Cornell University
College of Agriculture and Life Sciences New York State Agricultural Experiment Station

Sustainable Viticulture: Promotion and Practice

Tim Martinson

Senior Extension Associate in Viticulture

www.vinebalance.com

VineBALANCE
Sustainable Viticulture in the NORTHEAST

A Strong Future for New York Agriculture
NYFVI
NEW YORK FARM VIABILITY INSTITUTE, INC.

AEM

Sustainability

Practice ⟷ Promotion

LONG ISLAND SUSTAINABLE WINEGROWING

NATIONAL GRAPE CO-OP Welch's SINCE 1869

VineBALANCE

Sustainable Viticulture in the NORTHEAST

What is the VineBalance Workbook?

- VineBalance is…
  - Educational tool
  - Decision-making tool
  - A scorecard
  - Basis for documenting sustainable practices
- VineBalance is not…
  - A production guide
  - A ‘sustainable viticulture program’

What is sustainability?

- Standard Definition
  - Low Environmental risk (Environment)
  - Profitable vineyards (Economics)
  - Safe, healthy workforce (Social Equity)
- Three ‘E’s’ of Sustainability
- ‘Triple Bottom Line’

WAL★MART

Saving people money, so they can live better.

Wal-Mart Promotes Sustainable Agriculture

At Wal-Mart, we know that being an efficient and profitable business and being a good steward of the environment are goals that work together. One of our environmental goals at Wal-Mart is to sell products that sustain our resources and environment, and one of the ways we hope to achieve this is by ensuring a long-term supply of reliable agricultural products produced in a sustainable way. For this reason, Wal-Mart created the Food & Agriculture Network, a coalition of buyers, suppliers, NGOs, and academics hoping to create change by evaluating how food miles, water, packaging and energy-efficiency can positively affect the agricultural supply chain.

Sustainability is 'Mainstream'

Producing more. Conserving more. Improving farmers' lives. That's sustainable agriculture. And that's what Monsanto seeds are all about.

Learn more of the story at ProduceMoreConserveMore.com

MONSANTO imagine

PRODUCING MORE | CONSERVING MORE | IMPROVING FARMERS' LIVES

New Yorker Magazine
Back-Page Ad
February 7, 2009

Industry ‘Drivers’

- Community-mindedness, water quality
- Product Marketability: *Maintain or increase marketability by adopting and documenting ‘Green’ production practices*.
- Small Winery Segment:
  - Tasting Room sales/ image/ regional identity
- Juice Grapes
  - Sustainability programs of ‘Big Box’ retailers

But is it credible?

- Greenwashing
- Sustainability Claims
  - Based on ‘real’ impacts
  - Verifiable

Practice ⟷ Promotion

Questions

- How do you know if you are ‘sustainable’?
- How do you tell the world about it?

What is sustainability?

- Broad Goals
  - Low Environmental risk (Environment)
  - Profitable vineyards (Economics)
  - Safe, healthy workforce (Social Equity)
- Farm Level:

Nuts and bolts:

