nutrient cycling abilities

- nutrients are more readily available to the plants you're growing

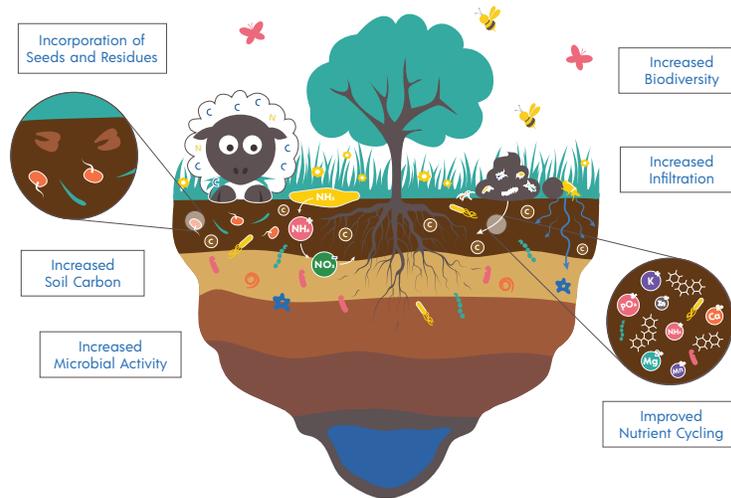
“When we graze, we’re able to improve soil organic matter, and encourage all the good microbes that are turning over and making nutrients bioavailable. It all kind of builds from there.”

Maria Zumkeller



GRAZING CAN BE USED TO STIMULATE ROOT GROWTH, FURTHER CONTRIBUTING TO THE SOIL HEALTH BENEFITS OF USING COVER CROPS. PHOTO BY S. BATES

