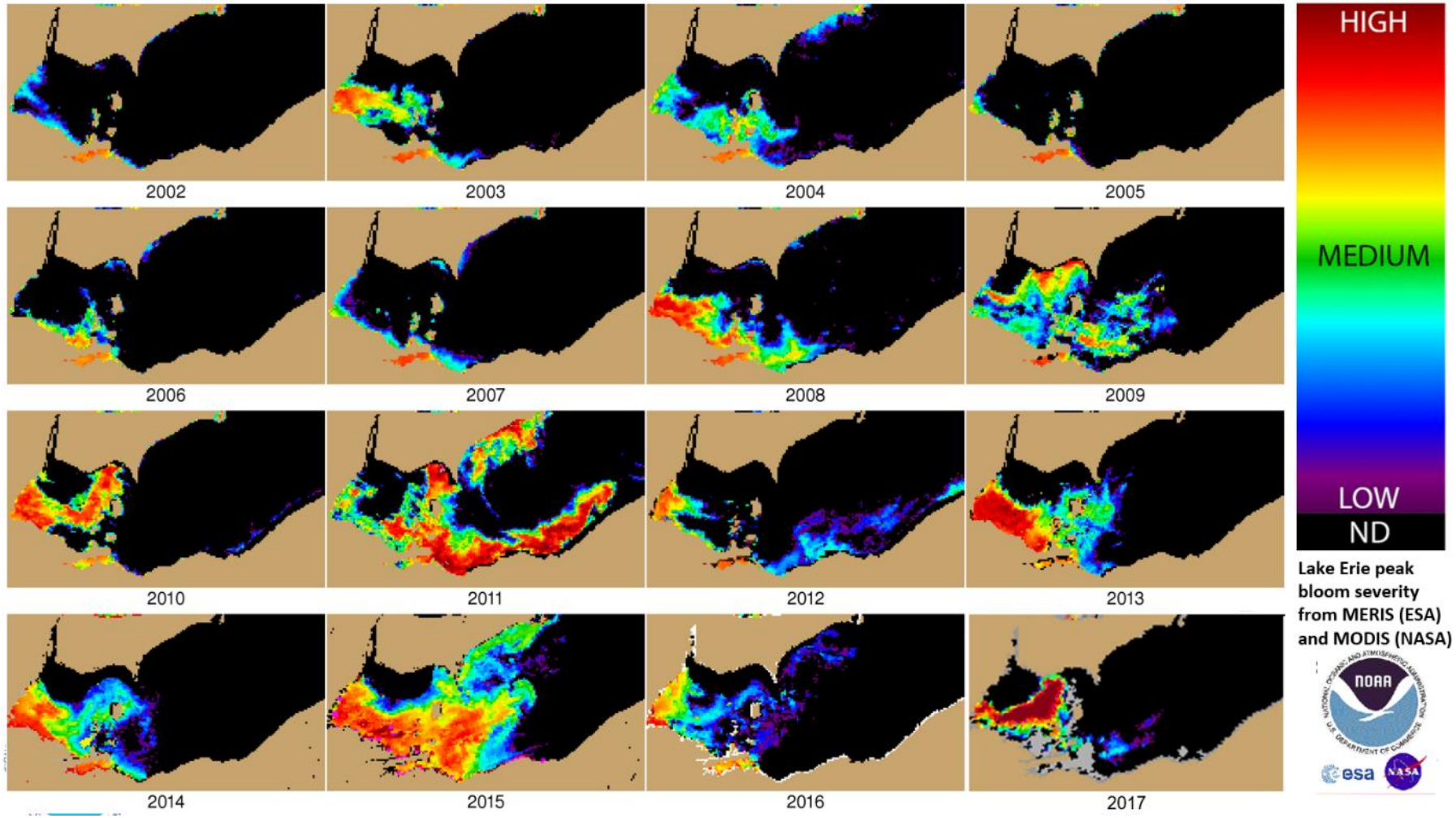
Tracking Nutrients to Guide Management Across Northwest Ohio Watersheds

September 13, 2018

Ohio Environmental Protection Agency

Lake Erie HABs 2002-2017



Lake Erie peak bloom severity from MERIS (ESA) and MODIS (NASA)

Lake Erie 303(d) Impairments

Use Designation Impairment	Western Shoreline	Western Open Water	Islands Shoreline	Sandusky Shoreline	Sandusky Open Water	Central Shoreline	Central Open Water
Aquatic Life Use (*Biological Community/Diversity*)	✓		✓	✓		✓	
Public Drinking Water Supply (*Microcystins*)	✓	✓	✓	✓	✓		✓
Human Health (*Fish Tissue*)	✓		✓	✓		✓	
Recreation (*E. coli*)	✓		✓	✓		✓	
Recreation (*Algae*)	✓	✓	✓				

Learn more about the impairment listings:

http://www.epa.ohio.gov/Portals/35/tmdl/2018intreport/SectionF.pdf

https://www.youtube.com/watch?v=nlKoBZSQwYU

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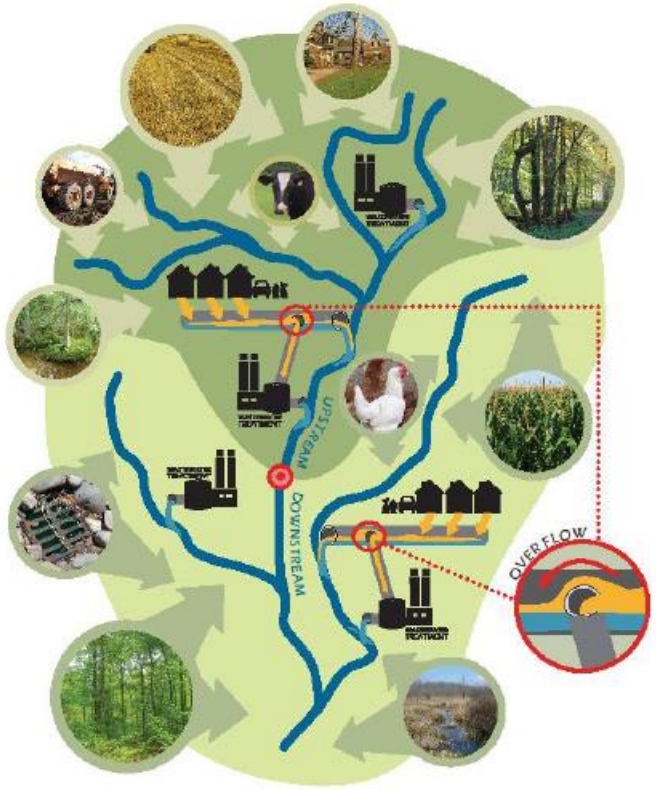
Nutrient Mass Balance Study for Ohio's Major Rivers



Ohio EPA must report nutrient total load and load sources every two years.

