FOTC 2015 Fertilizer Outlook & Technology Conference

Larry Clemens

North American Agriculture Program Director
The Nature Conservancy

Meeting the Demand for Food While Protecting Critical Resources for The Future

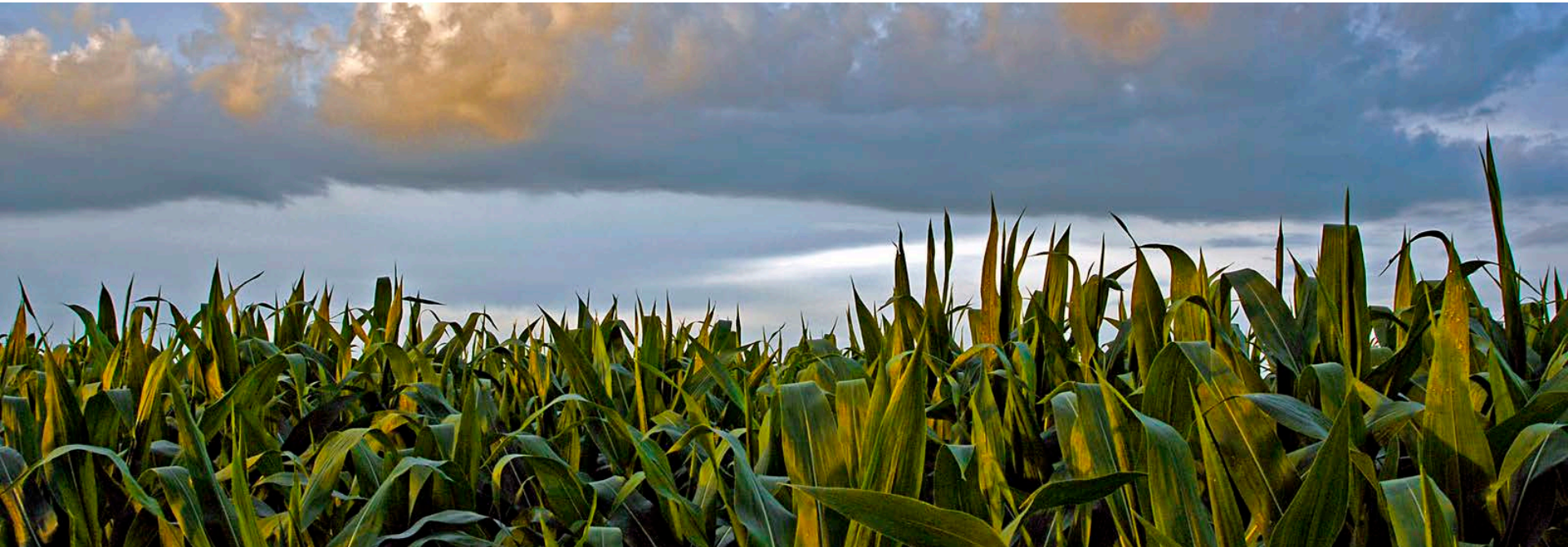
The Fertilizer Institute
Nourish, Replenish, Grow

Fertilizer Industry Round Table

North America Region

Agriculture Program

“Meeting the Demands for Food While Protecting Critical Resources for the Future”



We conserve the lands and waters on which all life depends.

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LASTING *results*

1 million + members

64 years of conservation

Approximately **21 million acres conserved** in the U.S.