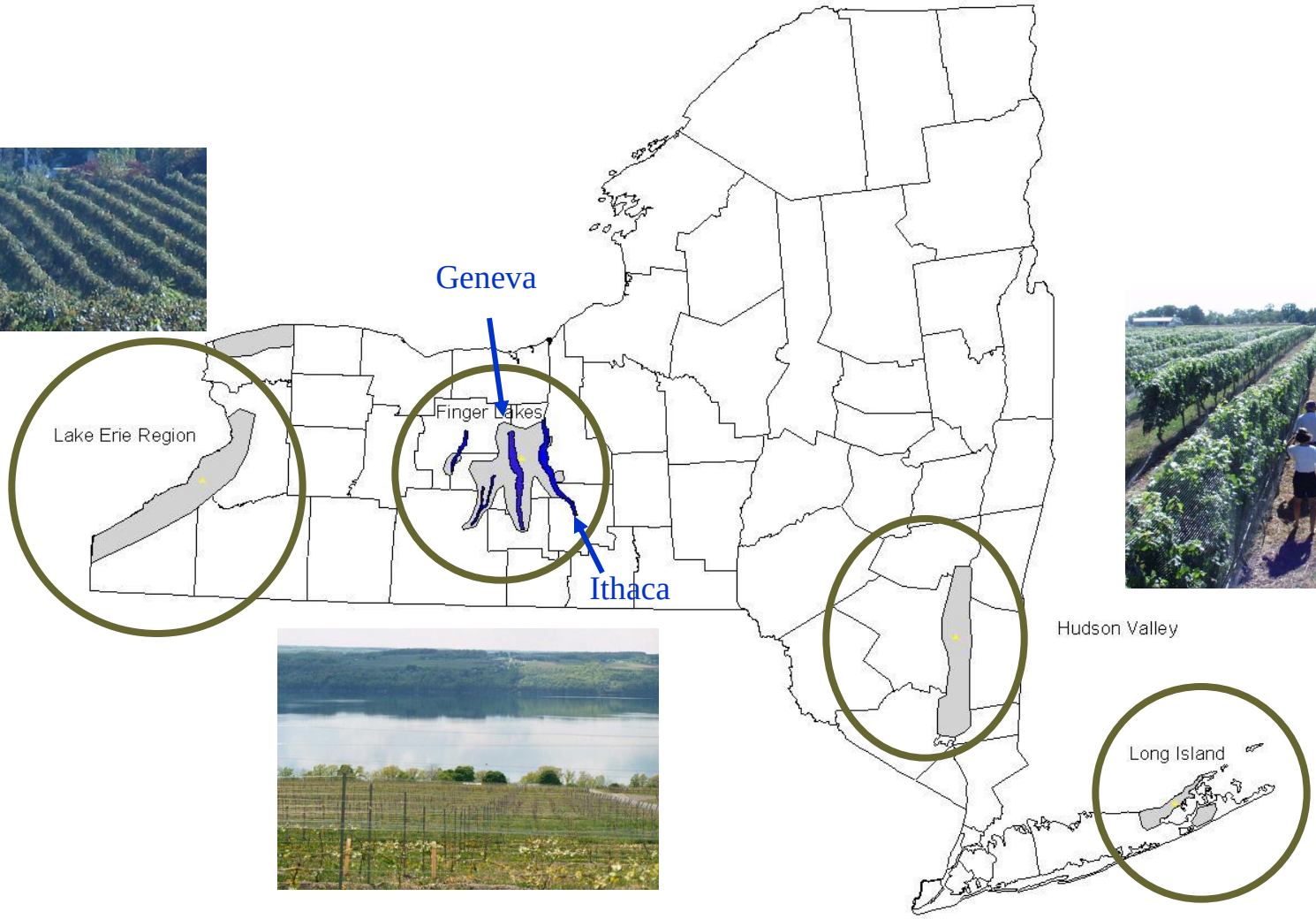
"Sustainability" results from specific decisions about what production practices you use in producing grapes

More Specifically…

- Environment
  - Protect Water Quality/Health
    - Soil Conservation
    - Pesticide use, choice
    - Nutrient Management (N and P)
  - Energy Use
  - Greenhouse Gases
  - Water Use (irrigation)
- Economics
  - Reduced inputs = lower costs?
  - Inputs per unit of crop produced better measure?
- Social Equity
  - Protect Worker Health/Safety

VineBALANCE
Sustainable Viticulture in the NORTHEAST

New York Grape Production



Protecting Water Quality

Finger Lakes

Long Island

Biggest Environmental Impact:

New vineyard project in Finger Lakes

The Workbook

VineBALANCE
Sustainable Viticulture in the NORTHEAST

www.vinebalance.com

New York Guide to Sustainable Viticulture Practices

Grower Self-Assessment Workbook

Cornell University Cooperative Extension

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Production Funded by:

A Strong Future for New York Agriculture
NYFVI
NEW YORK FARM VIABILITY INSTITUTE, INC

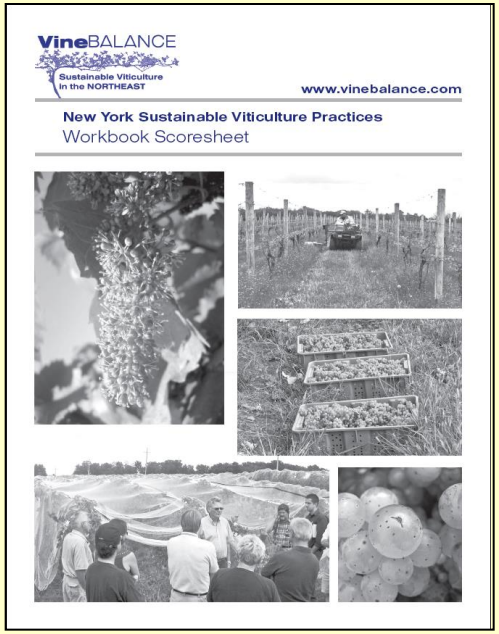
The Northeast Center for Risk Management Education

UNCORK! New York!
www.newyorkwines.org
New York Wine and Grape Foundation

The NY Sustainable Practices Workbook

Nitrogen (N) Management Practices ← Increasing Sustainability					
	1	**2**	**3**	**4**	**YOUR RANK**
When is N fertilizer soil-applied in spring?	N is applied during the period of maximum uptake – bud break to fruit set. *AND* Split applications are used with 30-50% of the N applied pre-bloom and the remainder applied post-bloom.	All N is applied during the period of maximum uptake – bud break to fruit set. *AND* Split applications are not used.	N is applied up to 2 weeks prior to bud break when vines are still dormant. *OR* All N is applied in the period between fruit set and veraison.	N is applied >2 weeks prior to bud break.	
There is little absorption of N by roots prior to bud break. The soil is cold and roots are inactive. Early vine growth depends almost entirely on N stored in the woody parts of the vine. It is unclear whether pre-bud break application of slower release organic fertilizers confers an advantage in terms of N availability to the vine.					

