Overview and Findings of The Ohio Lake Erie Phosphorus Task Force

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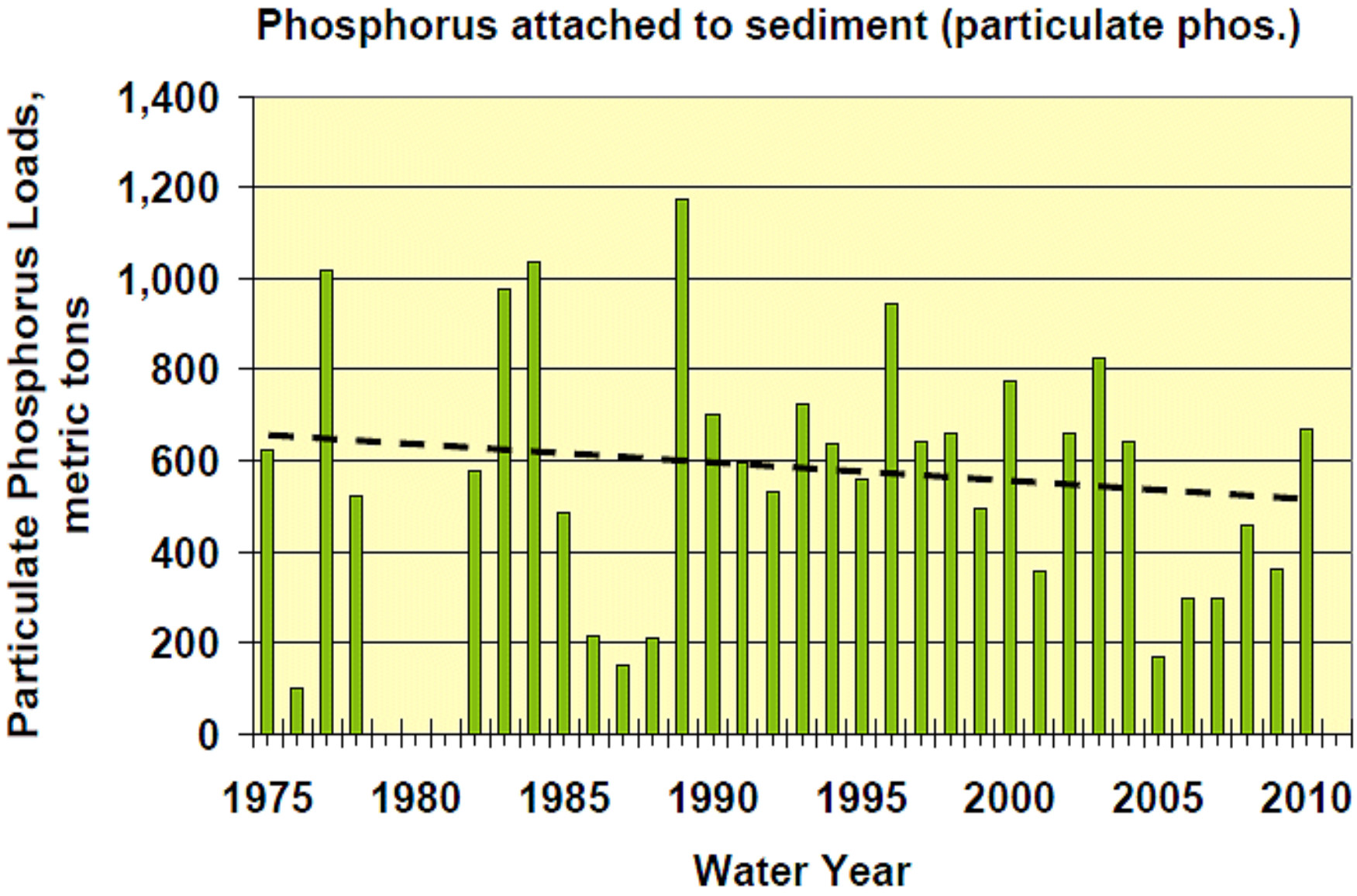
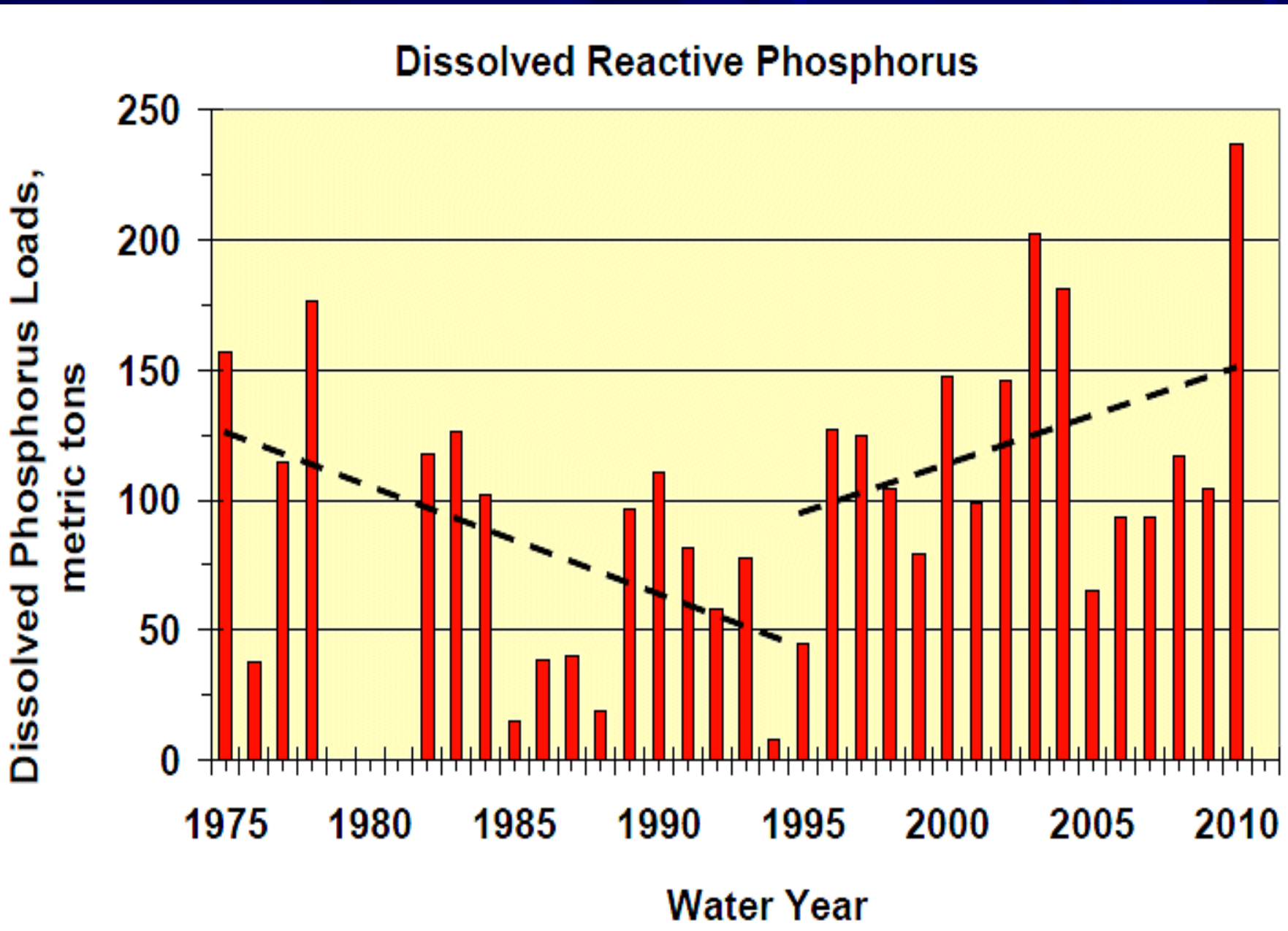
Topics

