Too Much of a Good Thing: The Problem of Nutrient Pollution

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September 14, 2019

Great Lakes-St. Lawrence Legislative Caucus

Great Lakes Commission des Grands Lacs

CSG MIDWEST

PATRICIA BIRKHOLZ INSTITUTE FOR GREAT LAKES-ST. LAWRENCE POLICY

N-P-K


10-0-2
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NET WT 1.5LB (680g)


SPRINKLE
1 scoopful* per 2 gal. pot or 4 sq. ft.
MIX
into top 1-3 in. of soil
WATER
regularly
REAPPLY
every 6 months
FEEDS UP TO 6 FULL MONTHS
Osmocote Plus
Performance Guaranteed
OR YOUR MONEY BACK.
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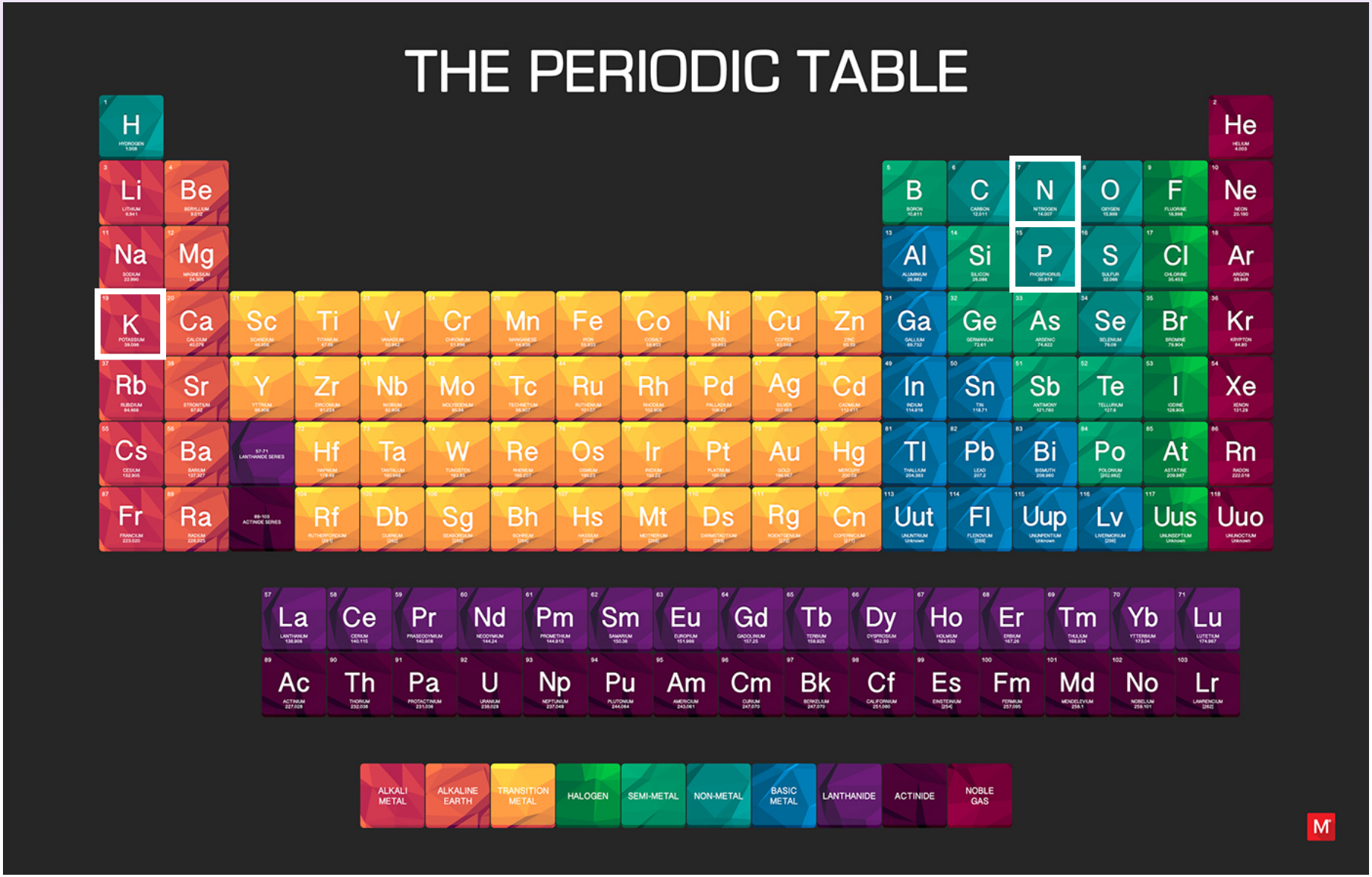
GUARANTEED ANALYSIS
KEEP OUT OF REACH OF CHILDREN

Nitrogen

Phosphorus

Potassium?


THE PERIODIC TABLE
ALKALI METAL
ALKALINE EARTH
TRANSITION METAL
HALOGEN
SEMI-METAL
NON-METAL
BASIC METAL
LANTHANIDE
ACTINIDE
NOBLE GAS

Nutrients & Water Quality Impacts

Phosphorus

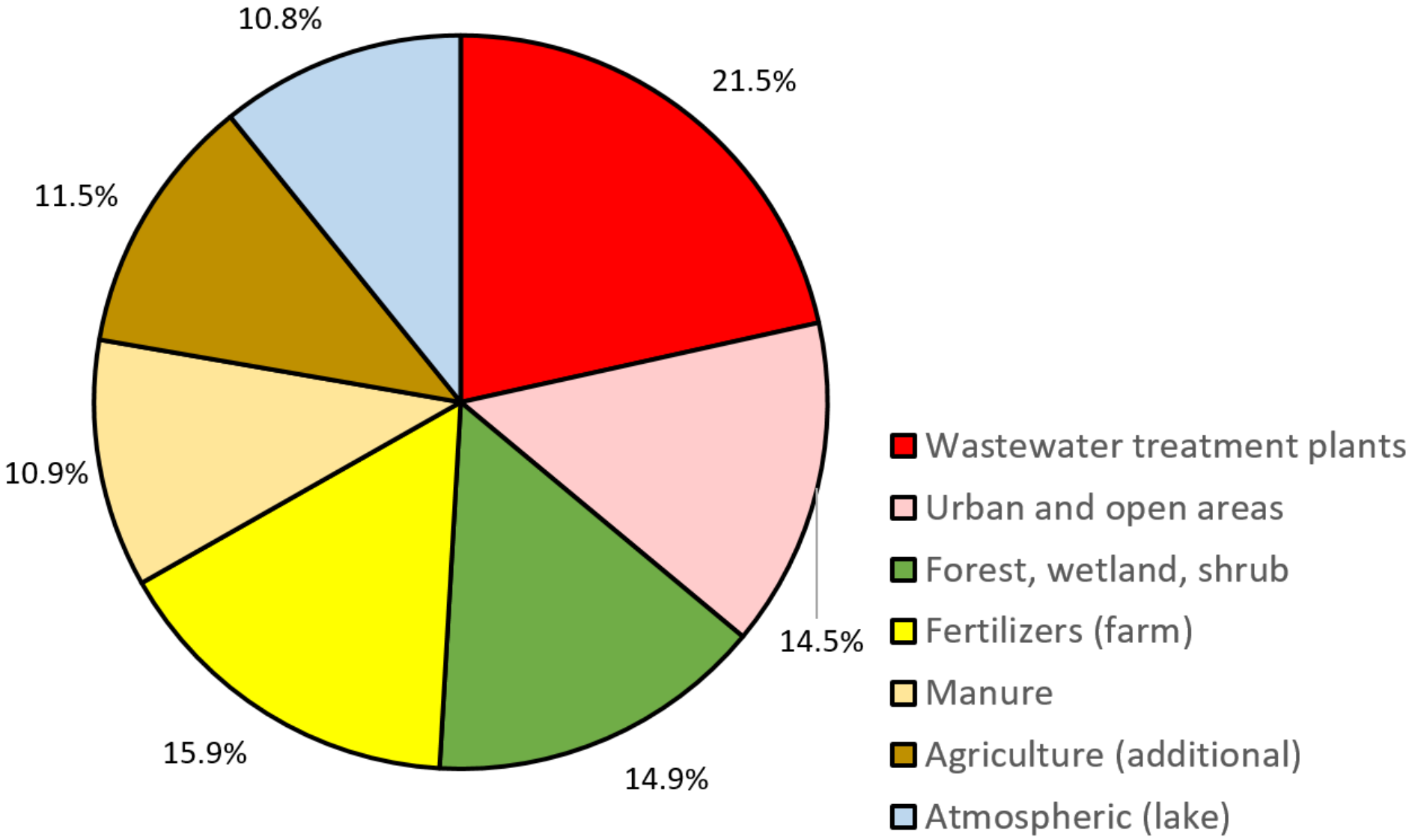
- ✓Algae (harmful & nuisance)
- ✓Harmful algae may produce algal toxins
- ✓Decomposing algae depletes oxygen, creating hypoxia or dead zones

