Issues in Vineyard Resource Conservation

Glenn McGourty,
Wine Growing and Plant Science Advisor
UCCE
Mendocino and Lake Counties
Sustainable Agriculture

Economically Viable

Environmentally sound

Socially Responsible

Not codified by law, but is philosophically adhered to by many producers
Sustainable Agriculture

- Farming in a way that protects the resources needed to maintain an agricultural system
Important Resources To Grow Winegrapes

- Soil
- Water
- Air
- Financial
- People
There Are Also Public Trust Resources...
The Fishing Industry Then and Now
The Concept of Stakeholders
Your Vineyard as Part of An Ecosystem
Your Vineyard Provides Financial Services:

- Taxable income
- Real estate taxes
- Employment
- Employment taxes
- Excise taxes on alcohol
- Economic activity for goods and services
Your Property is Providing Ecological Services:

- Habitat for wild life and beneficial insects (in some cases), such as predators, parasitoids and pollinators
- Carbon cycling, release of oxygen
- Nutrient cycling
- Watershed
- Take advantage of the ecological capital!
Biodiversity

- In its natural habitat, California has copious biodiversity
- Habitat helps to create diversity
- Two strategies: retain diverse habitat or create it
- Cover crops are one of the easiest and least expensive techniques to create habitat and improve biodiversity
A vineyard monoculture
Creating Biodiversity in the Vineyard

- Cover crops
- Managing hedgerows and noncrop areas
- Diverse habitat for beneficial insects and spiders
Cover crops and their effects in vineyards

- Prevent erosion
- Improve soil structure
- Retain soil moisture
- Increase organic material and soil fertility
- Attract beneficial insects
- Increase diversity of soil organisms
- Affect micro-climate
Steve Wratten, Lincoln University
Steve Wratten, Lincoln University
Leafroller damage

Proportion of bunches infested with leafrollers. Economic threshold for leafrollers shown.

Proportion of bunches

Economic threshold

Buckwheat Control

Treatment

Buckwheat Control

Steve Wratten, Lincoln University
The Good Guys: Predatory Mites

*Galendromus occidentalis*
Conclusion:

- Put nature to work for you—create habitat, and the good bugs will come
- Don’t spray broad spectrum insecticides if you can avoid it
Soil as a Resource: Protect and Enhance

Mendocino County Soils Tops For Red Wine Grape Varieties
Carbon Sequestering and Global Warming:

- Increase of atmospheric CO$_2$ from human activity
- Loss of carbon from soil by tillage = 30% of total CO$_2$ generated
Improving Soil Quality: Increasing Soil Organic Matter

- Cover cropping
- Compost applications
**Organic Matter**

- Decomposed plant and animal residues
- Helps bind soil particles together to give the soil “structure”
- Good source of plant nutrients
- Gives the soil its dark color, as it coats the mineral portion of the soil
- Improves CEC and water retention
Soil Organic Matter by Percentages
# Vineyard Organic Matter

**Per Year, kg/ha**

<table>
<thead>
<tr>
<th>Item</th>
<th>Conventionally Farmed</th>
<th>Organic/Biodyn. farmed</th>
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</thead>
<tbody>
<tr>
<td>Prunings</td>
<td>1000</td>
<td>1000</td>
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<tr>
<td>Leaves</td>
<td>1400</td>
<td>1400</td>
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<tr>
<td>Weeds/cover c.</td>
<td>1200</td>
<td>1200-12000</td>
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<tr>
<td>Compost</td>
<td>0</td>
<td>2300</td>
</tr>
<tr>
<td><strong>Total, kg/ha</strong></td>
<td><strong>3600</strong></td>
<td><strong>5900—17900</strong></td>
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<tr>
<td><strong>Total, tons/acre</strong></td>
<td><strong>0.75</strong></td>
<td><strong>1.2—3.5</strong></td>
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Compost and Organic Matter—Helping Your Soil Come Alive

- Recycled Pomace
- Manure, lime, gypsum
- Produced on Farm or Winery
- Process takes about one year
- Applied at one or two tons/acre
On Farm Composting
Compost Applications: Beneath vines or across the vineyard floor
Soil Protection With Cover Crops

