Mystic River Phosphorus Loading Study:

Background, History, and Some Results

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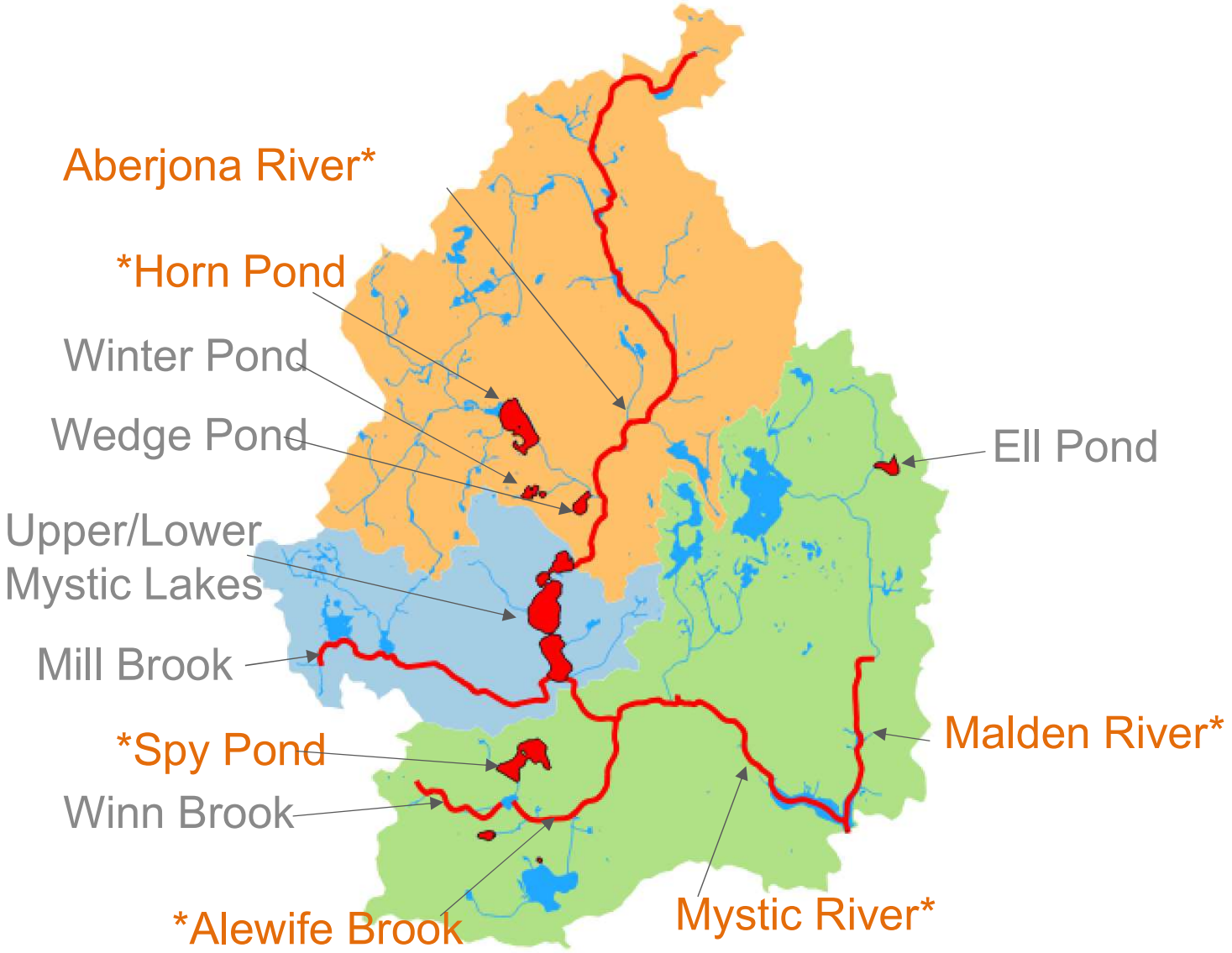
Mystic River Science Forum
US EPA offices, Boston, MA
May 4, 2017

303(d)-listed Water Bodies in Watershed

All category 5 impairments (TMDL required) 2014



Nutrients as pollutants

- Phosphorus is limiting nutrient in freshwater
- High in urban areas
- Fosters algal blooms and invasive plants
- Leads to eutrophication: low oxygen, etc.
- Public health implications: cyanobacteria