Scoresheet and Action Plans



Example Action Plan

Section (Page)	Topic	Score	Action (Y/N)	Goals	Action Steps	Timetable	Date Complete	Notes
EXAMPLE								
Nutrition Manag. (Page 4)	Nitrogen (N) contribution from organic sources	4	Y	4 -> 1: Experiment with cover crops to reduce N inputs, increase soil health & take up water in the spring	1. Establish cover crop research plots 2. Calculate cover crop N contribution 3. Develop & implement vineyard-wide plan	1. Fall 2007 2. Spring 2008 3. 2008-2009	1. _____ 2._____ 3. _____	Will experiment with legumes cereal rye, and other cover crops

What Practices Promoted?

8 sections, 140 questions

- Vineyard Management
  - Canopy management practices
  - Yield management
- Nutrition Management
  - Nutrient use efficiency
  - Tissue and Soil Sampling
- Pest Management
  - Scouting & economic thresholds
  - Weather, variety-driven disease management programs
- Pesticide Management
  - Mixing, loading & storage practices
  - Worker Protection Standards

What Practices Promoted?

Continued

- Soil Management
  - Leaching & runoff potential
  - Preplant site preparation
  - Cover crops & organic matter
- Weed Management
  - Post- vs. pre-emergent herbicides
  - Integrated tillage/ weed management
- Irrigation Management
  - System design & maintenance
  - Water use efficiency
- Continuing Education

Technical Assistance and Cost Sharing

NRCS and Soil & Water Conservation Districts

Funding Opportunities for Environmental Stewardship

Les Travis and Jeff Ten Eyck
Associate Environmental Analysts
New York State Soil & Water Conservation Committee

Many in the wine and grape industry have recently experienced customers asking about the environmental stewardship being practiced in the growing of grapes. The new Sustainable Vineyard Practices Workbook, a component of New York State's Agricultural Environmental Management (AEM) Program, will help growers document their environmental stewardship and identify areas for opportunities to improve.

In New York State, there are a number of funding opportunities available to grape growers to help address environmental concerns on their farms. Working with the local Soil & Water Conservation District (SWCD), and USDA Natural Resources Conservation Service (NRCS), farmers can apply for cost share assistance to implement conservation practices.

A sound first step is to complete the Sustainable Vineyard Practices Workbook (AEM Tier 2) to determine your environmental strengths, needs, and opportunities. You can complete the workbook as a self assessment, or better yet, contact your local SWCD to assist you. Following the assessment, work with Cornell Cooperative Extension, SWCD, and/or NRCS representatives to develop an action plan to address the needs and opportunities identified. Knowing your needs and opportunities, as well as building a relationship with the SWCD and NRCS is the key to identifying cost-share programs to assist in implementing the conservation practices identified in your action plan. Each funding program has its own unique purpose, qualifications, and requirements. The following programs may be applicable to the grape farmer. More in-depth information may also be found at the website listed with the program.

New York State's Agricultural Non-point Source Abatement and Control Grant Program (Ag NPS) assists farmers in preventing water pollution from agricultural activities by providing technical and financial assistance. Co-ordinated by the County SWCD, the program provides technical assistance and cost share funding up to 87.5% to construct or implement Best Management Practices identified in your action plan. In the past, grape farmers have used this program to construct agrichemical mixing facilities and to solve erosion control issues. More information is available at www.nys-soil-andwater.org.

Environmental Quality Incentives Program (EQIP) is a federal voluntary conservation program that promotes agricultural production and environmental quality. It is USDA's primary program to provide environmental improvements on farms. EQIP offers technical and financial assistance for the installation or implementation of structural or management practices on agricultural land. Cost share rates generally range from 50 to 75%. Nutrient management and pest management are examples of two practices that can be cost shared for the grape grower through EQIP. More information is available at www.nrcs.usda.gov/programs/eqip/

Conservation Reserve Enhancement Program (CREP)/Conservation Reserve Program (Continuous Sign-Up) are two very similar federal programs that place environmentally sensitive land near streams, lakes, and public wellhead protection areas into approved vegetative cover for a period of 10 to 15 years. In return, farmers are paid annual rental payments and reimbursed for establishing recognized conservation practices. Farms with riparian areas that are low producing, or too risky for crop production, may opt to earn money from that land through CREP/CRP. The money earned through the program could be used to install conservation practices on other parts of the farm. More information is available at www.fsa.usda.gov/pas/publications/facts/html/crpcont03.htm

