Total Maximum Daily Loads
A Formula for Reducing Pollution in New York's Waters

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NYSDEC Division of Water

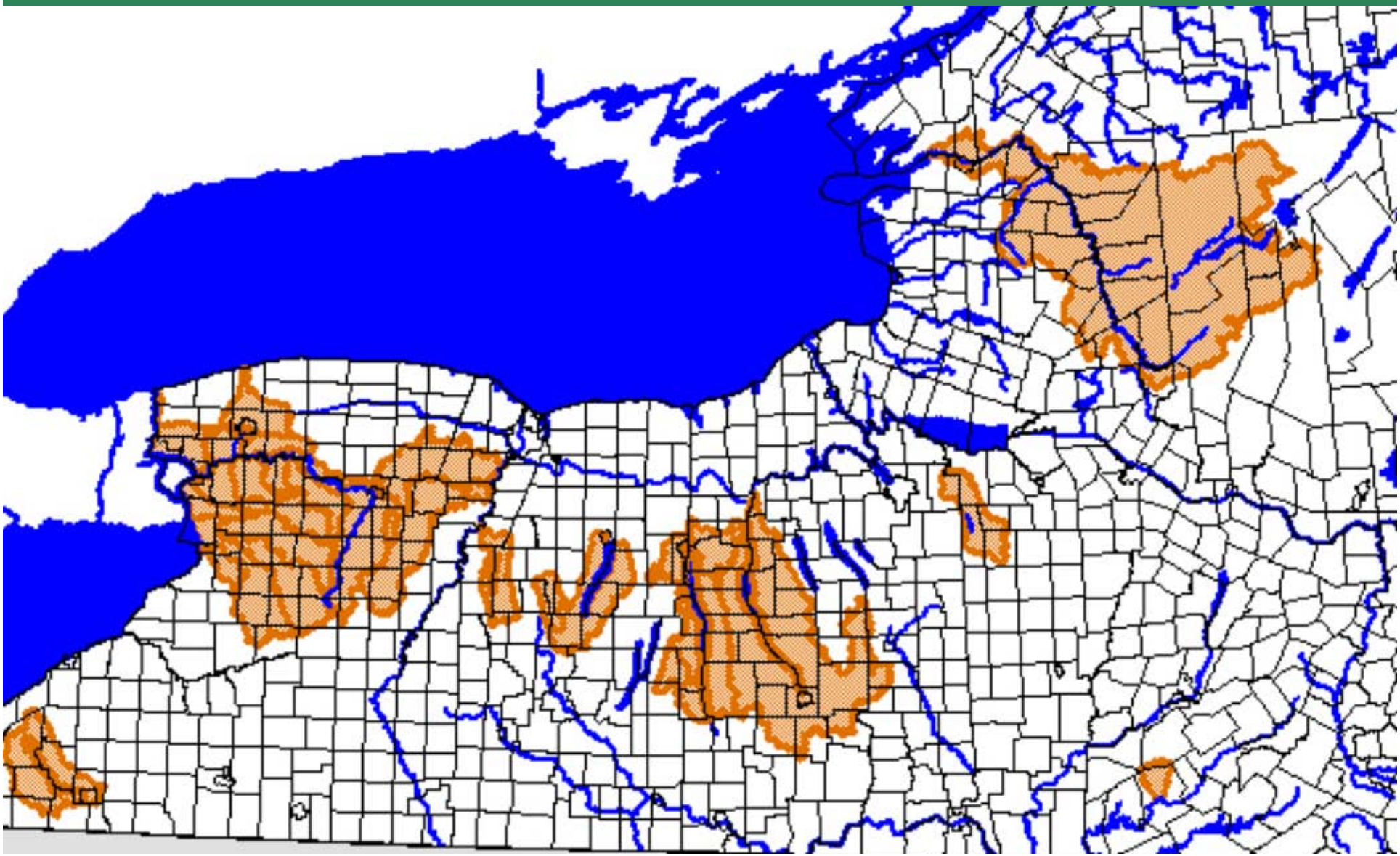
Total Maximum Daily Loads
Federal Clean Water Act

- Legal Mechanism to Address Impaired Waters (Requirement for State)
- Amount of pollutant a waterbody can receive and still meet State Water Quality Standards
- TMDL = WLA + LA + MOS
  - Waste Load Allocation (permitted discharges)
  - Load Allocation (diffuse “unregulated” pollution)
  - Margin of Safety (account for uncertainty)

Why be involved?

- SPDES discharge to impaired waters
  - Municipal or industrial treatment plant
  - Combined Sewer Overflows
  - Municipal Storm Sewer Systems (MS4s)
  - Construction general permits
- Watershed planning and restoration
  - Local value of natural resources
  - Economic development
  - Assessed valuation

DOS Watershed Plans



News Flash
Upcoming Funding Availability

- **Clean Water Act Section 604(b) Projects for Water Quality Management Planning Activities**
- **American Recovery and Reinvestment Act (ARRA) 2009**
- The Request for Applications (RFA) will be available soon. When it is released it will be posted on the DEC website

Upcoming Funding Availability

- The ARRA provides $1.7 million to New York State for planning activities associated with:
  - Green Infrastructure;
  - **Total Maximum Daily Loads (TMDLs**);
  - Phase II Stormwater for Municipal Separate Storm Sewer Systems (MS4s); and
  - Water Quality Management.
- The Department encourages eligible parties to reach out to New York State organizations and governmental units involved in the administration of watershed based programs for possible projects.

What is a Third-Party TMDL?

