Ohio Soil Test Phosphorus and Environmental Issues

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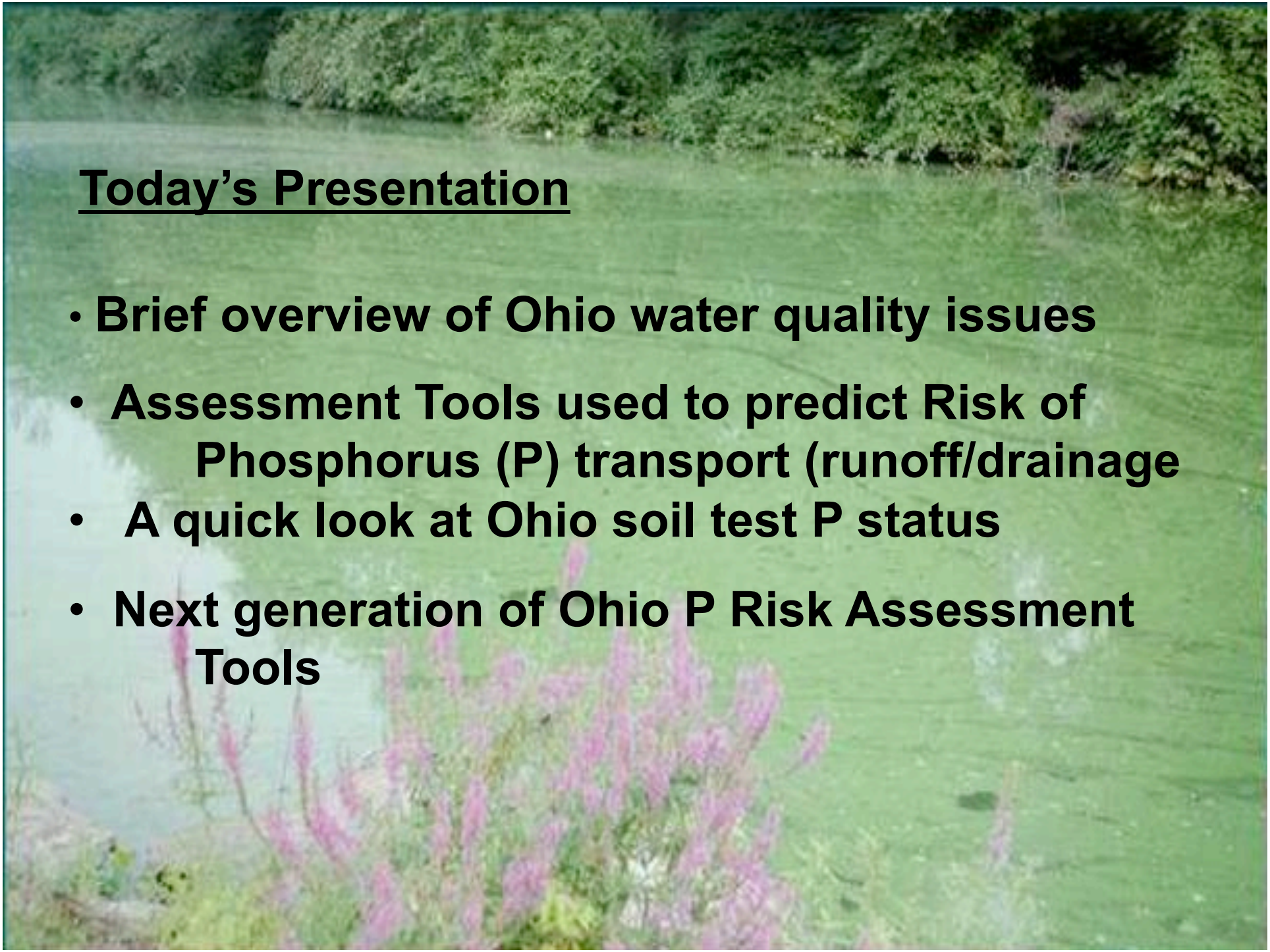
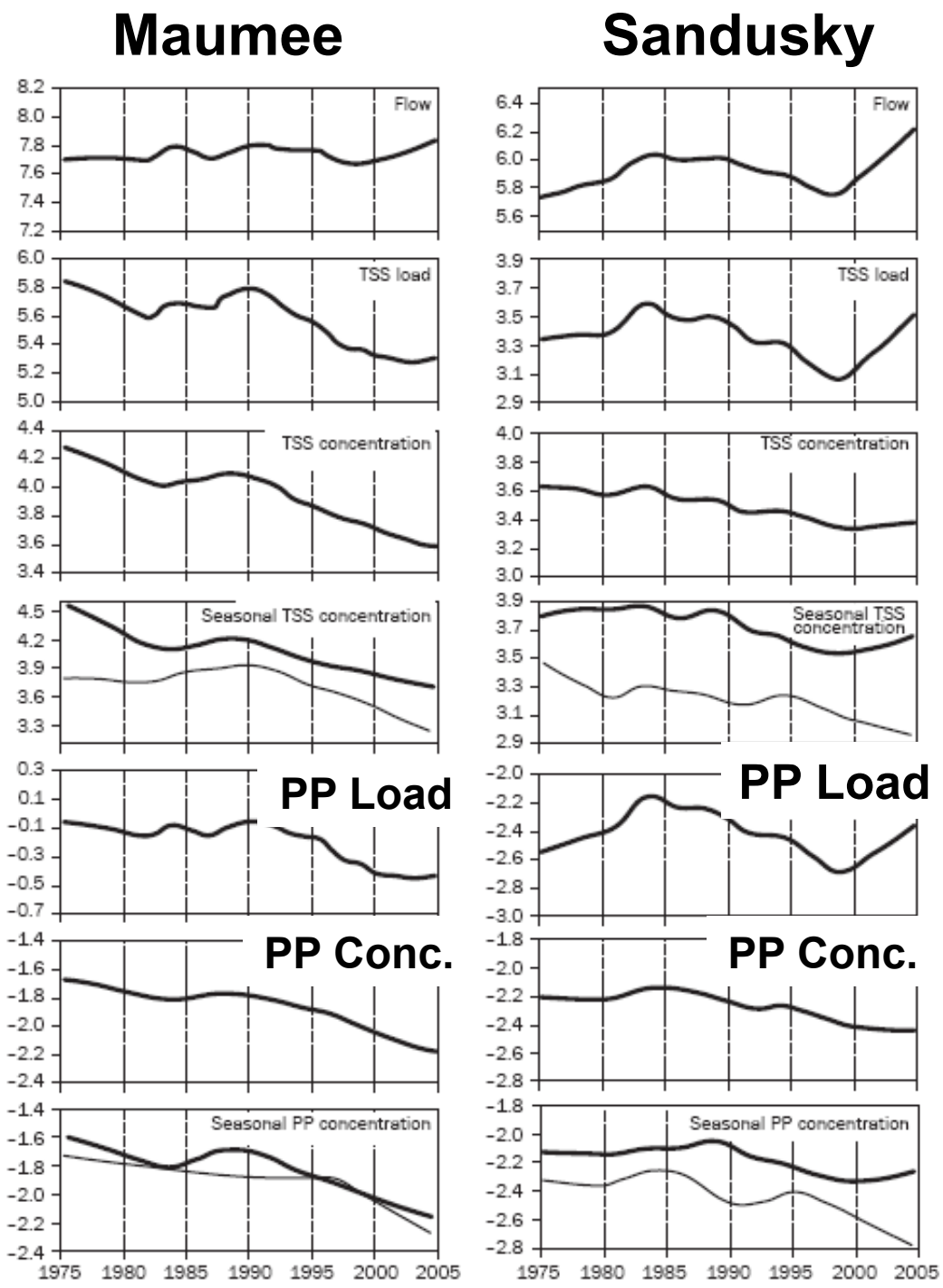