Evidence of impairment:
Invasive plants

Cyanobacteria Are Far From Just Toledo's Problem

Carl Zimmer
MATTER AUG. 7, 2014

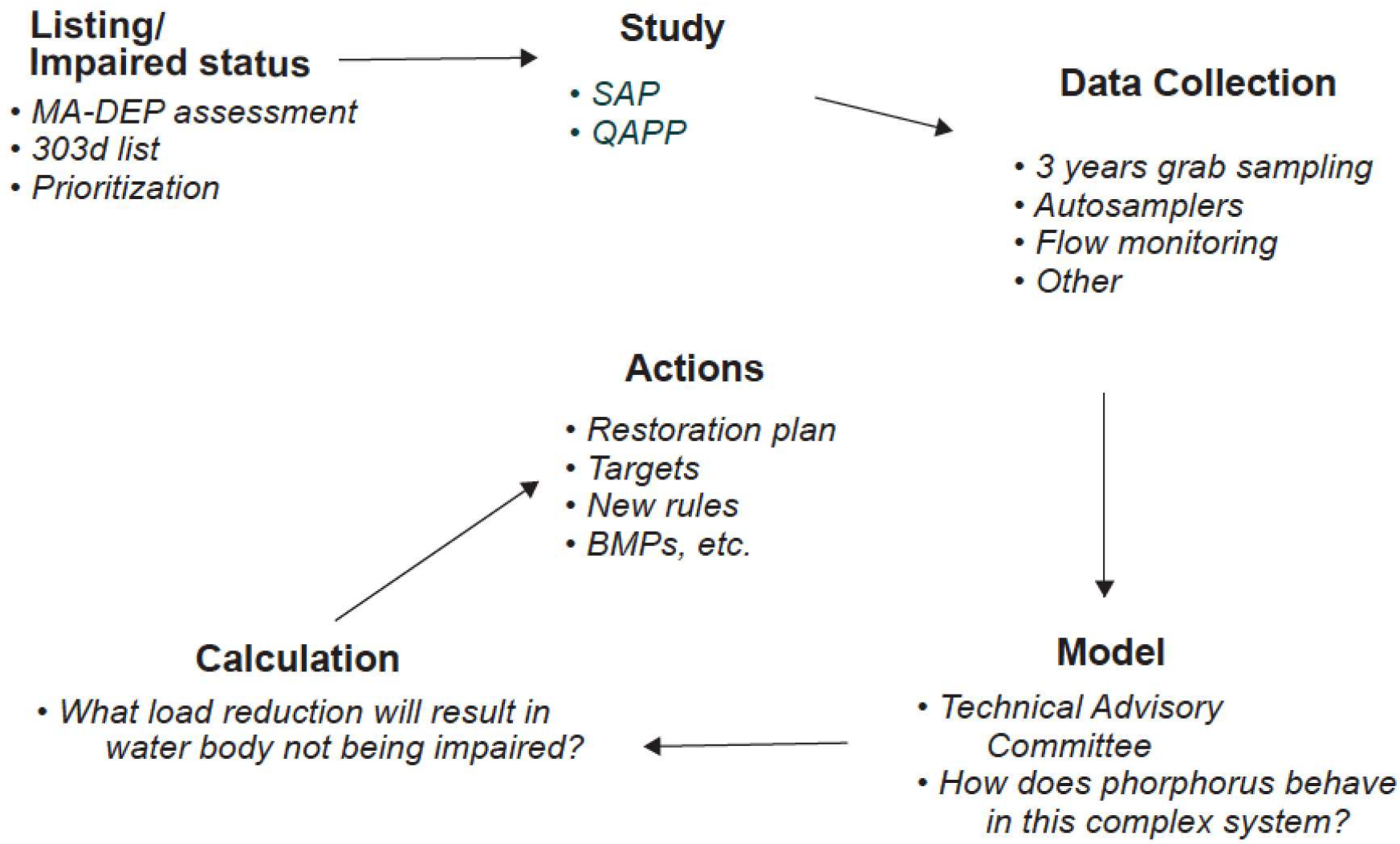
The algae-clogged waters of Lake Erie as seen from Maumee Bay State Park near Toledo, Ohio.
Joshua Lott for The New York Times