- Cover crop foliage shields soil from rain splashing, slaking of aggregates
- Infiltration rates stay elevated
- OM conserved by preventing erosion
- Mulching effect keeps soil cool in summer, protects OM from oxidation
Cover Crop Types
Short Term Physical Improvements with Cover Crops

- Creation of macropores by tap roots
- Fibrous roots help aggregate soils
Beneficial Activities of Microbes

- Decomposition of plant residues for energy and growth
- N cycling
- Increase availability of P, Fe, So, K and others
- Humus formation, C cycling
- Aggregate formation
- Suppression of pathogens
- Mycorrhizal relationships
Grass and Legume Mixes

- Important to have N to build SOM
- Much of biomass is respired into the atmosphere
Cover Crop Rotations
Who Can Help With Soils Information and Cover Cropping

- NRCS
- UCCE
- Private Consultants
- Seed Companies
Beneficial Use of Water for Winegrowing
Water Rights Are Critical For Long Term Sustainability

- Riparian and Lacustrian
- Appropriative
- Ground water
Water Quality Laws That Will Impact All Winegrowing Operations in California:

- Porter-Cologne Act
- Clean Water Act
State Water Resources Control Board

- State Board Supervises 9 Autonomous Regions
- Each Region is Free to Set Its Own Rules and Policies
- Scientists Unfortunately Are Subordinate To Lawyers
TMDLs: A Shift in Focus

- TMDL: Total Maximum Daily Load
- TMDLs determines each category of pollutant a water body can absorb daily without becoming polluted.
- All combined sources of each pollutant in the watershed, including nonpoint sources are limited to discharging no more than that total limit.
Big Problems for Agriculture:

- Listing of most North Coast streams and rivers by EPA as “impaired water bodies”
- Listing of steel head trout, chinook and coho salmon as “threatened species”
Water Quality Laws Will Be Enforced on a Watershed Basis
Watershed Components
Human Activities and Cumulative Impacts
Porter-Cologne Act:

Provides for a three tiered approach to achieving water quality objectives

- Tier 1 - Voluntary Implementation of Management Measures
- Tier 2 - Regulatory Based Encouragement of Management Measures
- Tier 3 - Effluent Requirements/Waste Discharge Permits
Possible Actions:

- Ranch or Vineyard Water Quality Plan and Letter of Intent
- Watershed Group: Pay an Annual Fee for Monitoring Water Quality
- Certification Such as Fish Friendly Farming
- Discharge Permits and Enforced Water Quality Monitoring
Possible Actions In Water Quality Plan:

- Reduce Harmful Pesticides
- Protection and Improvement of Riparian Areas, including repairs of actively eroding banks, revegetation (Streambank Restoration)
- Cover cropping to reduce siltation
- Replace or remove culverts that block access to habitat for fish
Sources of Help:

- UC Cooperative Extension
- Natural Resource Conservation Service
- Resource Conservation Districts (administer EQUIP cost share programs)
- Resource Agencies including Fish and Game, US Fish and Wildlife, National Marine Fishery Service
Air Quality Laws

- State Air Resources Control Board enforces laws
- Administered on a county basis
- You may need permits and have to monitor some activities
Air Quality Laws

- PM 10 monitoring and mitigation
- Big offenders: Diesel smoke, sulfur dust, vineyard soil dust, smoke from ag burning
- You may need to retire some stationary motors and other agricultural engines
- Tractors are not affected yet, but may be in the near future
Sources of Help

- Local County Air Quality Control District
- County Farm Bureaus for Information (strong advocates for property rights of land owners)
Human Resources:
Tradition and Experience
Human Resources: Multiple Generations
Human Resources: Adequate Labor Supply

- Farm workers
- Technical Help
- Managers
- Can be a problem to source help in areas with few vineyards
Who Can Help?

- Farm Labor Contractors
- Trade Groups
- Employment Development Department
- Friends and Neighbors (be considerate—don’t steal key employees!)
More Questions?

- Contact Glenn McGourty:

  gtmcgourty@ucdavis.edu