Farm-Based Nutrient Opportunities

California Air Resources Board
Non-Digester Projects Dairy Subgroup #1
August 21, 2017

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Newtrient LLC
www.newtrient.com

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INNOVATIVE SOLUTIONS IN RESOURCE RECOVERY

Now is the time …

- Increasing regulatory, judicial and societal pressure around manure and agricultural by-products
- Increasing surface and ground water issues related to nitrogen and phosphorus
- Decrease in consumer trust

Our Desired Outcome

1. Farms help resolve societal issues related to water pollution and GHG emissions
2. Farmers realize economic benefits from voluntary actions
3. Farmers improve their social license to operate and increase consumer trust

Where we are today

- In the 1970s, we “punted” with non-point sources of pollution and regulatory development was more focused on point sources
- Over time, EPA has shifted it’s focus from policy development to enforcement
- Permits made it easier for manufacturers to keep their playing field level
- Traditional manufacturers are price makers (cost +), but most farmers are price takers meaning food prices are not tied to costs

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How do we create an economic model that incents the behavior we want?

The Roots of Modern Environmentalism

- How to “internalize external costs?”
- Garrett Hardin’s Tragedy of the Commons (1968)
  - Formed the underpinnings of the EPA enforcement model
- <u>NEGATIVE DRIVERS</u>
  - Regulation
  - Permits
  - Litigation
  - Citizen Enforcement

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Aligning Market Incentives With Desired Outcomes

POSITIVE DRIVERS

- Value Environmental Asset Services (e.g., GHG reduction, phosphorous capture)
- Allow those responsible for higher cost pollution prevention obligations to purchase voluntary lower cost results
- Spread pollution prevention costs across larger population (e.g., entire supply chain)
- Nutrient Trading (e.g., water quality trading)
- Tonnage Fees
- Contaminant Bounties
- Recycled Fertilizer Portfolios

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Don’t let the pursuit of perfection get in the way of progress!


STOP

Milk, Meat & MANURE

Energy

- Electricity
- Heat
- Renewable Natural Gas
- Aviation Fuel
- Biodiesel
- Hydrogen
- Methanol
- Syngas

Environmental Assets

- Carbon Credits
- Renewable Identification Numbers
- Low Carbon Fuel Std. Credits
- Renewable Energy Credits
- Nutrient trading: Water quality credits (N & P)

Manure-Based Products

- N – Ammonium Nitrate, Ammonium Sulfate
- P – Ammonium Phosphate, Mono-ammonium Phosphate
- Compost
- Bedding
- Custom Fertilizer Products
- Worm Castings
- Biochar
- Water
- “Cow Pots” (fiber)
- “Magic Dirt” (fiber)
- Zeolite
- Struvite
- Digestate algae
- Humus

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[redacted]

(Demand)

High Cost Compliance Obligations

(Supply)

Low Cost Voluntary Pollution Prevention

Wastewater Buyer

[redacted]

Farmer Seller

[redacted]

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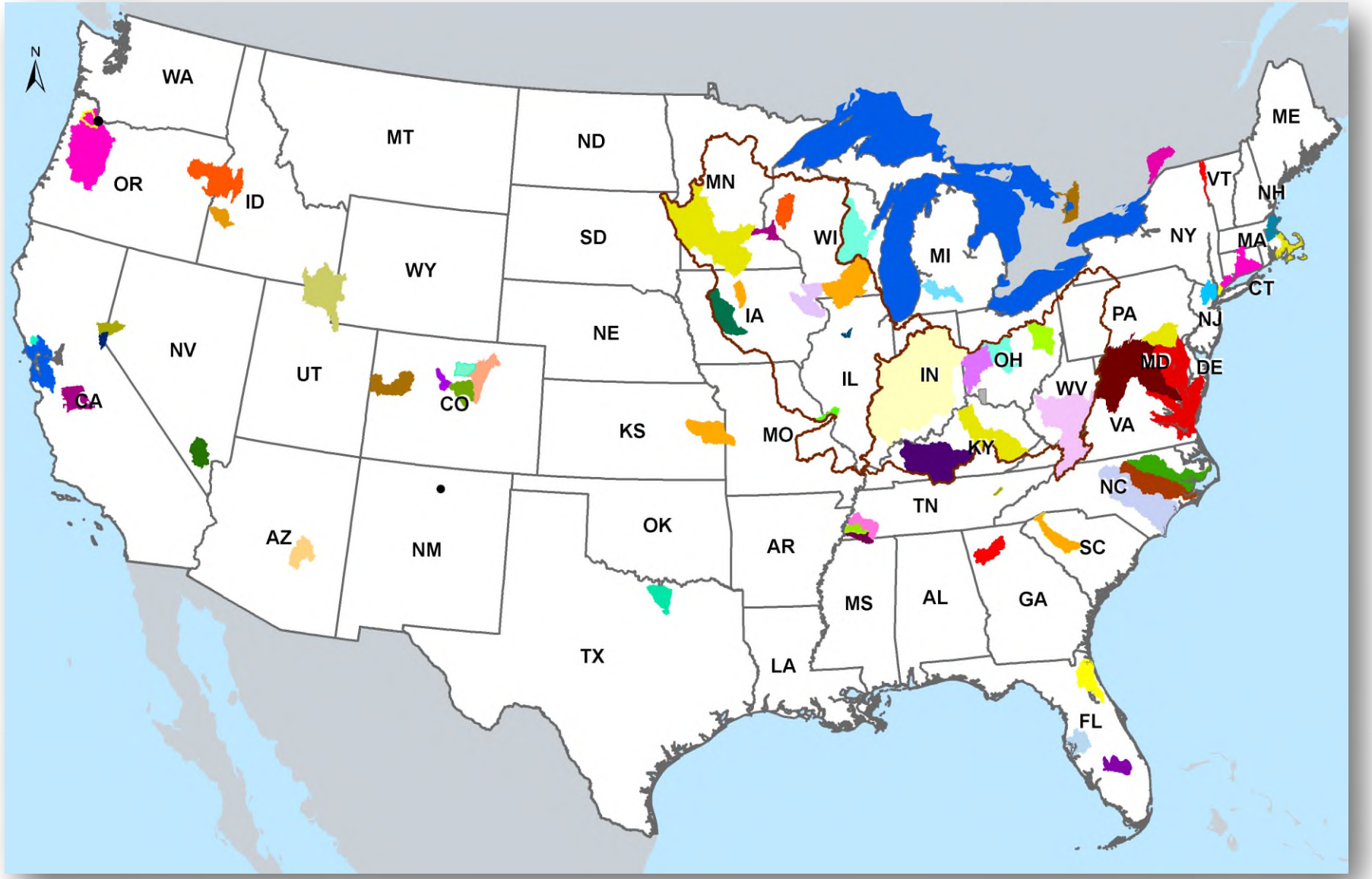
Mark S. Kieser
Kieser & Associates, LLC
Kalamazoo, MI USA