Today's Presentation
• Brief overview of Ohio water quality issues
• Assessment Tools used to predict Risk of Phosphorus (P) transport (runoff/drainage
• A quick look at Ohio soil test P status
• Next generation of Ohio P Risk Assessment Tools



First the Good News!

Data from
Heidelberg University
Tributary Monitoring Program
1975 to 2005

Reductions in PP

Load

Maumee = 33%
Sandusky = 18%

Concentration

Maumee = 37%
Sandusky = 27%

Richards, R.P. et al., 2009.
J. Soil and Water Conservation 64:200-211

Continued

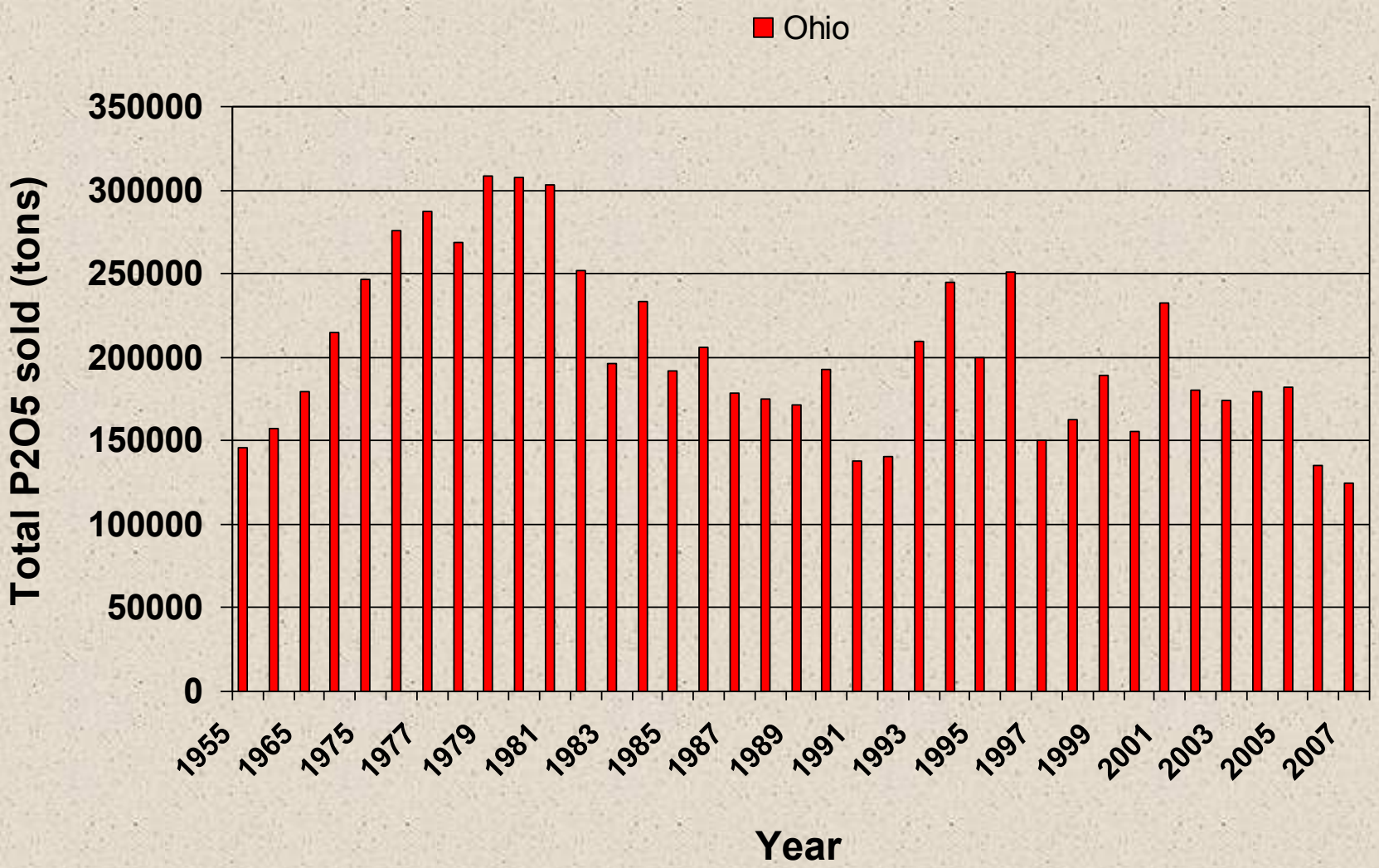
"The management goal of 11,000 metric tons of total P/yr from all sources was first met in the mid 1980s and has been met since then in more years than not."

