

Huichica Creek Sustainable Demonstration Vineyard

Carbon Farm Plan

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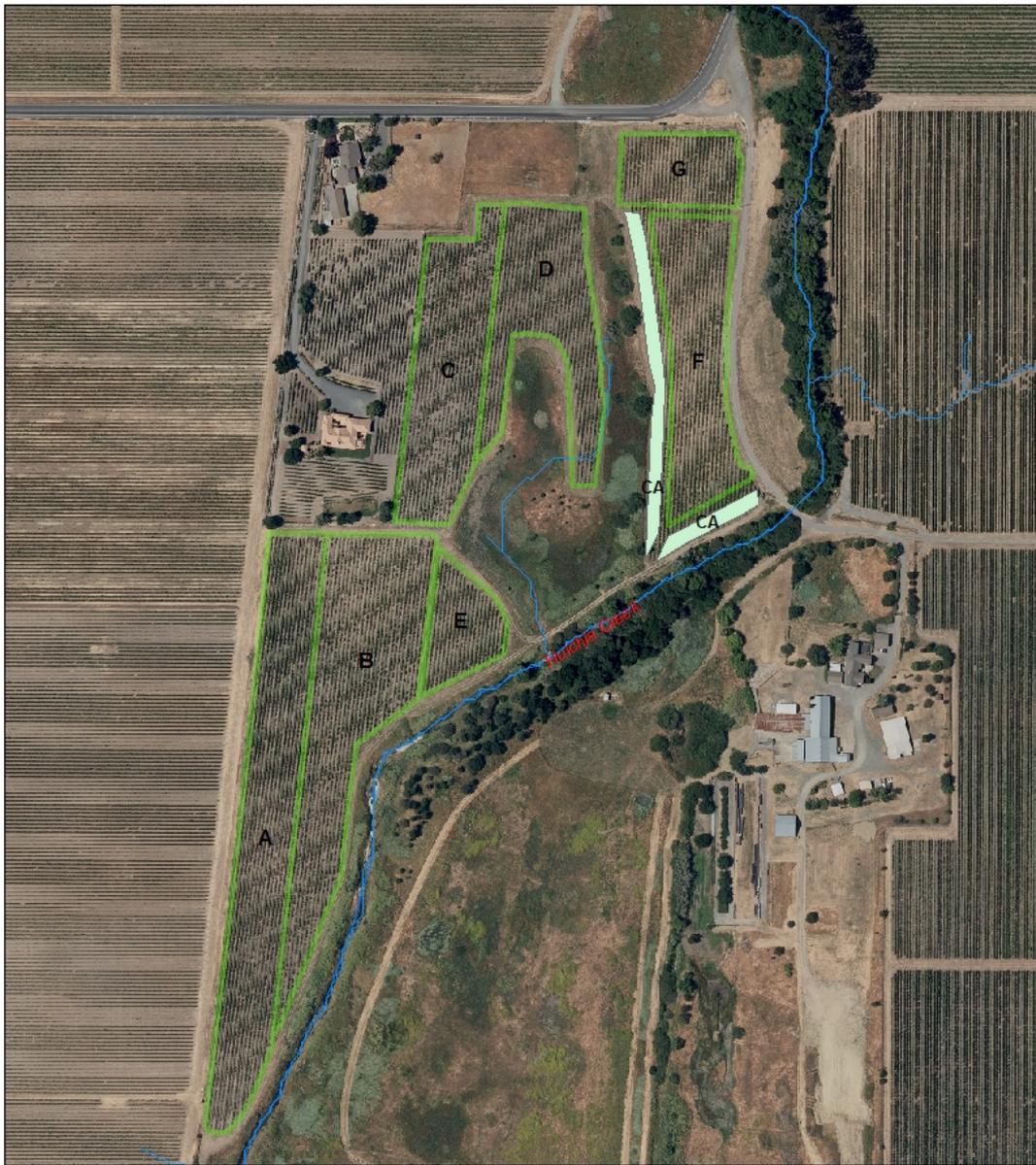
Carbon Cycle Institute



Huichica Creek Vineyard

- Owned and Managed by Napa County Resource Conservation District
- Carneros AVA of Napa County
- 21 acre property
 - 8 acres Chardonnay
 - 5.25 acres Pinot Noir
 - $\frac{3}{4}$ acre of antique cider apples
- 6 acres of riparian and wetland habitat
- 26 years of soil health, habitat restoration, and conservation resource management demonstration.