Nitrogen

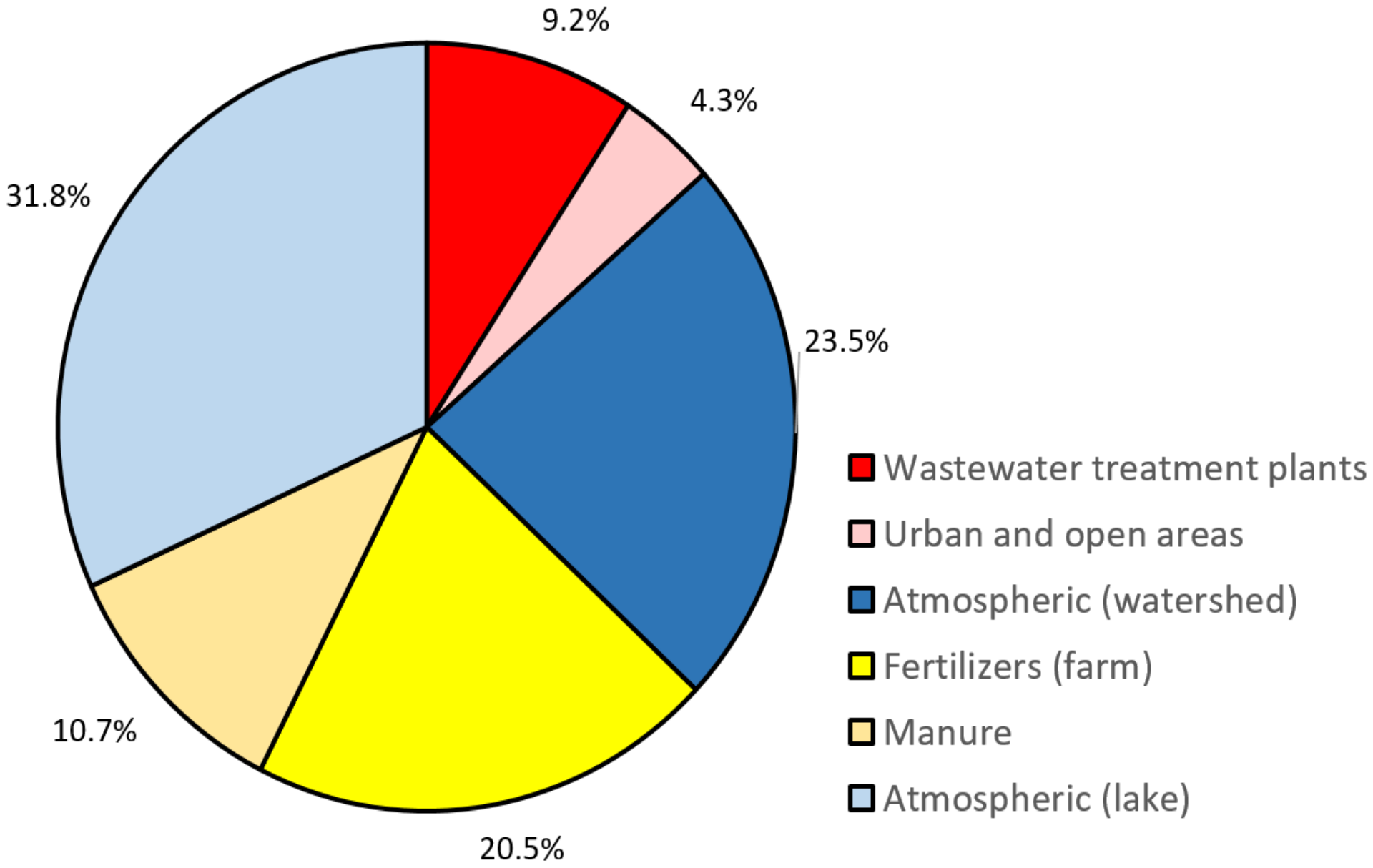
- ✓Also contributes to algal bloom formation & toxicity
- ✓Acute threat to drinking water ("Blue Baby Syndrome," *methemoglobinemia*)

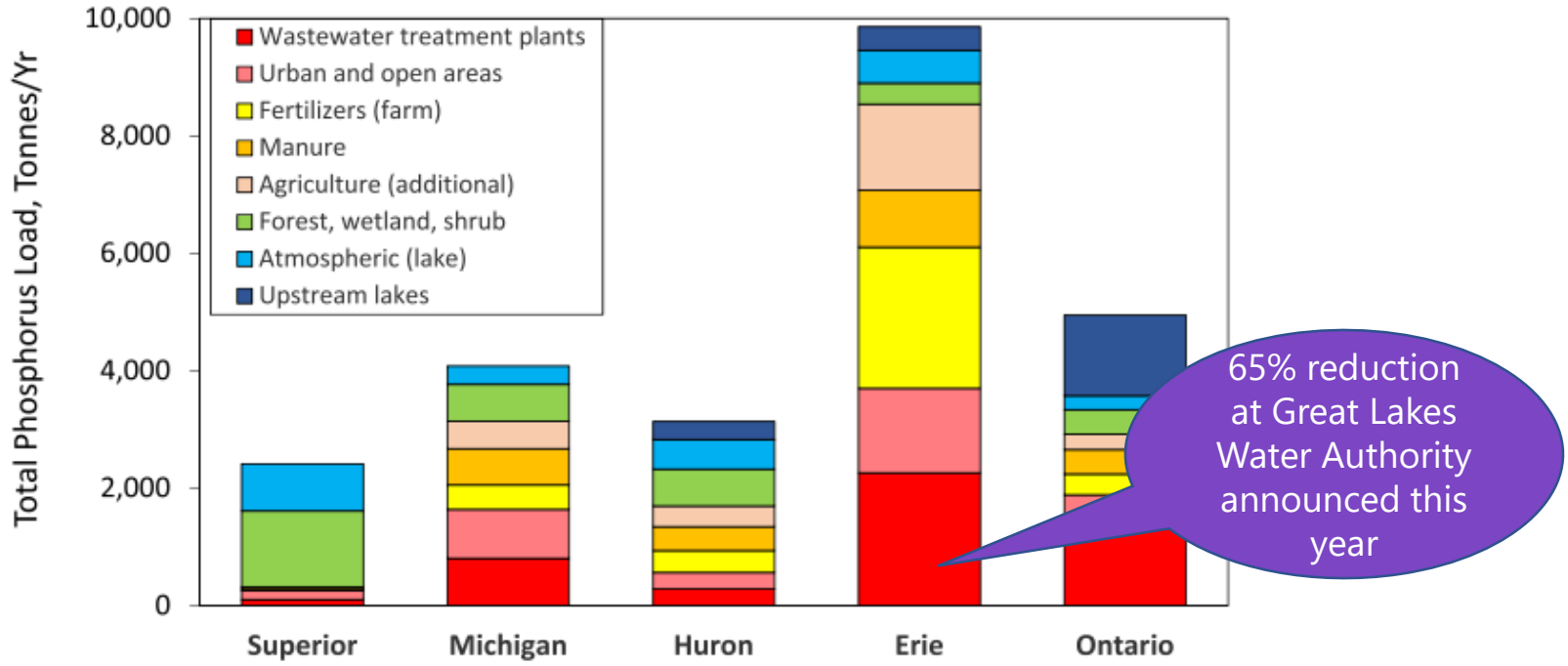
Total Phosphorus Contributions to the Great Lakes