"….these results are consistent with the expected benefits of erosion-control practices, such as reduced tillage and the use of filter strips."

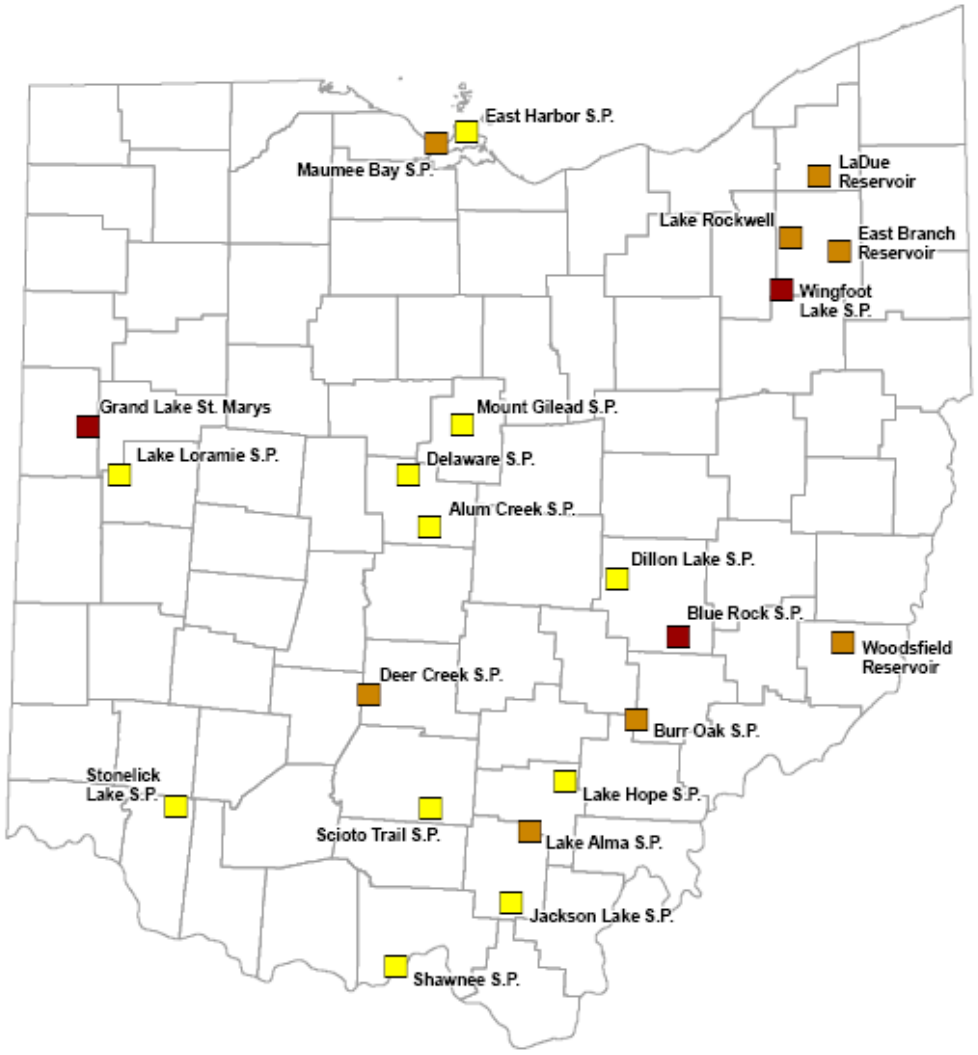
Federal and State USDA conservation programs