- TMDL in which an organization other than lead water quality agency (NYSDEC) takes responsibility for developing the TMDL document and supporting analysis.
  - NYSDEC must still adopt and submit the TMDL to USEPA for approval
- Third party could be:
  - Watershed group
  - Municipal or industrial discharger group
  - Other unit of government
- Water Environment Federation
  - Third-Party TMDL Development Tool Kit

New York TMDLs

Examples of Multi-Party TMDLs?

- Peconic Estuary - Nitrogen
- Northeast Regional (NEIWPCC) - Mercury
- New York City Reservoirs - Phosphorus
- Small Lakes – Phosphorus
- Shellfishing Waters - Pathogens

Levels of Involvement

- The International Association of Public Participation describes the spectrum:
  - Inform
  - Consult
  - Involve
  - Collaborate
  - Empower

Continuing Assessment Process

- Rotating Sampling (5-yr cycle)
  - 2009 – Genesee River Basin
  - 2010 – Western Lake Ontario Basin
  - 2011 – Central LO/Oswego R./Finger Lakes
  - 2012 – Eastern LO/ Black River Basin
- Un-assessed waters
- Priority Waterbody List
  - Threatened
  - Stressed
- 303 (d) list - 2008 (2-yr update)
- Evolving contaminants/standards

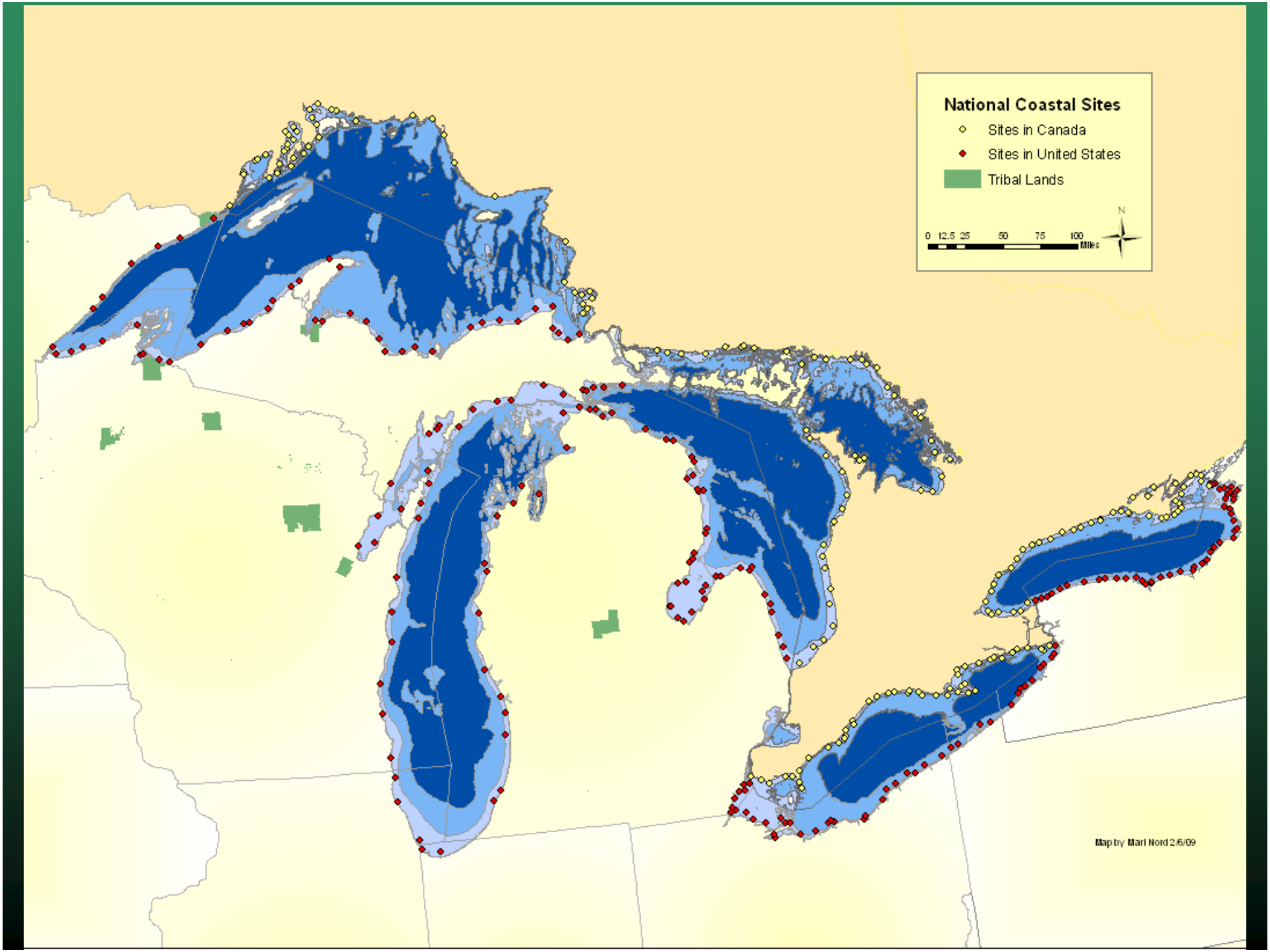
Great Lakes Coastal Survey 2010 Sites

NYS Department of Environmental Conservation

Survey Design

- Depth and Distance from Shore: Extends out to as deep as 30m but no further than 5km
- Smaller coastal ponds, lakes and lagoons near shoreline and connected to Great lakes by narrow channels are not in National Coastal Assessment
- Included harbors with breakwall or other structure within framework.
- Water Column Indicators: salinity, temperature, depth, pH, DO, photosynthetically active radiation (PAR), secchi depth, DIN, DIP, TN, TP, chlorophyll *a*, enterococci