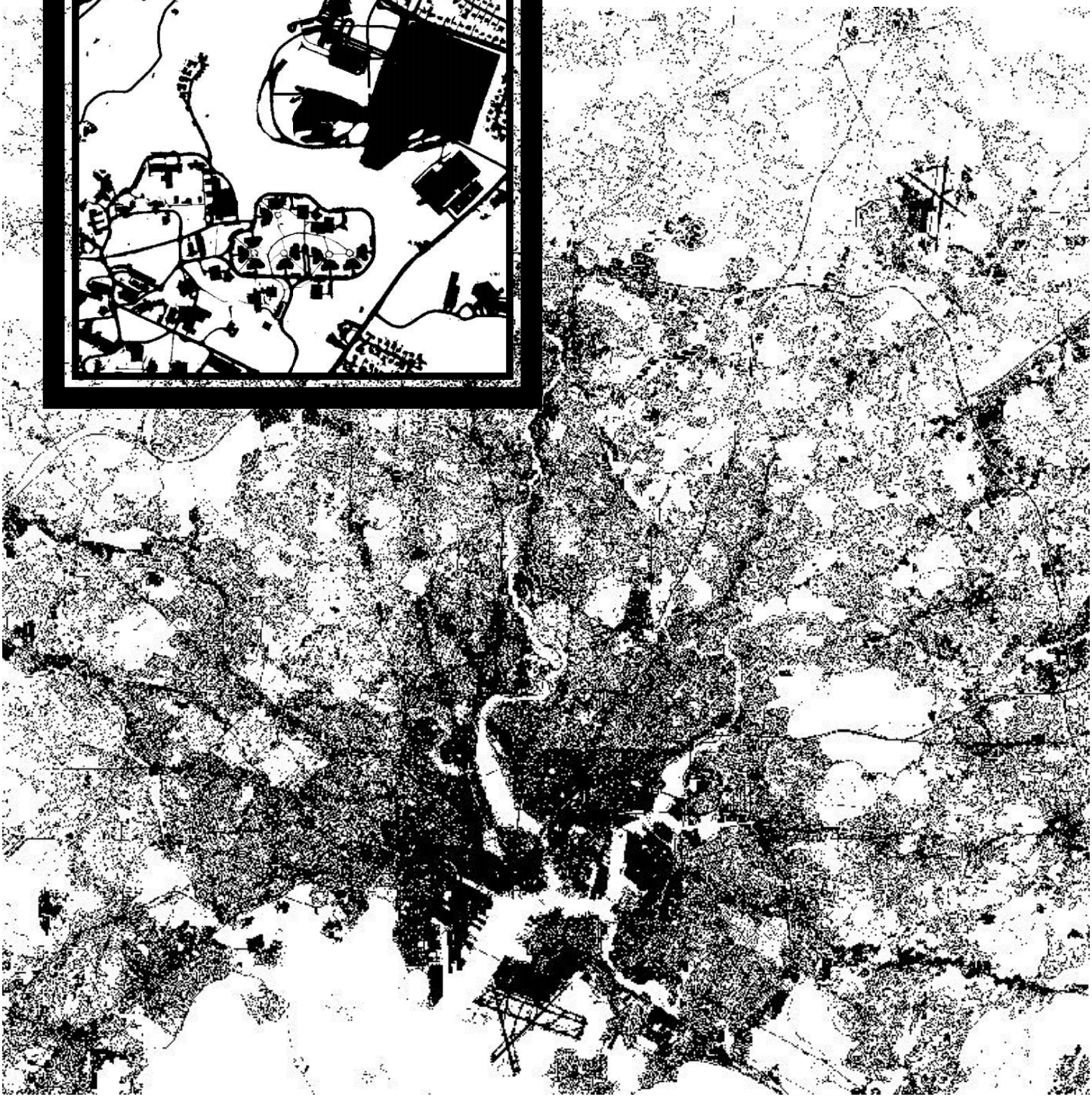
Mystic River Cyanobacteria Bloom Summer 2016