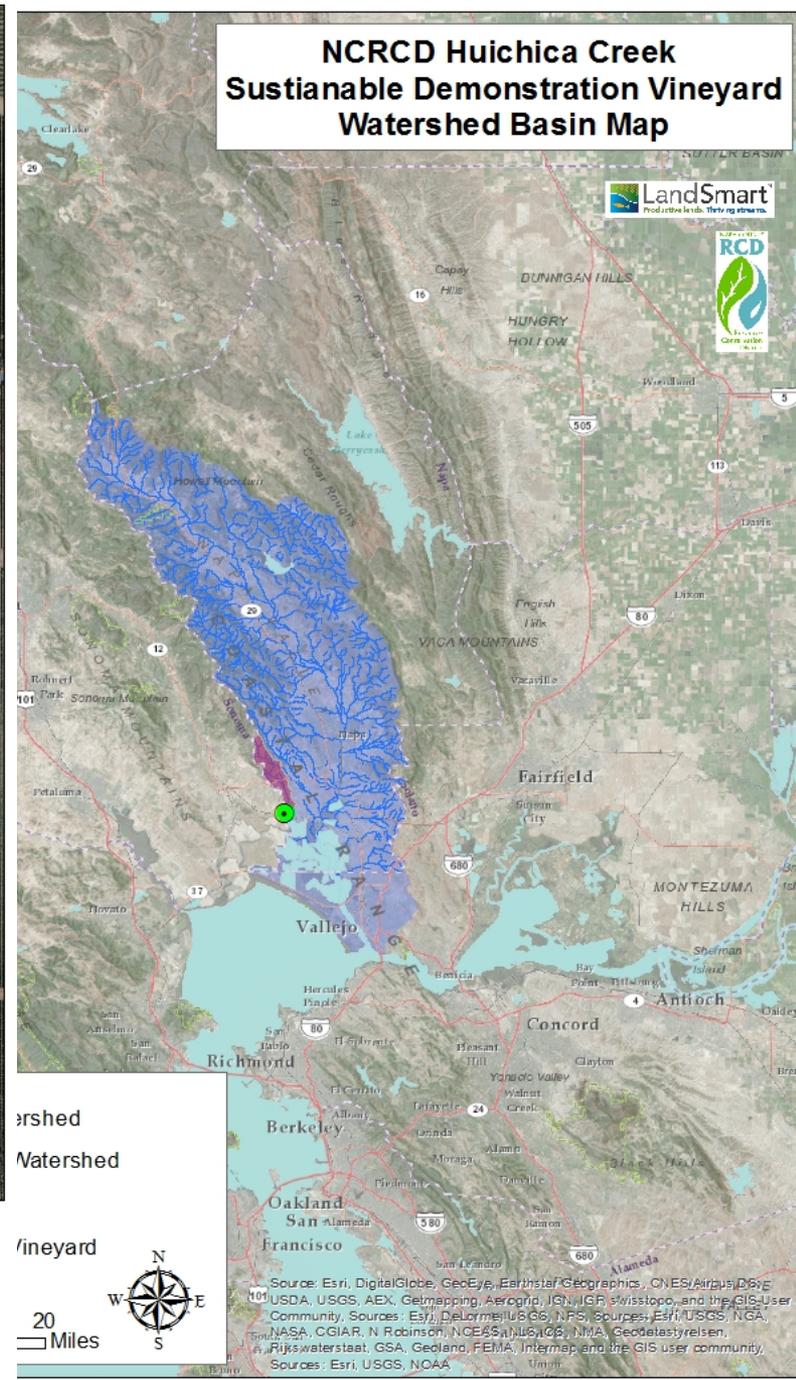




**Napa County RCD
Huichica Creek Sustainable Demonstration Vineyard**



0 250 500 1,000 Feet



Huichica Creek Sustainable Demonstration Vineyard Carbon Farm Plan



Huichica Creek Vineyard Farm Assessment



- Producer's objectives
- Producer's operations
- Producer's interest
- Producer's landscape



Huichica Creek Vineyard Farm Assessment

Objectives and Interests

- Further develop property and vineyard as a demonstration site for climate mitigation and drought resilient farming
- Enhance riparian and wetland vegetation and insectary habitat
- Improve grape yields to 4 ton/acre

Landscape

- Flood zone of Huichica Creek and seasonal wetland
- Riparian corridor



Soil

- Soil analysis
 - Haire Loam Soil – Silt loam to heavy Clay
 - Rooting depth = 40 inches
 - Topsoil % SOM
 - 2.29-4.81 % - Cover crop rows
 - 2.51-3.68 % - Under the vine (drip zone)
 - Salt build up in drip zone
 - ESP 6.8-8.4 %
- Opportunity to build Soil Organic Matter and Organic Carbon – **Yes!**



Farm Assessment

Opportunities to improve the following?

