



A Soil Health Farmer Profile

Mark Lyon, Lyon Vineyard, Eco Terreno Wines and Vineyards

The Transition to Regenerative Agriculture

Mark Lyon has been growing wine grapes in the Alexander Valley of northern Sonoma County for 40 years. In 1980, he established Lyon Vineyard, consisting of 92 acres, near the town of Cloverdale. The flat land and loamy alluvial soils along the Russian River, along with the warm climate, are well-suited for wine grape production. At that time, and for many decades, Mark also served as a winemaker for Sebastiani Winery.



practices on all his vineyards to build soil health.

He gained knowledge by engaging with expert consultants and others with experience in organics and biodynamics. He changed his farming philosophy and began to emphasize grape quality as a goal towards making better quality wines.

Mark also dramatically changed his soil management practices. For instance, he seeded a broad diversity

of cover crops between the vine rows on all 92 acres, and he adjusted the crop mixes to the soil features in different vineyard blocks.

In the past, Eco Terreno farmed conventionally, using standard chemical inputs and practices for managing soils, pests, and weeds. They usually sold the grapes to local wineries at average regional prices. Although yields remained steady, the vineyard faced significant challenges over time, including persistent vine diseases and viruses, and degraded soils from continual tilling. At the same time, the costs of fertility and pest management inputs rose steadily.

In April 2012, Mark visited wineries in France, and he was impressed with the wines' quality and flavors. These vineyards were managed using healthy soils practices, such as nutrient management, conservation cover, mulching, and composting. Mark became inspired by the vineyards' healthy conditions.

Those tours motivated him to make a major conversion when he returned to California. In 2013, he began implementing healthy soils

He also replaced synthetic fertilizer with compost to improve soil health. The vineyard's compost is made from a mixture of manure, pomace (leftover grape skins, seeds, and stems) and plant residues. He began incorporating biodynamic preparations in 2015, which enhance soil microbiological activity. Recently, Mark started using vermicompost tea as a soil amendment on some blocks.

Mark says "they were tilling the soil to death" prior to 2013, which was excessive for producing quality grapes. He purchased a roller machine to crimp the cover crops in 2018, rather than mowing or tilling, and is aiming for no-till in the future. To manage weeds under the vines, he discontinued herbicides, and instead uses a combination of under-vine mowing, manual labor, and occasional under-vine cultivation. Mark said he has "weaned the grape vines from chemical input. It's like junk food for plants."

Key Facts

COUNTY: Sonoma, California

WATERSHED: Russian River

CROPS: Wine grapes, olives, mixed fruits, and vegetables

FARM SIZE: 92 acres of wine grapes

SOILS: Cortina and Yolo loam soils on level land

SOIL HEALTH PRACTICES: Nutrient management, conservation cover, mulching, compost application

American Farmland Trust's **BAY AREA FOOD AND FARMING PROGRAM** supports research and on the ground programs that assist in the protection of the Bay Area's diverse farms and ranches. This soil health grower profile highlights regenerative agricultural practices that improve the environment and the grower's economic bottom line.

Stewardship and Cost Savings

Since Eco Terreno has adopted healthy soils practices, they have experienced major benefits for the soil, vineyard, grapes, and ecosystem. The soil improvements include increased organic matter, better tilth, greater friability and water retention, less compaction, decreased sediment loss dust in the air. The vineyard has less disease than before, as the vine health has improved overall, and there is a better

balance between the amount of fruit produced and vine canopy.

Although changes have required new capital expenses for different machinery and some changes in labor practices as well, the elimination of chemical fertilizers, insecticides, and herbicides saved input costs. The fuel and labor for those tasks have been eliminated. Furthermore, the reduction in tillage saved significant costs.

As a result of the improved water retention, the vineyard is using approximately 40% less water. This improves water resilience, avoids aquifer depletion, adapts to climate change, and mitigates aggravating water scarcity in California. It also results in lower fuel costs for groundwater pumping. In addition to water savings, the cover crops, along with other organic and biodynamic methods, have increased the population of the vineyard’s beneficial insects.