Division of Surface Water

Modeling, Assessment and TMDL Section

April 16, 2018

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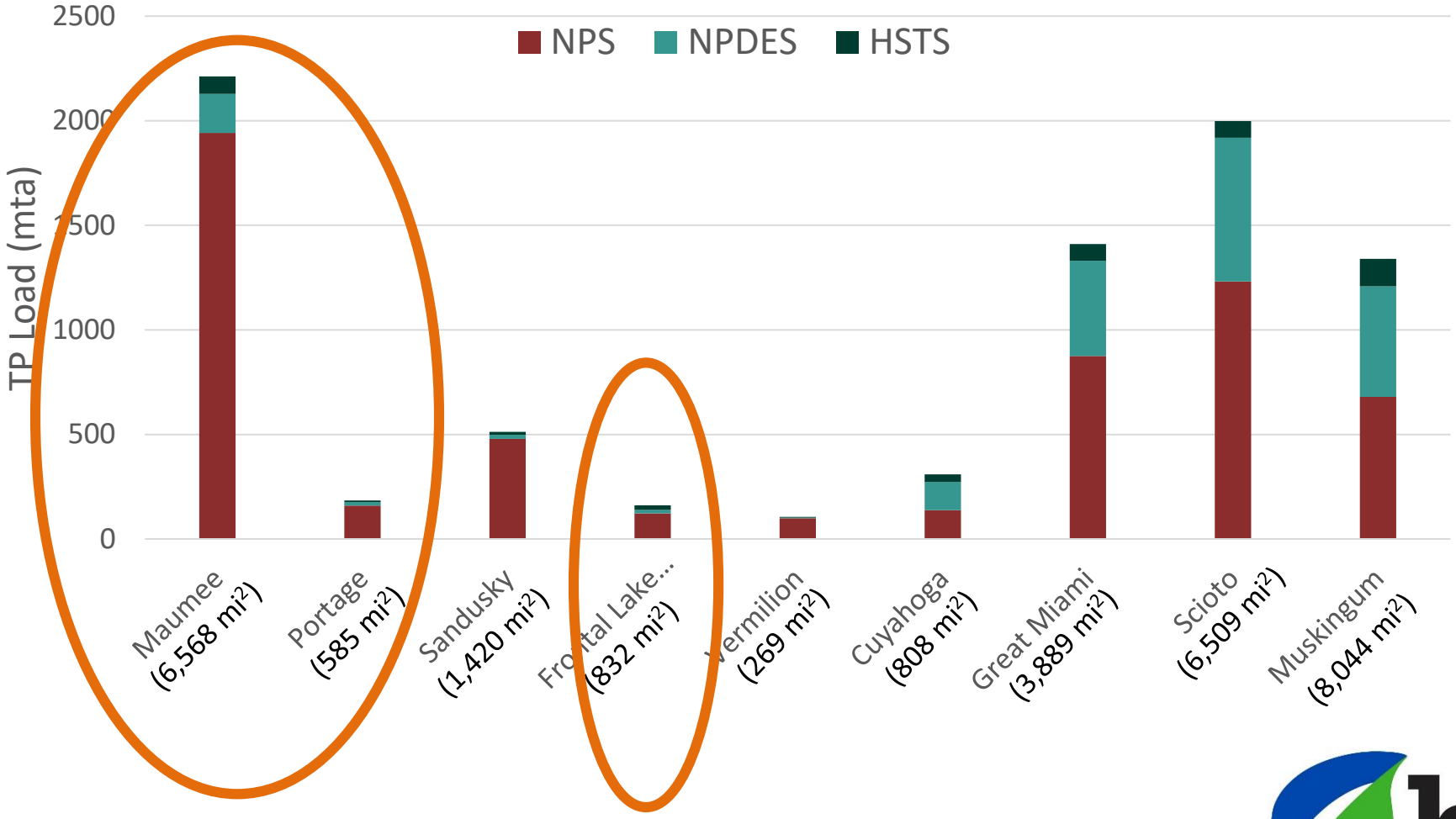
Total P loads

Average 2013-2017



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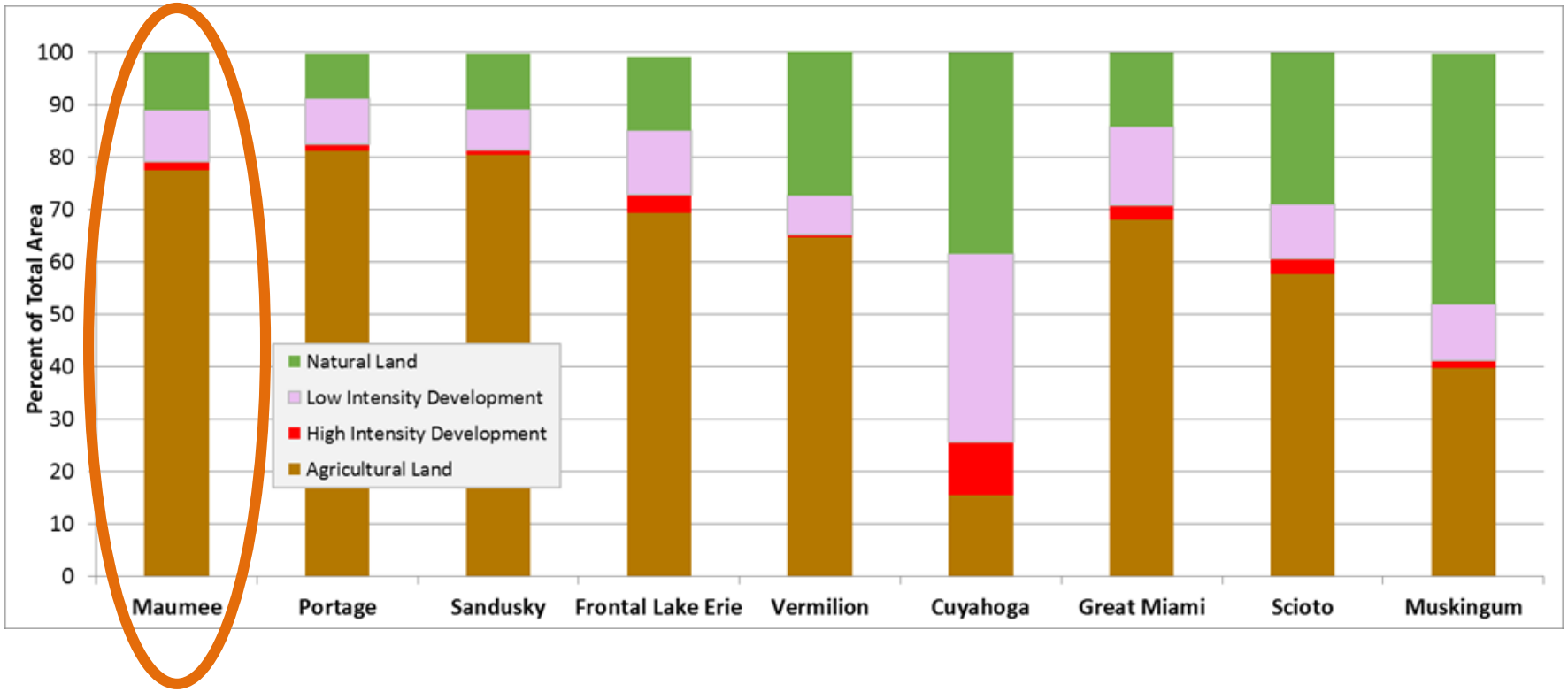
Land Use



- The land use of the Maumee, Portage and Sandusky watersheds is dominated by agriculture
  - Just under 80% of the land in the Maumee

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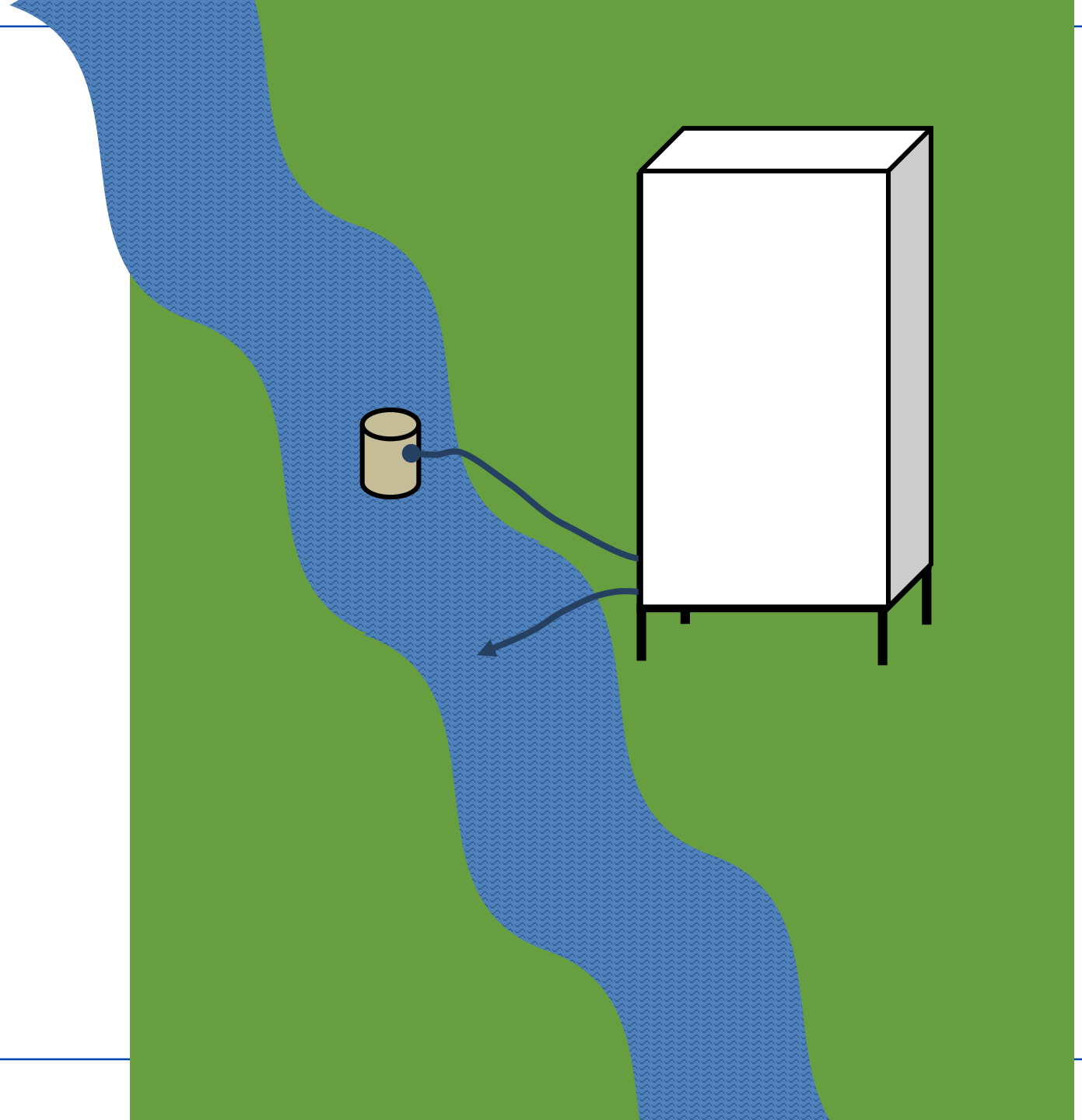