- Tillage Practices
- Cover Crop Productivity
- Grape Yields
- Habitat Enhancement

Opportunities to Sequester Carbon and Reduce GHG Emissions?

NRCS Conservation Practice Standards

CPS 329
Conventional Tillage
to No Tillage



CPS 391
Riparian Buffer



CPS 380/ 657
Wetland Restoration
Wind Break



Conservation Practices Standards



CPS 484 Compost/Mulch Application

CPS 327 Permanent Cover Crop Establishment



Conservation Practices Standards

CPS 379 Multistory
Cropping/ Diversifying

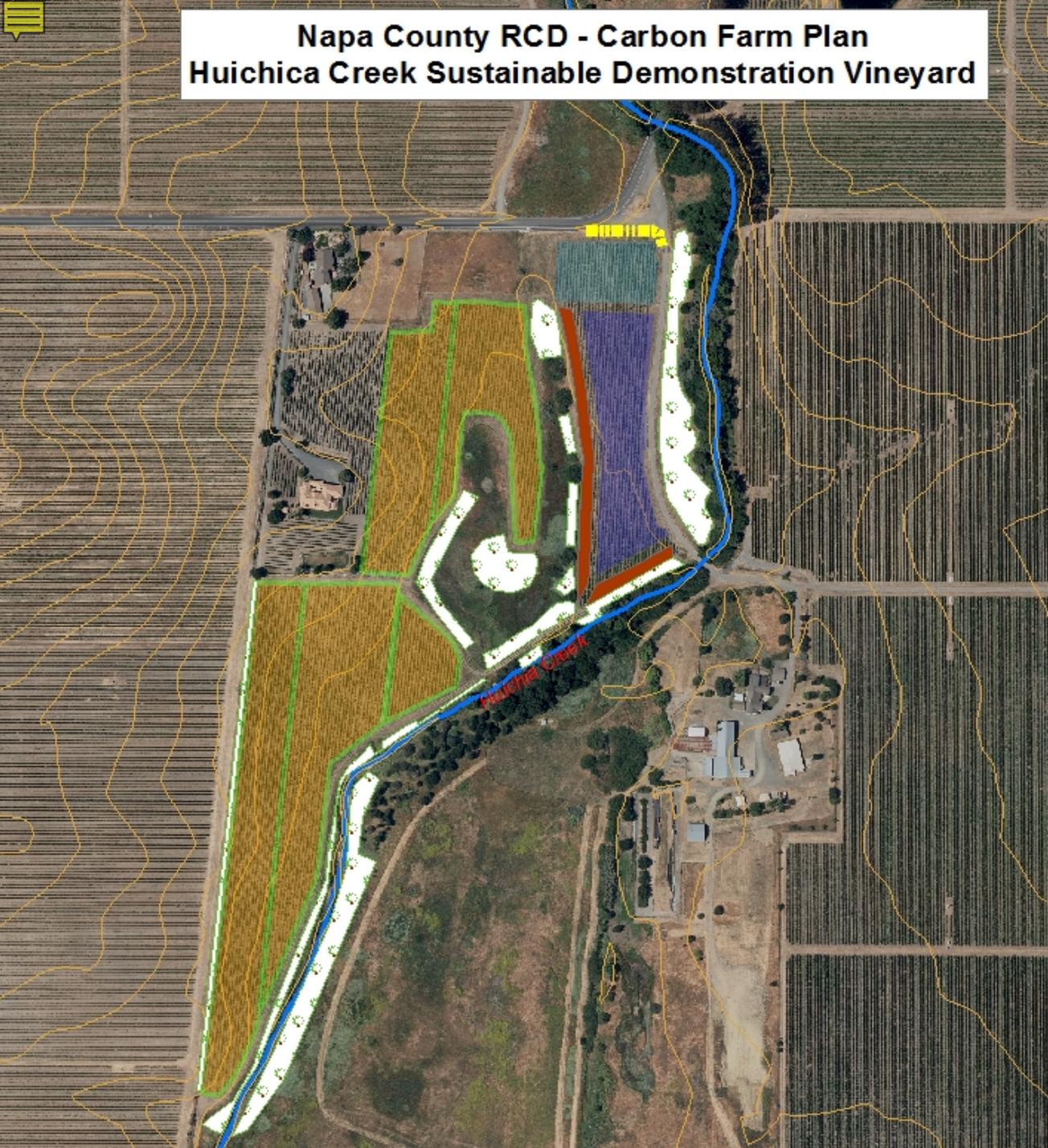


CPS 484 Mulch Application



CPS 422 Hedgerow Planting

Napa County RCD - Carbon Farm Plan Huichica Creek Sustainable Demonstration Vineyard



Current Practices

-  Blocks A-E: Alternate Row Till
-  Block G - No Till
-  Replant Block F - No Till
-  5 Foot Contour
-  Huichica Creek

Planned Conservation Practices

Compost Application in all vineyard blocks

-  Riparian, Wetland, and Windbreak Planting
-  Alternate-Row Tillage to No-Till
-  Multistory Cropping

Carbon Farm Practices (NRCS Practice)

1. Riparian Restoration (390)
2. Hedgerow Planting (422)
3. Conventional Tillage to No Tillage (329)
4. Compost Application Mulching (484)
5. Cover Crop Establishment (340)
6. Multistory Cropping (379)
7. Windbreak Establishment (380)