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Focus Areas

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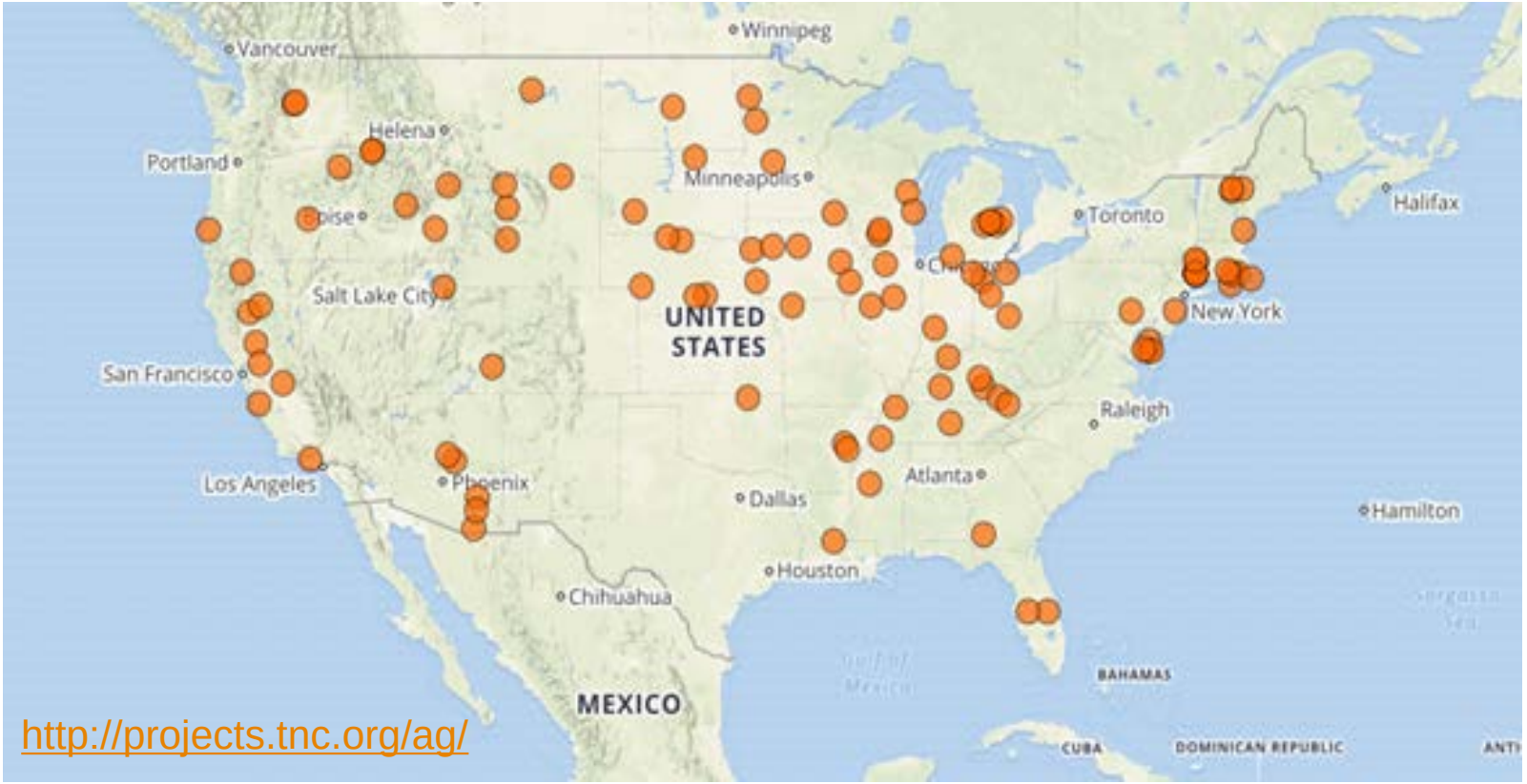
Dozens of agriculture projects are embedded in these whole systems.

North America Region | Agriculture



Irrigation & Grassland Network + Launching a Nutrient Network

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North America AG lands: 371 properties, inc <14,000 acres cropland & <350,000 acres grazing (2014)

*Total grazing acre value includes some entire pasture areas vs. exclusive 'active' grazed area. This division will be addressed in quality review.

Nutrient Goal:

Reverse agricultural nutrient loading trends causing hypoxic zones in freshwater systems and oceans **by 2025**.

How?

- Demonstrate the **value of Precision Conservation** technologies
- Mobilize with the agriculture industry to increase conservation champions and advisors **guiding farmers to deliver those practices**
- Engage the food industry in supply chain initiatives to drive change
- Increase **policy incentives**