Conservation Security Program (CSP) is a new federal conservation program that supports ongoing stewardship of private agricultural lands by providing payments for practices already in place to maintain and enhance natural resources. CSP identifies and rewards those farmers who are meeting high standards of conservation and environmental management. In addition to payments for existing practices, CSP can provide cost-sharing to do further improvements. The program will be staged annually in certain watersheds across the state until farmers in every watershed have had a chance to participate. Long Island was designated as a participating watershed in 2004, and over 20 grape growers qualified for payments due to their high level of environmental stewardship. The program has yet to visit the Finger Lakes watersheds. Details on the program can be found at www.nrcs.usda.gov/programs/CSP/cspinfo.html

The NY Sustainable Viticulture Program is an excellent resource, not only does it provide valuable agronomic and varietals management tools, but it also offers an important environmental management review. Participants will

(continued on page 7)

- NYS Agricultural Non-point Source Abatement and Control Grants Program
- EQIP
- Conservation Reserve Enhancement Program
- Conservation Security Program

S[illegible]ewsletter

Modifying Nitrogen Use at Centerra Wine Company

Jamie Hawk

Centerra Vineyard Manager, Matt Doyle

Under the weight of skyrocketing nitrogen fertilizer costs, New York grape growers are rethinking their nitrogen application practices. Led by vineyard manager Matt Doyle, Centerra Wine is working with a vineyard consultant (ACS) to tailor their fertilization program on a block-by-block basis. This spring begins their third consecutive year of intensive soil sampling using GPS (Global Positioning System) to ensure consistency. "Soil samples are taken at the same place and time every year so we can manage how our soil is changing," explains Doyle, "and we're managing our soils, not necessarily the vines – we're kind of getting away from petiole testing. We do some petioles for comparison, but we're really doing intensive soil sampling."

So far their efforts have focused primarily on two aspects of the results of the soil analyses: pH and soil organic matter. "We have pH problems with some of the farms, so we're trying to get the pH up with lime to better balance our soils," notes Doyle. Both pH and organic matter have profound effects upon vine nutrition: low pH reduces the availability of potassium, magnesium, and calcium to the vines, while the breakdown of organic matter provides nitrogen for uptake. "Typically in the past, we'd always done blanket nitrogen applications using the same rate everywhere across the board. Now we want to tailor it more to what the vines need using our soil samples." Sites with soil organic matter at or above about 4% are receiving less inorganic nitrogen. "For sections that had high organic matter, we're just lowering the rate, doing a half rate instead of a full [about 27 lbs/acre actual vs. 55 lbs/acre]. For the sections that have low organic matter, we're going to build it up so we can get away from adding the nitrogen."

To further increase the efficiency of their nitrogen use, Doyle has modified the timing of application as well as the form of nitrogen applied. "Before, we put our nitrogen on with our preemergent herbicides early in the spring, and I don't think it did much for the vines. Now we're trying to apply it closer to bloom so the vines are actually using the nitrogen we put on. And we've gone from liquid to granular forms – we feel we don't get as much loss to the atmosphere with the granular."

This month they've begun their next step, adding composted pomace to the blocks to raise the level of organic matter, which is especially important in those areas where soil analysis indicates a deficiency. "We're going to put our first trial blockdown this year; the pomace compost has a lot of nitrogen and potash in it, so we're thinking it'll be a good slow-release product. Over time, as organic matter increases in the soil, we'll do less and less nitrogen. And we are seeing in our soil sampling that pH is definitely coming up where we've added lime, and that will help a lot." In regard to the expected time frame to reach their goals, Doyle states, "I think we're looking at 4 or 5 years down the road to be more balanced on everything. We'll track our organic matter continually, and because we have so many acres that are low, it's going to take us a while to get to where we need to be." And the cost of this remediation program? "Actually, what ACS is charging us for the soil samples is not much more than what it would cost us to do it ourselves."

For New York State grape growers, it's time to rethink nitrogen application practices and to specifically tailor rates to individual vineyard blocks. "The price of nitrogen is going through the roof," Doyle stresses, "and for us to keep our budget inputs the same, we either had to cut our rates or try to do it differently. Our struggle is to try to stay efficient and get all our work done, and at the same time be innovative and cost effective too. And we're trying to be sustainable in terms of our vineyards and the environment – if nitrogen isn't necessary, then you shouldn't put it on just because that is what you've always done."

Sustainable Viticulture in the Northeast 7

Sustainable Viticulture in the Northeast 4

May 2006

Sustainable Viticulture in the Northeast 3

Sustainable Viticulture in the Northeast 2

May 2006

Sustainable Viticulture in the Northeast 1

- Environmental Impact
- Sustainability Concepts
- Best Management Practices

- Background/Science
- Management Issues

- Grower Sidebar

Grower Participation

- 84 growers state-wide
- 7,270 acres managed total
  - 39 Finger Lakes (2,727 acres)
  - 29 Lake Erie Region (3,994 acres)
  - 10 Long Island (499 acres)
  - 6 Hudson Valley (51 acres)
- 24 growers have purchased the workbook to complete on their own.