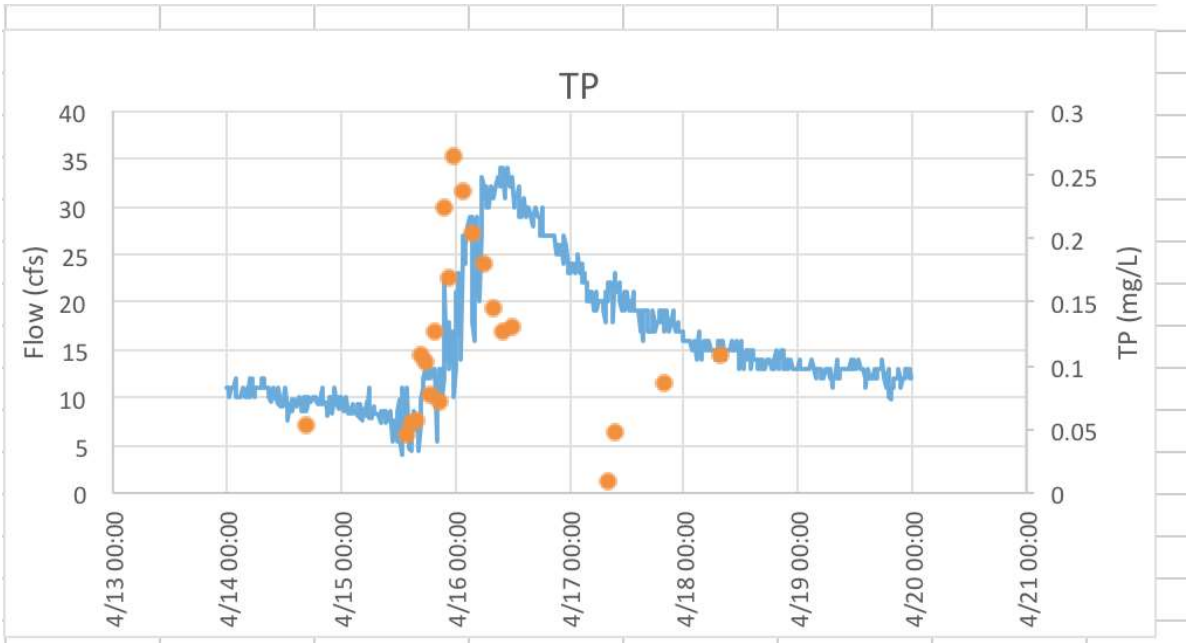
History of project and collaborations

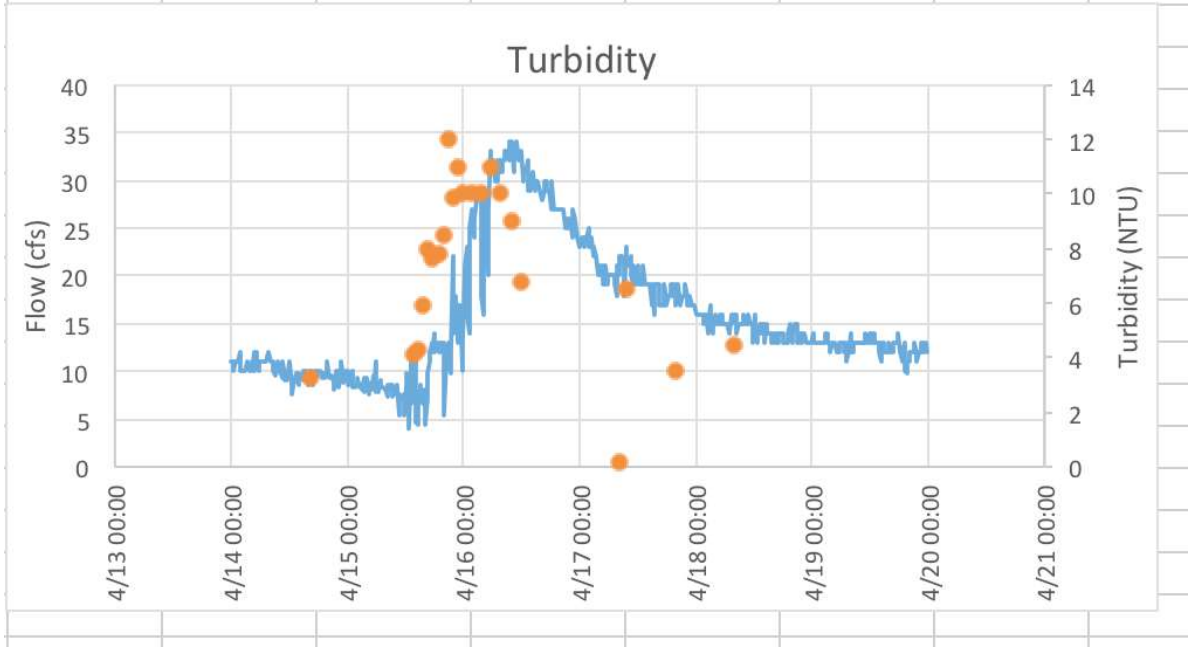
- EPA Region 1 laboratory
- Mass DEP
- USGS
- MWRA
- MyRWA
- SAP and QAPP in April 2015