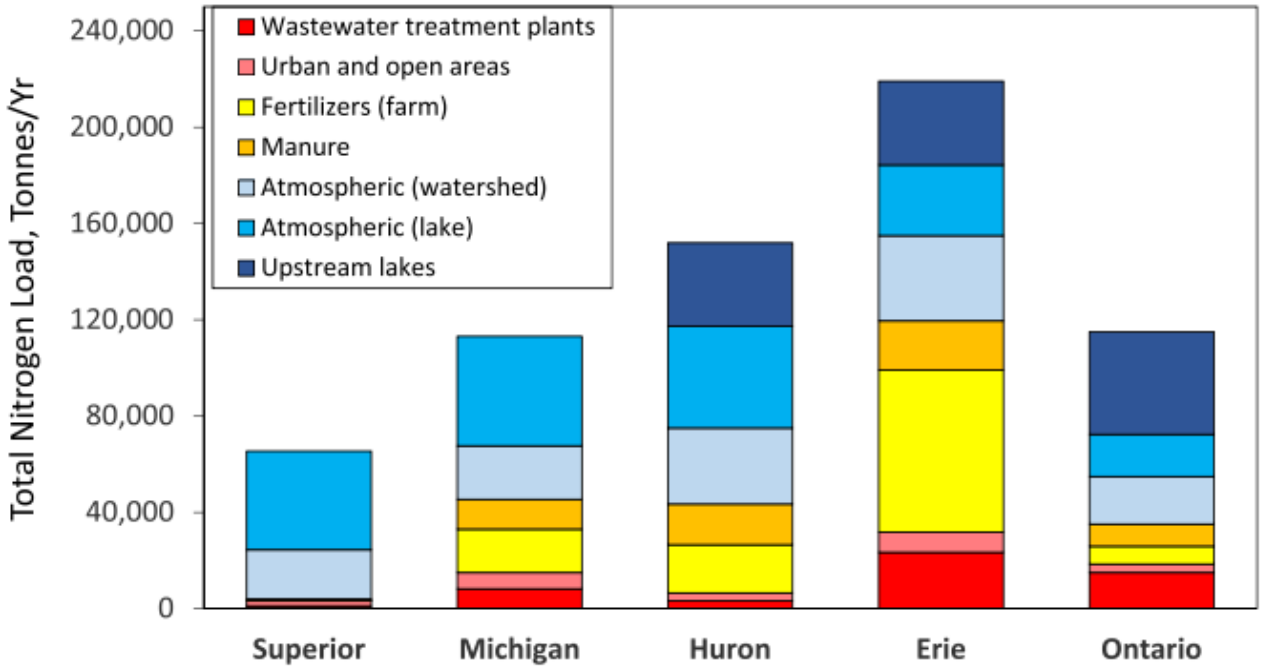
2002 data sources, presented by Robertson et al., 2019; JAWRA