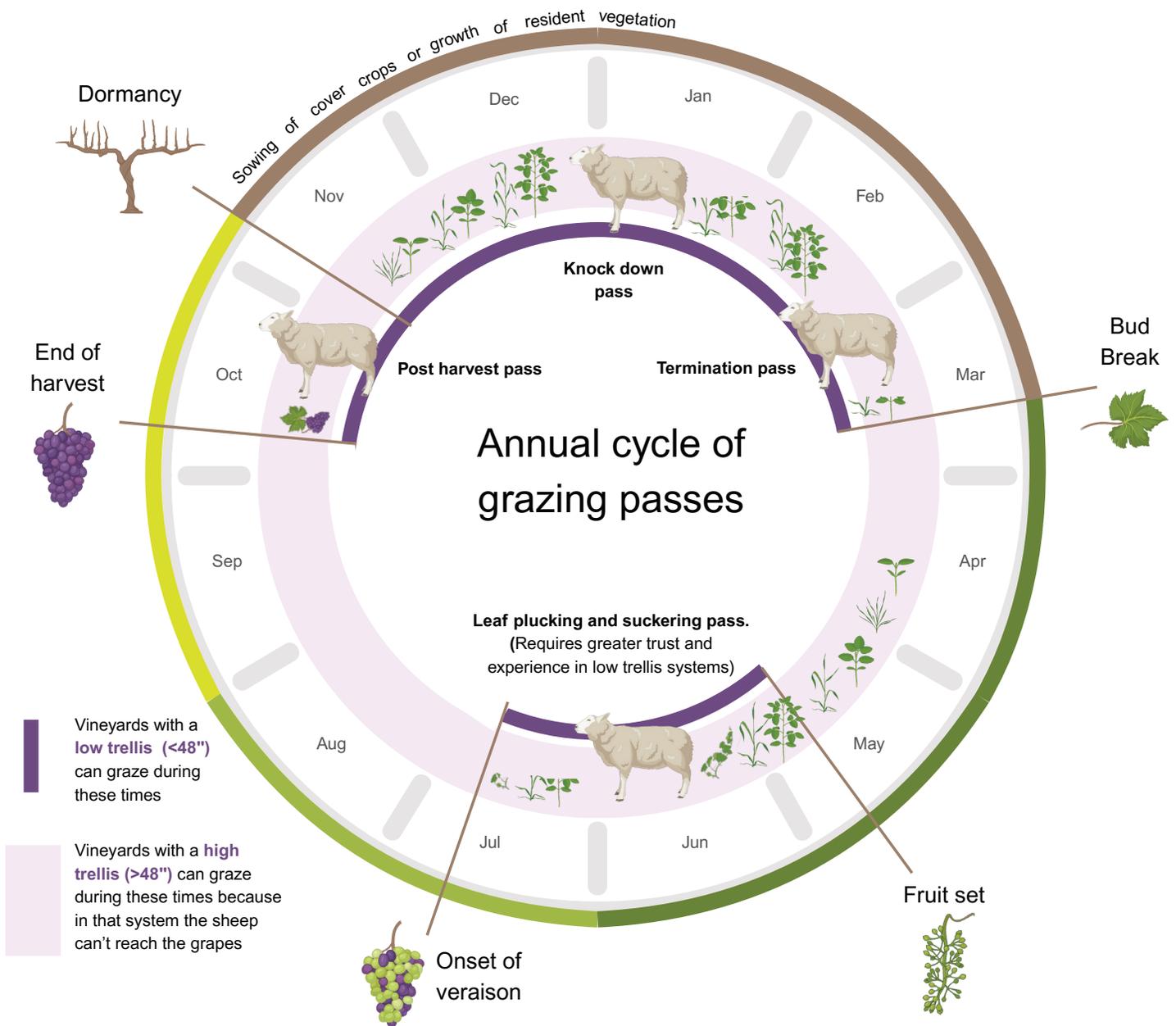
Integrated Crop-Livestock



urine and feces that grazers leave behind provides nutrient-rich food for microbes, enhancing nutrient cycling/availability. applications of these inputs have been found to increase soil organic matter.

STUDIES SHOW...

Vineyards implementing grazing practices have significantly more soil carbon, and nitrogen than vineyards that do not graze. (Sustainability outcomes of integrated sheep vineyards systems). Further, in vineyards with grazing, the organic portion of the nitrogen is in a more readily available form. Annual gains for plant-available nitrogen were 1.1 lbs per acre per year, translating over a decade to an additional 11 lbs per acre of plant-available nitrogen. The vineyards with grazing also have larger and more active microbial communities which make the nitrogen more available to the vines. On both certified organic and conventional vineyards, the amount of soil carbon and nitrogen in the top 12 inches of soil increases with each additional year of grazing. Stacking grazing with other regenerative practices, such as no-till in the tractor row, maintaining permanent ground cover, and using organic amendments further improves vineyard soil health metrics. Finally, sheep grazing has been found to have no adverse impacts on soil compaction, water infiltration, soil pH, soil salinity, grapevine health, vine yield or berry quality (Fenster 2024). *Graphic above by Jessica Chiartas*



A CIRCULAR TIMELINE OF GRAZING PASSES AND CORRESPONDING VINEYARD EVENTS. GRAZING PASSES DURING DORMANCY AND POST HARVEST ARE MOST POPULAR AS THERE IS MINIMAL RISK OF DAMAGE TO THE VINES OR GRAPES. GRAZING PASSES DURING THE GROWING SEASON OF THE VINES ARE TYPICALLY DONE IN HIGH TRELLIS SYSTEMS OR POST FRUIT SET, PRE-VERAISON IN LOW TRELLIS SYSTEMS (SEE DEEPENING SYNERGIES SECTION BELOW).

PRESCRIBED GRAZING

Prescribed grazing attempts to mimic natural grazing systems. Altering the amount of time and intensity (number of sheep compared to paddock size) of grazing can drive shifts in the plant community, soil health metrics and/or productivity. You can work with your grazer to create a grazing plan which takes into consideration: your ecological and economic goals, the size of the paddocks, the size of the flock and the amount of available forage (resident vegetation or cover crops).

Through the act of grazing, animals actually stimulate the plants they nibble on to shed some of their root fibers. Underground, the plants are looking for more nutrients needed to regrow. This kind of intentional and metered grazing can, in turn, increase root growth, microbial biomass and activity in the soil. It's a delicate balance to strike, and timing is everything.