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A Systems Approach

Edge-of-Field

Down Stream

In Field

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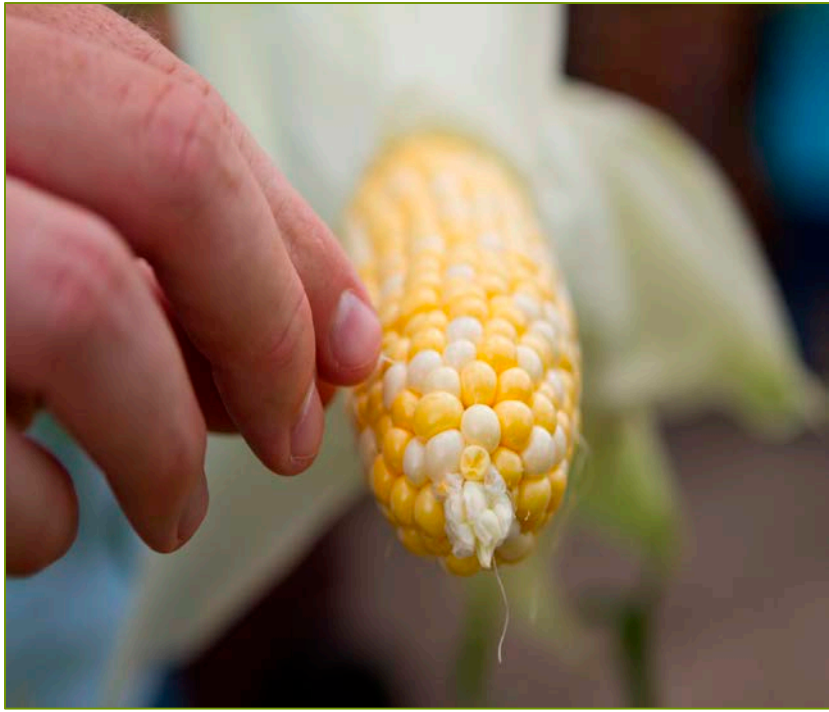
SOIL HEALTH PARTNERSHIP

The SHP – *a 5-year initiative* – seeks to **catalyze sustainable agricultural production** by demonstrating the economic and **conservation value** of improved soil management.



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SOIL HEALTH PARTNERSHIP

We believe soil health is the continued capacity of a soil to function as a vital living ecosystem that sustains plants, animals and humans.

Who Are We?

Administrator

- National Corn Growers Association

Partners

- National Corn Growers Association
- Monsanto

Grants

- Walton Family Foundation
- NRCS Conservation Innovation Grant
- United Soybean Board

Technical Advisor

- The Nature Conservancy

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What Are We Doing?

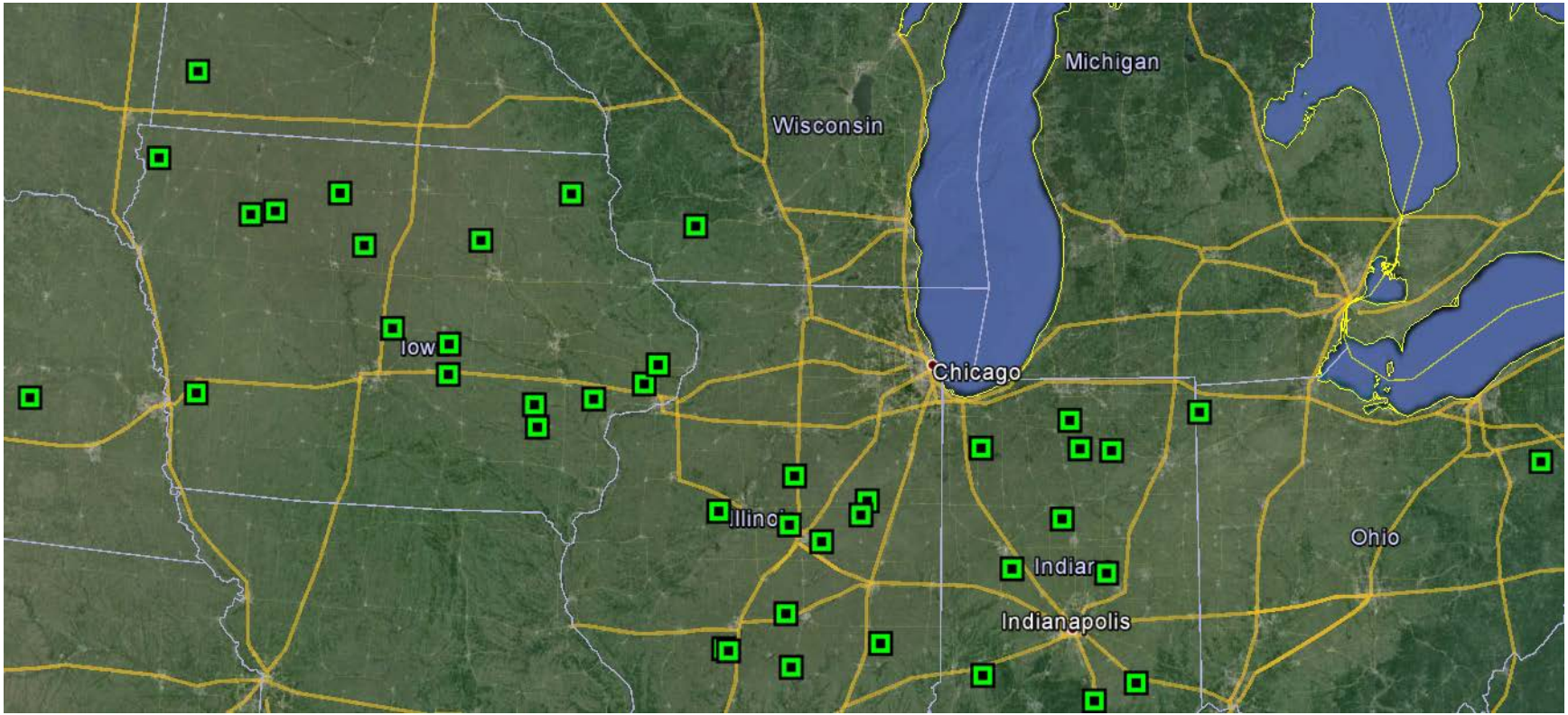
Recruiting a network of demonstration farms showcasing soil health practices (e.g., reduced tillage, cover crops and advanced nutrient management)