Watershed-scale Trading Programs



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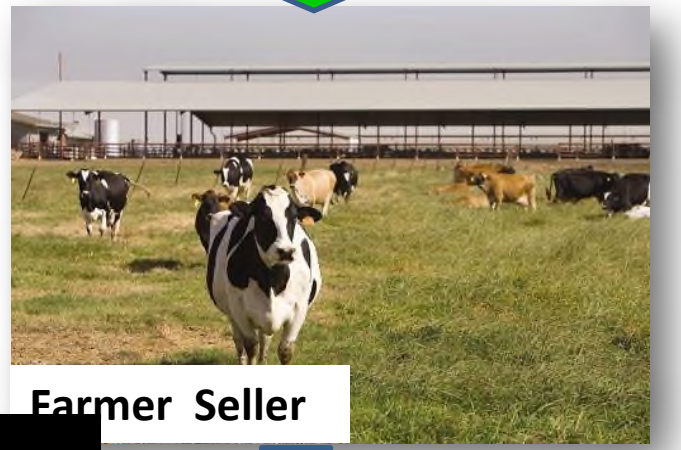
(Demand)

(Supply)

High Cost Compliance Obligations

Low Cost Voluntary Pollution Prevention

Compliance Buyer



Farmer Seller

[redacted]

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A new kind of company

NEWTRIENT
INNOVATIVE SOLUTIONS IN RESOURCE RECOVERY

A leader in discovering innovative ways to capture the value of manure to preserve and enhance the environment.

Evaluating the state of manure management technologies

Creating a marketplace for manure-based products

Driving adoption of environmental asset markets for voluntary, pollution prevention

Open source manure technology resources

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HOME ABOUT CATALOG NEWS OUR TEAM CONTACT

HOME / TECHNOLOGY SCORING

Newtrient 9-Point Technology Scoring System

- Technology Catalog
- Dairy Manure 101
- Technology Scoring
- FAQ

Every technology is evaluated based on nine criteria developed by Newtrient's Technology Advancement Team (TAT) of highly experienced experts in manure management technology fields. This 9-Point Technology Score indicates the status and assists in tracking the progress of the technology in the key areas of commercial viability, economic & industry value and transparency & interaction.

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Representing 50% of the US Dairy Farmers

Newtrient's Team

CEO

Steve Rowe

Newtrient's Board

Link to Board Entities:
http://www.newtrient.com/Our-Team/Dairy-Industry-Leadership

Engineering & Bus Dev

Jim Wallace

Operations & Catalog

Mark Stoermann

Bus Dev & Finance

Chris Kopman

Innovation Center

Team of Experts

- Environmental Stewardship
- Animal Care
- Industry Partnerships

Product Development Team

Paul Sellew

- Entrepreneur in Agriculture products

Steve Liffers

- Lawn and Garden Sales & Supply Chain

Ron Alexander

- Product & Market Development

Technical Team

Craig Frear

- Nutrient Recovery & Bio-Energy

Curt Gooch

- Nutrient Recovery & Bio-Energy

Garth Boyd

- Nutrient Recovery & Bio-Energy

Dana Kirk

- Nutrient Recovery & Bio-Energy

Jerry Bingold

- Anaerobic Digesters & Energy

Gov't Affairs & Environment Team

Clay Detlefsen

- Legislative & Regulatory

Bruce Knight

- Former Chief of NRCS

Ryan Bennet

- NMPF Industry & Environment

Mark Kieser

- Water Quality

Frank Mitloehner

- Air Quality

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Link to Newtrient team Bio's: http://www.newtrient.com/Our-Team/Our-Team-of-Experts

Key Takeaways

- Let natural science, social science and sound economics be our guide
- Any improvement is good – A lack of precision is okay so long as we are directionally correct
- Newtrient understands the path and the dairy industry is committed to success

Ski the spaces . . .

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