- Background
- Findings
- Trends in Agriculture
- Recommendations

The Ohio Lake Erie Phosphorus Task Force

- Convened by Ohio EPA
- Purpose is to review data in relationship to current conditions in Lake Erie
- Analyze the correlations in increases in soluble reactive phosphorus levels and corresponding increases in algal blooms
- Both trends began to appear in the mid-1990s


Phosphorus attached to sediment (particulate phos.)
Particulate Phosphorus Loads, metric tons
1,400
1,200
1,000
800
600
400
200
0
1975
1980
1985
1990
1995
2000
2005
2010
Water Year


Dissolved Reactive Phosphorus
Dissolved Phosphorus Loads, metric tons
250
200
150
100
50
0
1975
1980
1985
1990
1995
2000
2005
2010
Water Year

Microcystis bloom August 2003


SEP 19 2008

Lyngbya Wollei

Benthic mats become buoyant and float to surface (Maumee Bay State Park)

Ohio Phosphorus Task Force Members

- Composition
  - State program personnel from Ohio EPA, ODNR and ODA
  - Academia
  - Agricultural agencies and organizations at the federal, state and local level
  - USEPA-Great Lakes National Program Office
  - USGS
  - Wastewater Treatment Plant

P Task Force Approach

- Identify all possible sources of DRP
- Quantify what we can with existing data sources
- Consult with topical experts
- Consult peer-reviewed publications
- Compare *relative contributions* from possible sources
- Develop recommendations