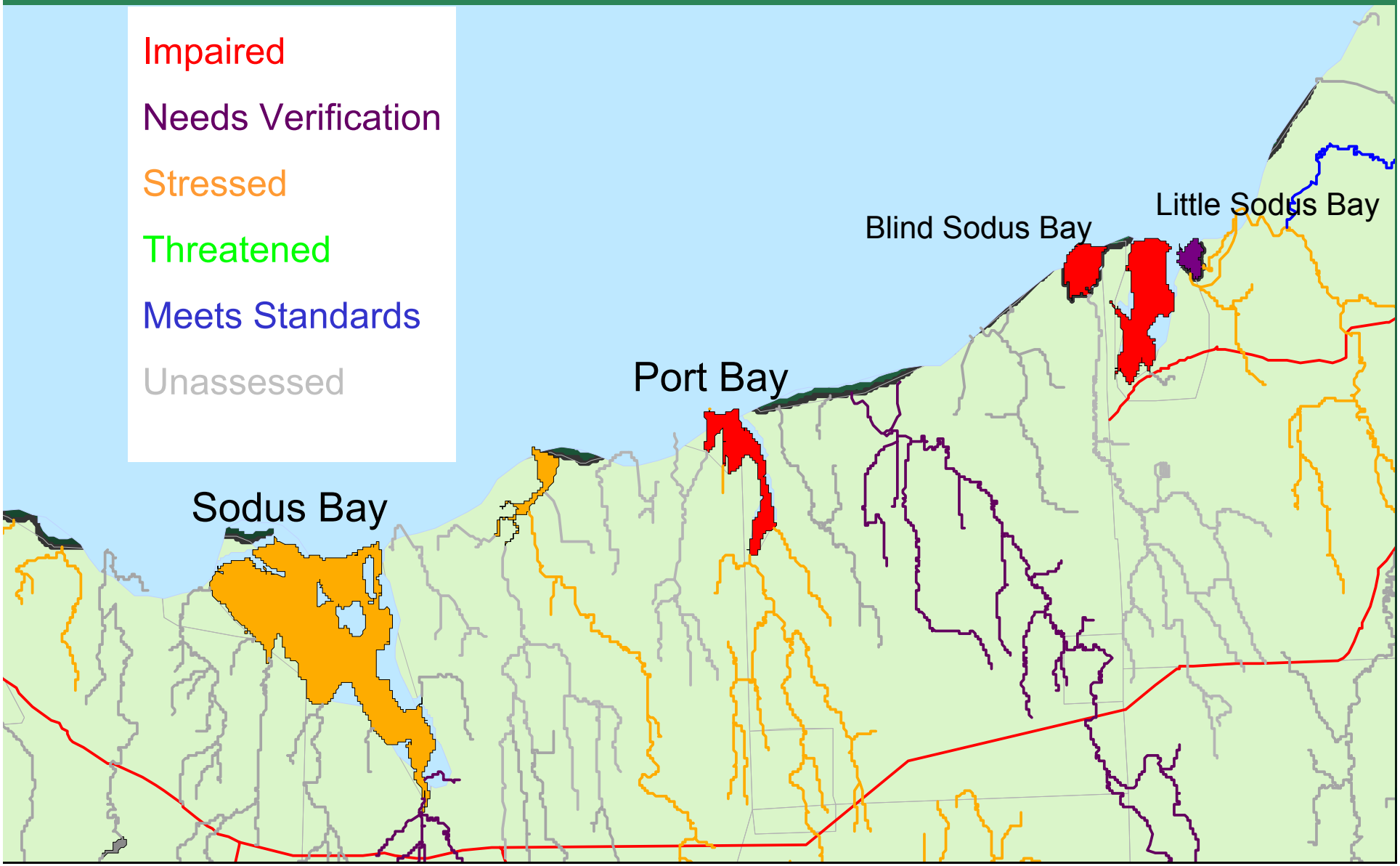
  (Under consideration: Cladophora, Zebra mussles)


National Coastal Sites
Sites in Canada
Sites in United States
Tribal Lands
N
0 12.5 25 50 75 100
Miles
Map by Mari Nord 2/6/09