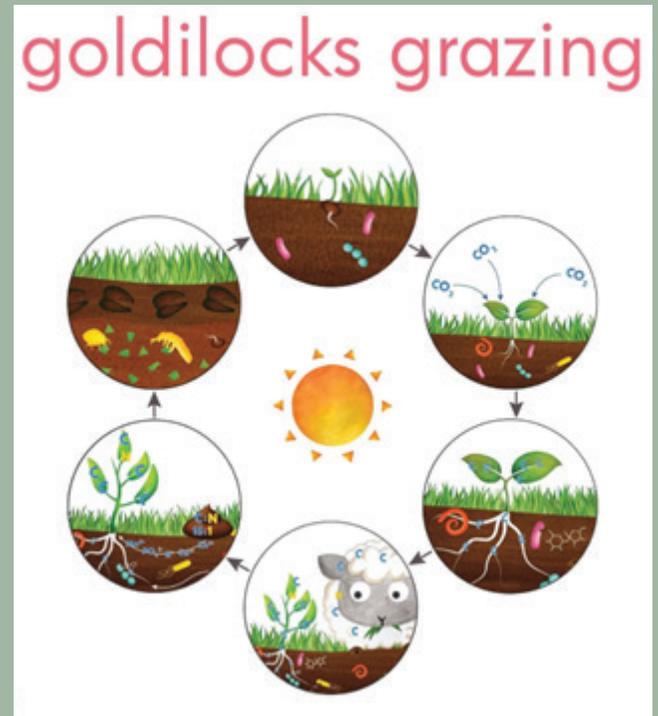


ILLUSTRATION BY JESSICA CHIARTAS, SOILLIFE.ORG

GRAZING STRATEGIES

- Post-harvest grazing allows the sheep to eat any remaining fruit, leaves and weeds before spraying pre-emergent herbicide (resulting in greater efficacy) and/or sowing cover crop seed.
- If you are looking to stimulate root growth in cover crops, you can bring sheep in mid winter for a quick pass. Keep in mind this will result in a "shaggy" appearance on the vineyard floor, but the soil health benefits are great!
- To terminate cover crop or knock back resident vegetation, sheep are brought in as late as possible before bud break.

MANAGEMENT MODIFICATION STRATEGIES

Some managers utilizing sheep have chosen to alter their management strategy. They are able to reduce mowing/tillage and/or reduce herbicide use which maximizes their labor and input savings. This all depends on the larger goals and needs of the manager.

BIODIVERSITY

Biodiverse environments are often more resilient in the face of challenges such as pest pressure, nutrient deficiency and drought.

Grazing animals in a targeted manner has been observed to:

- alter the plant species present in a given area
- increase legumes and perennial grasses on the vineyard floor
- increase microbial activity and populations in the soil.

Additionally, managers even commented on the effects this can have at a larger community scale, noting that biodiversity is not limited to the plant and microbial populations present, but also includes people and the larger ecosystem we are part of.

“Biodiversity for the sake of resiliency has just always been part of what we do and how we think.”

Aron Weinkauf, Vineyard Manager and Winemaker, Spottswode

“Sheep offer multiple benefits: their droppings, rich in microflora, enrich the vineyard soil, while their hooves naturally aerate it. Additionally, as they graze on cover crops, the forage releases root exudates, which, in turn, boost soil microbiology.”

Guillermo Perez, Vineyard Manager Stag’s Leap

“It’s about really having a reciprocal relationship with your land and your community. The community is larger than just the human community. It’s the animals that live there, the plants, soil, microorganisms, it’s the whole picture.”

Kristin Belair, Director of Winegrowing & Sustainability, Honig Vineyard and Winery



SUMMER GRAZING AT PAICINES RANCH

PHOTO BY K. MULVILLE

HOW TO GET STARTED

Before bringing sheep onto your vineyard, you will need to consider some basic questions in order to ensure you have the best outcomes. Remember that every site has its own context (soil type, slope, trellis type, average rainfall, management goals, etc.) and these are just basic guidelines to get a conversation started with graziers.

DETERMINE YOUR GOALS AND CAPACITY

What are your vegetation management goals? This will determine when you introduce the sheep and for how long, or if they will return for more than one pass.

What other goals might you consider which would make this practice more worthwhile?