Load Monitoring

- Samples are collected in the Maumee River **at Waterville, Ohio**
- Samples are collected 3x/day*, year-round and retrieved weekly for analysis in the laboratory
- Sampled since 1974 for all major nutrients and sediments

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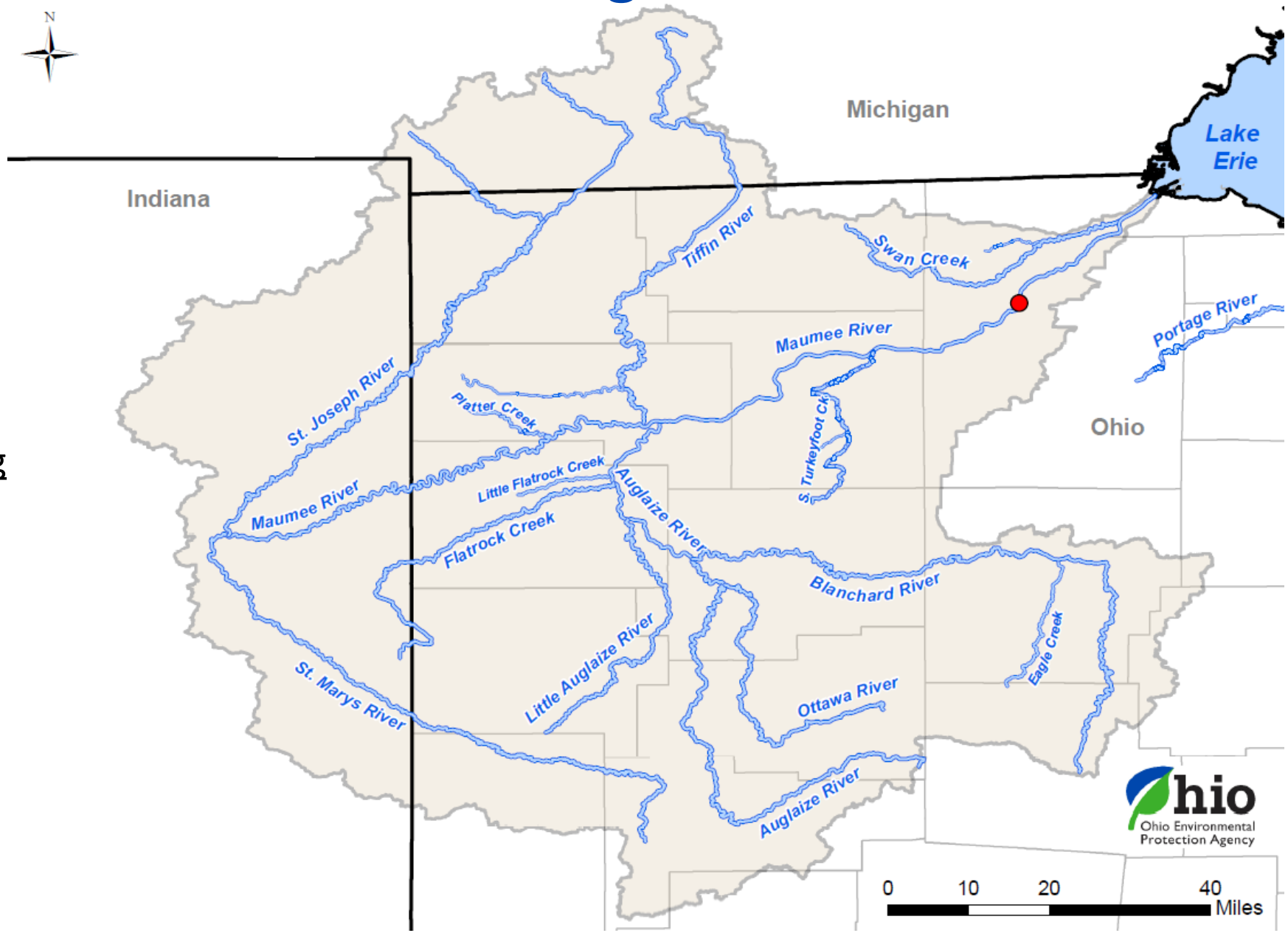
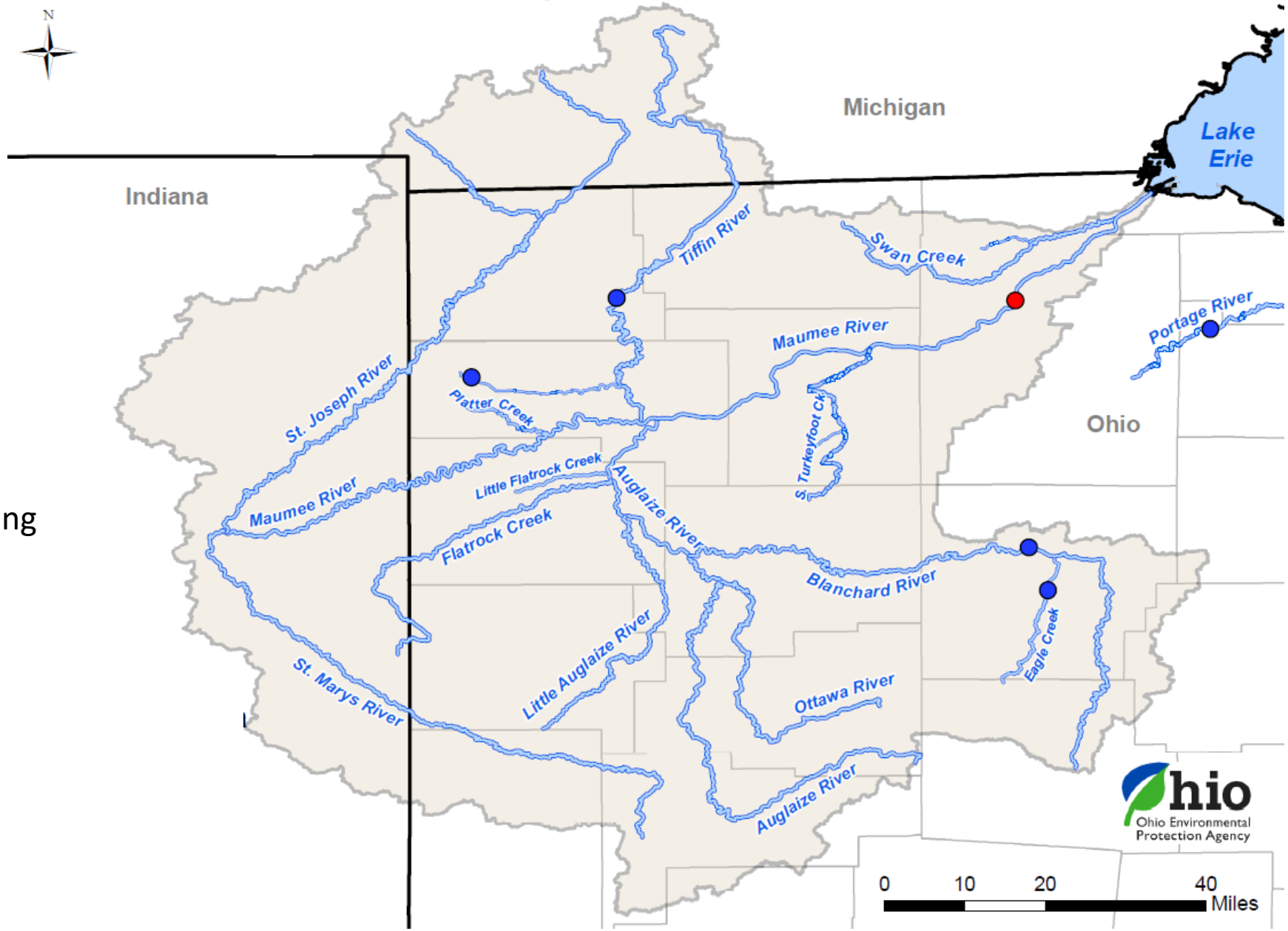
Load Monitoring