Total Nitrogen Contributions to the Great Lakes







Robertson et al., 2019; JAWRA

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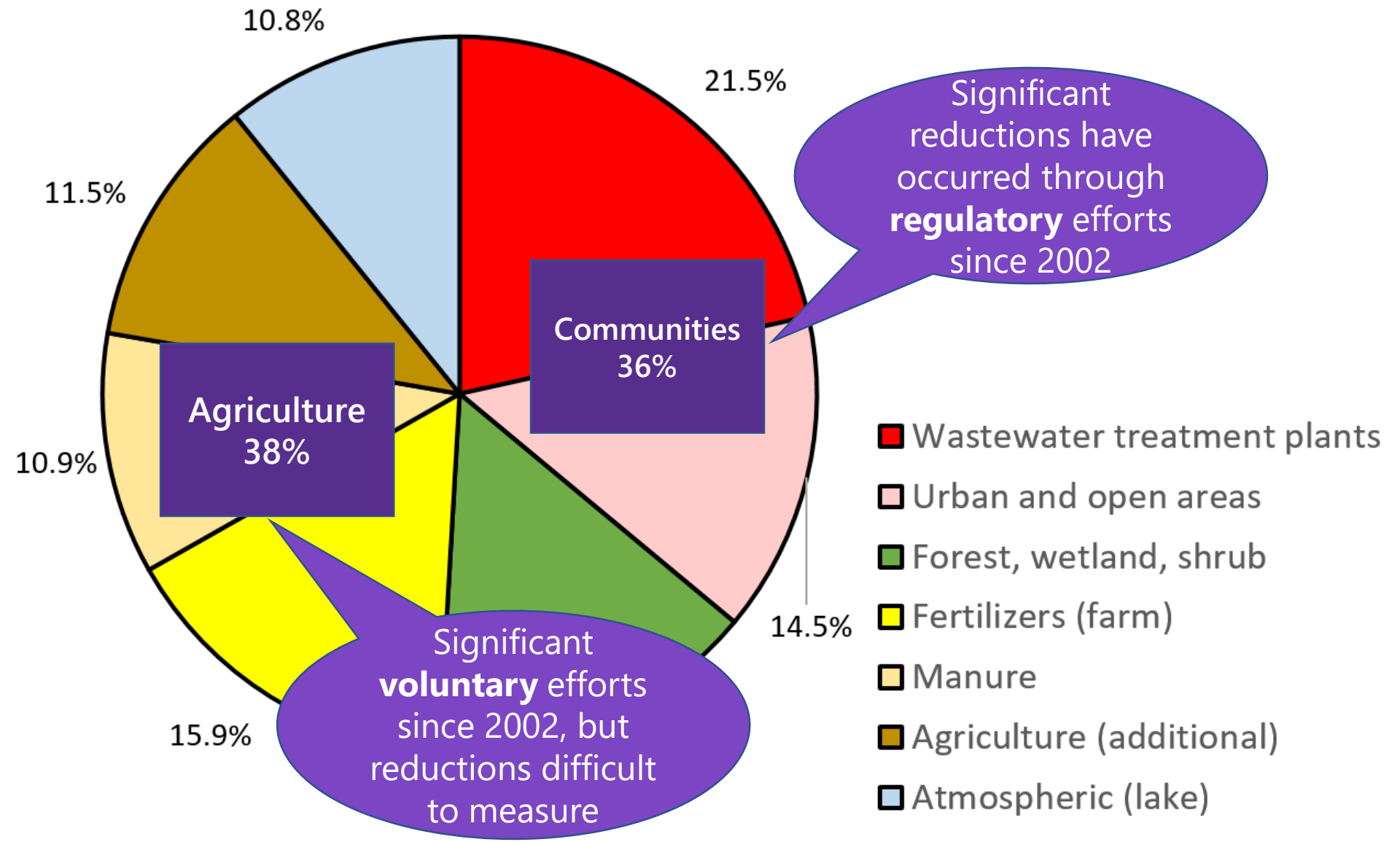
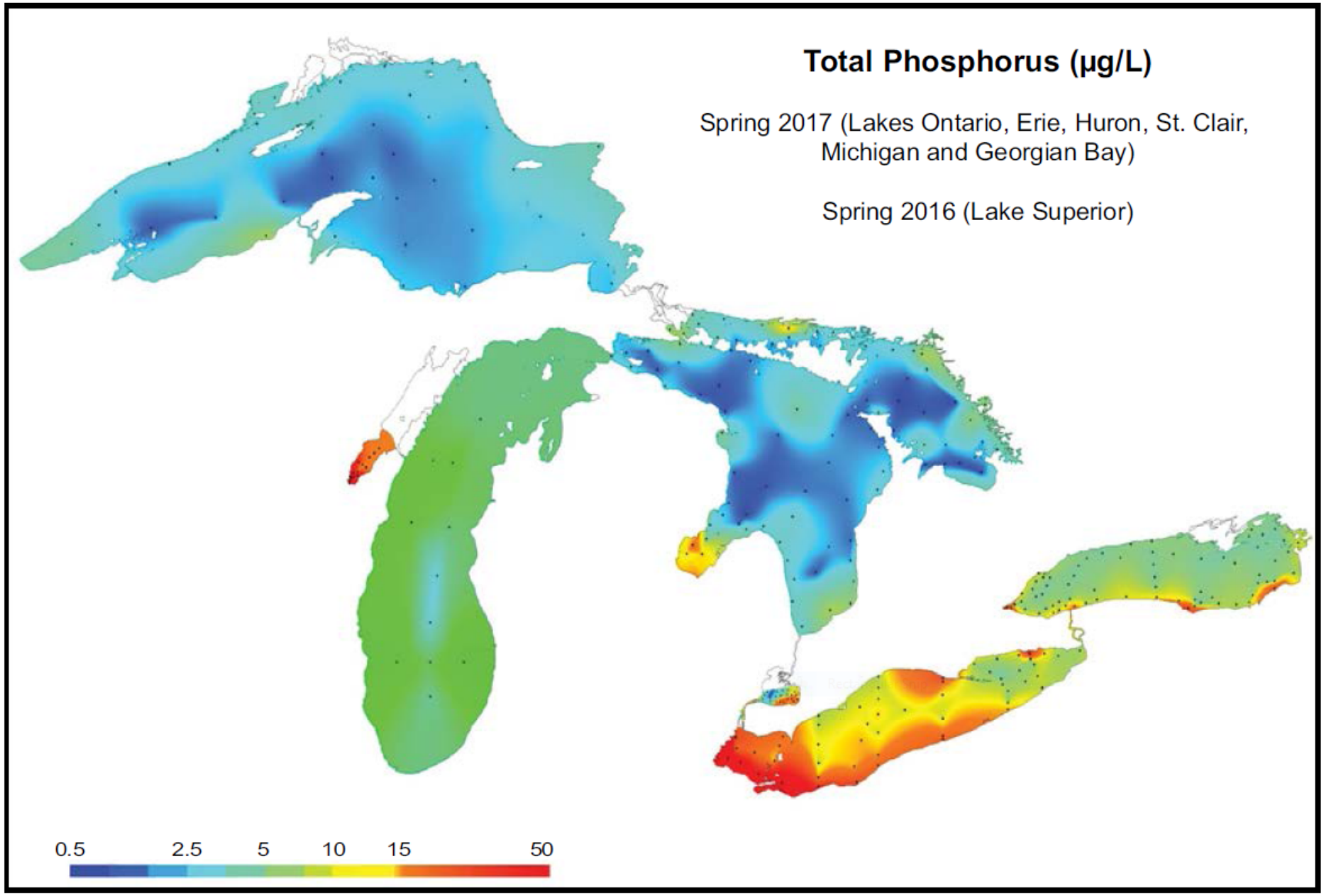




Source: Environment and Climate Change Canada, and United States Environmental Protection Agency, 2019.

Maumee River Loads

State of Ohio Nutrient Mass Balance Study *April 2018*

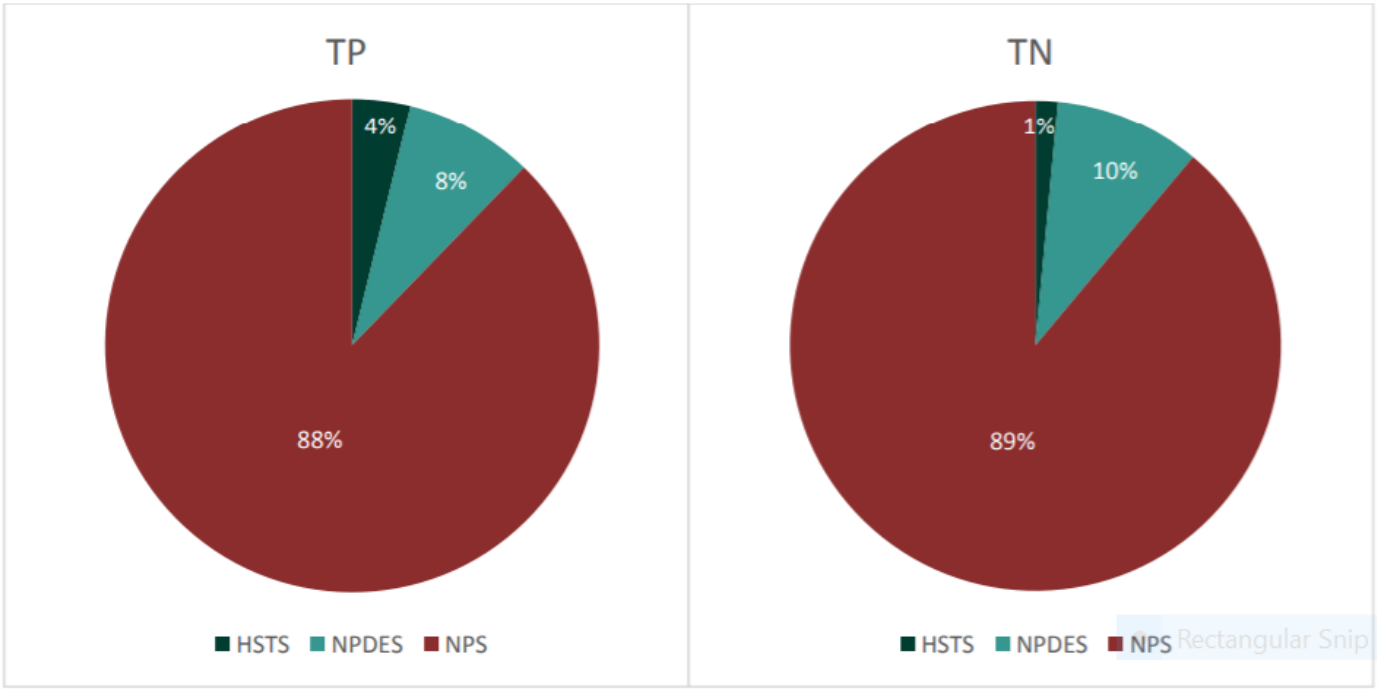


Figure 10 — Proportion of total phosphorus and nitrogen load from different sources for the Maumee watershed, average of 5-years (wy13-wy17).