Establishing research protocols to measure the connection between a diverse range of economic and environmental practices and outcomes

Publishing findings and recommendations, highlighting the immediate and long-term profitability and sustainability benefits of healthy soil

Supporting networking and technical assistance to help farmers and their advisors make decisions to enhance profitability and sustainability of their soil.

Demonstration Site Network



Water Quality Data from Indiana Soil Health Demo Farm

UNIVERSITY OF NOTRE DAME

Planting cover crops to reduce nutrient loss from agricultural fields and improve water quality

Laboratory of Jennifer L. Tank, Dept. of Biological Sciences, University of Notre Dame

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Protecting nature. Preserving life.™

Problem of Excess:

- Channelized agricultural streams and ditches export excess nitrogen (N), phosphorus (P), and sediments to sensitive downstream ecosystems where they contaminate drinking water, fuel downstream algal blooms with "dead zones", and harm sensitive fish and mussels.

- Excess fertilizer nutrients often enter streams and ditches via tile drains, especially during Winter and Spring when fields are bare.

Cover crops can reduce nutrient loss:

- Cover crops, like ryegrass, are planted after cash crop harvest and their growth coincides with critical times for nutrient export from tiles to streams/ditches.

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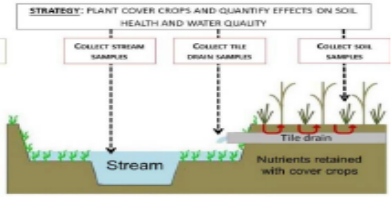
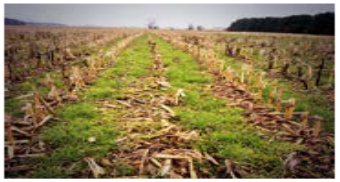
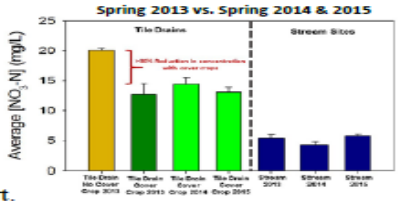
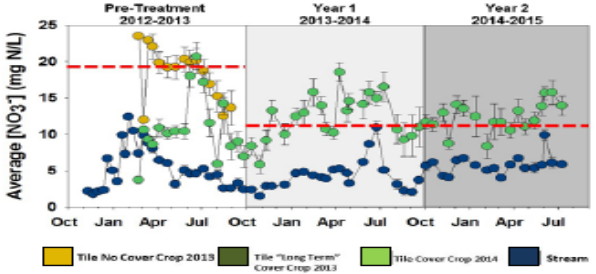






Goal: Retain nutrients/soils on fields, and reduce stream export.

Nitrate-N export from tile drains is lower with cover crops



- Tile drain NO_3^- without cover crops is especially high during Winter 2012 and Spring 2013 (see left panel).

- In 2014 (Yr 1) and 2015 (Yr 2), NO_3^- from tile drains with widespread cover crop planting are lower and similar in concentration to tile drains draining fields w/ long term cover crops.