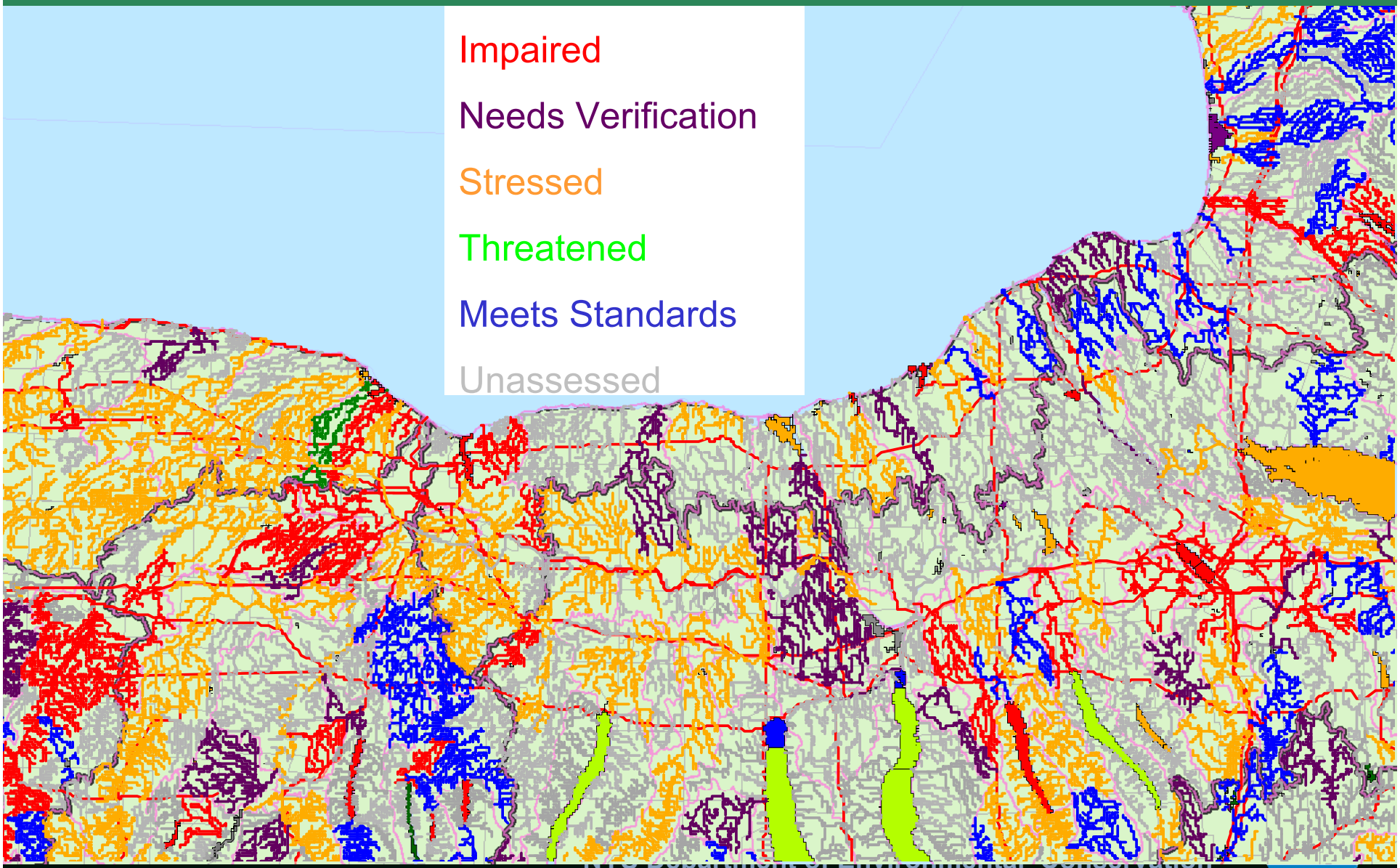
Impaired Waters
303 (d) list

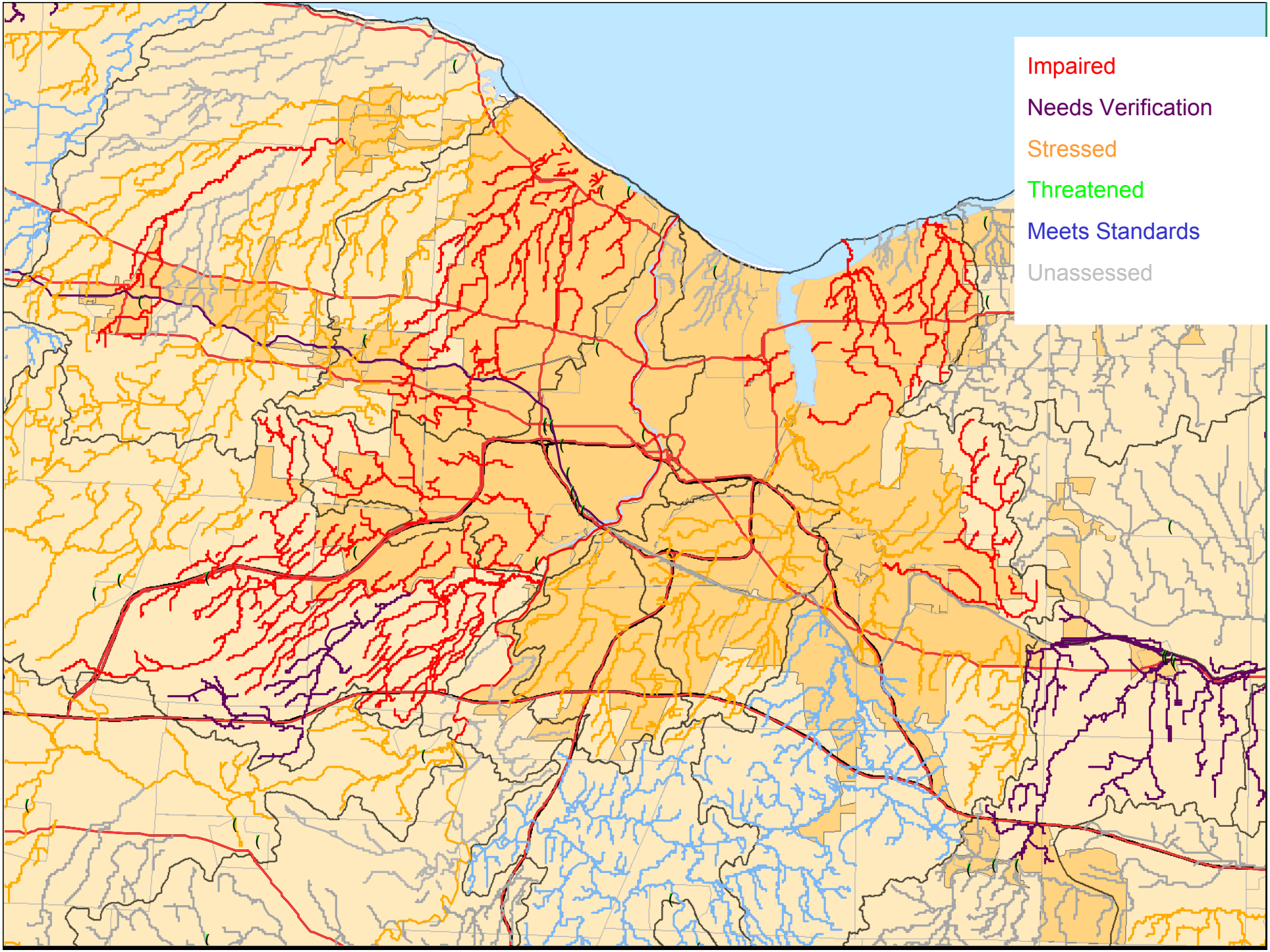
- Lake Ontario
  - PCBs, Mirex, Dioxin
  - Pathogens (Rochester Embayment – West)
- > Other waters in Lake Ontario Basin
  - Oxygen depletion
  - Floatables
  - Pathogens
  - Phosphorus
  - Silt/Sediment