From Nutrient Problem to Regulatory Solution





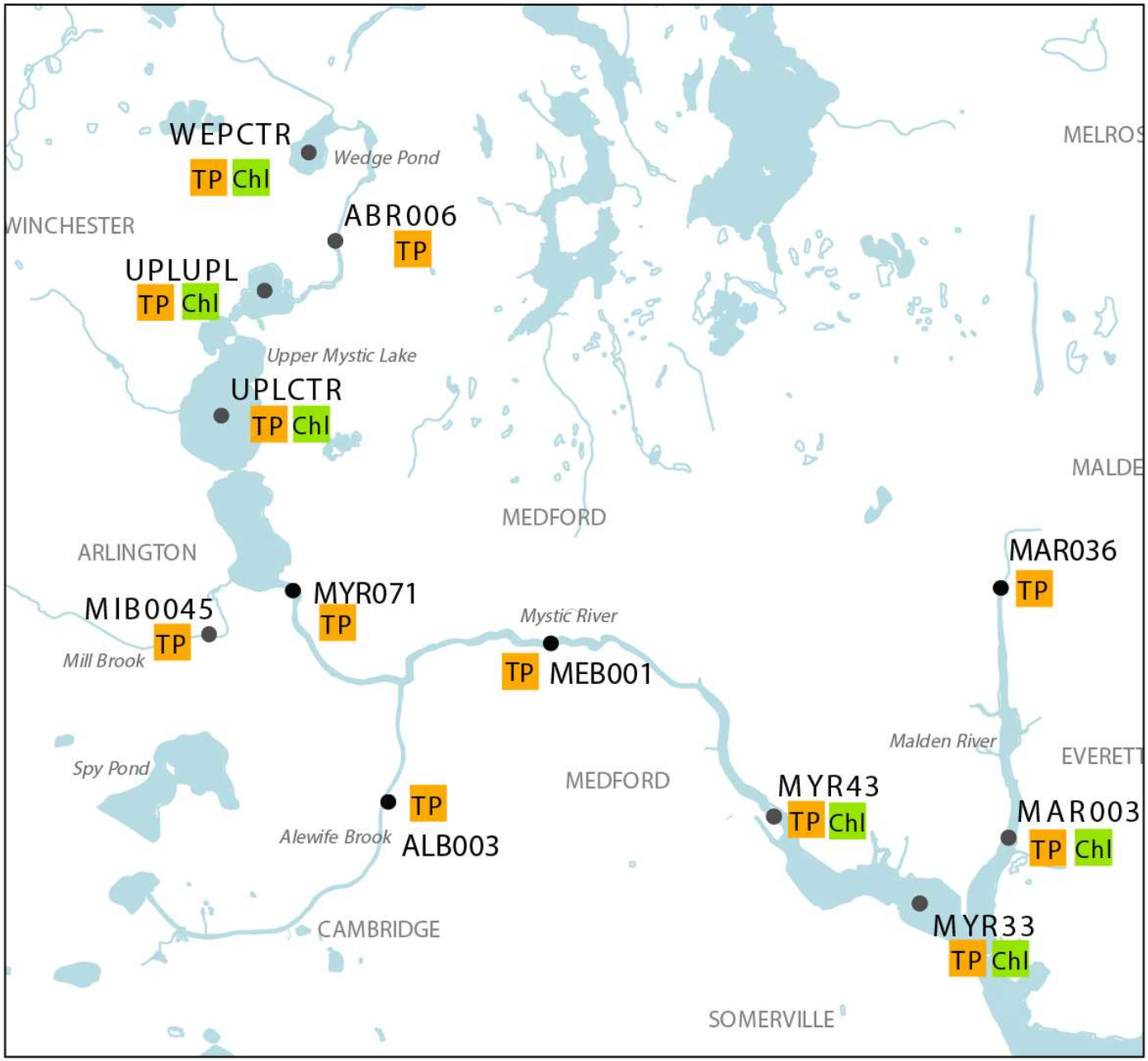




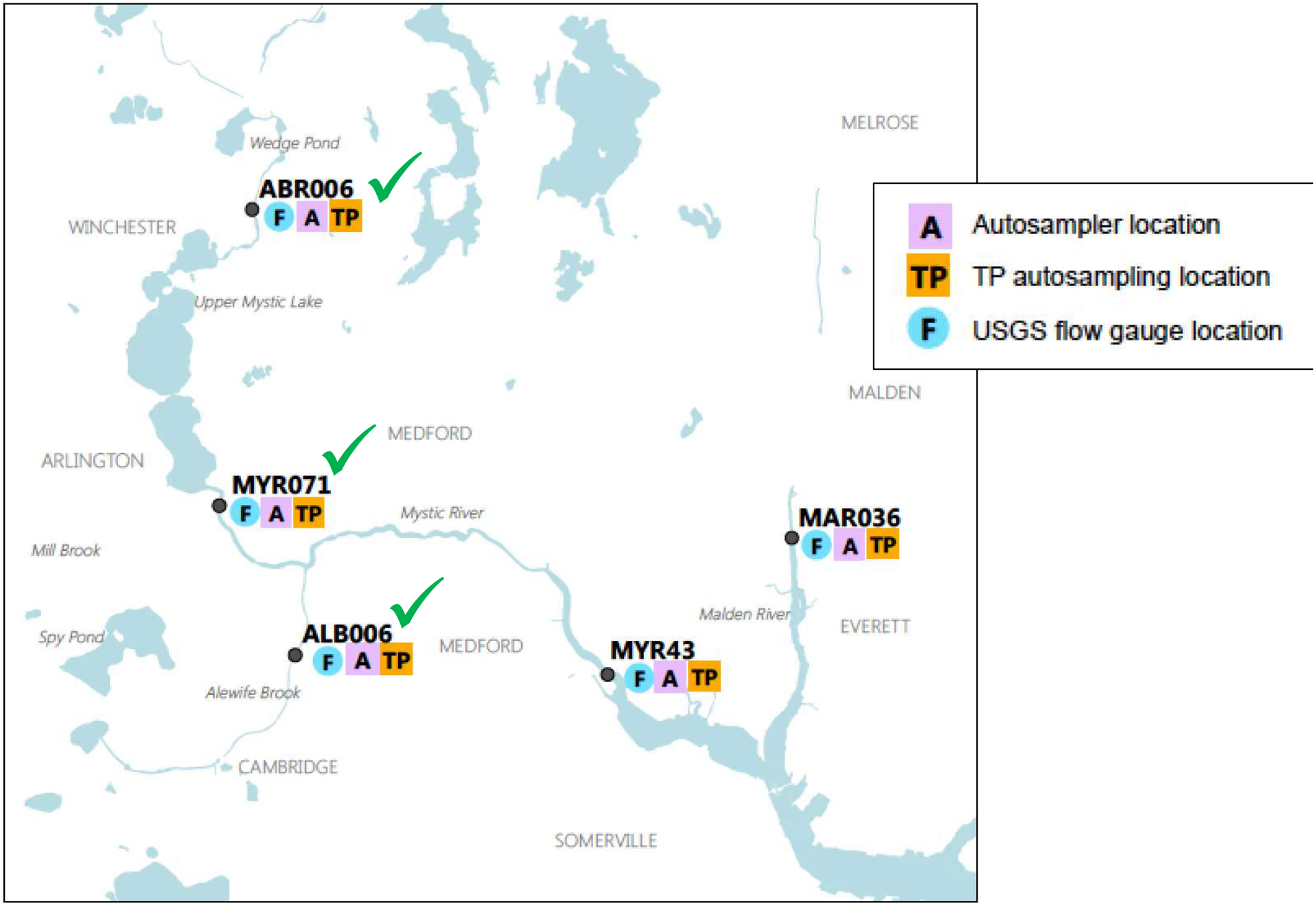
Phosphorus in a storm

Alewife Brook
4/16/14

