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

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.
James Bukovinsky, Hedges Family Estate

Benton County, WA

May 2021

SOIL HEALTH BOTTOM LINE PROGRAM

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**

<table>
<thead>
<tr>
<th>JAMES BUKOVINSKY, HEDGES FAMILY ESTATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benton County, WA</td>
</tr>
<tr>
<td>May 2021</td>
</tr>
</tbody>
</table>

### SOIL HEALTH PRACTICES

- Cover crop seeding—began in 2017
- Compost applications—began in 2017
- Minimum tillage—began in 2017
- Nutrient management—began in 2017

### 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

### POSITIVE EFFECTS

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

### NEGATIVE EFFECTS

<table>
<thead>
<tr>
<th>INCREASED COSTS</th>
<th>$/AC/YR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer applications as a result of nutrient management</td>
<td>$19</td>
</tr>
<tr>
<td>• 3-2-2 fertilizer blend</td>
<td></td>
</tr>
<tr>
<td>Cover Crops</td>
<td>$40</td>
</tr>
<tr>
<td>• Seed</td>
<td>$6/ac</td>
</tr>
<tr>
<td>• Planting &amp; labor</td>
<td>$14/ac</td>
</tr>
<tr>
<td>• Mowing</td>
<td>$20/ac</td>
</tr>
<tr>
<td>Compost application</td>
<td>$195</td>
</tr>
<tr>
<td>• Compost sourced off-farm</td>
<td>$125/ac</td>
</tr>
<tr>
<td>• Compost spreading</td>
<td>$40/ac</td>
</tr>
<tr>
<td>• Lab analysis</td>
<td>$1/ac</td>
</tr>
<tr>
<td>• Biodynamic preparations</td>
<td>$29/ac</td>
</tr>
<tr>
<td>Total Increased Costs</td>
<td>$254</td>
</tr>
</tbody>
</table>

### INCREASED REVENUE

<table>
<thead>
<tr>
<th>INCREASED REVENUE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased net revenue from wine grapes attributable to soil health practices as a result</td>
<td>$240</td>
</tr>
</tbody>
</table>

### TOTAL BENEFITS AND COSTS

- **Total Dollar Benefits** = $666/ac/yr
- **Total Dollar Costs** = $254/ac/yr
- **Net Benefits** = $412/ac/yr

$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 CO₂-
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.”

**Funding**

Funding for this analysis and grower
profile was provided by the National
Institute of Food and Agriculture, U.S.
Department of Agriculture, under award
number 2018-38640-28418 through
the Western Sustainable Agriculture
Research and Education program under
project number WPDP19-12. USDA
is an equal opportunity employer and
service provider. Any opinions, findings,
conclusions, or recommendations
expressed in this publication are those
of the author and do not necessarily
reflect the view of the U.S. Department
of Agriculture.

 Authored by Paul Lum, AFT California
Agricultural Specialist.