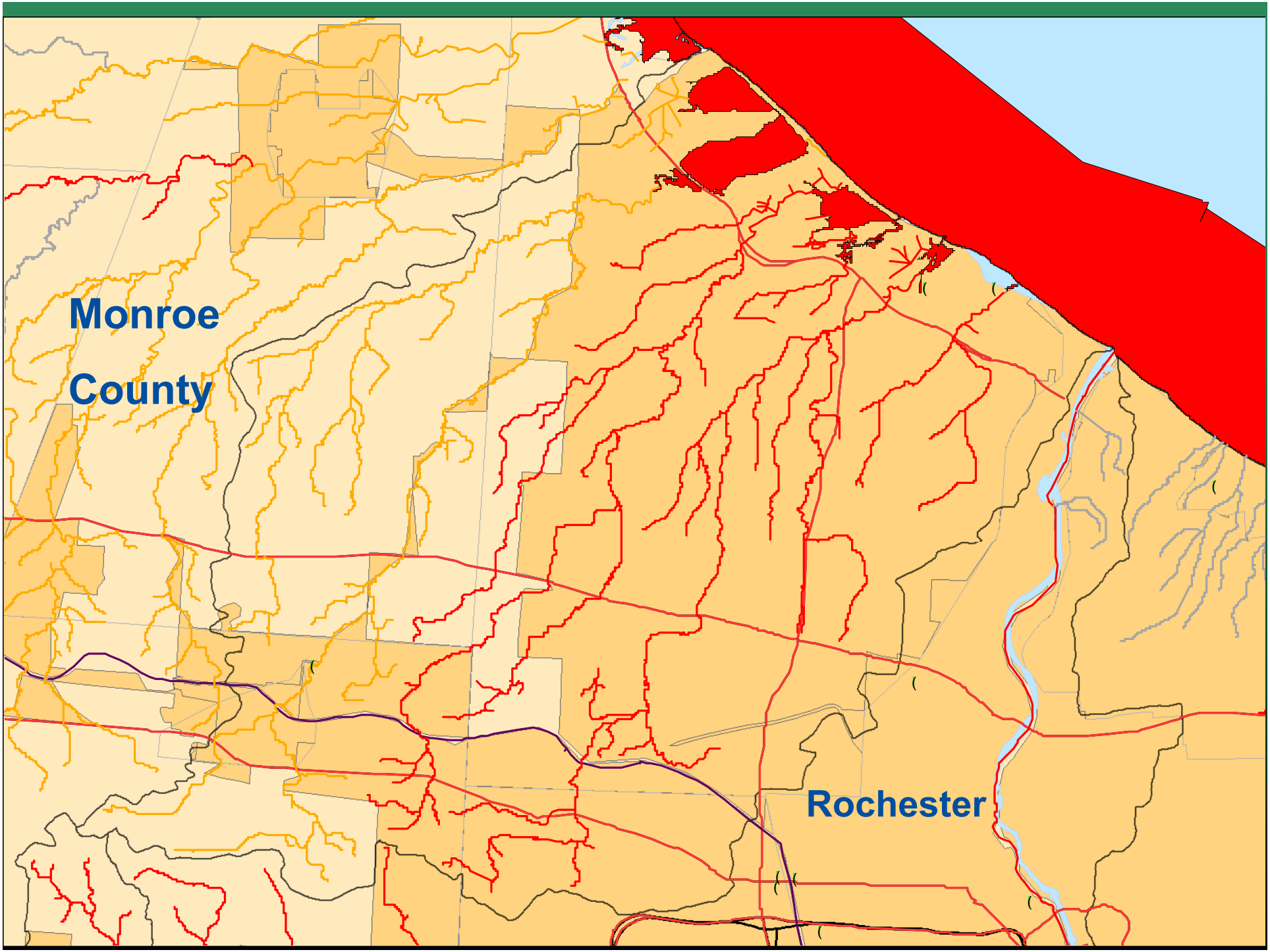
Water Quality Assessments



More Assessments




Impaired
Needs Verification
Stressed
Threatened
Meets Standards
Unassessed


Monroe
County
Rochester

What does a TMDL involve?