Phosphorus and chlorophyll grab sample locations 2016-2017



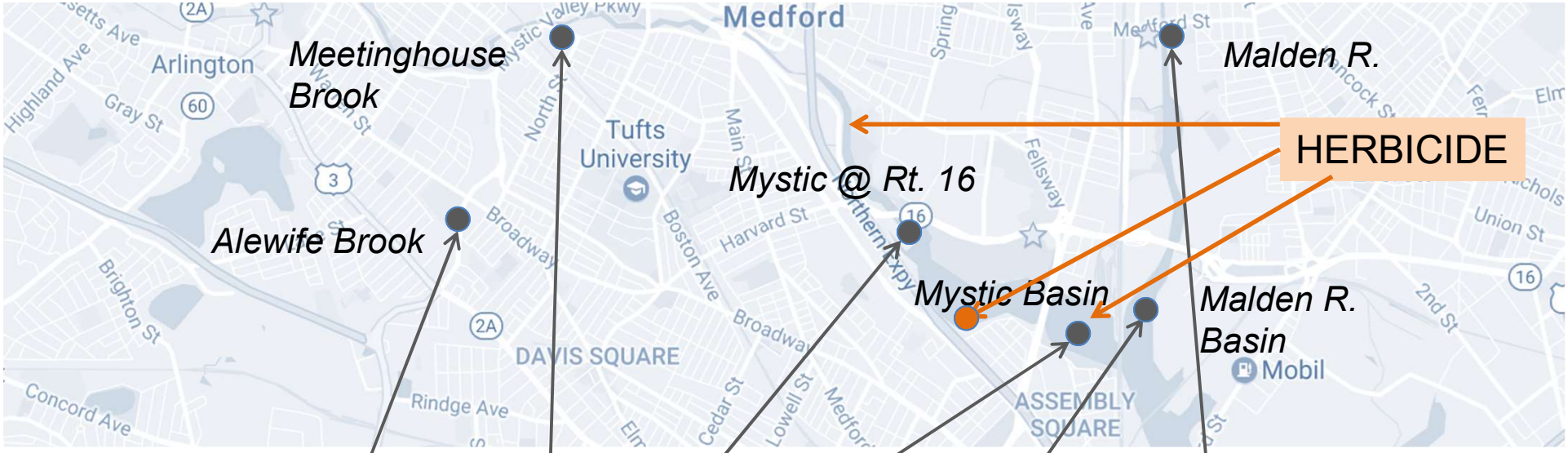
Autosampler and flow gauge locations

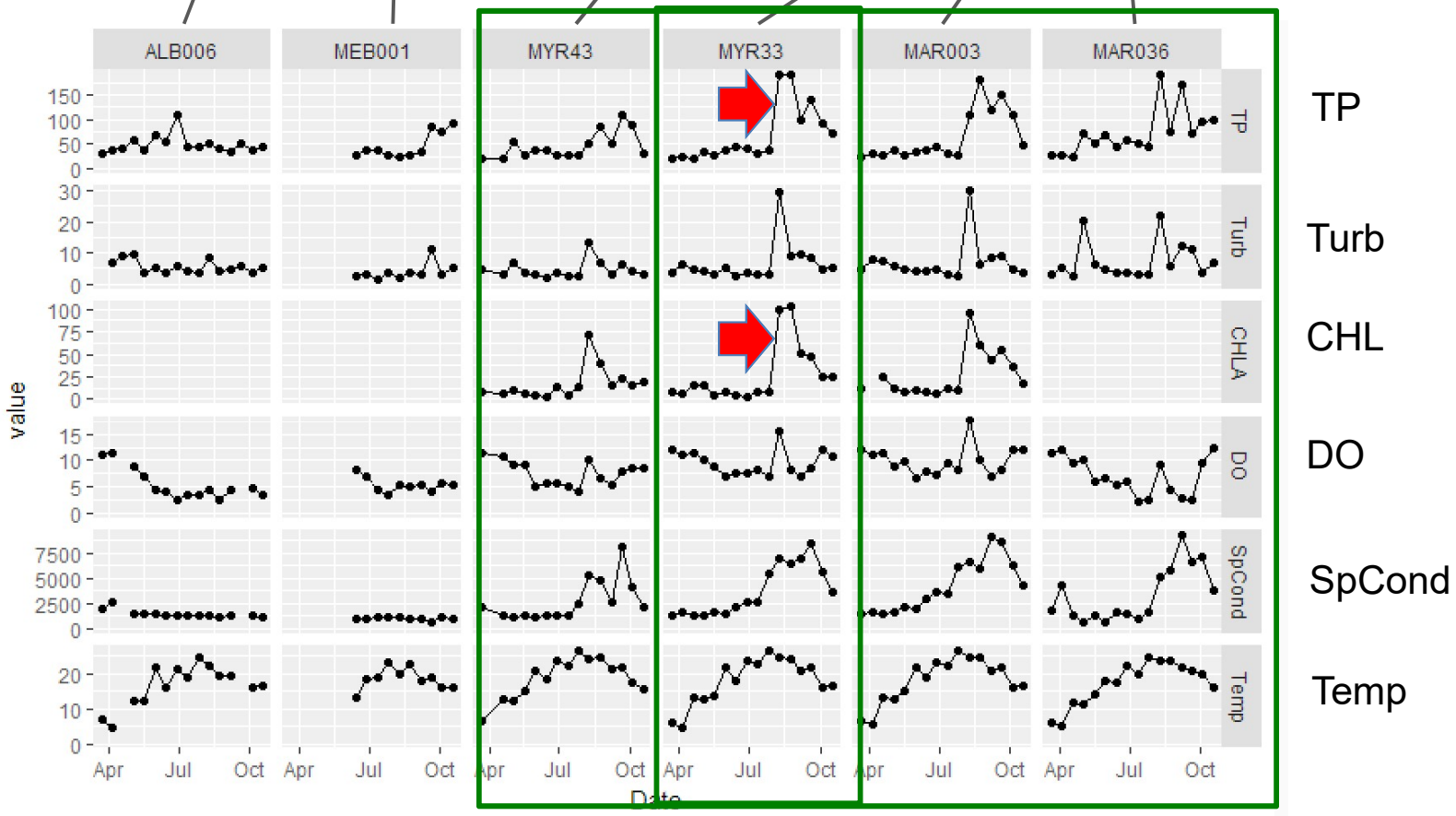



500+ visits
1500+ samples
TP, CHL, etc.

Autosamplers