- Year 1 and Year 2 planting suggests that the planting of cover crops reduces tile drain nitrate concentrations by ~30%.

- Our data suggest that cover crops have the potential to significantly reduce N export from tile drain outlets.

Conclusions:

- Cover crops provide a field-scale management solution that reduces nutrient loss to tile drains and keeps fertilizer on fields.

- Cover crops applied at the watershed scale have the potential to meet current reduction goals set by managers to significantly reduce nutrient export to downstream waters.

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Great Lakes in unprecedented danger, Chicago mayor says

The New York Times

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ever need, some of the best

Fertilizer pollution fears bubble
Toledo water crisis

Experts say that lax rules for fertilizer and creeping climate change brought on algae bloom that tainted city's taps

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Building Relationships can Scale Conservation

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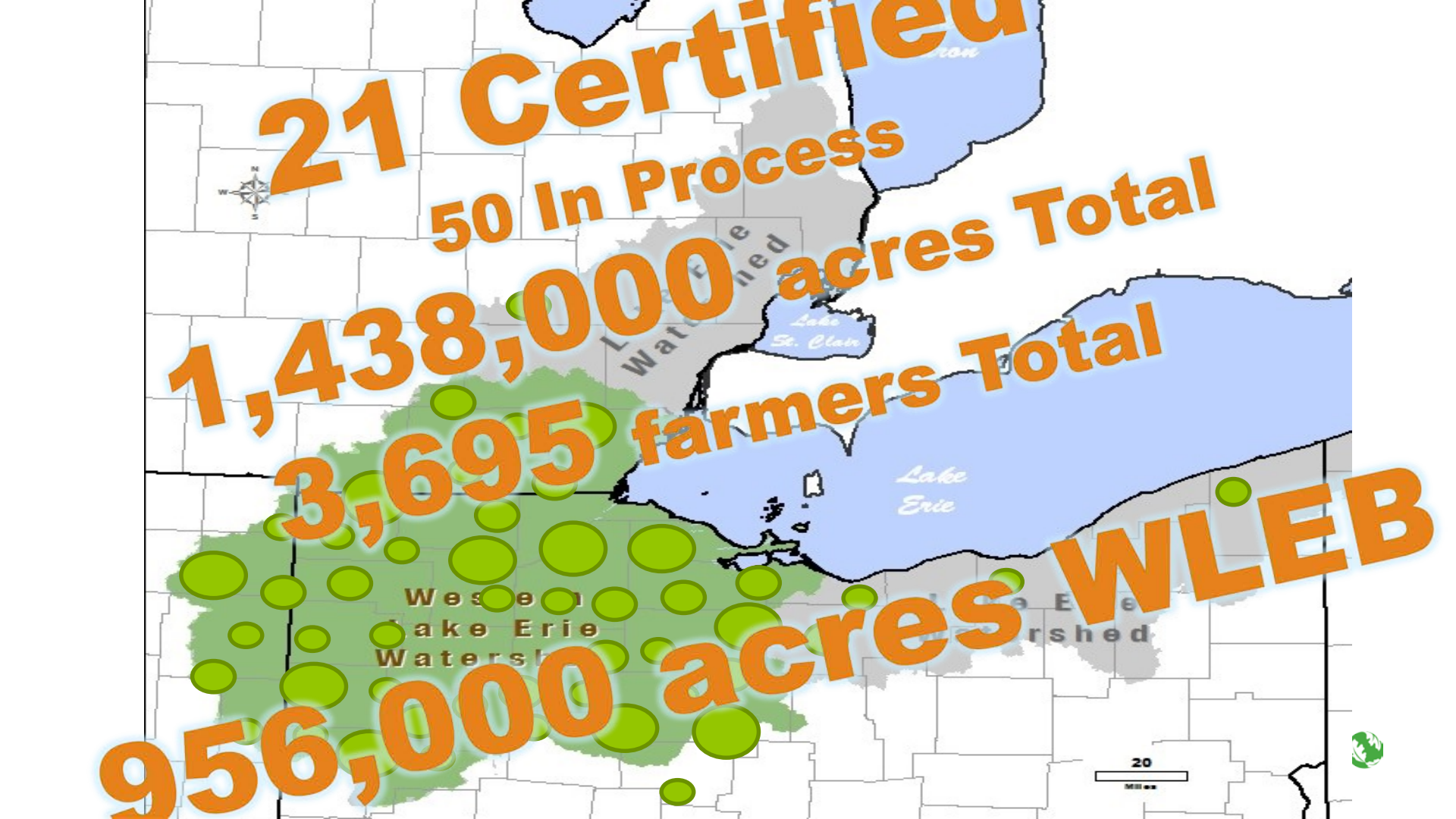
4R Nutrient Stewardship Advisory Committee