- 41 spring seasons



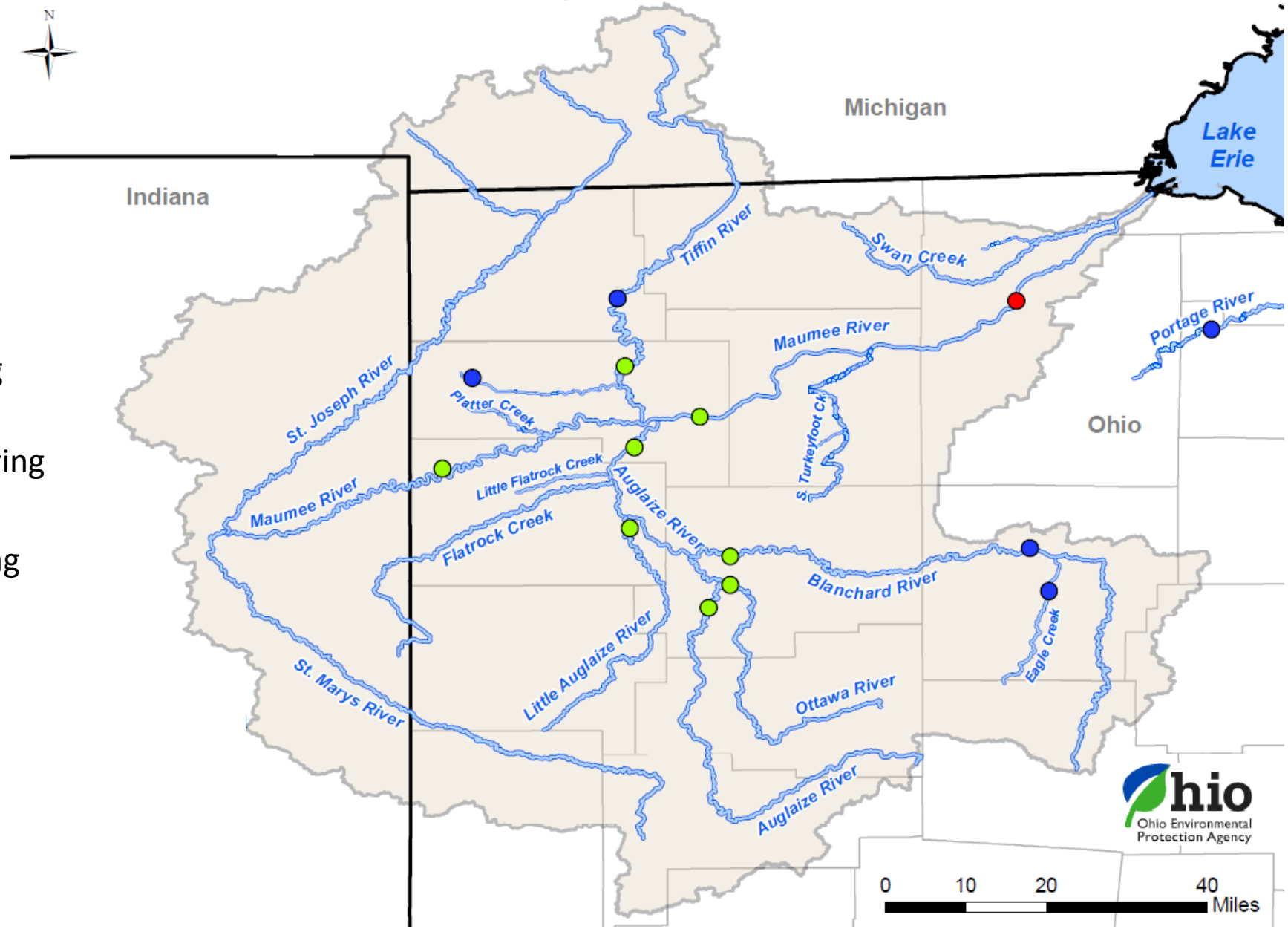
Load Monitoring - Added in Early 2000s

- 41 spring seasons
- 6 - 11 spring seasons



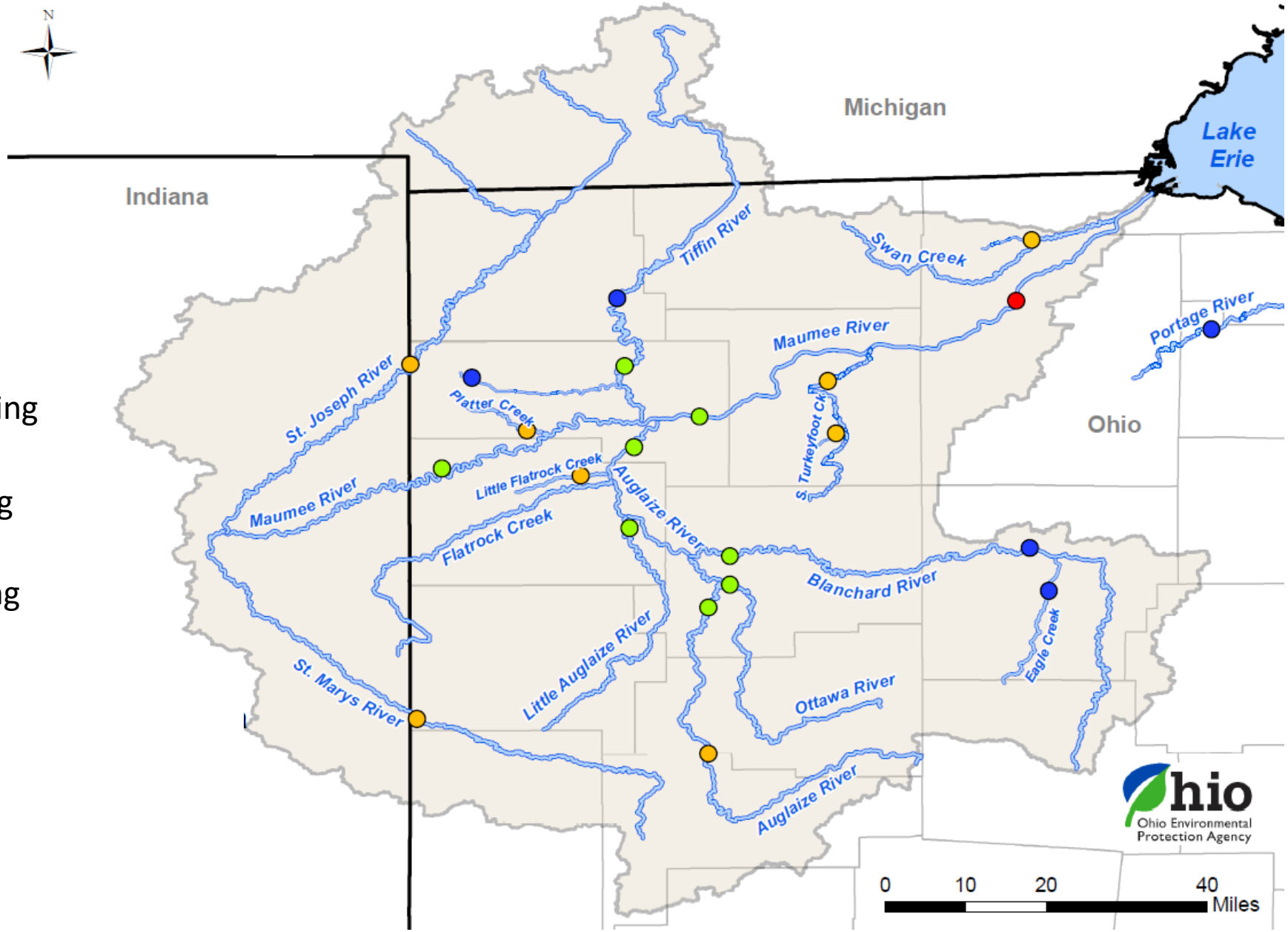
Load Monitoring - Added 2013-2015

- 41 spring seasons
- 6 - 11 spring seasons
- 4- 5 spring seasons



Load Monitoring - Added in 2017-2018

- 41 spring seasons
- 6 - 11 spring seasons
- 4- 5 spring seasons
- 1 - 2 spring seasons