Some 2016 Sampling Results





TP

Turb

CHL

DO

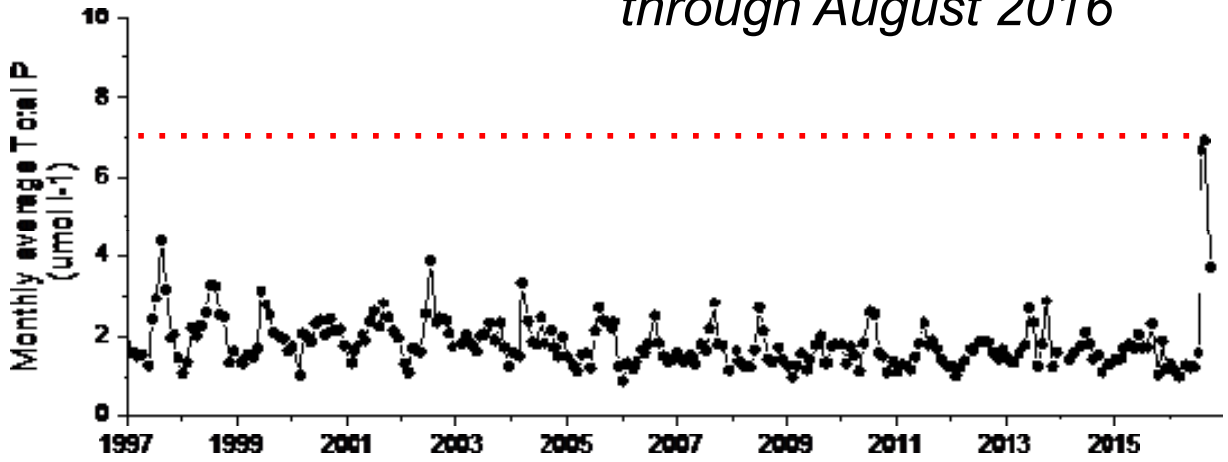
SpCond

Temp

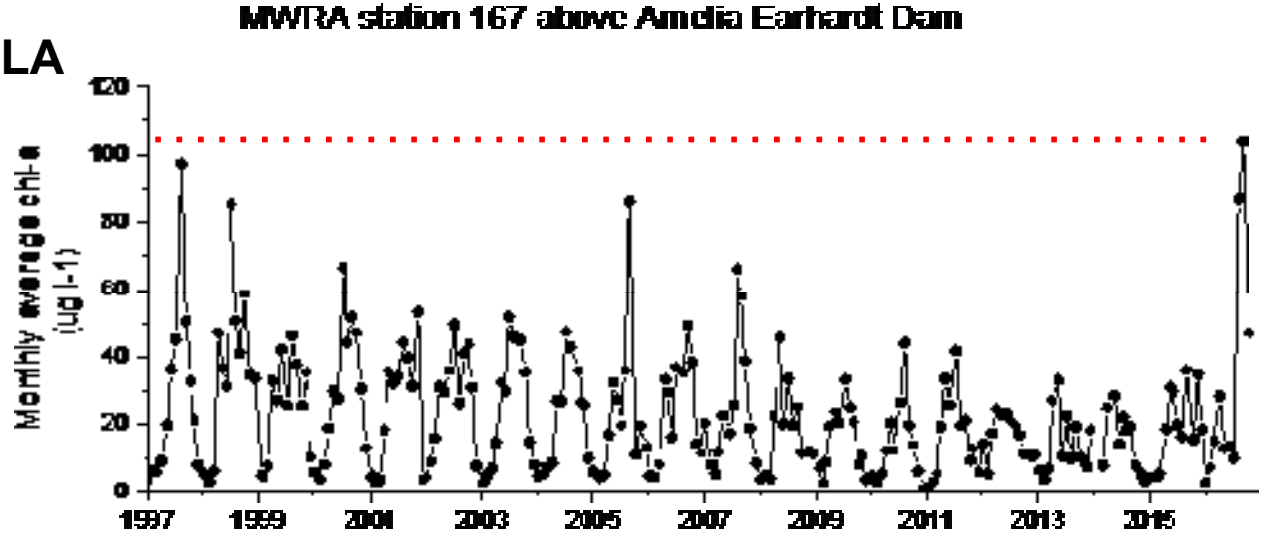
20 Years of MWRA Sampling Data at Amelia Earhart Dam