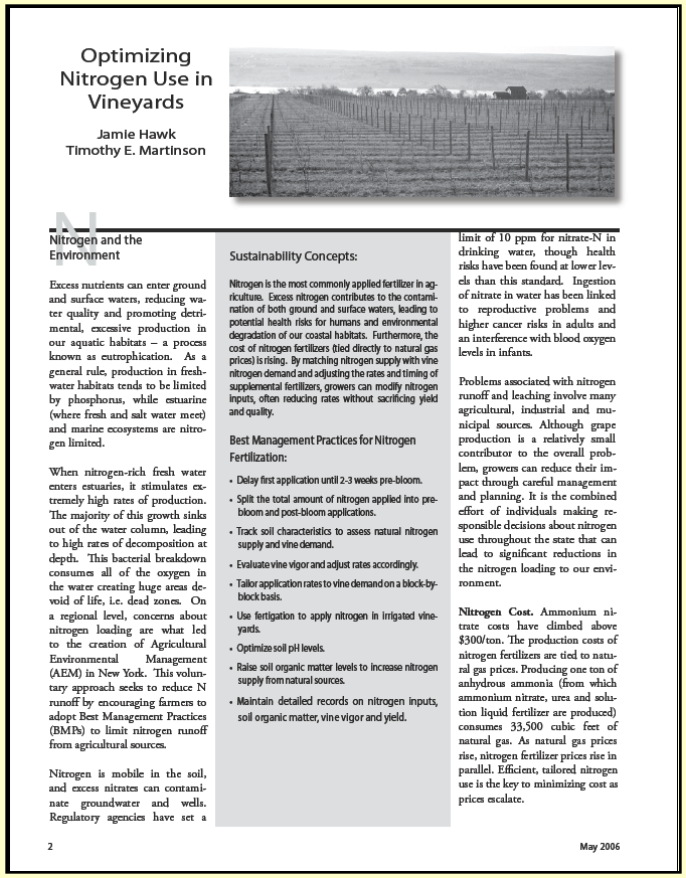
22% of NY Grape acreage

Applications for Cost-sharing

Soil and Water/ AEM program (Data from 2008)

- Finger Lakes
  - 10 referrals, 9 applications, 4 funded
- Lake Erie
  - 20 referrals, 12 applications, 0 funded
- Long Island
  - 6 referrals, 1 application, 0 funded

Nitrogen Use Guidelines



Optimizing Nitrogen Use in Vineyards

Jamie Hawk
Timothy E. Martinson

Nitrogen and the Environment

Excess nutrients can enter ground and surface waters, reducing water quality and promoting detrimental, excessive production in our aquatic habitats – a process known as eutrophication. As a general rule, production in freshwater habitats tends to be limited by phosphorus, while estuarine (where fresh and salt water meet) and marine ecosystems are nitrogen limited.

When nitrogen-rich fresh water enters estuaries, it stimulates extremely high rates of production. The majority of this growth sinks out of the water column, leading to high rates of decomposition at depth. This bacterial breakdown consumes all of the oxygen in the water creating huge areas devoid of life, i.e. dead zones. On a regional level, concerns about nitrogen loading are what led to the creation of Agricultural Environmental Management (AEM) in New York. This voluntary approach seeks to reduce N runoff by encouraging farmers to adopt Best Management Practices (BMPs) to limit nitrogen runoff from agricultural sources.

Nitrogen is mobile in the soil, and excess nitrates can contaminate groundwater and wells. Regulatory agencies have set a limit of 10 ppm for nitrate-N in drinking water, though health risks have been found at lower levels than this standard. Ingestion of nitrate in water has been linked to reproductive problems and higher cancer risks in adults and an interference with blood oxygen levels in infants.

Problems associated with nitrogen runoff and leaching involve many agricultural, industrial and municipal sources. Although grape production is a relatively small contributor to the overall problem, growers can reduce their impact through careful management and planning. It is the combined effort of individuals making responsible decisions about nitrogen use throughout the state that can lead to significant reductions in the nitrogen loading to our environment.

Nitrogen Cost. Ammonium nitrate costs have climbed above $300/ton. The production costs of nitrogen fertilizers are tied to natural gas prices. Producing one ton of anhydrous ammonia (from which ammonium nitrate, urea and solution liquid fertilizer are produced) consumes 33,500 cubic feet of natural gas. As natural gas prices rise, nitrogen fertilizer prices rise in parallel. Efficient, tailored nitrogen use is the key to minimizing cost as prices escalate.

Sustainability Concepts:

Nitrogen is the most commonly applied fertilizer in agriculture. Excess nitrogen contributes to the contamination of both ground and surface waters, leading to potential health risks for humans and environmental degradation of our coastal habitats. Furthermore, the cost of nitrogen fertilizers (tied directly to natural gas prices) is rising. By matching nitrogen supply with vine nitrogen demand and adjusting the rates and timing of supplemental fertilizers, growers can modify nitrogen inputs, often reducing rates without sacrificing yield and quality.