Phosphorus Fertilizer Sales Trends

Robert Mullen & Melissa Herman, SENR



Ohio Harmful Algal Bloom Advisories in 2010

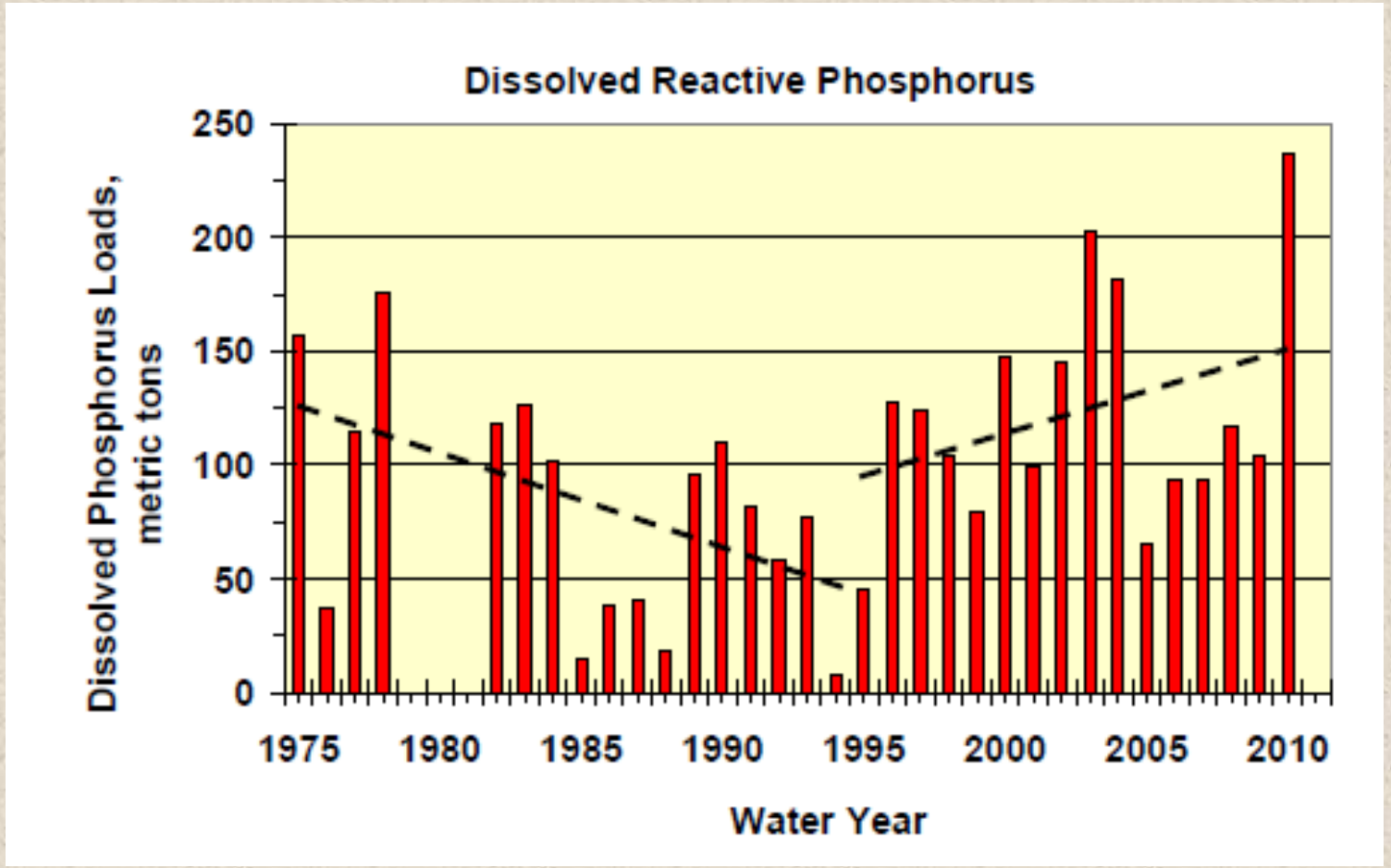


- No Contact
- Toxin
- Bloom

Ohio Environmental Protection Agency

However…
Summer 2010 & 11

Yikes!



National Center for Water Quality Research

Water Quality News and Notes
Technical Supplement

Heidelberg College
www.heidelberg.edu/wql
310 East Market Street
Tiffin, Ohio 44883-2462
Phone: 419.448.2198
Fax: 419.448.2345

July 19, 2010

Record Amounts of Dissolved Phosphorus Hit Lake Erie

ODNR Distressed Watershed Rules
Grand Lake St Marys

http://www.dnr.state.oh.us/portals/12/water/watershedprograms/GLSM/Watershed_in_Distres_FactSheet.pdf


Distressed
also??
Lake Erie Algal Bloom
Western Basin

In Response to Increased Degradation of Ohio Surface Water

OEPA Lake Erie Phosphorus Task Force

- Convened in 2007
- Charge: To identify and evaluate potential point and nonpoint sources of P loading to Lake Erie

Final Report 2010

http://www.epa.state.oh.us/portals/35/lakeerie/ptaskforce/Task_Force_Final_Report_April_2010.pdf

One Major Finding

Agriculture is a primary source of P to Lake Erie

Research Needs

Consensus: Examine/Revise
Ohio Agricultural P management Tools
To reduce P transport

What Are the Edge-of-Field Nutrient Transport Concerns??

Transport of sediment-bound and dissolved P on both concentration and load (vol. water x conc.) basis

Ohio Agriculture is Being Targeted due to P transport into Ohio surface waters

P is culprit for harmful algal blooms

Will Ohio Agriculture Take the Lead in Protecting Water Quality While maintaining production?

Avoid additional regulations

Good Public Relations

Ohio Phosphorus Management Tools

In Ohio, the risk of agricultural P transport to surface water is assessed by the Ohio USDA-NRCS:

Phosphorus Risk Index (P Index) Assessment Procedure

within the
Nitrogen and Phosphorus Risk Assessment Procedures

Critical Part of Ohio Nutrient Management Plans (NMPs)

http://efotg.nrcs.usda.gov/references/public/OH/Nitrogen_and_Phosphorous_Risk_Assessment_Procedures.pdf

Ohio P Risk Index Framework

P Index Score = **Transport Factors** + **Source Factors**

Runoff potential
Erosion potential
Connectivity to water
Filter Strip yes/no

Soil test P (STP)
Planned P
Application amount & method

Evaluates risk P tranport at the field-scale

Lake Erie Protection Fund Study

Analysis of Soil Testing Laboratories & Data Mining
Mullen & Dayton,

Collected > 1,000,000 STP data points back to 1992
Representing 50 Ohio counties
at zip code resolution