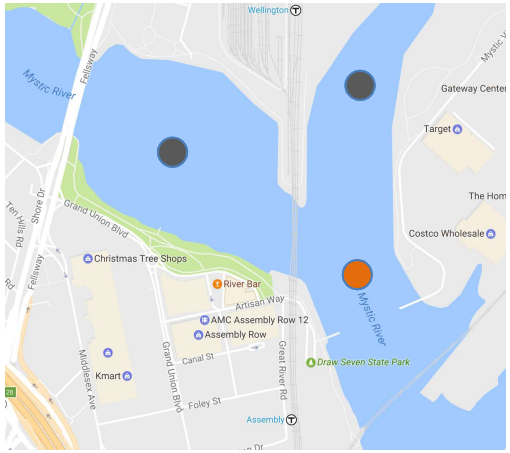
through August 2016

TP



CHLA

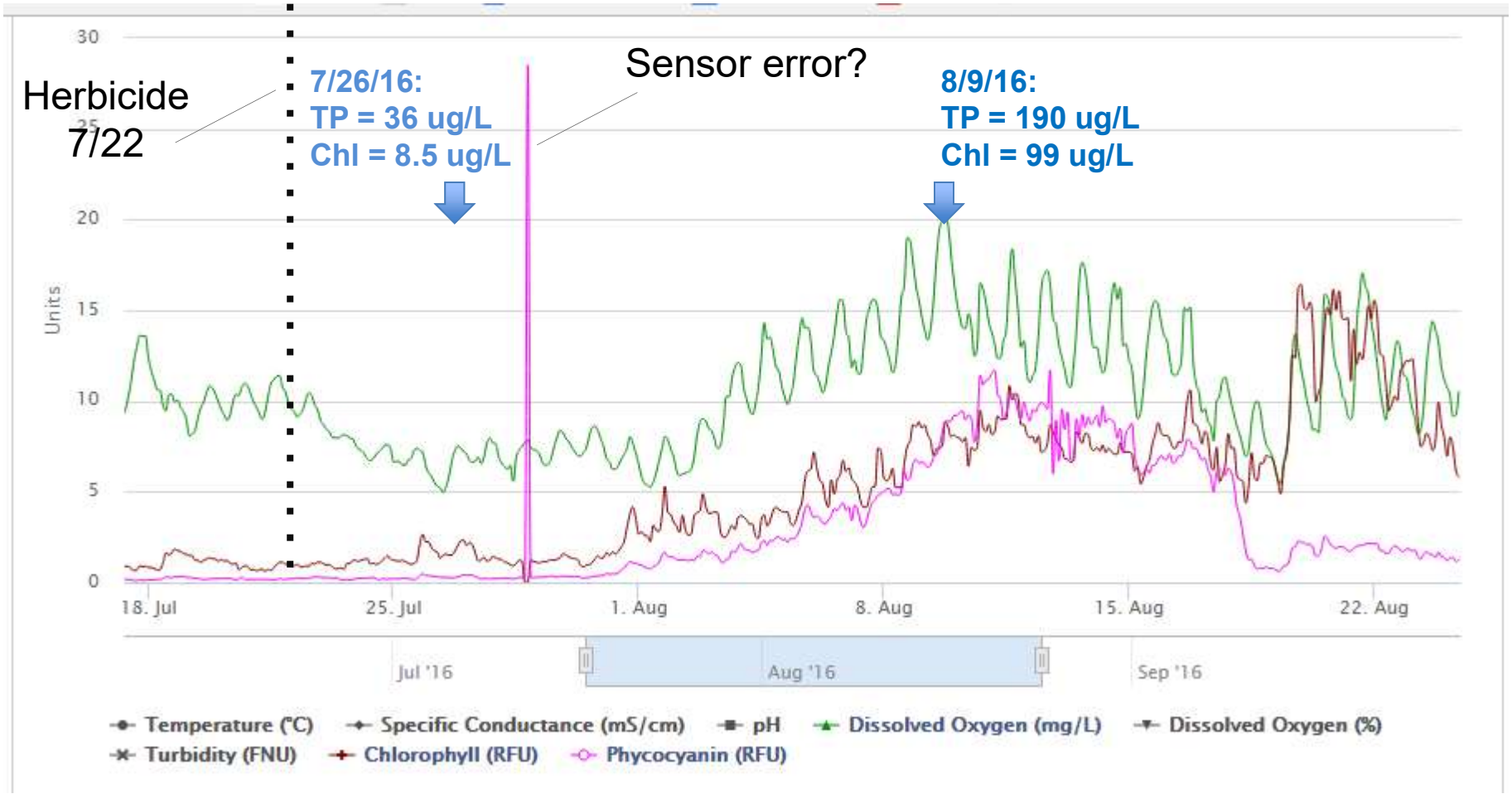




- MWRA site
- Our study sites in basin

Mystic River Cyanobacteria Bloom Summer 2016

EPA Buoy Data July-August 2016 Mystic River



Phycoycanin CHL DO

Lessons

- Unintended results of management actions

- Complex tradeoffs when balancing of multiple uses of river

- Ultimate source of the problem: excess nutrients


Questions?
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