Flow Weighted Mean Concentrations
Last Four Spring Seasons (2014-2017)

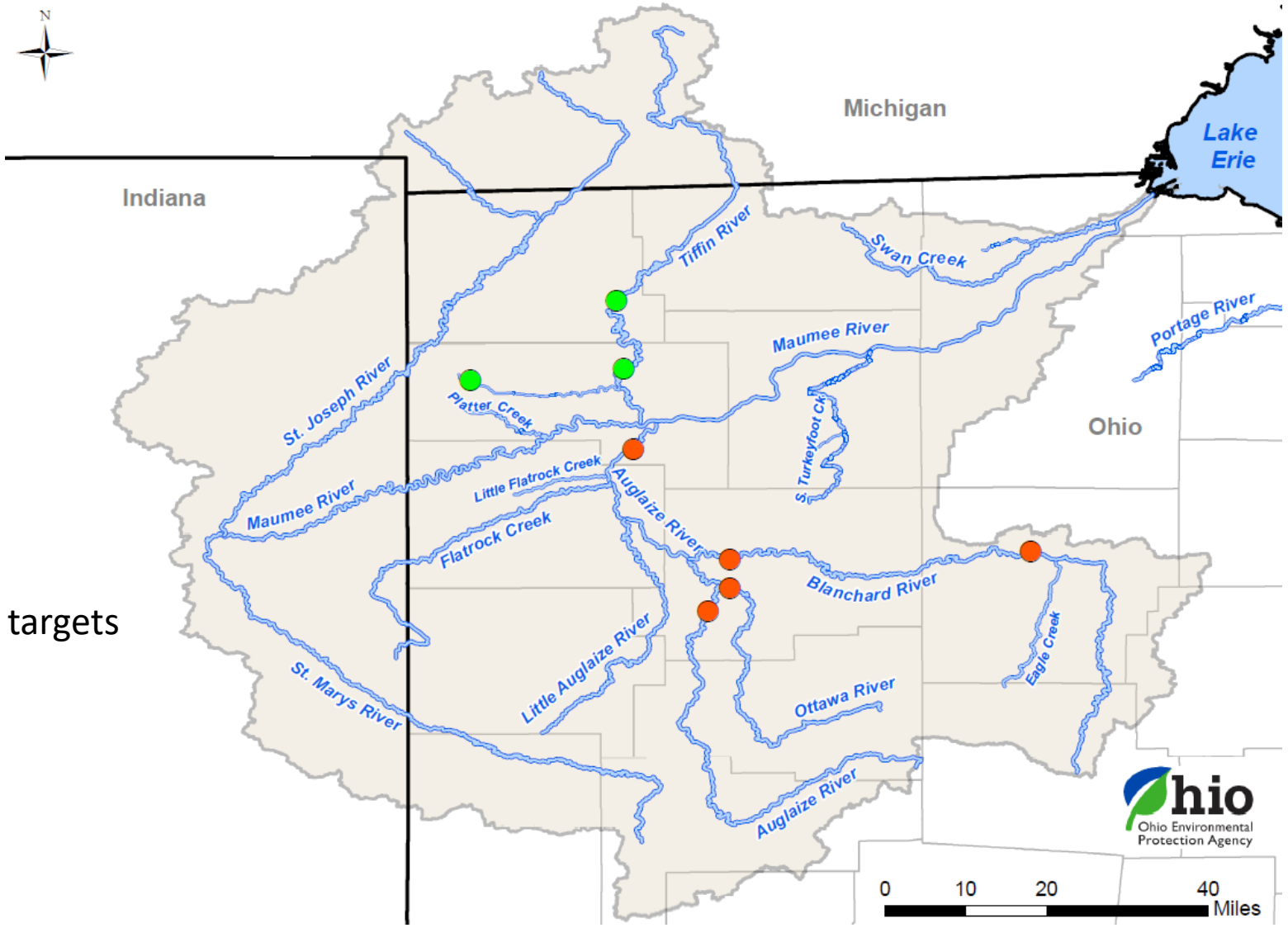
FWMC Annex 4 Targets:

TP: 0.23 mg/L

DRP: 0.05 mg/L

FWMC '14- '17 Results:

- Both < 2X targets
- TP and/or DRP > 2X targets



Flow Weighted Mean Concentrations
2017 Spring Season

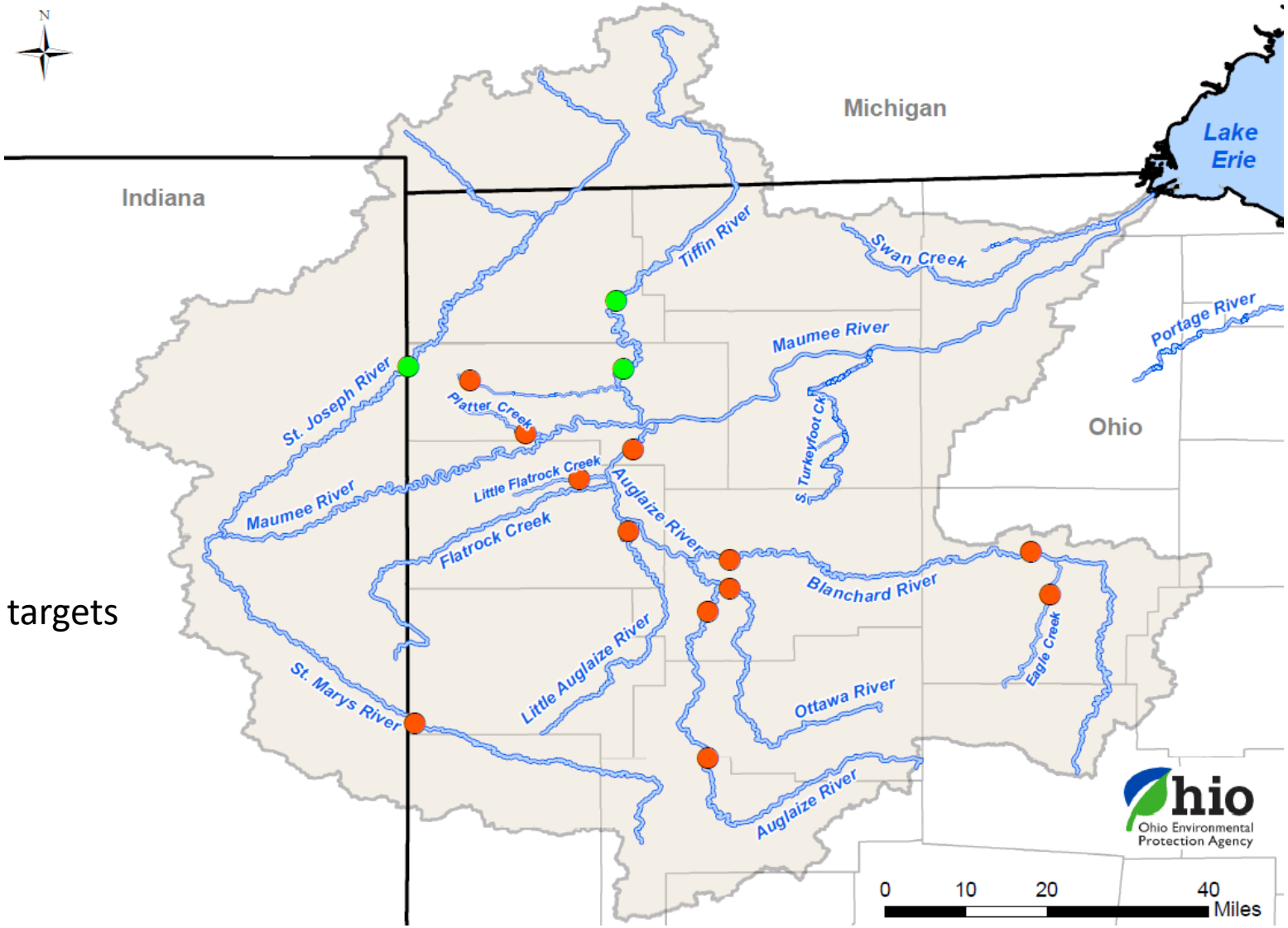
FWMC Annex 4 Targets:

TP: 0.23 mg/L

DRP: 0.05 mg/L

FWMC 2017 Results:

- Both < 2X targets
- TP and/or DRP > 2X targets



What Can a TMDL Do?