- Economic benefits - can you save money on tractor passes/labor/herbicide?
- Are there additional soil health benefits you want to target?
- Can this help facilitate a long-term shift in management practices over time, i.e., reducing tillage or herbicide application?

Is the vineyard easily accessible to a truck with a livestock trailer (consider turning radius, road access in wet conditions, etc.)?

How much land will you want the sheep to graze?

- Are your vineyards separate or on a contiguous land holding (transportation of animals is often the most expensive component)?
- Do you have any neighbors who would also like to graze their vineyard? See Working with Neighbors section below.

Do you have a staff member who can dedicate time to coordinating a grazing project?

Is your vineyard well established? If vines are less than 4 years old, they should be well protected from sheep.

Is there potable water and shade access for sheep?

Are you open to a shepherd living on the property and/or a guardian dog being on site?



ELECTRIC FENCING IS USED TO CREATE PADDOCKS AND KEEP SHEEP SAFE FROM PREDATORS.

PHOTO BY C. HAMILTON

"I always try to ask the vineyard managers or the owners 'what are your goals with this?' because for some people it's financial, some people it's ecological. Some people it's producing a better fruit crop. Some people it's mitigating labor shortages or labor needs. Some people it's frost prevention. Some people want to go no-till or go organic. So it's all kind of different."

Christian Cain, Founder,
Perennial Grazing, LLC

WORKING WITH A CONTRACT GRAZIER



**SHEEP UNLOADING FROM TRAILERS, SHOWING THE AMOUNT OF SPACE NEEDED FOR LIVESTOCK TRANSPORT.
PHOTO BY J. IRWIN**

Once you have determined that adding sheep to your operation is feasible, you will want to reach out to contract graziers to seek out a good partnership (see Resources section below). It is recommended that you start with an experienced grazing operation before looking into owning your own flock, allowing you to see if the practice fits into your management style and goals with minimal risk. The earlier you reach out to a grazer the better, allowing as much time as possible to plan for the season ahead.

Open, trusting communication between the vineyard manager and the hired grazing operation is the key to success. It's important that you feel very comfortable calling each other at any time about any concern in order to make the contract run smoothly, ideally having one person on your team be the main point of contact.

“It’s not a romantic experience. You really have to think things through and communicate. But in my experience, there’s never enough communication.”

Guillermo Perez, Vineyard Manager,
Stag’s Leap Vineyards

HEALTH & SAFETY CONSIDERATIONS

- **Copper is toxic to sheep and can result in death, so always consider where and when you are spraying if animals are around.**
- There is little research on a safe re-entry window for livestock after the application of herbicides or fungicides. Vineyard managers defer to the safe re-entry period for humans, but always check with your grazer to make an informed decision.
- A block or paddock should be allowed to rest for 4-6 weeks between grazing events in order to keep the parasite/worm load of the sheep at a minimum.
- Prunings can be hazardous to sheep so it is helpful to have prunings only in every other row if possible.
- Sheep have the potential to bring in weed seed or pests such as mites. Sheep that are freshly shorn or treated may have a decreased pest load. None of the managers interviewed for this project noted an increase in weed or pest pressure after using sheep.
- Sheep can fall prey to various predators (domestic dogs, coyotes, mountain lions, etc). Graziers will often use electric fencing to contain sheep, as well as guardian dogs to protect them.
- Guardian dogs are working animals that should not be interacting with tasting room customers, or their pets. Be sure your crew and staff are aware of the flock's whereabouts and who to contact if animals get out of fencing. Guardian dogs bark often at night as they work to protect the flock.
- If you are producing grape juice, fresh grapes, raisins or any other fresh product, Food Safety Modernization Act (FSMA) regulations prohibit grazing 90-120 days before harvest. This is not applicable to wine grapes.
- After grazing sheep in the winter months, light disking might be required to even out the ground to ensure workers, both on tractors and on foot, are safe.



GUARDIAN DOGS AND ELECTRIC FENCING ARE NECESSARY FOR LIVESTOCK SAFETY.

PHOTO BY S. BATES

DEEPENING SYNERGIES

Practices listed below are not very common in all regions of California due to financial, geographic and seasonal constraints. However, they do provide a wide variety of opportunities for successful management.