Fox River Basin

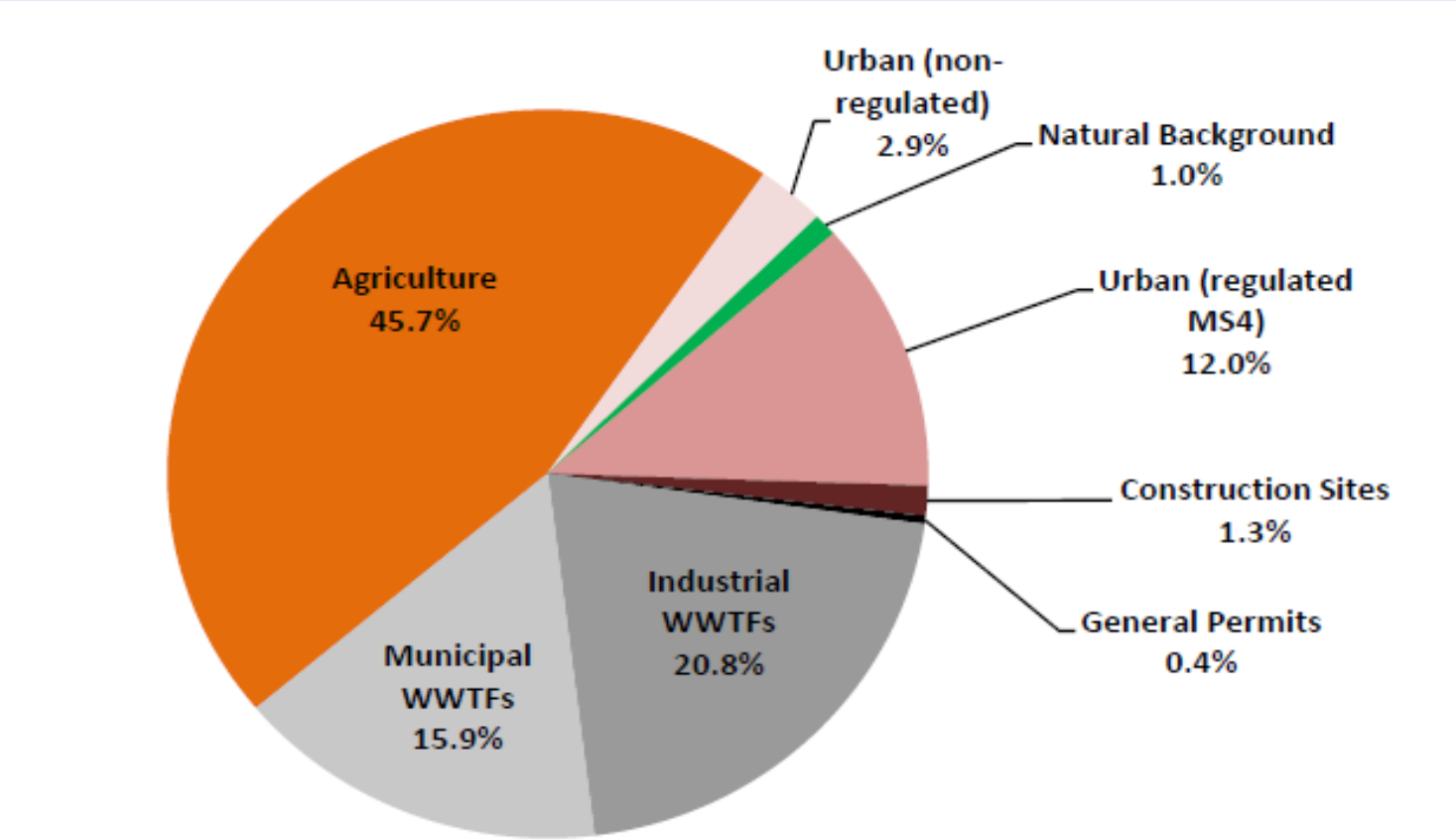
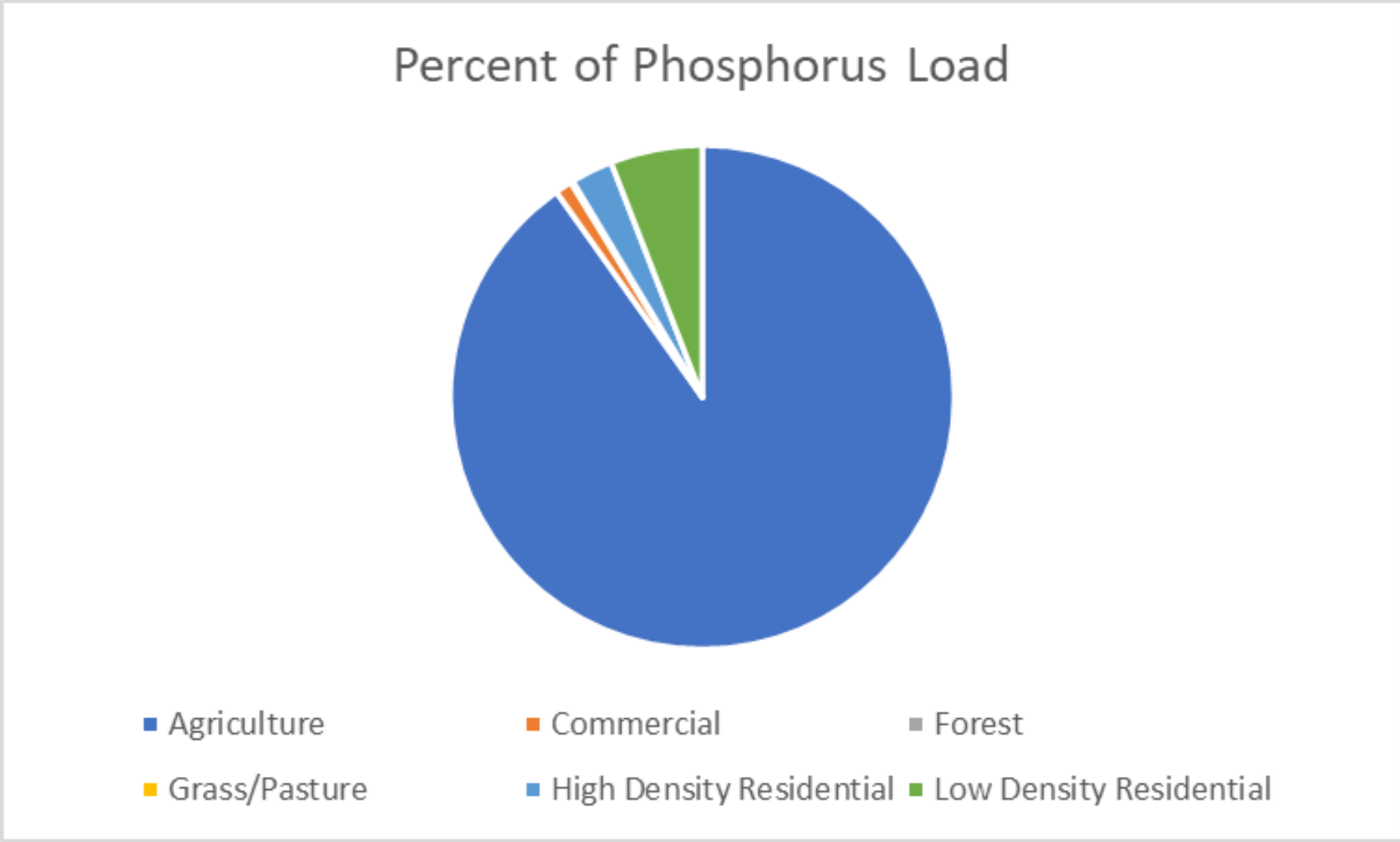