Special Thanks !
to
A&L, Brookside, and
Spectrum Analytic

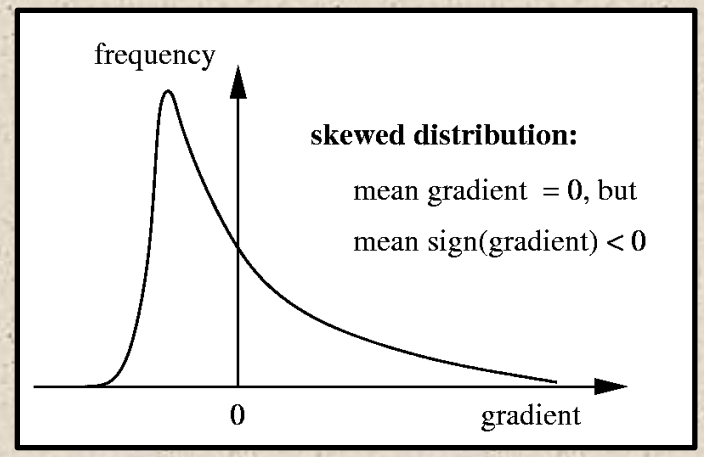
Some Data Issues

Data only represents those who soil test

- **Good stewards**
- **CAFO**
- **Farm Bill Conservation program participants**
- **No assurance that these were “normal” field soils**

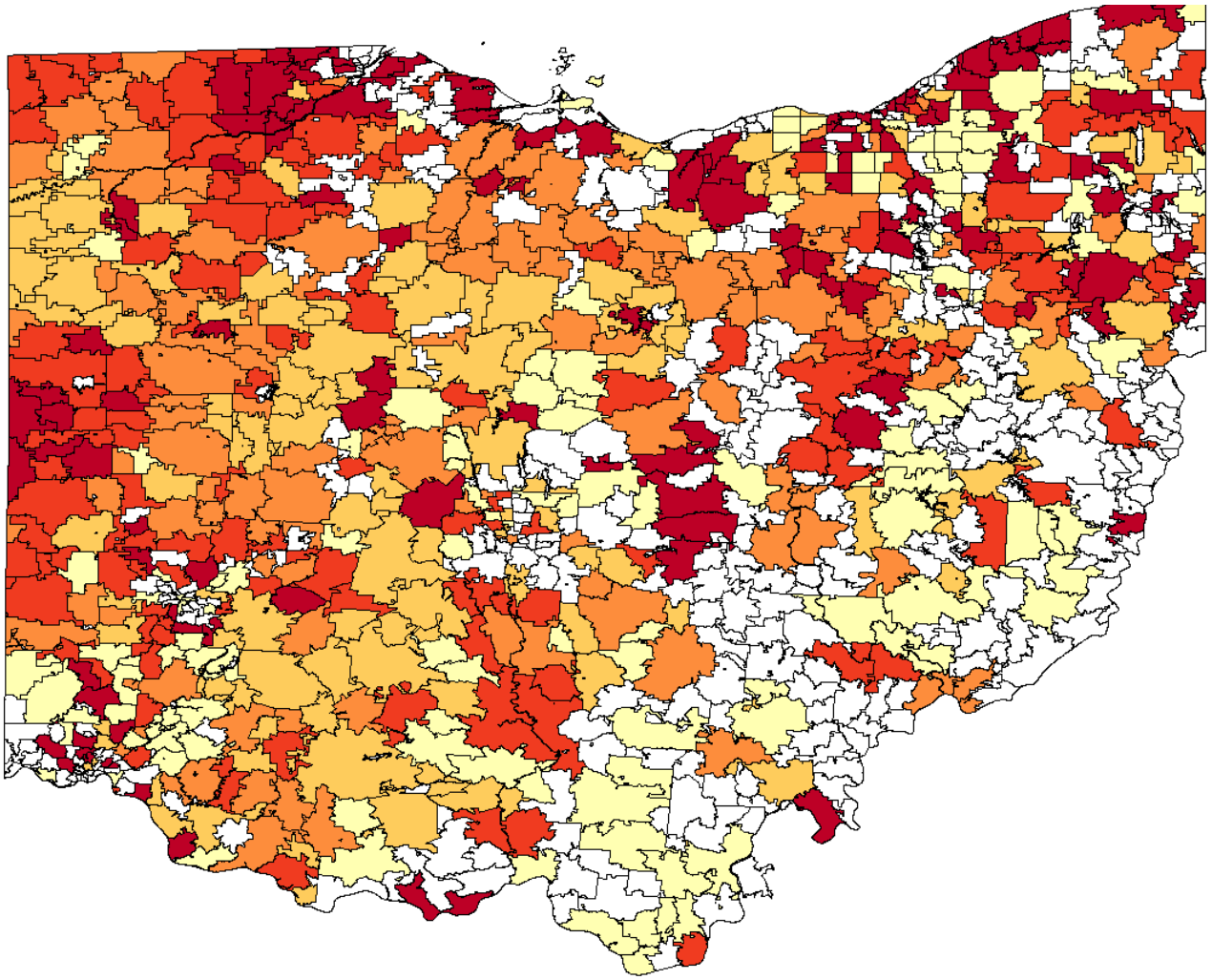
Large variation in numbers of samples/zip code/region over time period