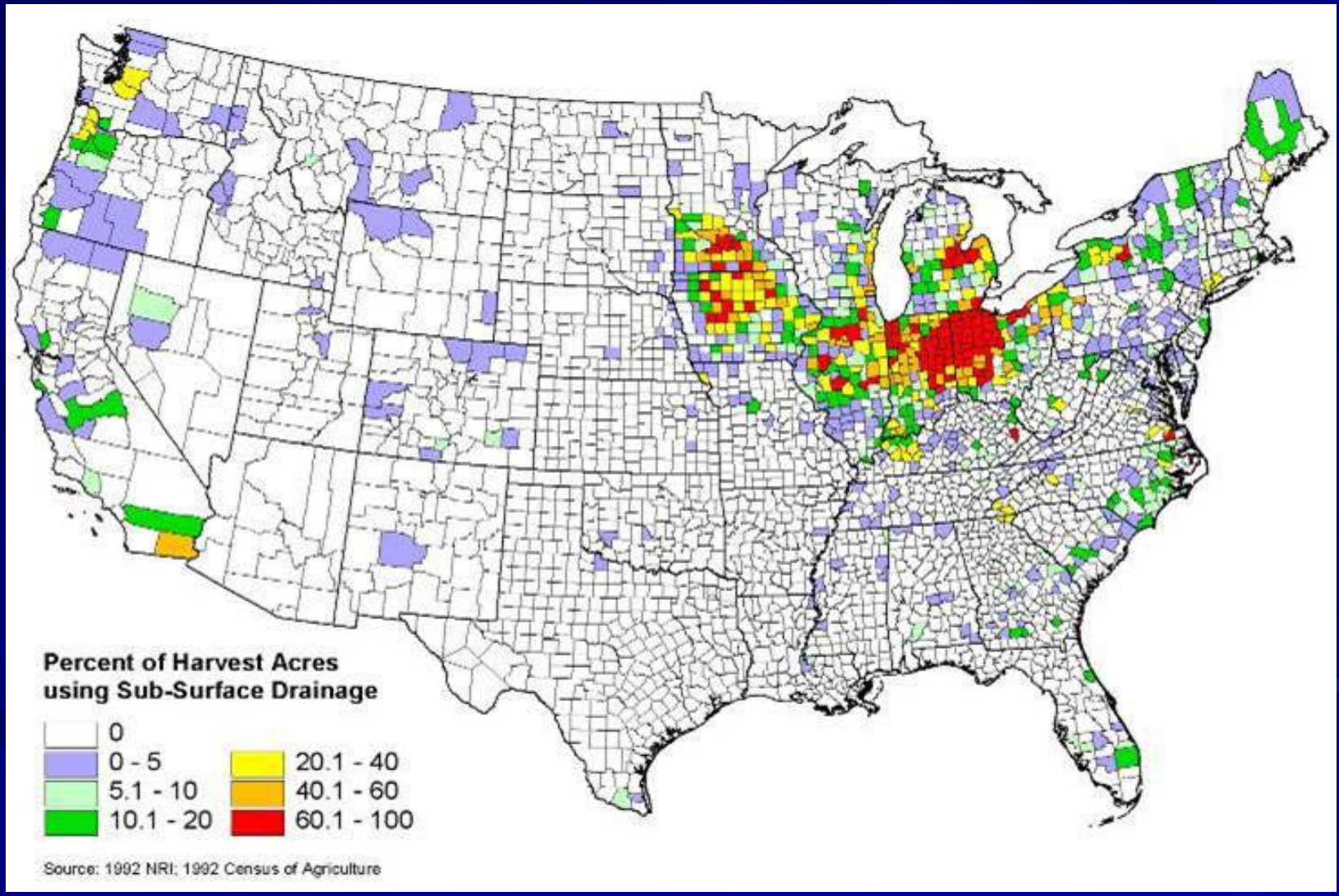
List of Possible Sources

- Point sources
  - POTWs, Industrial, CSOs, HSTS
- Agriculture
- Urban/residential
  - Lawn care fertilizers, storm water, orthophosphate in treated water, dishwasher detergent
- Other
  - In lake loads/recycling
  - Streambank erosion
  - Detroit River/upper lake loads
- Transport mechanisms
  - Subsurface drainage, surface runoff

Findings

- Point sources have remained relatively consistent
- Lawn care – can have localized impact
- Mussels have altered P cycling
  - Extent unknown
  - Processing external sources
- Transport mechanisms – surface and subsurface drainage
  - Relative contribution unknown