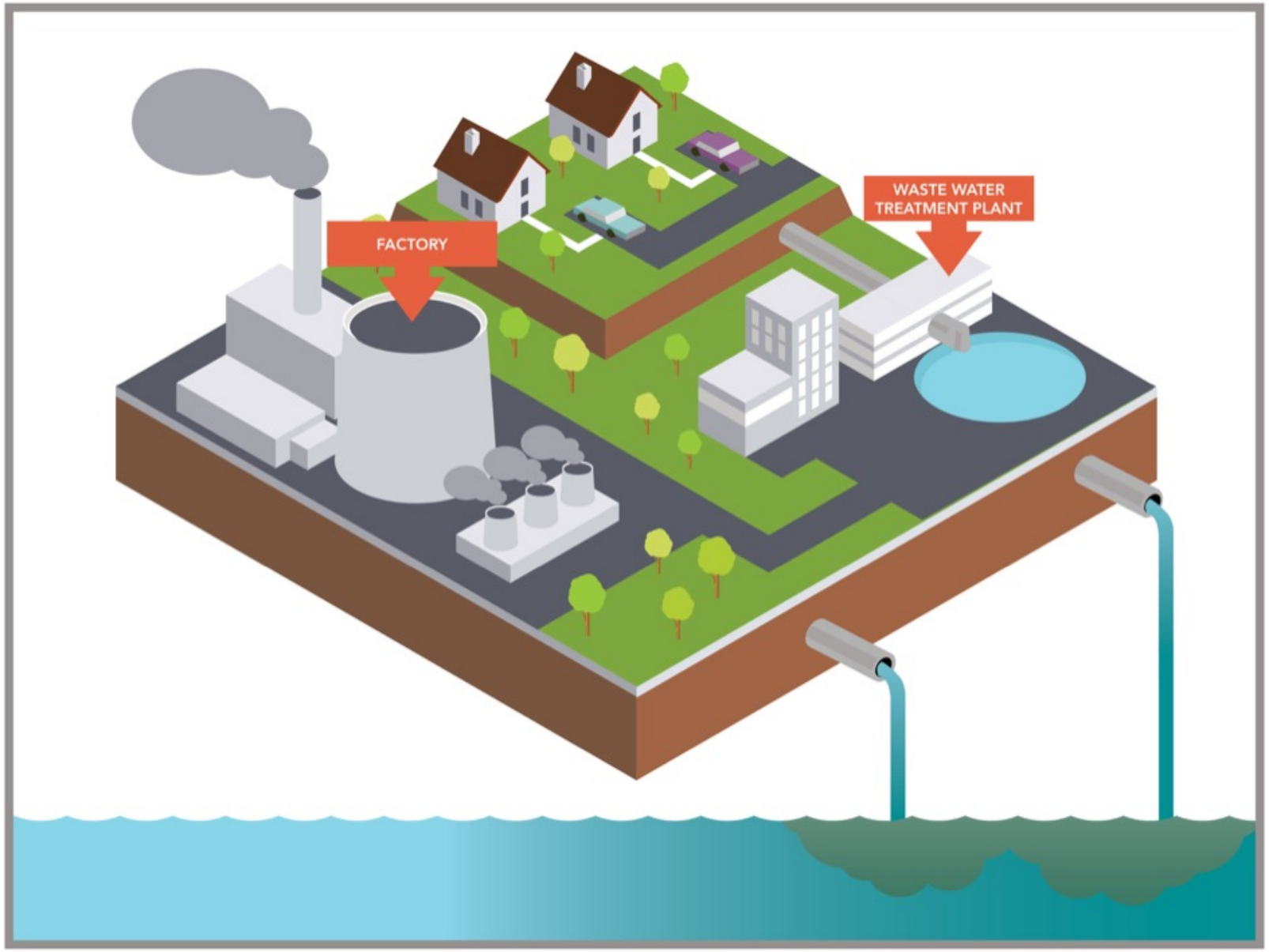
Figure 19. Sources of baseline TP loading in the LFR Basin

From Wisconsin DNR's TMDL Report

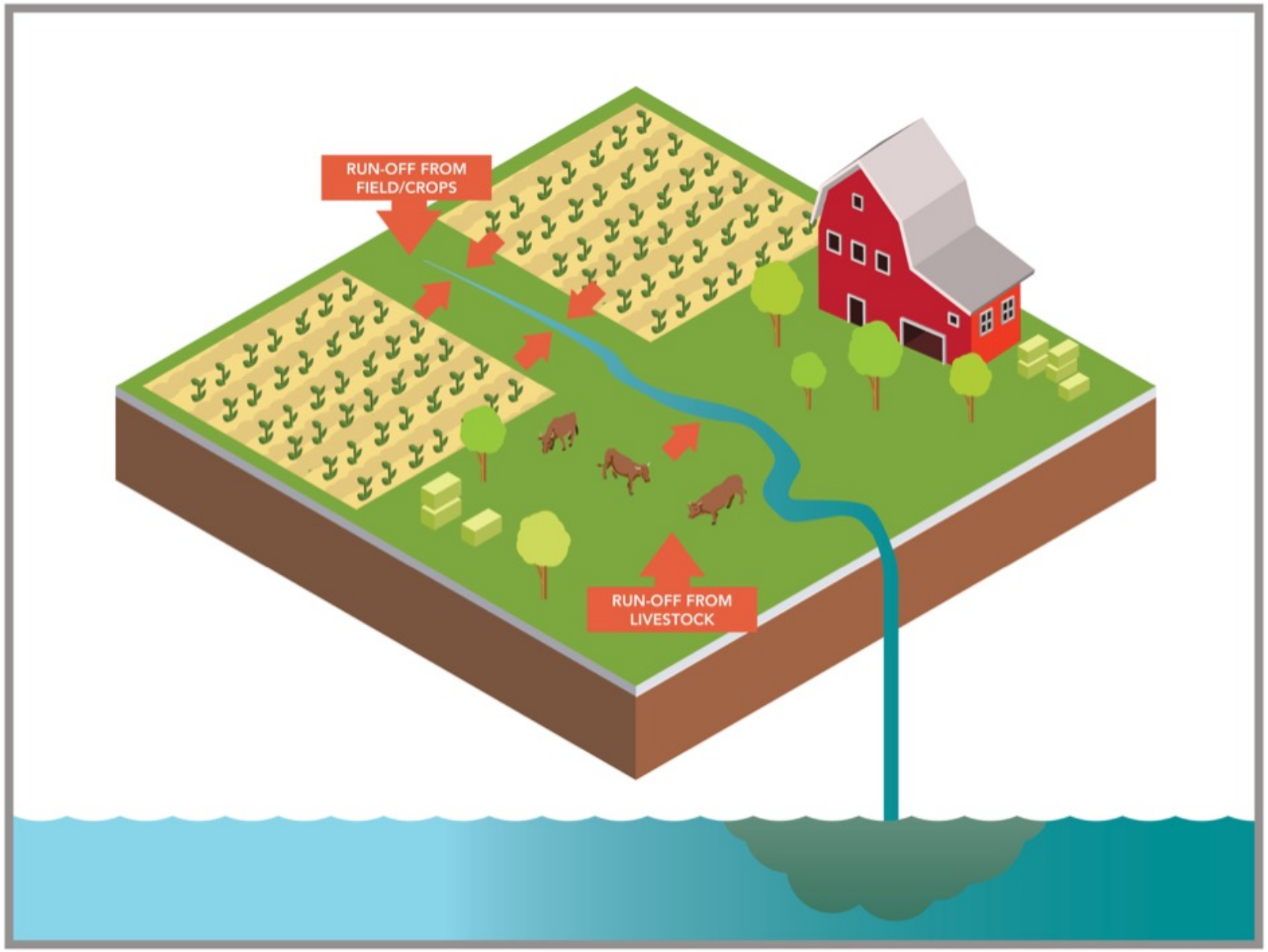
Saginaw Bay



Adapted from a 2010 Michigan DEQ study



Graphic courtesy of Heidelberg University



Graphic courtesy of Heidelberg University

"For over forty years, the Great Lakes Water Quality Agreement has served as a guidepost for the binational management of the Great Lakes and as a model of international cooperation for the protection of water quality in other large lakes of the world."