NUTRIENT STEWARDSHIP CERTIFICATION

Private Third Party Audito

Nutrient Service Providers

Voluntary


21 Certified
50 In Process
1,438,000 acres Total
3,695 farmers Total
956,000 acres WLEB
Lake Erie
Lake St. Clair
20

Slow the Flow

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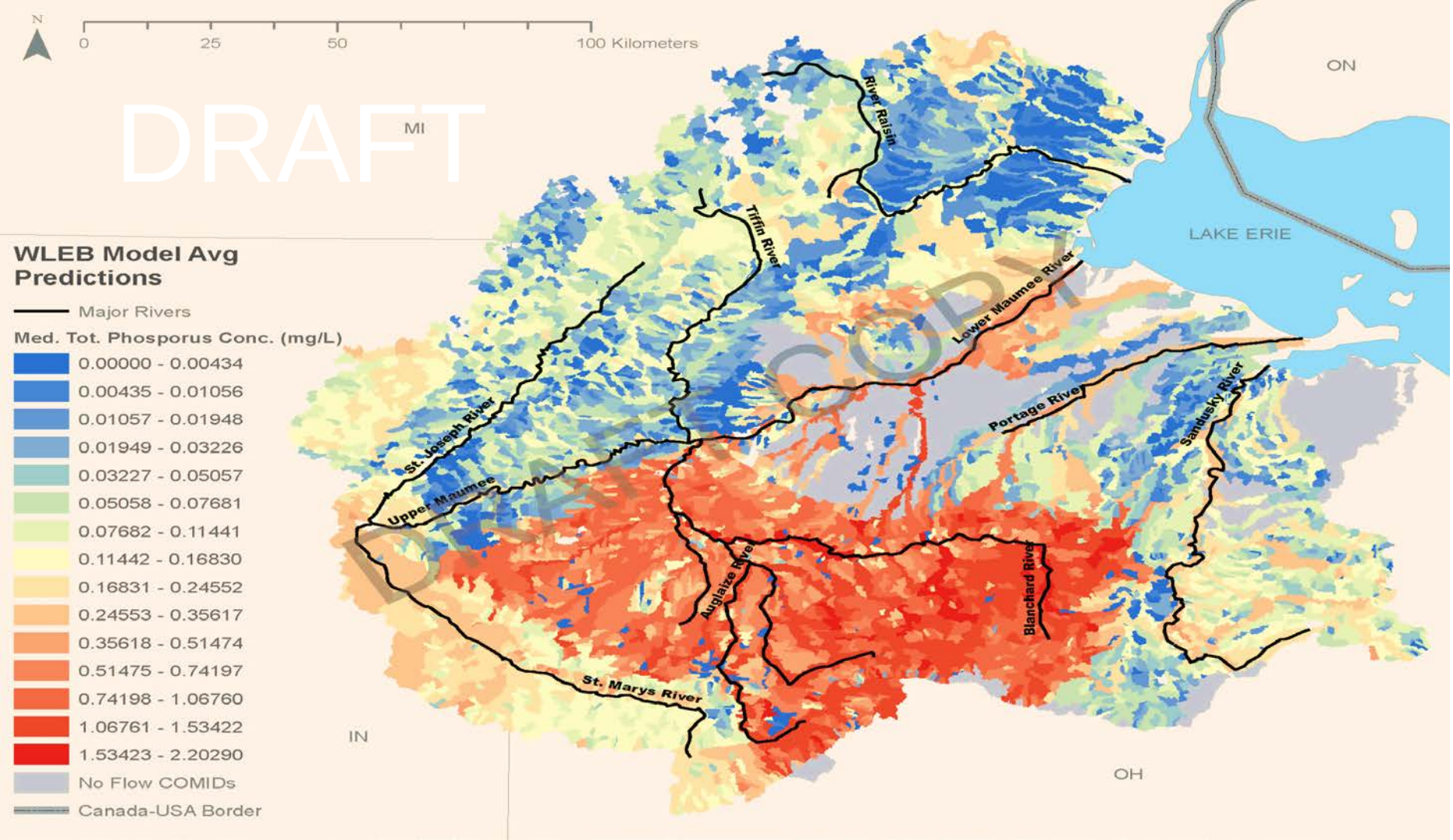
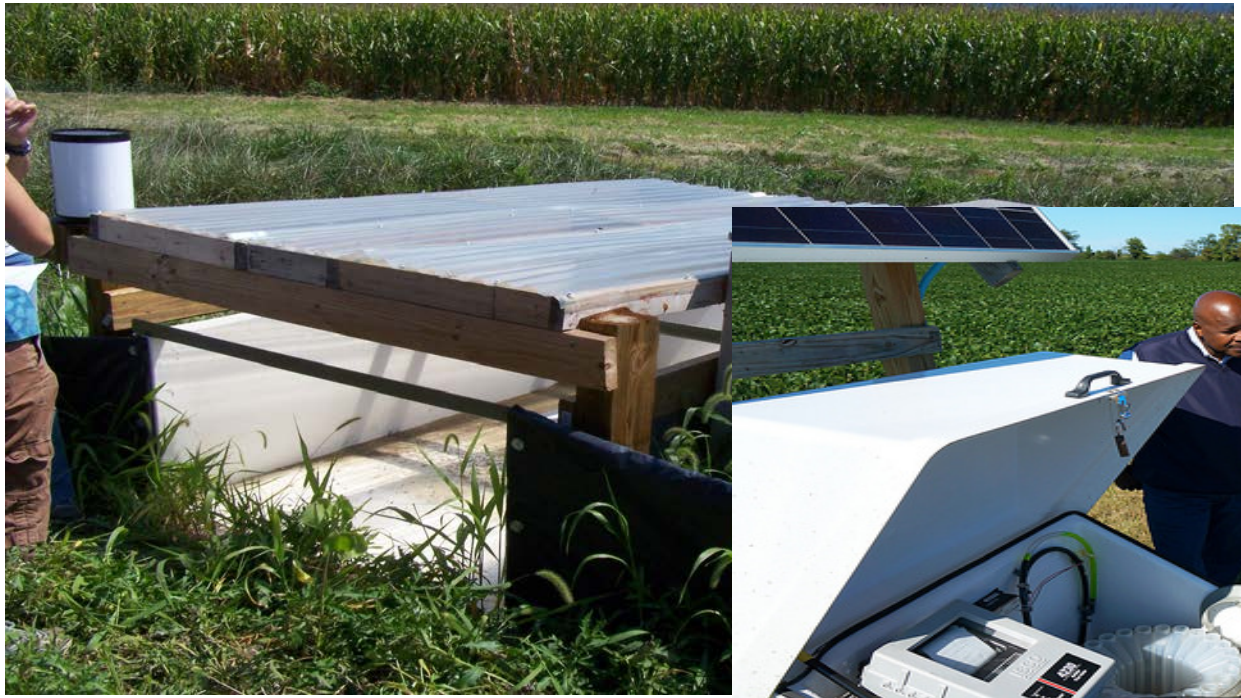