Best Management Practices for Nitrogen Fertilization:

- Delay first application until 2-3 weeks pre-bloom.
- Split the total amount of nitrogen applied into pre-bloom and post-bloom applications.
- Track soil characteristics to assess natural nitrogen supply and vine demand.
- Evaluate vine vigor and adjust rates accordingly.
- Tailor application rates to vine demand on a block-by-block basis.
- Use fertigation to apply nitrogen in irrigated vineyards.
- Optimize soil pH levels.
- Raise soil organic matter levels to increase nitrogen supply from natural sources.
- Maintain detailed records on nitrogen inputs, soil organic matter, vine vigor and yield.

2 May 2006

- Avoid ‘blanket’ rates
- No more than 50 lb/acre maximum
- Adjust for soil organic matter content
- Adjust for cropping level, vine vigor
- Delay first application until after budburst
- Use split applications (especially on coarse soils)

Farm Level Impacts

N Application Practices

Standard Rate: 100 lb N/acre ($84/acre*)
Research-based Rate: <50 lb/acre (<$42/acre*)

**Based on Urea at $400/Ton*

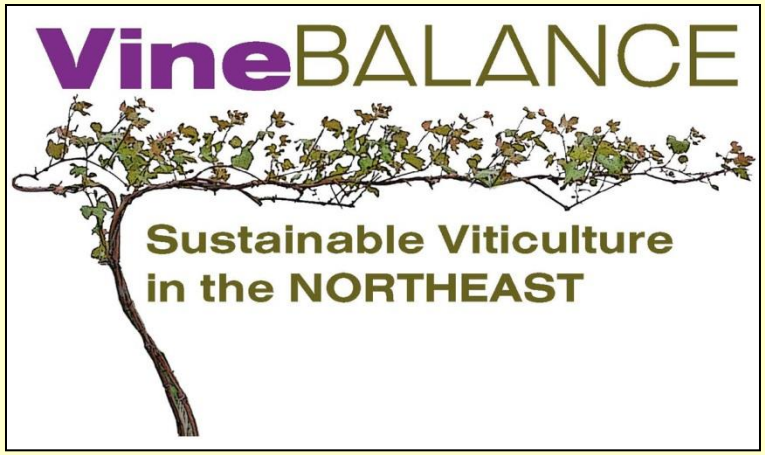
100 acre farm = $4,200 saving
5 Tons less actual N

10K acres in Finger Lakes = 500T ($420,000)
32K acres statewide = 1,600 T ($1.3 Million)

78% of participants follow reduced rates (5K acres -$210K)

Sustainability Program Approaches

- Certification and Labeling
  - Who gets to use the label?
  - What standards does the label represent?
- OR: Industry-Wide ‘metrics’



National Grape Cooperative Sustainability Programs "Industry-wide Metrics"

Rob Smith

Region Manager National Grape

Three Production Regions

Tri-States and Canada

Michigan

Washington State

National Grape Cooperative

- Mandatory completion of the self-assessment prior to the 2012 harvest
  - National staff held small group meetings to lead members through the workbook
  - Members found it educational and learned something
  - Each member has a baseline score upon which to improve

National Grape Cooperative

- Entering the score sheets into the computer
  - Enable members to review their scores and address and areas that are deficient