From www.binational.net

The agreement, between the U.S. and Canada, is overseen by a Great Lakes Executive Committee

The 2012 GLWQA & Annex 4

Interim Substance Objectives for Total Phosphorus Concentration in Open Waters (ug/l)
(as represented by Spring means)

Lake Superior	5
Lake Huron	5
Lake Michigan	7
Lake Erie (western basin)	15
Lake Erie (central basin)	10
Lake Erie (eastern basin)	10
Lake Ontario	10

Interim Phosphorus Load Targets
(Metric Tonnes Total P Per Year)

Lake Superior	3400
Lake Michigan	5600
Saginaw Bay	440
Lake Erie	11000
Lake Ontario	7000

New target established in 2016 for western & central basins: 6000 MT (aka the 40% reduction goal)

State & Provincial Leadership

- Permit limits for point sources
- Non-traditional "point sources" (concentrated animal feeding operations & storm water)
- Environmental certification programs for farms
- Restrictions on fertilizer use and application
- Support for green or natural infrastructure
- Water quality standards for nutrients
- Funding for research initiatives
- Grant programs for nonpoint source control
- Identification of high-quality (or at risk) waterbodies
- Water Quality Trading


nonpoint
CSO
drinkable
fertilizer
research
clean
buffers
phosphorus
nutrients
licensing
groundwater
certification
farm
solution
voluntary
setbacks
TMDL
funding
St.Lawrence
NPDES
rivers
GreatLakes
manure
regulation
fishable
tools
swimmable
nitrogen
Communities
nature
pollution
environment
authority
Authorized
pointsource
water
stormwater
city
MS4
spreading

Two overused (yet valid) sayings… and one opinion

- ✓What gets measured, gets managed
- ✓Don’t let the perfect be the enemy of the good
- ✓None of this is going to be easy, but it is necessary

www.blueaccounting.org

Strategies | Blue Accounting

blueaccounting.org/issue/source-water/strategies?issue_Goal_filter%5B%5D=Goal%3A+Nutrients

Blue Accounting

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SOURCE WATER GOALS STRATEGIES INVESTMENTS PROGRESS RESOURCES

FILTER BY

Nutrients × | Jurisdiction | Locality | APPLY

LIST VIEW GRID VIEW

The Minnesota Buffer Law

Updated on: June 13 2019

The Minnesota Buffer Law requires landowners to establish perennial vegetation buffers of up to 50 feet along lakes, rivers, and streams and buffers of 16.5 feet along ditches in order to reduce nutrient and

LEARN MORE

Erie County Pennsylvania's PA VinES Program

Updated on: June 14 2019

PA VinES (Pennsylvania Vested in Environmental Sustainability) is a voluntary program that promotes self-assessment of on-farm operations in Erie County's vineyards and provides a pathway for grape growers to access

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The Michigan Agriculture Environmental Assurance Program (MAEAP)

Updated on: June 13 2019

The Michigan Agriculture Environmental Assurance Program (MAEAP) is a voluntary verification program that helps farmers reduce environmental impacts from their operations by providing technical

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Healthy Urban Waters' Huron-to-Erie-Real-Time Drinking Water Protection Network

Updated on: June 13 2019

The Huron-to-Erie Real-time Drinking Water Protection Network collects data on source water quality in real time to promote collaborative water research and community education, and as a tool to aid emergency

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The Indiana Agriculture Nutrient Alliance

Updated on: June 13 2019

The Indiana Agriculture Nutrient Alliance (IANA) is a non-profit organization that brings together agriculture groups, government agencies, conservation organizations and academics working to improve

LEARN MORE

The Wisconsin Nutrient Strategy

Updated on: June 13 2019

The Wisconsin Nutrient Strategy is a framework that brings together diverse nutrient management activities for point sources and nonpoint sources across the state. It documents the progress of ongoing

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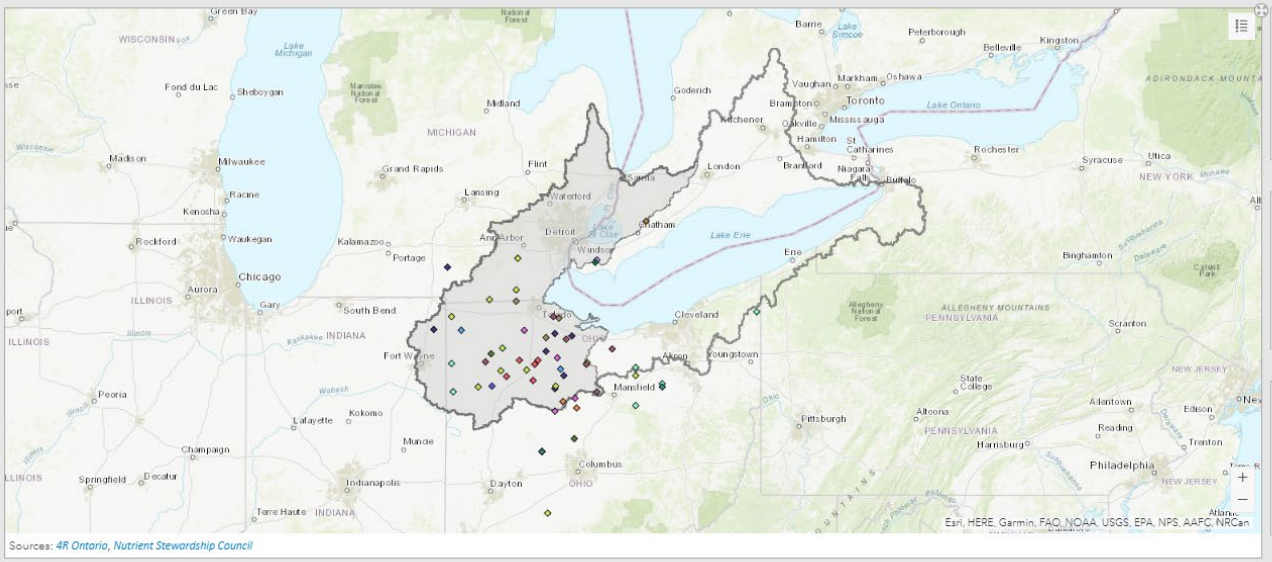
Blue Accounting Source Water

Protecting Drinking Water at its Source

This map shows retailers participating in the 4R Nutrient Stewardship Certification program. The program encourages agricultural retailers, service providers, and other certified professionals to implement proven best practices through the 4Rs, which refers to using the Right Source of Nutrients at the Right Rate and Right Time in the Right Place. ErieStat is helping participants track progress in terms of acres being managed consistent with the 4Rs, numbers of clients working with 4R certified professionals, and retailer certifications in the Lake Erie Basin over time. Use the tabs to select for either the Western Lake Erie Basin (WLEB) or Lake Erie Basin to view progress.