8. Wetland Restoration (657)



Tools and Resources for Estimating Potential CO₂e Reduction

COMET-PLANNER
USDA-NRCS
Comet-Planner.com



Evaluate Potential carbon sequestration and greenhouse gas reductions from adopting NRCS conservation practices

COMET-FARM
USDA-NRCS & Colorado St U
CometFarm.NREL.ColoState.edu



A whole farm and ranch carbon and greenhouse gas accounting system

Tools and Resources for Estimating Potential CO₂e Reduction

Riparian Revegetation Carbon Sequestration

- Lewis, D.J., M. Lennox, A. O'Geen, J. Creque, V. Eviner, S. Larson, J. Harper, M. Doran, and K.W. Tate. 2015. Creek carbon: ***Mitigating greenhouse gas emissions through riparian restoration***. University of California Cooperative Extension in Marin County. Novato, California. 26 pgs.



Compost Application Carbon Sequestration

- Ryals, R, and Whendee L. Silver. “**Effects of organic matter amendments on net primary productivity and greenhouse gas emissions in annual grasslands.**” *Ecological Applications*, vol.23, no. 1, 2013, pp. 46-59



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Huichica Creek Sustainable Demonstration Vineyard Approximate Carbon Sequestration and Greenhouse Gas Emission Reductions 2016 - Future (tons CO₂ equivalent per year)