WORKING WITH NEIGHBORS CAN REDUCE THE NEED FOR TRAILER TRANSPORT, THEREBY LOWERING COST PER ACRE.

PHOTO BY J. IRWIN

WORKING WITH NEIGHBORS

The biggest expense folded into a grazing contract is transporting the animals. If, instead, the sheep are moved on foot from one property to another, the per acre fee of grazing can be significantly reduced. The partnership between neighbors allows grazing of border vegetation in between vineyards, and is effective in controlling wildfire fuel loads. Coordinating with your neighbors to both increase the acreage being grazed and reduce the need for transport can lower your costs, and can also strengthen the community's resilience. Generating the interest of your neighbors may make grazing more economically feasible for the community and the grazer.

“The biggest expense with sheep grazing is moving them around, so if you can have a community partnership, then it makes it very economically feasible.”

Kristin Belair,
Director of Winegrowing & Sustainability,
Honig Vineyard and Winery

HIGH TRELLIS VINEYARD DESIGN FOR YEAR-ROUND GRAZING

Growers are starting to design new vineyards, or transitioning current vineyards, to higher trellising systems. The reasons for high wire trellis systems include: reduced installation costs, allowing for year round grazing, reducing frost damage and **heat stress** to the vines, reduced water usage, and greater potential for mechanical harvesting. If you are able to design a vineyard with the intention of integrating sheep for undervine management, a fruiting wire at a height of 48-60" is recommended to protect the fruitful shoots and grapes.

While some operations graze year round in a single high wire system, it is important to note that this allows for foliage from the vines to hang down into the feeding zone of the sheep. To prevent sheep from reaching this foliage, additional lateral wires that extend horizontally on either side of the

trellis (V trellis as seen in the photo from Paicines Ranch on page 19) can be installed to train vine shoots up and out. A drip line at trellis height is recommended to minimize sheep damage to the irrigation system, while allowing the sheep to freely move between rows.

“We’re trying for the goal of going no herbicide on 300 acres. Four grazing passes a year is the target on all the plots. And those are highwire vineyards specifically, so that’s why we can do that there.”

Maria Zumkeller, Technical Vineyard Manager, LangeTwins Family Winery and Vineyards



SHEEP GRAZING IN SINGLE WIRE, HIGH TRELLIS SYSTEM AT LANGE TWINS IN JULY. NOTE THAT SOME OF THE SHOOTS ARE STRIPPED SINCE THE SHEEP CAN REACH THEM. PHOTO BY E. ROBELOT



**HIGH WIRE V-TRELLIS SYSTEM WITH HIGH IRRIGATION AT PAICINES RANCH ALLOWS FOR SHEEP TO MOVE EASILY BETWEEN ROWS.
PHOTO BY L. AGUILAR**

A higher trellis system can maximize the amount of time that sheep are in the vineyard, resulting in greater soil health improvements. Selecting a breed of sheep that is small statured (such as Babydoll) or cannot stand on its hind legs (Danish Shropshire) can also put fruitful shoots and grapes outside the sheep's reach, extending the time that sheep can be in the vineyard. Grazing year-round can dramatically decrease, if not eliminate, the need for herbicide applications and tractor passes associated with mowing, discing, and tillage.

Note: Some other systems can also be mechanically harvested, and growers could transition existing vineyards to these high wire systems over time (~18 months).

“Having utilized a high wire V trellis (Watson) in all of our plantings we have successfully eliminated the need for most mowing, suckering, shoot tipping and ground applied fertilizers while steadily increasing soil and vine health, biodiversity, and resilience to climate change. Fighting nature costs a lot more than working with her. Our tractors are getting bored.”

Kelly Mulville, Vineyard Director, Paicines Ranch

CASE STUDY



HIGH TRELLIS AT LANGE TWINS VINEYARD IN LODI ALLOWS FOR SUMMER GRAZING. PHOTO BY T. FENSTER

San Joaquin County, Year-round grazing:

This 1500 acre vineyard is not certified organic but is committed to building ecosystem health and biodiversity while reducing off-farm inputs. On 350 acres, they installed a high wire trellis system (60-65 inches) where they aim to stack sustainable practices by going herbicide-free and grazing 4 times throughout the year. The first grazing pass occurs post harvest, at the end of November, two weeks after they applied post harvest fertilizer.