For more information visit:
ErieStat Strategies - Agriculture
ErieStat Investments - Agriculture



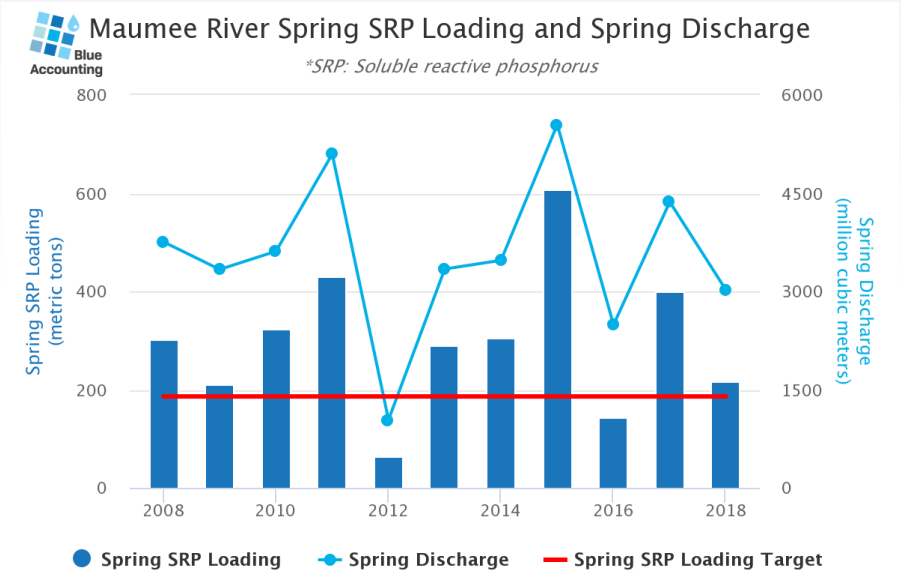
44
Certified Facilities in the Western Lake Erie Basin
WLEB | Total

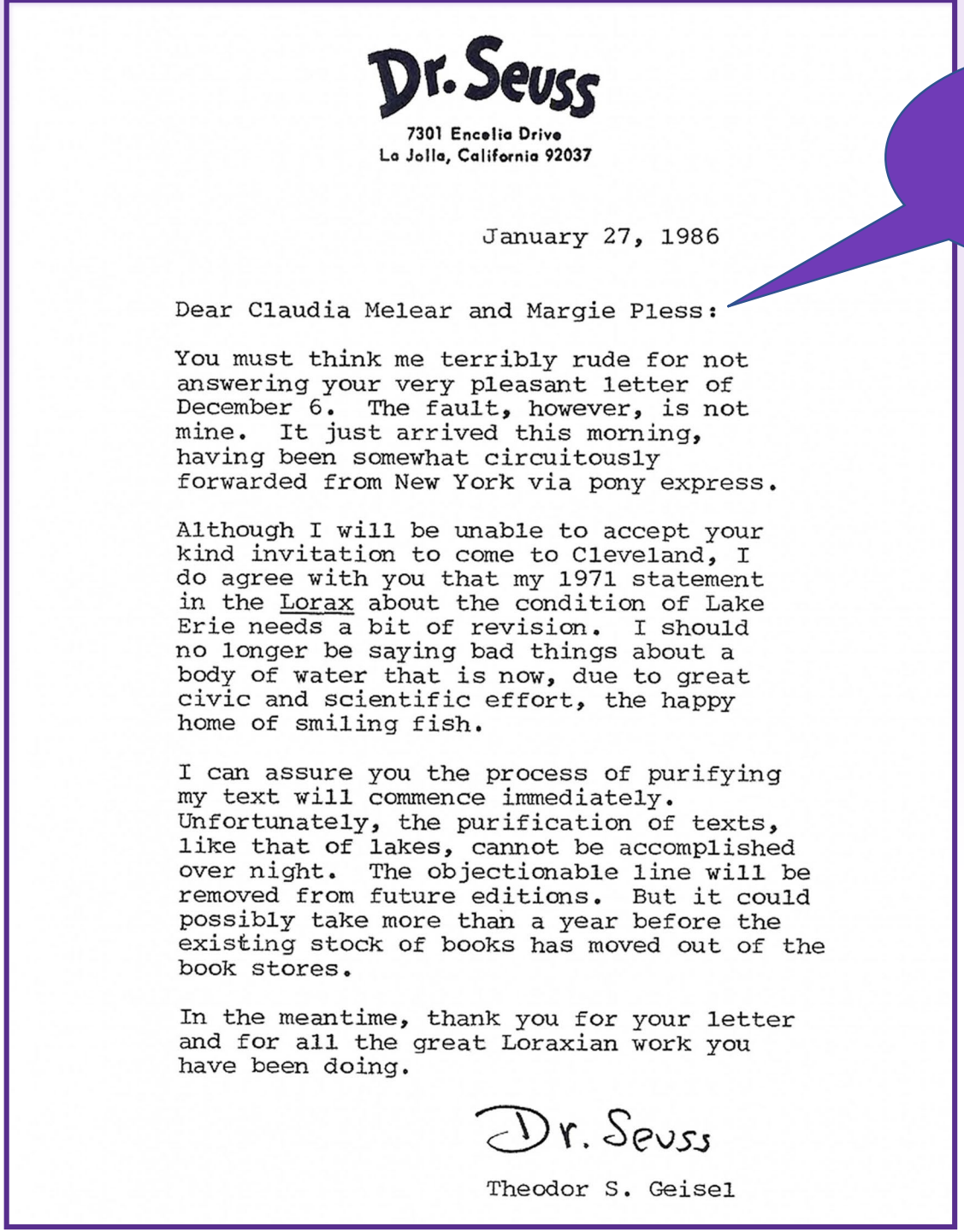
2.02M
Acres in WLEB
WLEB | Total

4,900
Customers in WLEB
WLEB | Total

Blue Accounting ErieStat

Tracking Progress Toward a Healthier Lake Erie





Dr. Seuss
7301 Encelia Drive
La Jolla, California 92037

January 27, 1986

Dear Claudia Melear and Margie Pless:

You must think me terribly rude for not answering your very pleasant letter of December 6. The fault, however, is not mine. It just arrived this morning, having been somewhat circuitously forwarded from New York via pony express.

Although I will be unable to accept your kind invitation to come to Cleveland, I do agree with you that my 1971 statement in the Lorax about the condition of Lake Erie needs a bit of revision. I should no longer be saying bad things about a body of water that is now, due to great civic and scientific effort, the happy home of smiling fish.

I can assure you the process of purifying my text will commence immediately. Unfortunately, the purification of texts, like that of lakes, cannot be accomplished over night. The objectionable line will be removed from future editions. But it could possibly take more than a year before the existing stock of books has moved out of the book stores.

In the meantime, thank you for your letter and for all the great Loraxian work you have been doing.

Dr. Seuss

Theodor S. Geisel

Ohio State University Graduate Students

Letter found on Ohio Sea Grant's blog, 3/2/19

A “great civic and scientific effort” (that “cannot be accomplished overnight”)…

Birkholz Fellows’ Path to an Action Agenda for Nutrients

The Institute Agenda

1. Introductory Web Meetings:
   - ✓ September 20
   - ✓ October 4
2. Briefing Book delivery
   - ✓ Week of October 7
   - ✓ Also available as a pdf.
3. Weekend Retreat in Detroit
   - ✓ Friday afternoon tour of the Great Lakes Water Authority Water Resource Recovery Facility
   - ✓ Evening session to understand different perspectives on nutrient control
   - ✓ Saturday morning farm tour
   - ✓ Action Agenda creation