N
0
25
50
100 Kilometers
DRAFT
MI
ON
LAKE ERIE
River Raisin
Tiffin River
Lower Maumee River
Portage River
Sandusky River
St. Joseph River
Upper Maumee
Auglaize River
Blanchard River
St. Marys River
IN
OH
WLEB Model Avg Predictions
Major Rivers
Med. Tot. Phosporus Conc. (mg/L)
0.00000 - 0.00434
0.00435 - 0.01056
0.01057 - 0.01948
0.01949 - 0.03226
0.03227 - 0.05057
0.05058 - 0.07681
0.07682 - 0.11441
0.11442 - 0.16830
0.16831 - 0.24552
0.24553 - 0.35617
0.35618 - 0.51474
0.51475 - 0.74197
0.74198 - 1.06760
1.06761 - 1.53422
1.53423 - 2.20290
No Flow COMIDs
Canada-USA Border

Field → Watershed → Lake



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Nutrient Goal:

Reverse agricultural nutrient loading trends causing hypoxic zones in freshwater systems and oceans **by 2025**.

Success:

- Collaboration with the Private and Public Sector.
- Taking project level work to state and basin scales.
- Use science to develop solutions.
- Understand the economics.
- Voluntary over regulatory. But we need to make progress!

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nature.org/workinglands

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North America Agriculture Program

Thank you!

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