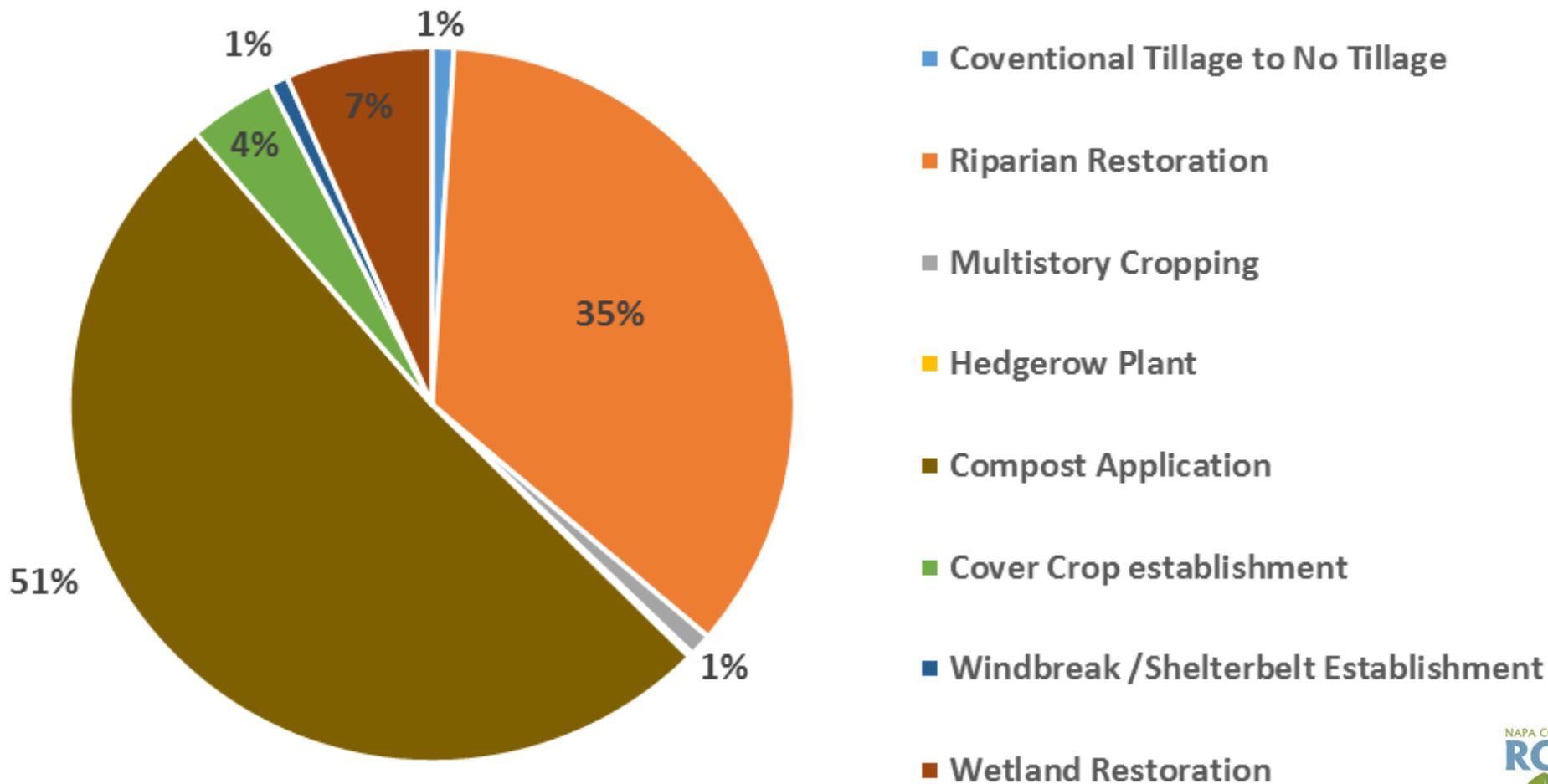
NRCS Conservation Practice	Acres	1yr - Metric tons CO ₂ e Reduction	20yrs - Metric Tons of CO ₂ e Reduction
Riparian Restoration (CPS 390)	2.76	45.1	902.0
Hedgerow Planting (CPS 422)	0.15	0.3	5.1
Conventional Tillage to No Tillage (CPS 329)	4.00	1.2	24.8
Permanent Cover Crop Establishment (CPS 340)	4.00	5.0	100.8
Compost Application (CPS 484)	14.00	218.4	1310.4
Mulching (CPS 484)	4.00	1.28	25.60
Multistory Cropping (CPS 379)	0.75	1.3	26.1
Windbreak/ Shelterbreak Establishment (CPS 380)	0.50	1.0	20.9

Equivalent offset - 550 Passenger Vehicles!

- EPA, 2014, "Greenhouse Gas Emission from a Typical Passenger Vehicle" = 4.7 MT CO₂e/yr



Relative Carbon Benefit of Practices



Huichica Creek Vineyard

Carbon-Soil-Water-Climate Connection

- 25% reduction in CA's annual vineyard water use *if CA's vineyards increase SOC by 1% (2% SOM) in plow layer*
- **Assumption** – 1% increase in SOM results in 1 acre-inch increase in soil WHC.
- Potential increase of 7 acre feet water holding capacity

Huichica Creek Vineyard

Farming Options to Quantify in the Future

- Fuel and energy use
- Graze livestock for weed management and soil fertility
- More multistory cropping and diversification
- Biochar application for carbon sequestration and soil fertility



Huichica Creek Vineyard

Carbon Farming Practices Already Implemented

1. Compost application, CPS 484
 - 8 acres
 - 8-10 tons per acre
2. Conversion of tillage to no tillage, CPS 329
 - 1 acre
3. Mulch application, CPS 484
 - Orchard
4. Wetland restoration, CPS 380/657
 - ½ acre – 15 trees and 50 wetland grasses

CHALLENGES for Implementation



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