Sub-Surface Drainage



Findings

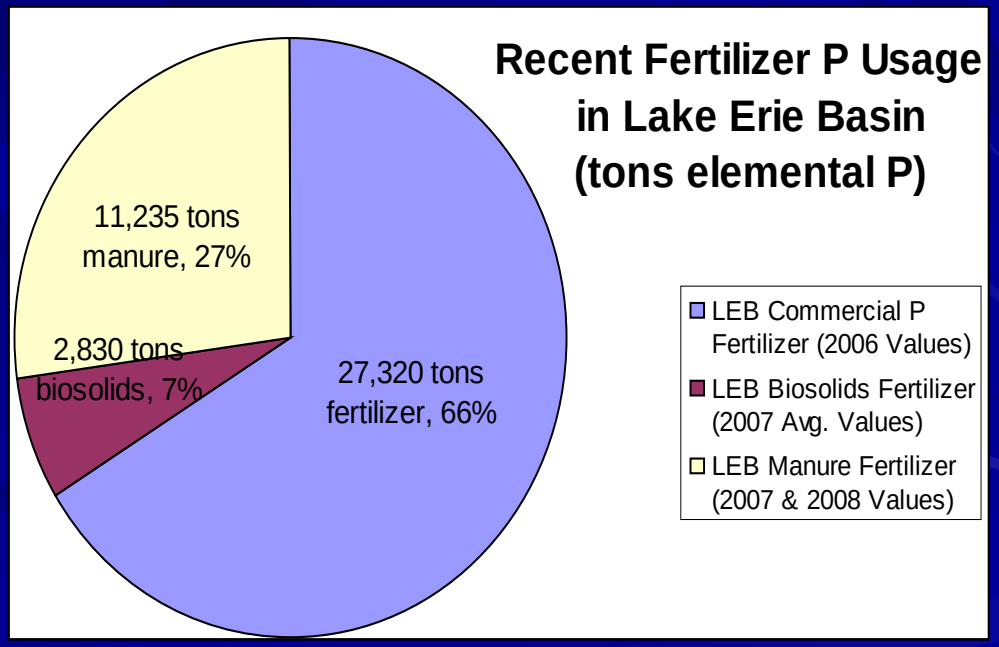
- Soil nutrient interactions are key to understanding nutrient movement
- Soil P naturally fluctuates between dissolved and solid forms
- Soil mineralogy influences solubility
- Other factors, including nitrogen, may be affecting algal blooms

Findings

- DRP loadings are driven by runoff events
- Weather trend changes: higher intensity storms, less snowfall, high winter runoff events
- Multiple contributors; agriculture is key
- Need to look at how we manage our P inputs

Phosphorus Inputs Agriculture

- Biosolids
- Animal manure
- Commercial fertilizer



Trends in Agriculture

- Overall, nutrient inputs are down
  - Biosolids, animal manure, commercial fertilizer
- Larger farms, larger fields and larger equipment
- More year-round operations
- Larger, heavier equipment may be leading to soil compaction

Trends in Agriculture, cont.

- More fall preparation of seed beds, *more fall and winter application*
- Changing methods: more broadcast application without incorporation
- Unknown and uncertain use of soil tests and adherence with recommendations
- Changes in drainage

3 Categories of Recommendations

- Priority practices
- Tools to quantify edge of field runoff potential
- Research

Recommendations - Practices

- Push for “Priority Practices” for nutrient management
- Use innovative approaches to sell these practices
- Apply adaptive management principles
- Key issues:
  - Amount - Incorporation
  - Timing - Management of field runoff

No single practice will result in lower nutrient runoff

Recommendations - Tools

- Ensure consistent, reliable soil tests

  and increase the frequency of testing

- Update screening tools that account for agronomic need and environmental risk

  USE THE TOOLS

  – Link soil test results to fertilizer recommendations

  – Link recommendations to applications

  – Link nutrient management practices to highly variable conditions

Recommendations - Research

- Pursue the Research Agenda: field to stream to nearshore to in-lake
- Review new information, monitor progress, course correct as necessary

Ongoing Efforts

- Research projects currently funded by the Ohio Lake Erie Commission and USEPA and other projects of the Millennium Network
- NRCS work group evaluating the P Index
- Lakewide Management Plan (LaMP)
  - Proposing ecological endpoints (nutrient concentrations)


GSX


30
40
50
MPH

Algal Toxins

- Microcystin
  - World Health Organization benchmark criteria
    - 1 ppb for drinking water
    - 20 ppb for recreational contact
- Anatoxin-a, Saxitoxin, Cylindrospermopsin

Ohio Inland Lakes

- Extreme event in Grand Lake St. Mary's
  - 2009 Microcystin level: 84 ppb
  - 2010 Microcystin level: >2000 ppb
  - Anatoxin-a, saxitoxin and cylindrospermopsin also detected
- Approximately 20 state park beaches posted with advisories

Ohio State Park Beach Algae Advisory Postings

No Contact Advisory	Avoid any and all contact
Toxin Advisory	Avoid direct contact with water
Bloom Advisory	Avoid direct contact with visible scum

www.epa.state.oh.us/dsw

Click: Phosphorus Task Force

www.epa.state.oh.us

Click: Grand Lake St. Marys Algal Bloom Update