The second pass is mid-March, the third, early June and the fourth in late August. In winter the sheep ate the cover crop, and in summer they ate weeds and some leaves on the lower half of the shoots.

In addition to high trellising, the vineyard is able to incorporate sheep year-round due to their unique relationship with their grazer. They partner with a grazer who they pay on a monthly, per-acre basis. This grazer is able to adjust their flock size according to the needs of the vineyard so that they can provide enough sheep at the right times. The target flock size for the 350 acre vineyard is 1300 of the grazer's Dorper sheep. The paddocks range from 12-20 acres, with 15 acres being ideal. The sheep stay in the paddocks for 3-4 days. During spring, when the vineyard frequently sprays sulfur, they give notice to the grazer to move the sheep and they wait 7 days before reintroducing the sheep into the vineyard.

LEAF PLUCKING

Leaf plucking with sheep can provide multiple benefits, including improved canopy aeration, reduced vigor, and decreased insect and disease pressure, while also lowering labor costs compared to human crews. Sheep are often gentler and more effective at removing leaves deep in the canopy, and they also remove pests present on leaves. To safely and effectively use sheep for this purpose, timing and management are critical: they should be introduced after fruit set and removed before the first signs of veraison. Because copper is toxic to sheep, vineyards must ensure they are not exposed to it. Different grape varieties should be fenced separately, as sheep may show preferences, and trellis height should not exceed 42 inches for them to reach the canopy. Some operations allow sheep only a few hours per day to control their browsing, and while inexperienced sheep may begin slowly, they adapt quickly. Care must be taken not to over-pluck, as excessive canopy removal can cause berry sunburn, though sheep sometimes naturally pluck more heavily on the cooler north side and leave more cover on the sunny south side, which can be advantageous. Ultimately, this practice requires close collaboration and trust with an experienced grazer to execute successfully.

OWNING A FLOCK

Keeping sheep alive and healthy is no small feat. Before purchasing a flock of sheep, you will need to train staff or hire someone with adequate livestock experience. This is often more practical on small acreage since the per acre fee of a contract grazer will be higher.

Potential additional costs include:

- Shelter/shade
- Supplemental feed (especially when sheep are breeding, lambing or lactating)
- Fencing (portable electric and/or hard fencing)
- Reliable water source
- Guardian animals
- Shearing (unless you purchase hair sheep)
- Wellness care - vaccinations, hoof trimming, antibiotics, etc.

Possible additional revenue:

- Sheep sales or rentals
- Wool
- Meat

“When they’re in here during the growing season, there’s a lot of bugs that are on the basal leaves that haven’t moved up into the canopy. So when you remove those basal leaves with sheep, it exposes the fruit, but it also removes nymphs and eggs. They can definitely control the pest population. So it may mean one less (pesticide) spray during the growing season, and I’m really okay with that.”

Tim Griffin, Vineyard Manager Shannon Ridge



PHOTO BY E. ROBELOT

“It takes a shift in skill set, takes a shift of infrastructure to support it. Obviously you’re dealing with living animals that need care 24/7. It’s a different way of thinking that you really have to embrace. So it was something that we’ve kind of developed a little bit more organically. We started with 10 sheep, and then expanded that to 15.”