- TMDL = Total Maximum Daily Load
- TMDLs are planning tools used to allocate pollutants to different sources.
- TMDLs are implemented for point sources through permit limits.
- TMDLs do not establish new regulations.
  - TMDLs do provide technical details used in developing pollution reduction implementation plans (aka 9-element plans).

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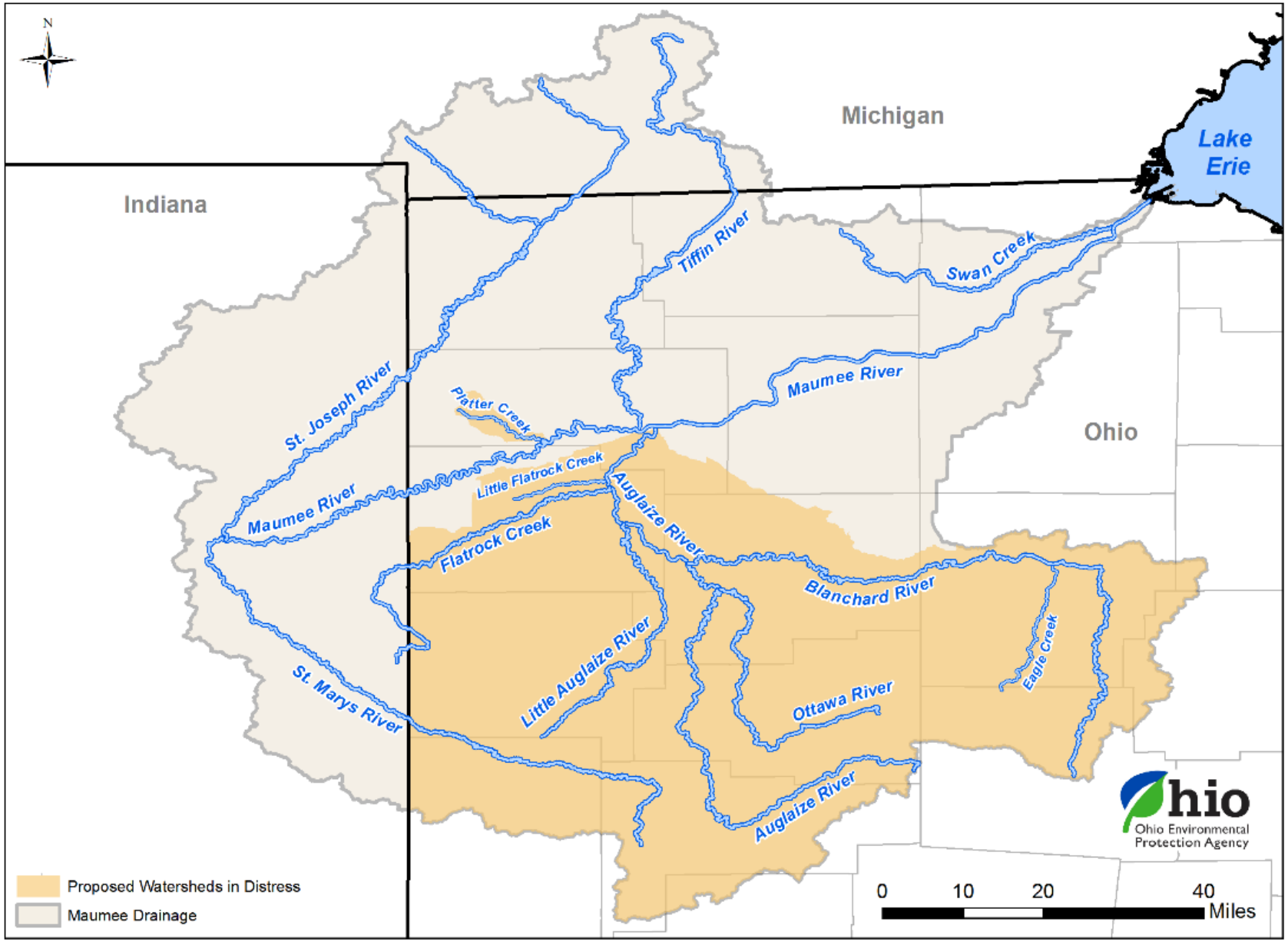
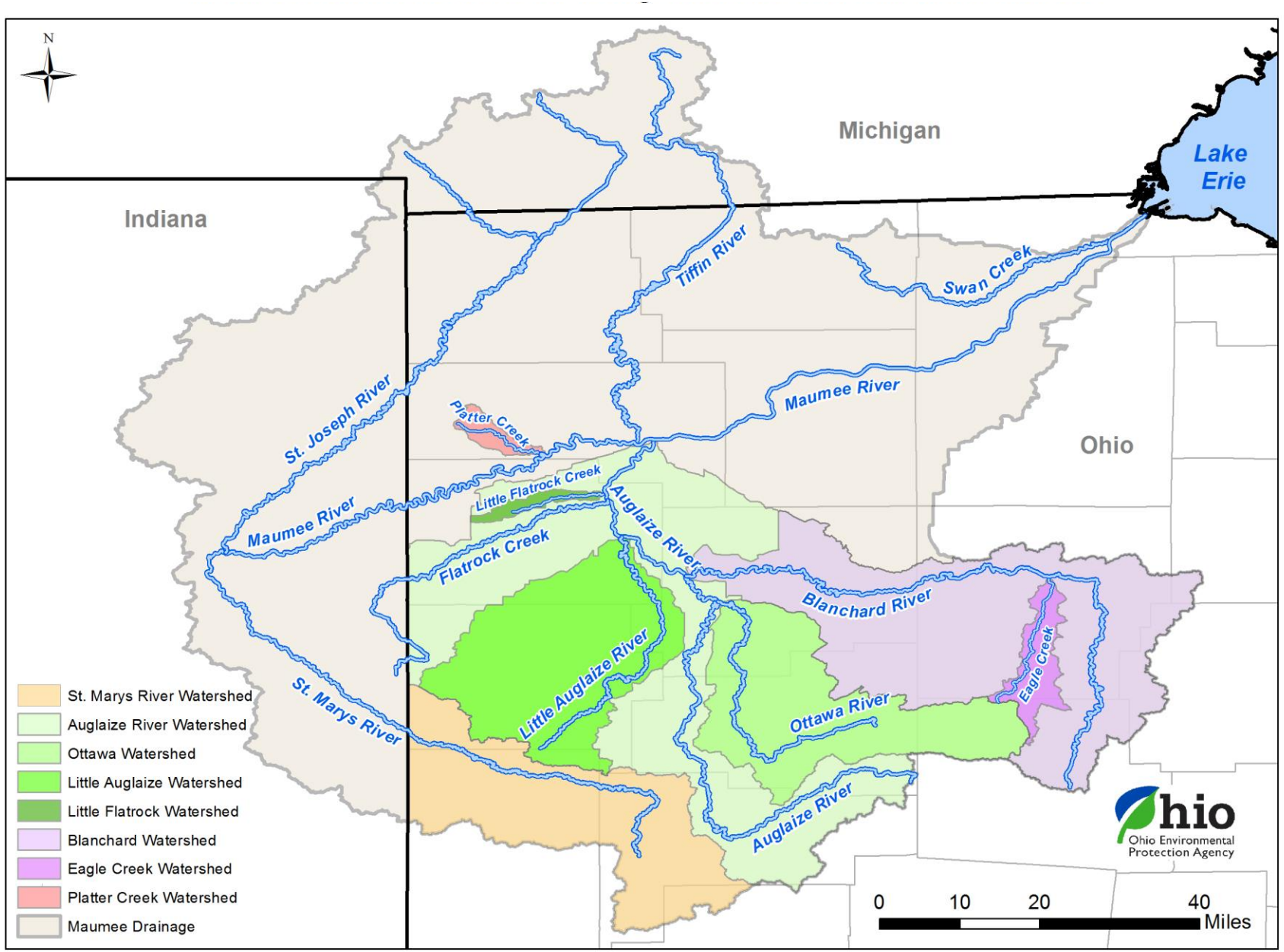
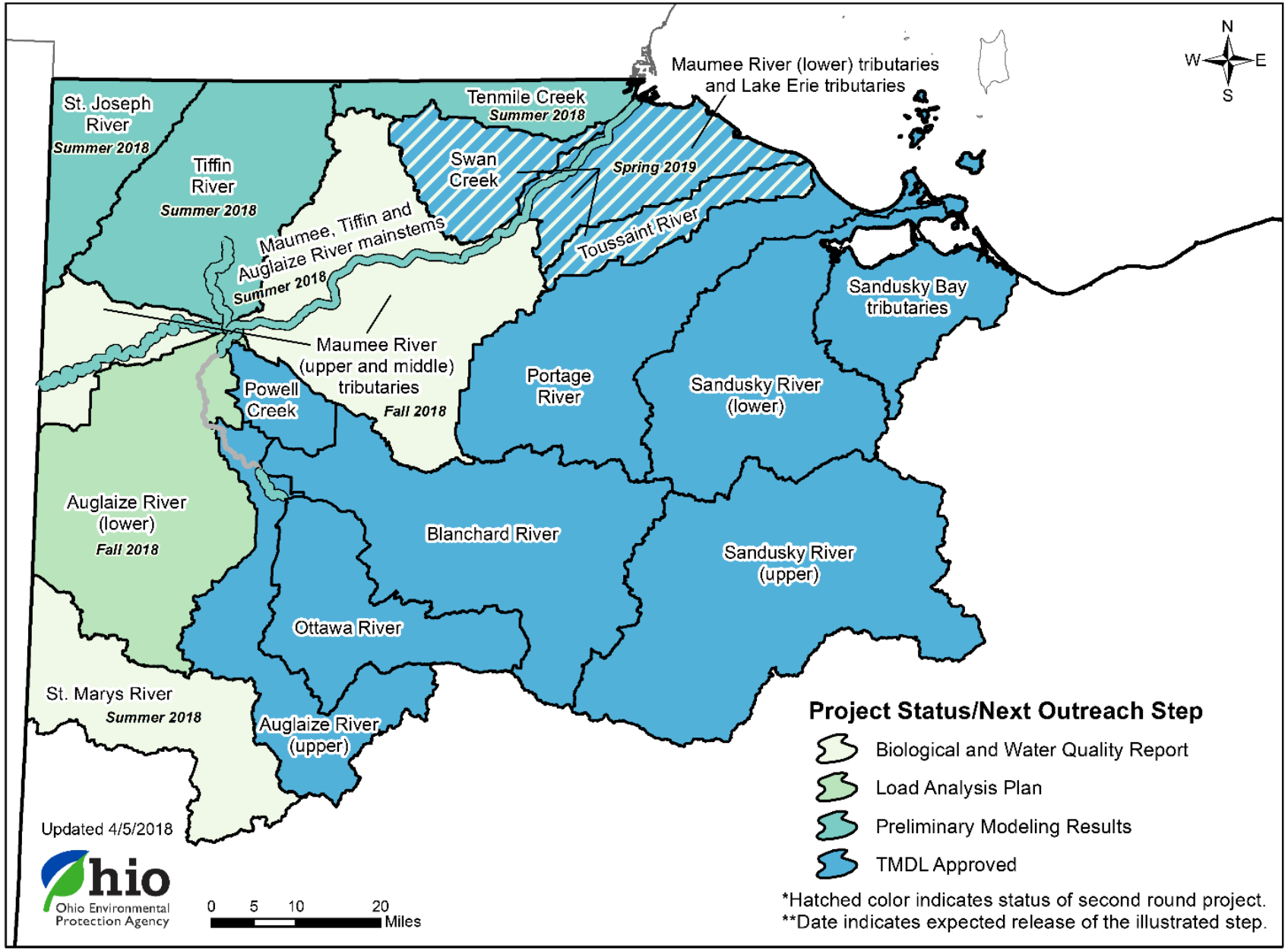
Watersheds in Distress