Potential for huge ranges in STP creating skewed distributions



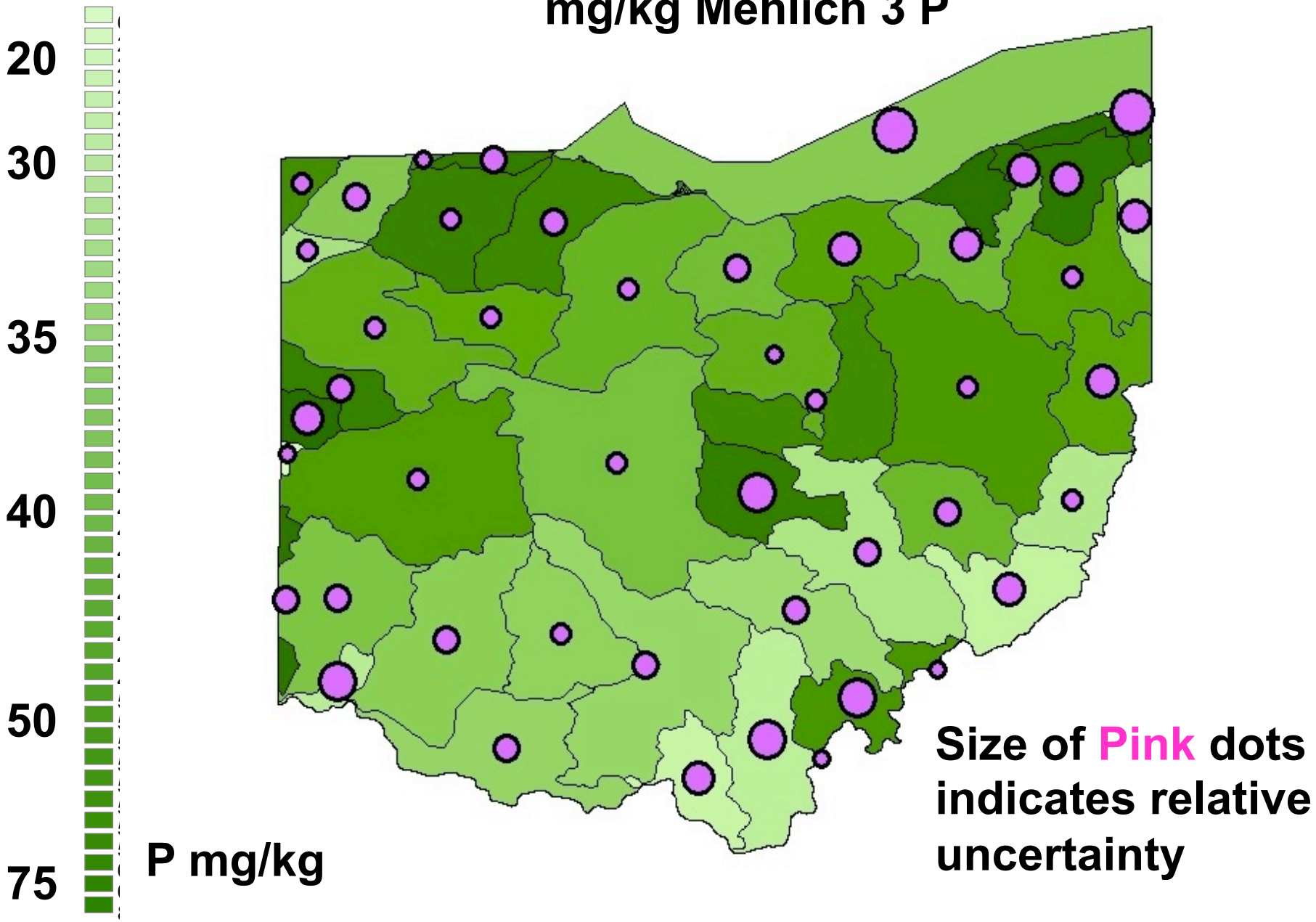
Is it possible some of these are not soils, but may be manure samples or paddock samples?

