SOIL HEALTH BOTTOM LINE PROGRAM

MAY 2021

A Farmer Profile in Sustainability

James Bukovinsky, Hedges Family Estate

Introduction

James Bukovinsky manages the Bel Villa vineyard for the Hedges Family Estate in Benton County, Washington. As the farm and vineyard manager, James implements sustainable farming practices that improve soil health, such as cover cropping, compost application, minimum tillage, and nutrient management. Located in eastern Washington in the Red Mountain AVA, the land consists of silt loam soils on Red Mountain's slightly rolling hills at an elevation of 900 feet above sea level. The region is relatively dry and warm, and only receives 6 to 8 inches of rainfall per year.

The Hedges Family Estate, owned by Tom and Anne-Marie Hedges, was established in 1986. Tom planted his first vineyard in Bordeaux varietals on 50 acres. The Hedges have since expanded to 110 acres, and in 2009 they began implementing sustainable practices to improve soil health, vineyard management, and winemaking. Tom says, "We now have the only vineyards and winery on Red Mountain that are USDA certified organic, and Demeter certified biodynamic. I'm a passionate believer in 'terroir', and my goal is for our wines to express the distinct qualities of the soil and climate."

James joined the Hedges team in 2017 and began with a focus on the viticultural management of the Bel Villa vineyard, which consists of the Cabernet Sauvignon, Cabernet Franc, Syrah, and Merlot varietals. James is a native of the Seattle area and earned a degree in Environmental Science at the University of Idaho. Early in his career James worked in California's Napa Valley vineyards, which led to an interest in viticulture and sustainable farming techniques. James' philosophy towards low-input and natural farming techniques echoes that of the Hedges. To improve soil health and vine vigor, James began planting cover crop seeds and applying compost. He reduced tillage and implemented a nutrient management program. James says, "We are seeing multiple benefits over time. Soil organic matter has increased from 1.2% to 1.5% and we have reduced fertilizer applications as a result. I'm observing more beneficial insects and fewer weeds. We also have reduced the number of tractor passes and pesticide sprays."

Soil Health Practices and Challenges

For this profile, the practices of cover cropping, compost, minimum tillage, and nutrient management were assessed. James described the challenges of improving soil conditions in the Bel Villa vineyard. "Our soil is slightly alkaline, with a pH of 8.0, and our groundwater is slightly alkaline as well. As a result, nutrients bind to soil particles and are less available to the crop. In alkaline conditions, synthetic nitrogen fertilizers are not very efficient. After shifting to a cover cropping and compost program, I believe that there is better nutrient and balance in the soil and greater vine vigor. I also have reduced overall fertilizer

Key Facts

COUNTY: Benton, Washington

WATERSHED: Lower Yakima River

CROPS: Wine grapes

FARM SIZE: 110 acres

STUDY AREA: 40 Bel Villa Vineyard

SOILS: Warden silt loam

SOIL HEALTH PRACTICES: Cover cropping, compost application, nutrient management, and minimum tillage

American Farmland Trust aims to elevate the role of farmers and farmland to adapt to and mitigate the effects of climate change. From policy and training to on-the-ground demonstration projects, we are working to scale up the adoption of climate-smart agriculture practices and ensure a resilient future for the land that sustains us. Our **SOIL HEALTH BOTTOM LINE** program supports on-farm research that showcases the economic and environmental benefits of using soil health practices.

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use." Other soil related challenges are erosion and compaction. However, James reports the soil health practices have led to improved soil stability, water infiltration and holding capacity, and less runoff.

The cover crop consists of a blend of winter rye and wheat, seeded annually in the fall at a rate of 25 pounds per acre. The seeds are planted every row in the alleys and rely on seasonal rainfall for germination and establishment. James mows once or twice during the growing season to allow for manual operations such as thinning and shoot positioning, as well as for tractor passes and harvest. Some grasses survive the season and become part of the vegetative cover the following year. James says, "I aim to maintain cover all year and build organic matter and biodiversity in the soil. We are seeing benefits to soil structure, aggregation, and more beneficial insects."

Compost is applied at a rate of 5 tons per acre and spread under the vine rows. The composted cow manure is certified organic and sourced locally. A lab analysis is taken to determine nutrient levels, identify any potential problems, and guide nutrient management. Biodynamic preparations, prepared on-site, are added to the compost before spreading.

James reduced the number of tillage passes in 2017. Historically, the vineyard was cultivated on a regular basis, primarily for weed control. To minimize soil disturbance and maintain soil biomass, James eliminated tillage in the alleyways and reduced the number of under-vine passes. James uses a new-generation ID David cultivator for the under-vine cultivation, which James describes as less disruptive to the soil surface. "I'd

BENEFIT & COST ANALYSIS T-CHART

JAMES BUKOVINSKY, HEDGES FAMILY ESTATE
Benton County, WA
May 2021

RESOURCE CONCERNS/BENCHMARK CONDITION
40 acre Bel Villa vineyard, Hedges Family Estate
Sustainably farmed, certified organic and biodynamic vineyard
Resource concerns include soil compaction, soil erosion, nutrient availability, and soil biodiversity and insect biodiversity