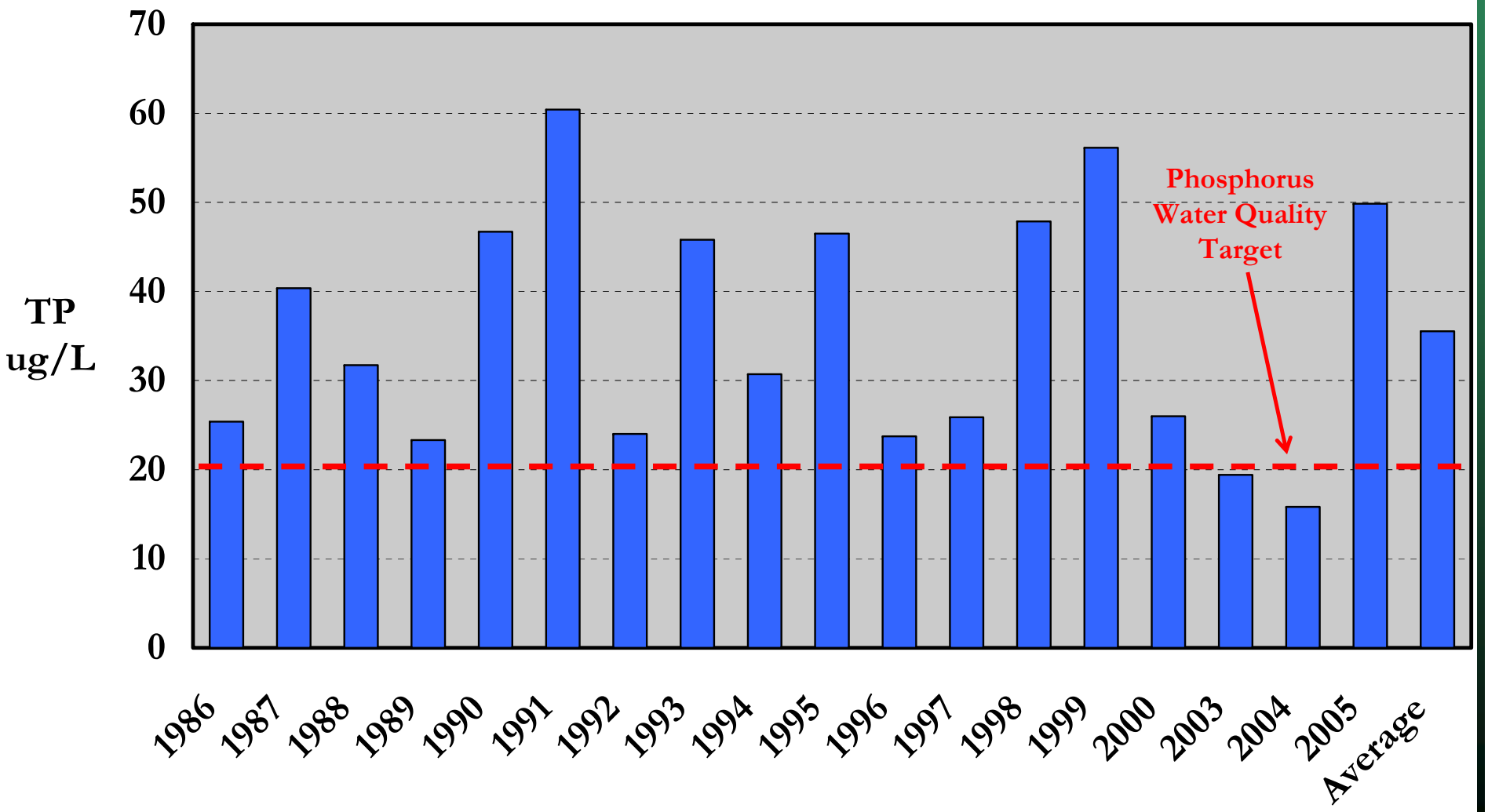
- Describing the Problem
- Setting Numerical Targets
- Identifying Pollutant Sources
- Assigning Allocations
- Developing an Implementation Plan
- Developing a Monitoring Plan

Describing the problem

- Need more information to fix than list
  - Temporal variation (TM**D**L)
  - Association with flow (concentrations/loads)
- Sources of information
  - Other government agencies
  - Academic institutions
  - Volunteer (Quality Control)
    - Citizen Statewide Lake Assessment Program (CSLAP)

CSLAP Lake Monitoring

Average Growing Season Epilimnion TP Concentration



Setting Numerical Targets
Cause and effect relationship

- Water quality simulation model is used to
  - Link the pollutant of concern to the impaired waterbody
  - Relate level of impairment to loads from pollution sources
  - Determine total loading capacity
- Consider
  - Critical flow and level conditions
  - Seasonality

Setting Numerical Targets
Cause and effect relationship

- Lake model is used to define the relationship between phosphorus loading to the lake and the resulting phosphorus concentration.
- Net accumulation in Lake (nutrient balance)
  - Nutrient (P) load input to lake (watershed model)
  - Nutrient (P) load output from lake (monitoring)
  - Nutrient (P) losses in lake (algae: chlorophyll-a, sediment, oxygen depletion)
- What is the maximum load that results in phosphorus concentration of 20 micrograms/liter ???

Identifying pollutant sources

- delineating the watershed
- describing hydrologic and geologic characteristics
- quantifying land use and land management practices
- identifying and locating loads from all pollutant sources by using a watershed model

THE CADMUS GROUP, INC.