BENEFIT & COST ANALYSIS T-CHART

ECO TERRENO WINES AND VINEYARDS	
Cloverdale, Sonoma County, CA	
2019	

SOIL HEALTH PRACTICES	
Nutrient Management—began in 2014	
Conservation Cover—began in 2014	
Mulching of Prunings—began in 2014	
Compost Application—began in 2014	

POSITIVE EFFECTS	
REDUCED COSTS	\$/AC/YR
Decreased machinery costs for applying gypsum • Eliminated gypsum hauling and application costs as a result of Nutrient Management.	\$80
Decreased Fertilizer Usage • Eliminated applications of Synthetic NPK, gypsum and potash as a result of Compost applications	\$350
Decreased Insecticide Usage • Eliminated synthetic insecticides as a result of benefits from Conservation Cover	\$55
Decreased Herbicide Usage • Eliminated herbicides due to weed suppression by Conservation Cover	\$82
Decreased Fungicide Usage • Reduced fungicides as a result of combined practices	\$90
Reduced machinery and labor for insect and disease control	\$120
Reduced machinery and labor for weed control	\$120
Reduction in tillage	\$280
Reduction in water use by 40% • As a result of improved water retention due to combined benefits of Conservation Cover and Compost Application	\$91
Total Reduced Costs = \$1,228/ac/yr	\$1,268

INCREASED REVENUE	
Increase in winegrape sales value • 20% increase in price as a result of improved fruit quality • 7% decrease in yield as a result of deliberate vine management	\$1,231
Total Dollar Benefits = \$2,499/ac/yr	\$2,499

RESOURCE CONCERNS/BENCHMARK CONDITION	
92 acres of winegrapes established in 1980	
Sustainably farmed with biodynamic techniques	
Resource concerns include soil organic matter depletion, soil tilth, vine health, water retention, and compaction	

NEGATIVE EFFECTS	
INCREASED COSTS	\$/AC/YR
Education and Learning activities • Seminars and conferences	\$12
Cover Crop costs • Purchase of Varislice Overseeder planter, \$11,700, 10 year amortization, \$16/ac/yr • Initial establishment, seed cost prorated 5 years, \$58/ac • Machinery and labor for establishment, prorated 5 years, \$8/ac • Annual planting—10% of vineyard rows, seeds, \$20/ac/yr • Annual planting machinery and labor, \$4/ac/yr • CC maintenance—crimp/roller machinery and labor, \$17/ac • Purchase of roller crimper \$6,600 offset by sale of mower	\$123
Compost and application • Composted cow manure with pomace and vermicompost teas applied 1x/yr • Compost, pomace, and teas, \$450/ac • Hauling and spreading, \$119/ac	\$569

Total Dollar Costs = \$704/ac/yr	\$704
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\$2,499/ac/yr Total Benefits - \$704/ac/yr Total costs = \$1,795/ac/yr Net Benefits
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The water quality benefit due to Mark's regenerative farming practices was calculated using USDA's Nutrient Tracking Tool, which found a 32% reduction in nitrogen losses and a 52% reduction in sediment losses, when compared to 2013 when the vineyard was conventionally farmed. USDA's COMET-Planner tool showed a reduction in greenhouse gas emissions and the sequestering of carbon equivalent to that of 760 acres of U.S. forests per year, which directly resulted from adopting regenerative farming practices.

An additional vital benefit is the *quality* of Eco Terreno's grapes and wines made from these grapes. This improvement resulted in significantly higher prices per ton for the grapes purchased by wineries—approximately 20% more in 2019 than in 2013. Eco Terreno now emphasizes quality over quantity and *deliberately* limits yields compared to 2013. This improves grape quality by concentrating sugars and by reducing undesirable flavors that occur with excessive vigor.

At the same time, the vineyard is receiving higher prices and accolades for the wines made from these grapes. A cost-benefit analysis shows a net gain of \$1,795 per acre as a result of implementing the soil health practices.

Final Thoughts

Mark Lyon's expertise as a winemaker has led him to appreciate the value of biologically based soil practices for the health of his vineyard. He especially likes the quality of wines made from these healthy grapes, and the higher prices received for his product.

As Mark explains, "The changes we made are a long-term investment in the land."

He realizes that adopting all these healthy soils practices may not be easy for many producers. However, he strongly feels the practices are worthwhile. Mark believes more grape growers will eventually implement healthy soils practices and realize the significant and impactful advantages of these practices.

American Farmland Trust utilized the following technical tools to quantify the economic and environmental benefits of soil health practices implemented on the Lyon vineyard: NRCS' Level III T-Chart, USDA's Nutrient Tracking Tool, and USDA's COMET-Planner.

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