Welch's and Walmart

Walmart

Food & Agriculture Global Sustainable Value Network

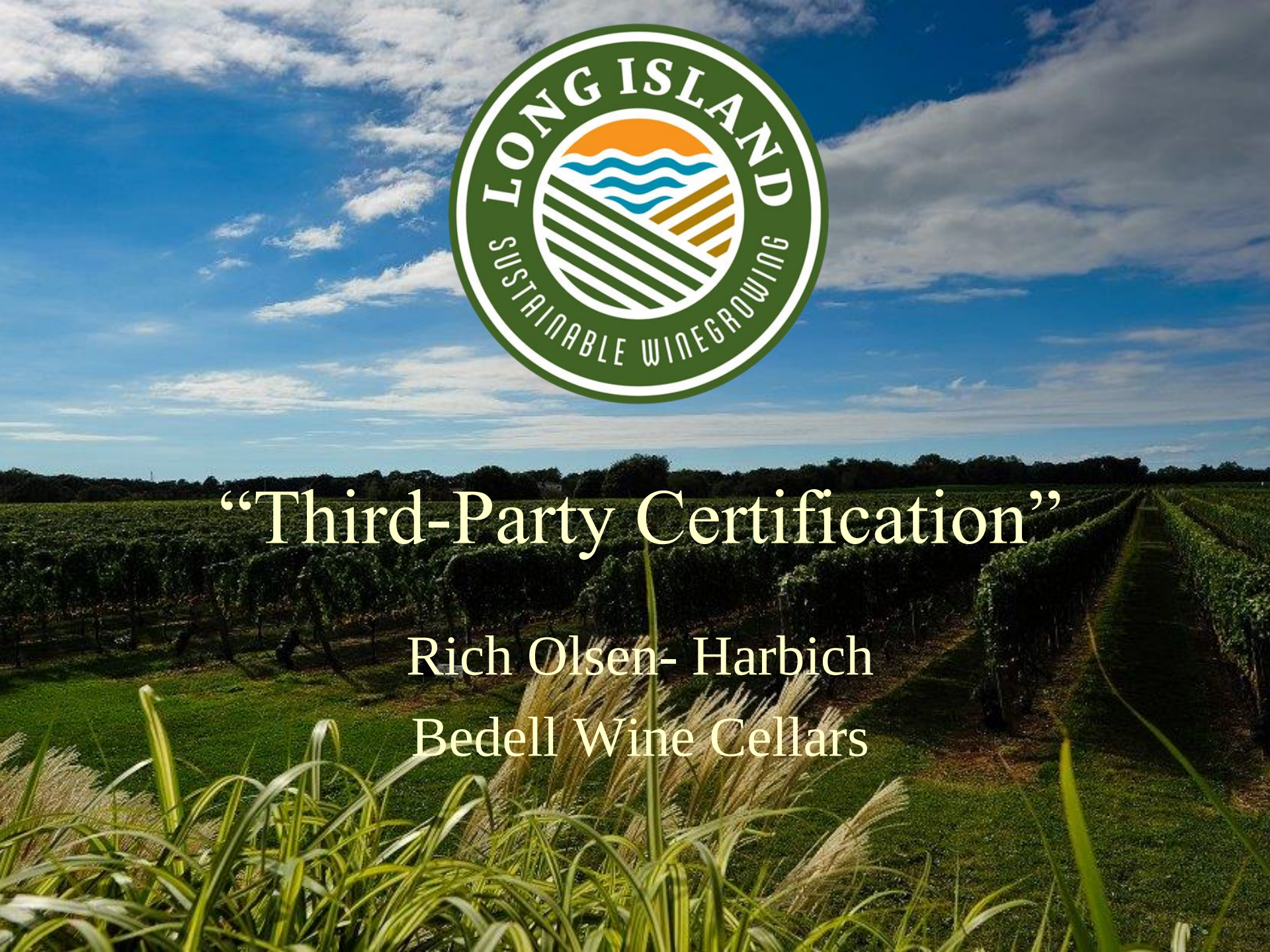
A community of stakeholders supporting our Global Sustainable Agriculture Platform.

2012 **Sustainable Food, Farms, & Communities** **November**

The National Grape Cooperative's Michigan Office is managed by John Jasper, Area Manager (Left), Terry Holloway, Viticulture Specialist (Middle), and Steve Tomac, Member Relations Assistant (Right). This team in Michigan has provided leadership and development for the company's sustainability program, working with their growers and stakeholders.

Company-wide, about 70% of all National Grape Cooperative grower members of the Coop have completed Grape*A*Syst or a similar sustainability program to date, and the charge is for 100% completion prior to the 2012 harvest. Grape production is different from state to state due to soil types, weather patterns, and growing season. Therefore, National Grape had developed specific programs for their growers in each region across North America, taking a proactive approach to produce grapes in the most sustainable manner.

- John Bowden, Business Development, Welch's



“Third-Party Certification”

Rich Olsen- Harbich
Bedell Wine Cellars

Establishing Regional Certification

Coalition of like-minded wineries

Well Defined Best Practices

Strong Technical Group

Consensus Building

- LISW version of Vine Balance Workbook: score - 2
- Core Criteria - 18 main sections: score 1-2
- Nutrient, Pest Control Program
- Third Party Certification Farm Visit
- Website: lisustainablewine.org

Nutrient Management

One ton of fruit picked from an acre of vines removes only 4 lbs of actual nitrogen

Fallow land on Long Island ranges from 1-2 mg/l

Long Island vineyard test wells measure an average ground water level of 4.3 mg/l

Row-crop agricultural test wells measure an ave. of 13-14mg/l

LISW limits total actual nitrogen application to 20 lbs per acre

Disease Control Program

LISW requires >50% of individual materials used for control of fungal diseases are “low-input”

ie—either EPA Reduced Risk, EPA Minimum Risk, EPA Bio-pesticide, are either OMRI-listed Organic or Washington State Department of Agriculture-listed Organic, or are generally considered as “low-input” materials despite being classified as a Conventional Material, eg---Sulfur.

Prohibited Materials *Disease Control*

Use in Agriculture/Horticulture has led to Groundwater Concerns: Not Allowed

Active Ingredient	Trade Name
Azoxystrobin	Abound
Azoxystrobin + Difenoconazole	Quadris Top
Metalaxyl/Mefanoxam	Ridomil, Ridomil Gold

Restricted Use Fungicides: Not allowed (subject to MRC review)

Active Ingredient	Trade Name
Fluopicolide	Presidio
Mancozeb	Dithane Rainshield (this formulation only)
Triflumizole	Procure
Mancozeb + zoxamide	Gavel

Why Certification?