Buck Pond

Legend

- Water
- Low Development
- High Development
- Hay/Pasture
- Row Crops
- Conifer Forest
- Mixed Forest
- Decidous Forest
- Wooded Wetland
- Emergent Wetland
- Quarry
- Transitional

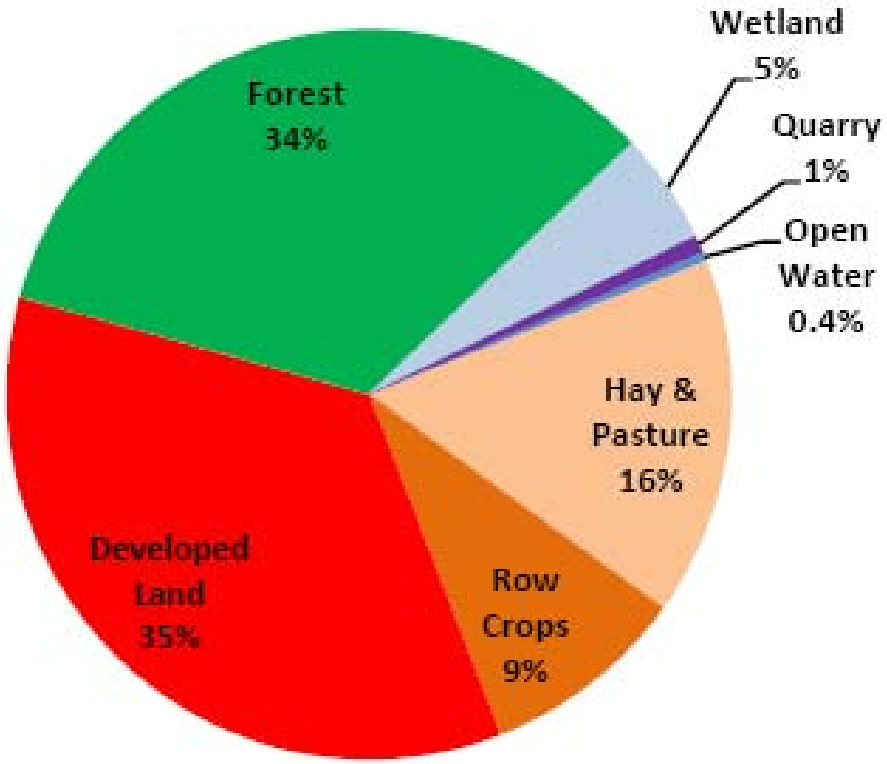
0 1 2 3 4 Miles

N W E S

Table 1. Land Use Acres and Percent in Buck Pond Drainage Basin

Land Use Category	Acres	% of Drainage Basin
Open Water	48	0.4%
Agriculture	2,702	25%
Hay & Pasture	1,714	16%
Cropland	988	9%
Developed Land	3,799	35%
Low Intensity	3,484	32%
High Intensity	315	3%
Forest	3,629	34%
Wetlands	532	5%
Quarry	81	1%
TOTAL	10,791	100%

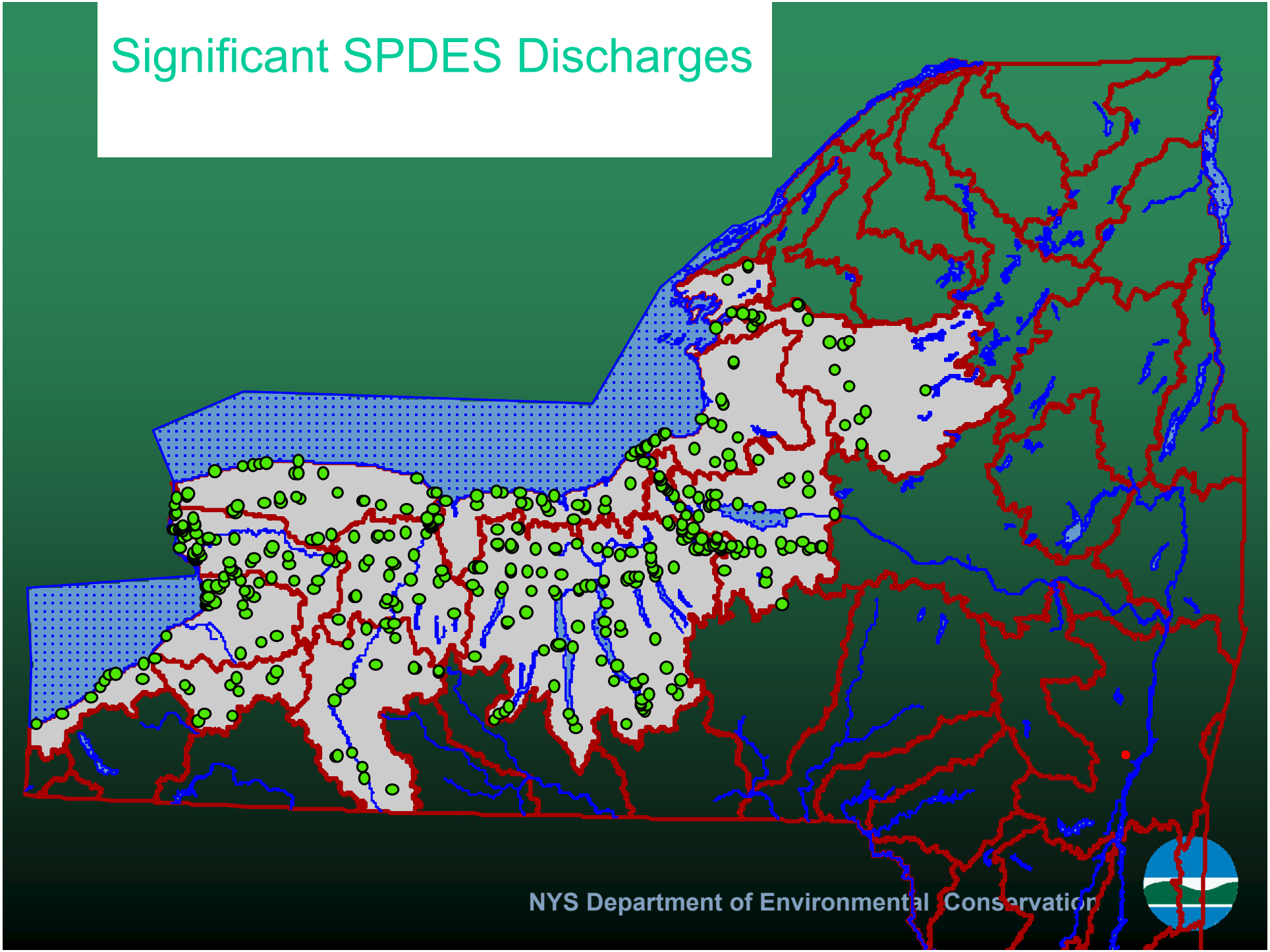
Figure 3. Percent Land Use in Buck Pond Drainage Basin