Spatial Distribution of Median P STP by zip code

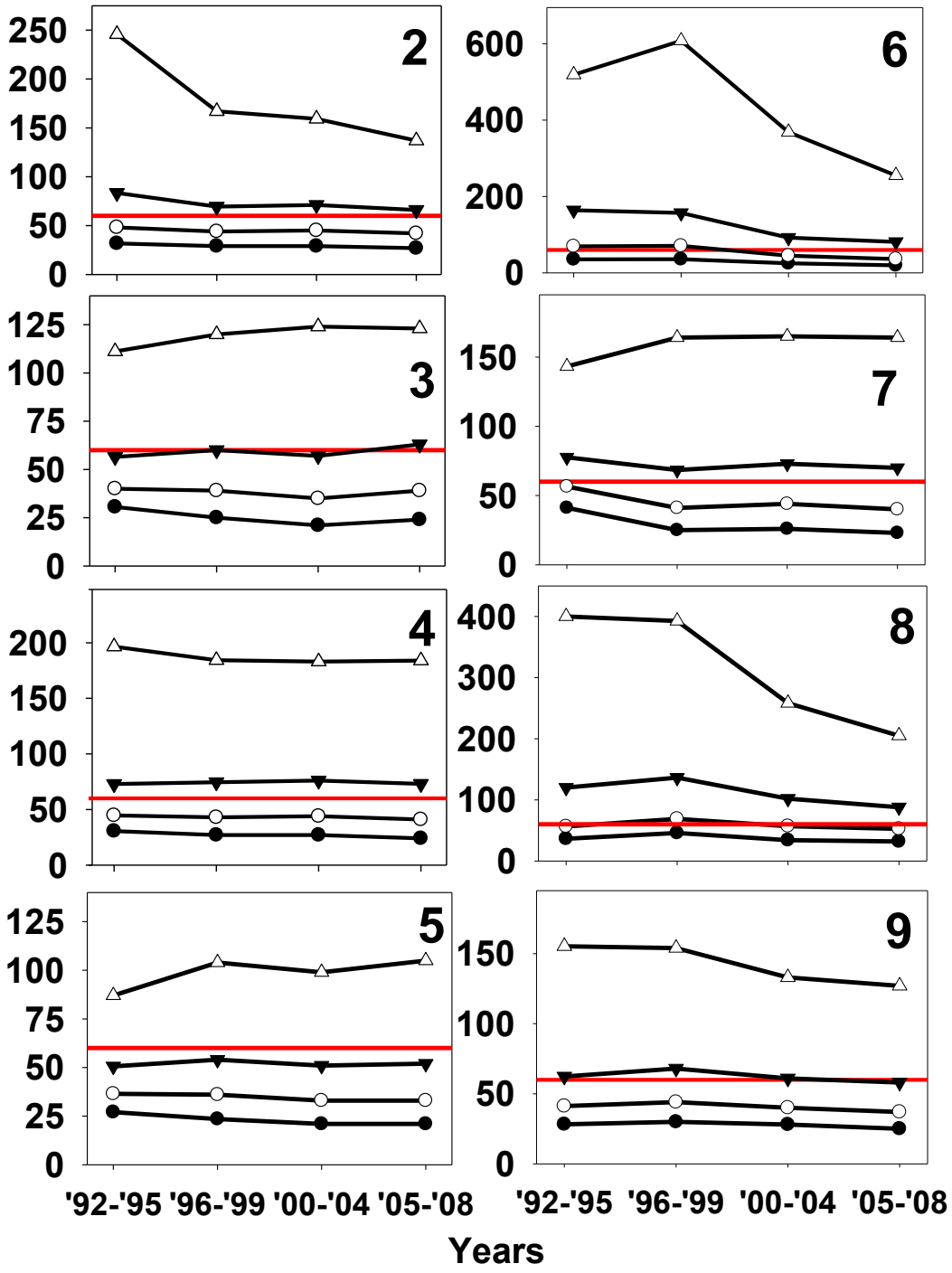


Range 4 to > 64 mg/kg

Median (50 percentile) Sub Region STP mg/kg Mehlich 3 P



Trends in STP
1992 - 2008



Reference Line
60 ppm M3P

<u>Percentiles</u>
Gives overview of frequency distribution of STP

Next Generation Ohio P Management Tools

Ohio P Risk Index Initiative (OPRII)

Because the P Index provides a field-scale estimate of *Risk* of P transport off farm fields

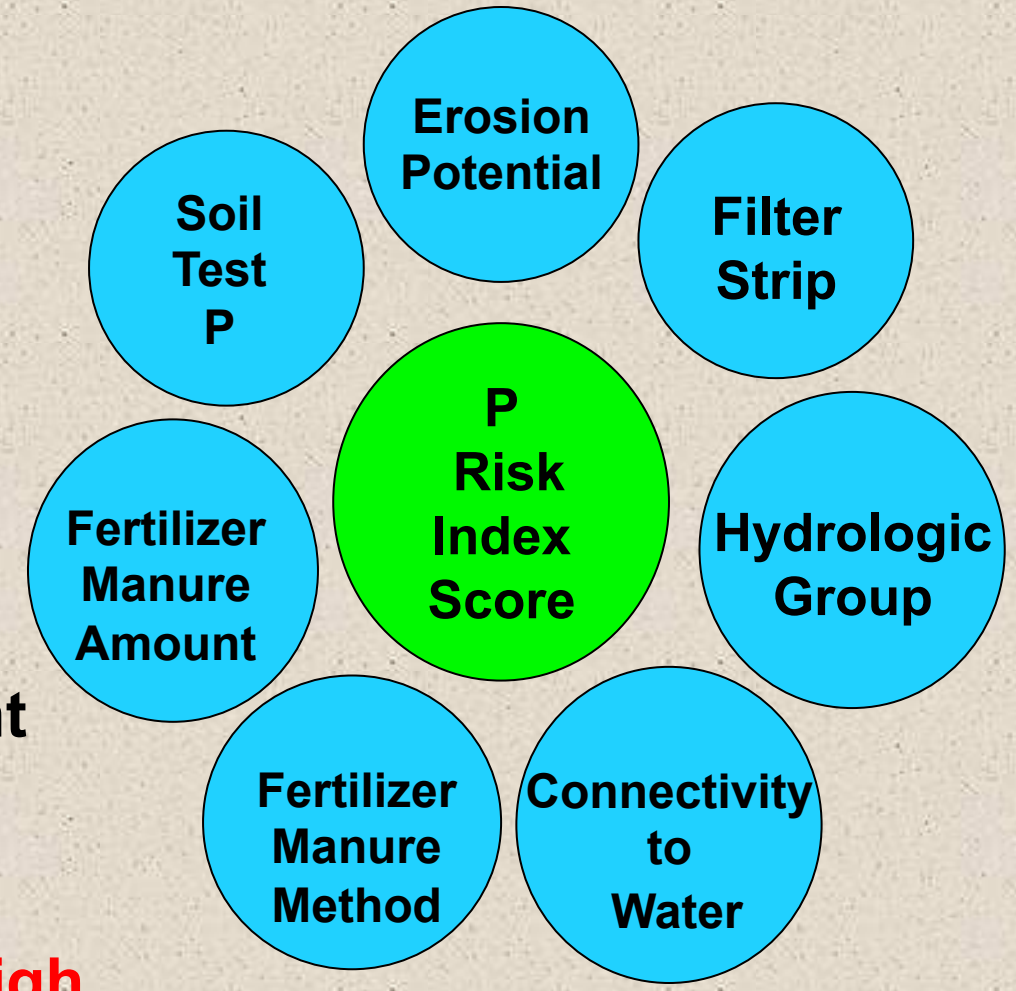
Used to judge performance !!