Validates the claims of sustainability

Promotes on-farm accountability

Pro-active response to local concerns

Respond to Global Competition

Improve and strengthen the Long Island wine brand

Third-Party Certification Process

Members are visited in years 1 and 2 and every 3rd year thereafter

Vineyard walk and record review

Review practices in VineBalance workbook

Review inputs and future plans

Gives report to Core Group for review/certification

Funding

Fully self-sustaining from membership dues and inspection fees beginning 2012

Grants for expansion and special projects

Practice ⟷ Promotion

Acknowledgements

Project Team

- Jamie Hawk – CCE Yates
- Alice Wise – CCE Suffolk
- Libby Tarleton – CCE Suffolk
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- Tim Weigle – Lake Erie Regional Grape Program
- Hans Walter-Peterson – Finger Lakes Grape Program

Industry Steering Group

Communications Services

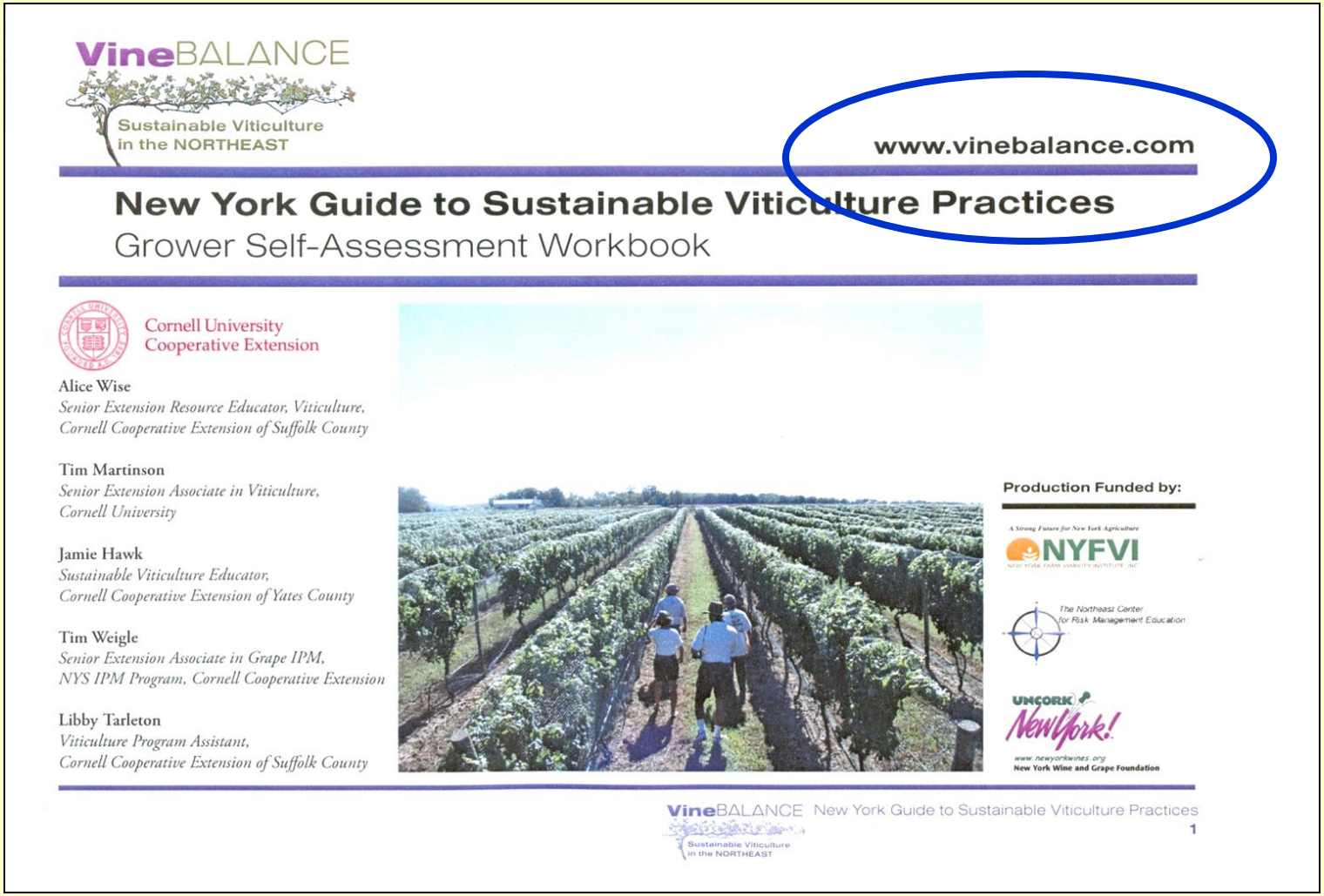
- Elaine Gotham – Workbook design
- Rob Way – Web site design

Special Thanks…

Rich Olsen-Harbich
Long Island Sustainable Winegrowing

Rob Smith
National Grape Cooperative

The Workbook



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