Aron Weinkauf, Vineyard manager and Winemaker, Spottswoode Winery

TIPS FROM VETERAN PRACTITIONERS

- Reach out to early adopters for support - talk with neighbors or colleagues, attend field days, watch a few videos from growers that have used sheep before to learn as much as you can **before** diving in.
- **Start small** and be conservative - take a low-risk approach when first integrating sheep into your operation. If it is economically feasible, start on a portion of your land rather than the total acreage, so you can learn and make mistakes in a controlled environment. You could remove sheep from the vineyard on the early side until you feel comfortable with the shepherd in managing them around budbreak.
- Be sure to have a back up plan and be ready to implement it in case things don't go as planned. Have tractors/implements and human labor at the ready as you normally would since you never know how things will go.
- Be clear and realistic - get clear on your goals, your budget, what you can expect from your grazier, and what they will expect from you.
- Keep good records - this is the best way to learn from year to year and assess if this practice is good for your operation. When did the sheep arrive? How long were they there? Did you reduce any tractor work/labor costs/inputs?
- Be ready to make irrigation repairs - the most common damage that occurs from grazing in vineyards is to irrigation systems. Sheep like to rub on things when they are itchy and can cause emitters to pop off or hoses to detach. Depending on how high your irrigation is, they may try to jump over it, etc. You should be prepared to check for damage after they leave. Consider placing irrigation at ground level or, in high trellis systems, at trellis height, to minimize damage.
- In order to avoid compaction, which is negligible when sheep are properly managed, move sheep regularly and don't graze in very wet soil.
- Start this practice in well-established vineyards since sheep can cause damage to vines less than 4 years old.
- Consider developing community partnerships - this might save you money, time and resources.



DRIP INSTALLED ON SOIL SURFACE TO DECREASE DAMAGE FROM SHEEP.

PHOTO BY L. AGUILAR

RESOURCES

GRAZING OPERATIONS

California Wool Growers Association Targeted Grazing Directory

Kaos Sheep Outfit - jaimeikaos@gmail.com
Lake, Napa, Mendocino, Sonoma and surrounding counties

Perennial Grazing - perennialgrazing@gmail.com
Napa, Sonoma and surrounding counties

Pilot Creek Ranch - Mark Gutierrez, pilotcreekranch@gmail.com, (559) 300-7160
Napa, Sonoma, Sacramento, Placer, El Dorado, Amador, Yolo, Nevada, Yuba counties

Napa Vineyard Sheep Grazing - Chris Maschauer, (707) 294-1935
Napa County

Napa Pasture Protein - Cori Carlson, cori@napapastureprotein.com
Napa and Sonoma counties

Jeremy Shepard "Farmer Shep" - farmershep@gmail.com
Yolo/Solano counties

Capella Grazing (Full Circle Wool) - Marie Hoff, admin@fullcirclewool.com
Napa county

F Ewe Sheep Company - Frankie Arburua III, (209) 373 -6868
San Joaquin, Stanislaus, Solano and Sacramento counties

Hamilton Brothers - rsham@citlink.net
Solano and San Joaquin counties

Kaleb Thomas - BTV grazing - btvgrazingco@gmail.com, (559) 612-6626
Fresno and Stanislaus Counties

COMMUNITY GRAZING COOPERATIVE DEVELOPMENT SERVICES

Sarah Keiser, Wild Oat Hollow - sarah.keiser@wildoathollow.com

RESOURCES

OPPORTUNITIES TO LEARN MORE / REFERENCES

Silvopasture in Vineyards - USDA Forest Service, National Agroforestry Center (2025)

Effectively Managing Sheep in Vineyards - Video from Paicines Ranch (2022)

Sheep in the Vineyard! - Leaf Pulling - Video from Shannon Ridge Vineyard (2011)

Designing a Vineyard for Year-Round Sheep Grazing - Podcast about Paicines Ranch Design (n.d.)

Sheep in Grapes Workshop (video) - Napa RCD, Fibershed, UCCE-Sonoma, and CAFF (2020)

Sheep Grazing Services Offer a Sustainable Management Tool For Lodi Vineyards - Lodi Wine Growers Ted Rieger (2022)

A guide to using sheep for leaf-plucking in the vineyard - Hawke's Bay Winegrowers Inc. (2010)

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Pennyroyal Case Study - CAFF

Grazing Sheep in Vineyards - Land and Livestock, K. Mulville (2009)

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Cover Crop Decision Guide for Perennial Systems - CAFF

Leveraging Campus Landscapes for Public Health: A Pilot Study to Understand the Psychological Effects of Urban Sheep Grazing on College Campuses A Haven Kiers, Kelly M. Nishimura, Carolyn S.Dewa, UC Davis (2023)

Long-term integrated crop-livestock grazing stimulates soil ecosystem carbon flux, increasing subsoil carbon storage in California perennial agroecosystems - K.Brewer, et al.

FUNDING OPPORTUNITIES

Cover crops:

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