SOIL HEALTH PRACTICES
Cover crop seeding—began in 2017
Compost applications—began in 2017
Minimum tillage—began in 2017
Nutrient management—began in 2017

POSITIVE EFFECTS

REDUCED COSTS		$/AC/YR
Decreased fertilizers as a result of combined practices		$124
• Eliminated UN-32	$40/ac	
• Eliminated micronutrients blends	$56/ac	
• Eliminated potassium	$21/ac	
• Eliminated phosphorus	$7/ac	
Decreased tillage as a result of cover crops		$45
Reduced mowing passes as a result of cover crops		$40
Eliminated herbicides as a result of cover crops		$37
• Material	$25/ac	
• Application	$12/ac	
Decreased insecticide as a result of cover crops		$83
• Material	$68/ac	
• Application	$15/ac	
Decreased fungicides as a result of combined practices		$97
• Material	$82/ac	
• Application	15/ac	
Total Reduced Costs		**$426**

INCREASED REVENUE	
Increased net revenue from wine grapes attributable to soil health practices as a result	**$240**
Total Dollar Benefits = $666/ac/yr	**$666**

NEGATIVE EFFECTS

INCREASED COSTS		$/AC/YR
Fertilizer aplications as a result of nutrient management		$19
• 3-2-2 fertilizer blend		
Cover Crops		$40
• Seed	$6/ac	
• Planting & labor	$14/ac	
• Mowing	$20/ac	
Compost application		$195
• Compost sourced off-farm	$125/ac	
• Compost spreading	$40/ac	
• Lab analysis	$1/ac	
• Biodynamic preparations	$29/ac	
Total Increased Costs		**$254**

Total Dollar Costs = $254/ac/yr	**$254**

$666/ac/yr Total Benefits – $254/ac/yr Total Costs = $412/ac/yr Net Benefits

NRCS Level III T-Chart, Soil Quality Improvement • NRCS Economics Technical Note No.: TN.200.ECN-1

rather not cultivate at all, but we need some occasional weed control for tough weeds like Russian Thistle, and to keep vegetation from interfering with the drip irrigation emitters."

Nutrient management is integral to improve soil health. James uses annual soil sampling and regular petiole sampling to monitor fertility and guide nutrient management decisions. James reports that the combination of cover crops, compost, and applications of 3-2-2 fertilizer provides benefits to nutrient cycling or nutrient availability. He is able to meet the crop nutrient demands while reducing nitrogen fertilizers such as UAN-32.

Economic, Water Quality, and Climate Benefits

The Benefit & Cost Analysis T-Chart (shown on the previous page) captures the changes in costs from 2016 to 2020. It is a partial budget analysis that compares the associated soil health costs from the period before healthy soils adoption (2016) and the current period (2020).

On the left column of the T-Chart, "**Positive Effects**" refers to cost decreases or increased revenue. Under *"Reduced Costs,"* are the farming practices that generated lower costs when comparing 2020 with 2016 (before healthy soils adoption). Cost reductions in fertilizer, tillage, mowing, and pesticides occurred and are entered for a total of **$426** per acre. Under *"Increased Revenue"* is the increase in net income of **$240** per acre due to enhanced fruit-wine quality and higher prices attributed to soil health practices.

On the right column, "**Negative Effects**" or cost increases are shown. The transition to a 3-2-2 fertilizer blend represents a cost of $19 per acre, cover cropping costs are $40 per acre, and compost application equals $195 per acre. The total increased costs are **$254** per acre.

In total, the Hedges improved their bottom line by **$412** per acre, or **$16,480** for the 40-acre vineyard.

Water Quality and Carbon Sequestration

The USDA's Nutrient Tracking Tool (NTT) was used to calculate the water quality benefit due to the soil health practices. Soil and farm input data such as fertilizer, tillage, and cover crops were collected. The NTT found a 95.4% reduction in nitrogen losses and a 97.6% reduction in sediment losses, when comparing 2016 farm inputs with 2020 inputs. These values show a significant benefit to soil and water quality, documenting potential decrease in leaching, runoff, and soil erosion, and an improvement in nutrient availability.

USDA's COMET-Planner tool estimates carbon sequestration and the reduction in greenhouse gas emissions associated with sustainable farming practices. Farm data from cover cropping, nutrient management, tillage, mulching, soil type, and location were entered into the tool. COMET-Planner found a reduction in greenhouse gases and the sequestering of carbon equal to 33 metric tons CO_2-equivalent per year, equal to the carbon sequestered by 43 acres of forests grown in one year.

Closing Thoughts

Since 2016, the vineyard has seen improvements in soil health as documented by soil organic matter testing, hands-on field work, and observation. In the vineyard, James takes additional management steps to optimize fruit-wine quality through careful and intentional pruning, thinning, and cluster management. The results are evident with award-winning and ultra-premium wines produced by the Hedges Family Estate.

"I believe in minimal inputs, biodiversity, and allowing the natural environment to contribute to the wines," says James. "Improving soil health is key to our farming approach and we make an effort to farm as sustainably as possible. Overall, we have decreased our farming inputs and importantly, we have reduced our carbon footprint."

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