Objectives:

1. **Provide confidence that Ohio P Index score accurately reflects risk of P transport at the edge-of-field**
2. **Increased management options (BMPs) integrated into the Ohio P Index for fields with high scores**
3. **Promote broad implementation of revised/improved Ohio P Index to protect Ohio surface water quality**

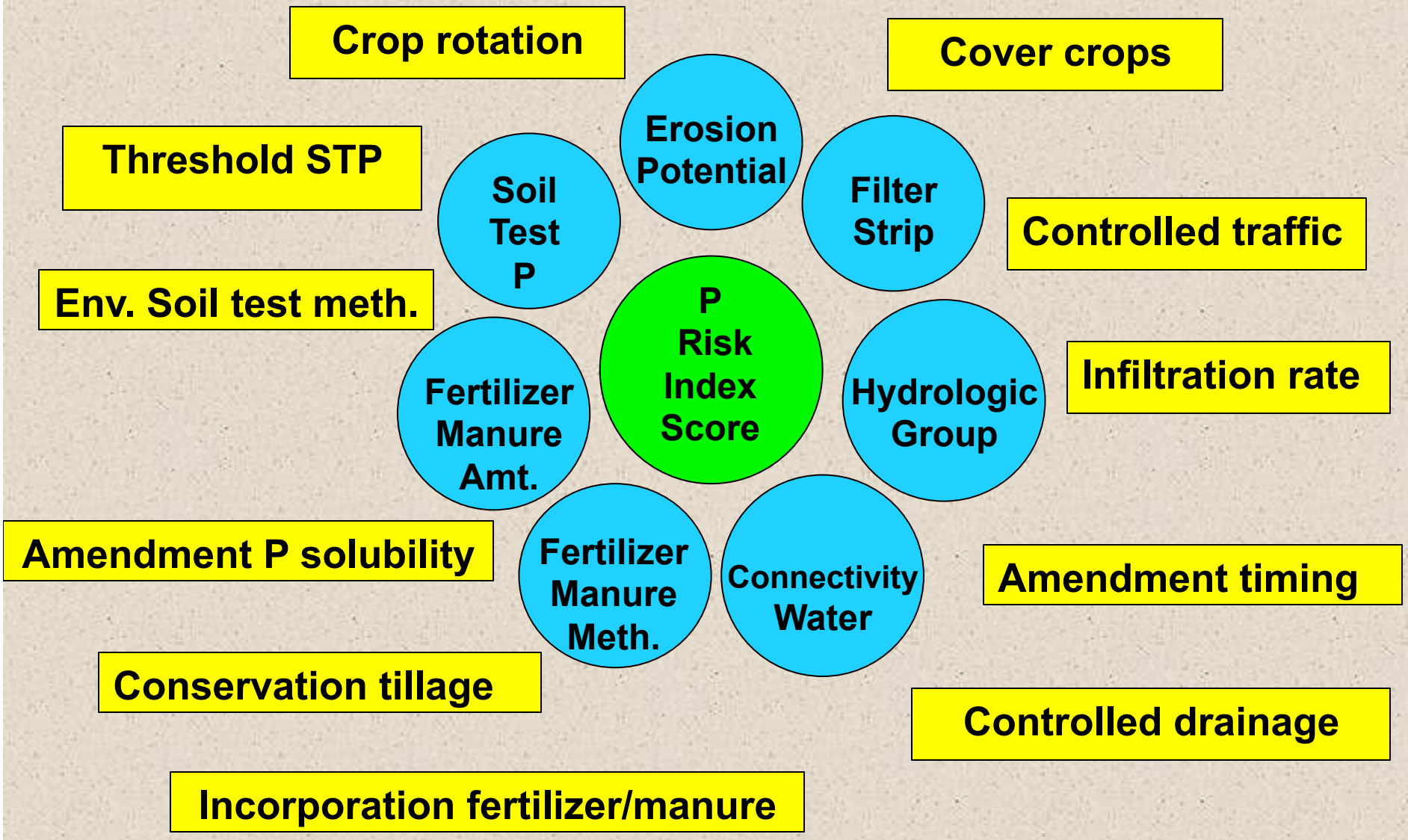
1. **Validate/Revise Current Ohio P Index:**
   Ensure P Index Scores accurately reflect P transport RISK at the field-scale using, edge-of-field monitoring

Parameters used in current Ohio P Index to calculate scores



Low, medium, high & very high risk

2. Integrate additional (BMPs) into P Index
Give Farmers more management options



3. Implement Revised Ohio P Index

On-Line Interactive Tool

Develop easy to use on-line, interactive, GIS based tool so farmers can calculate their Index Score

Further! Additional BMP options to choose from to reduce P transport risk and Ohio P Index score

Important !!

If a BMP NOT Officially in Ohio P Risk Index Farmer does NOT get CREDIT for it

Conclusions

NEED to REDUCE P load to Ohio surface waters

The Ag Community can take the lead in this effort

Soil Test P is an important component

The Ohio P Index can play an important role in P management

Good Ohio P Index Scores will provide GOOD DEFENSE for farmers

Once revised, the P Risk Index will only be effective if it is routinely utilized

The OPRII Team…… So far

E.A. (Libby) Dayton Soil Scientist	Kevin King Hydrologist/Engineer	Chris Holloman Dir. Statistical Consulting
OSU Extension		Ohio Soybean Council
Ohio Department of Agriculture	Ohio Small Grains	NRCS Natural Resources Conservation Service

Questions??

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School of Environment and
Natural Resources