Watersheds in Distress



Near-Field TMDLs



Connecting Annex 4 Lake Erie Targets to Near-Field TMDLs

- Contractor (TetraTech) developed project funded by Region 5 that included Ohio, Michigan and Indiana.

- **Phosphorus near-field TMDLs were not abundant enough to meet Annex 4 targets**.
  - Not all existing TMDLs even have P targets

- Developed methodology to distribute Annex 4 targets to major tributaries (HUC-8s) of the Maumee River.
  - **Far-field targets**

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Maumee Basin Far-Field Targets

- Ohio EPA is working on a new project to that allocates phosphorus loads to all sources in 186 HUC 12s within the Maumee Basin (within Ohio).

- Existing loads for all sources can be determined by our Nutrient Mass Balance methods.

- Adds granularity to allocations based on differences in each HUC 12s (i.e. differences in land use and wastewater discharges).

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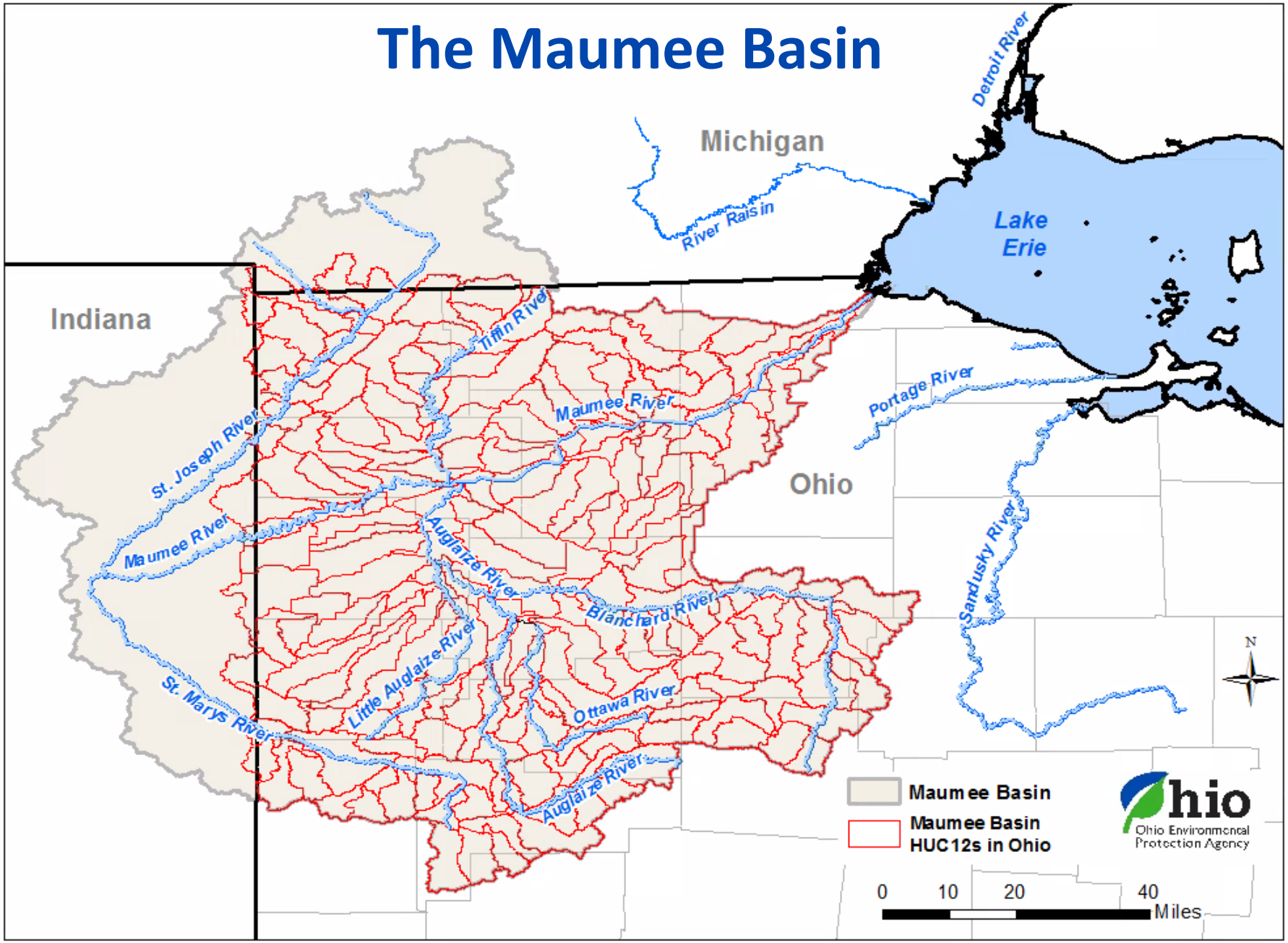
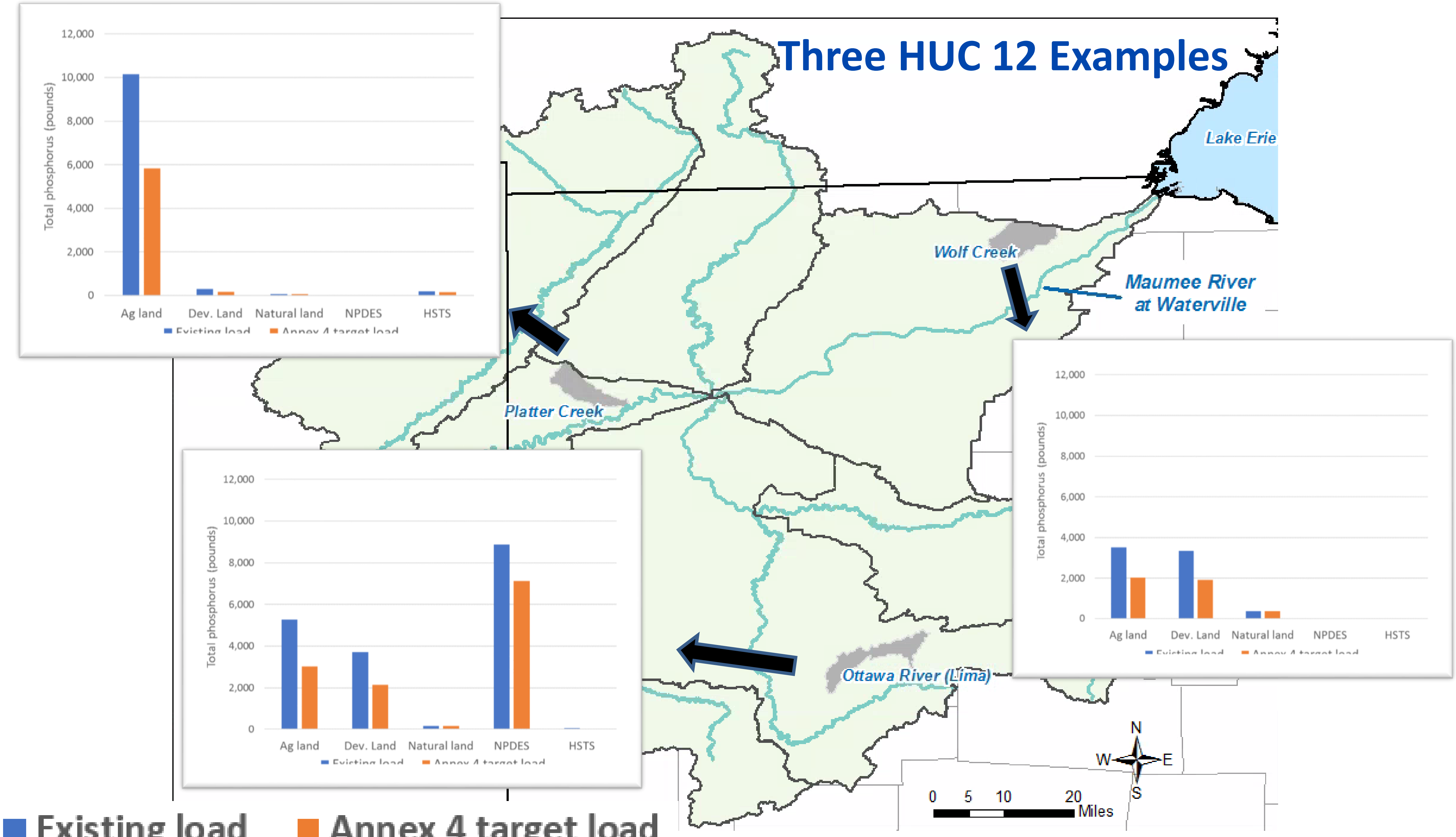
The Maumee Basin

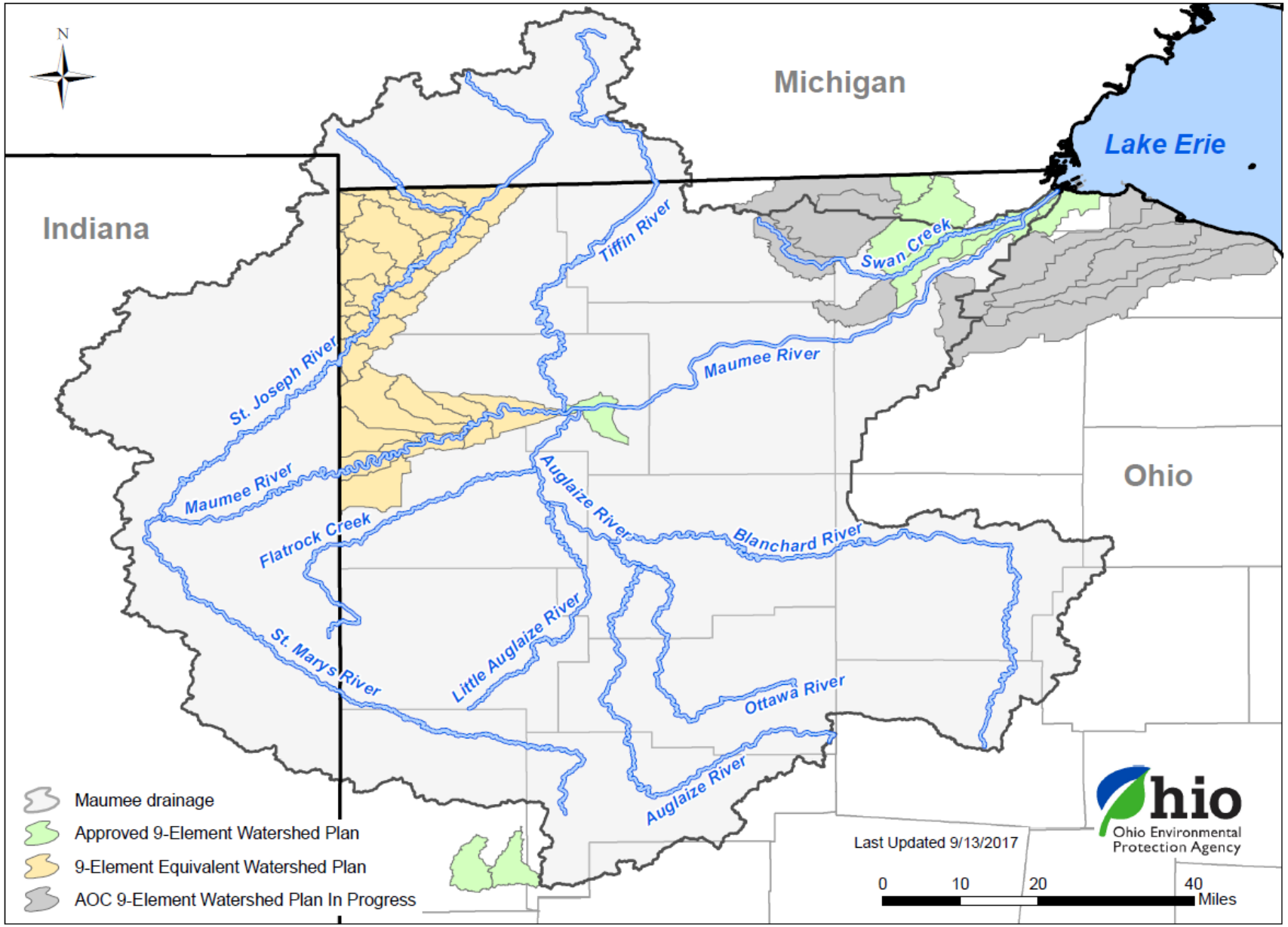


Three HUC 12 Examples



■ Existing load ■ Annex 4 target load

Existing 9-Element Plans



Tiffani Kavalec
Chief
Division of Surface Water

(614) 644-2001
Tiffani.Kavalec@epa.ohio.gov

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