Identifying pollutant sources

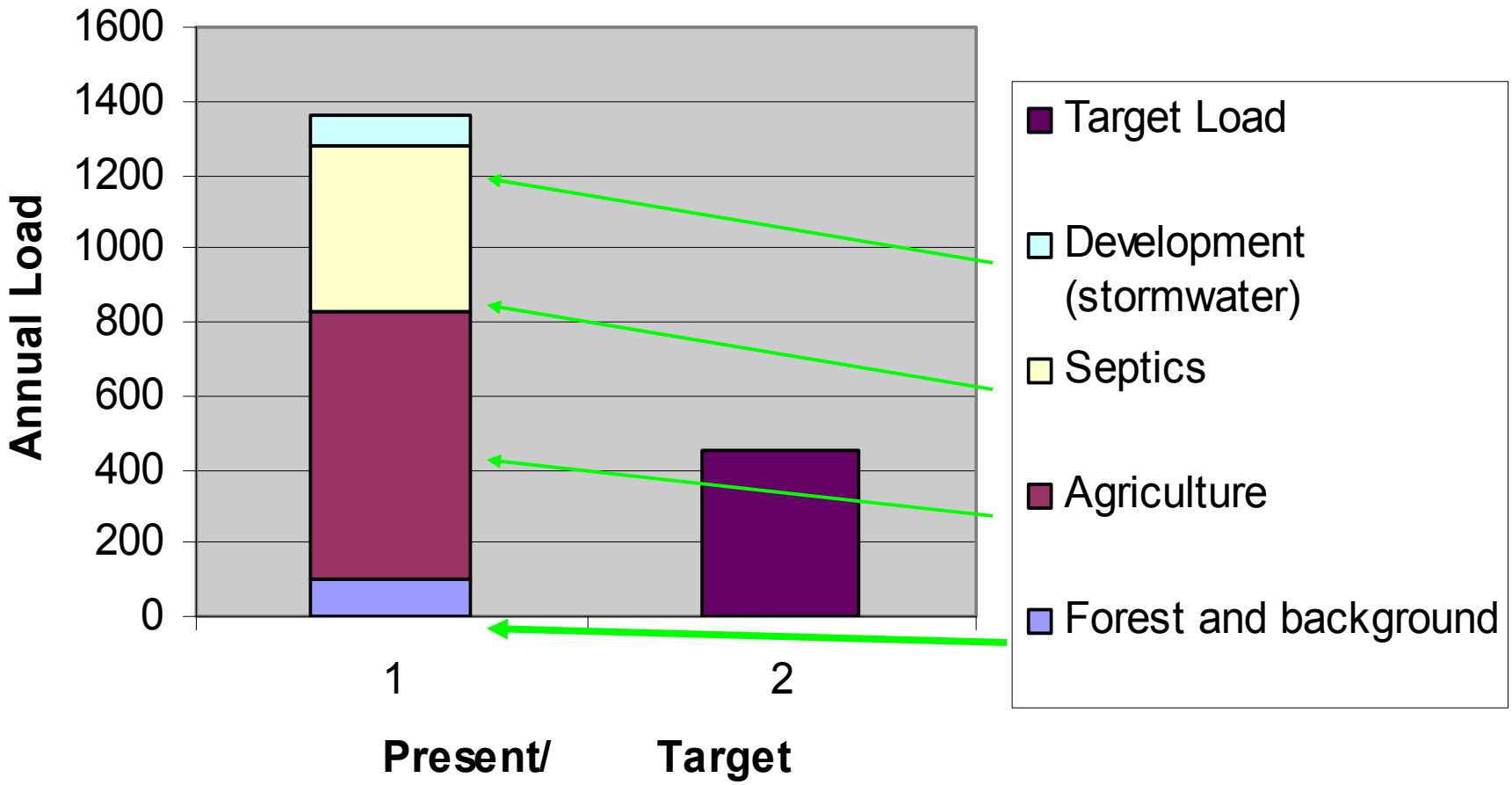
- Watershed Model will attribute load to source categories:
  - Wastewater discharges
  - Stormwater from developed land
    - Lawn fertilizer, animal droppings, erosion
  - Forest, wetlands, other natural background
  - Agriculture (fertilizer, manure, soil loss)
  - On-Site Wastewater (Septics)

Significant SPDES Discharges



Load Allocation

(living on a budget)



Assigning Allocations

- Time and Resource intensive
- Need to be clear with stakeholders
  - How allocation scenarios are designed and tested
  - How will the solution be implemented
    - Technical and environmental considerations; economic, social, and political considerations
    - Practical considerations for implementation, such as landowner acceptance of management practices, funding, and other constraints
    - “reasonable assurance” for NPS reduction

Assigning Allocations

- TMDL = WLA + LA + MOS
  - Waste Load Allocation (permitted discharges)
  - Load Allocation (diffuse “unregulated” pollution)
  - Margin of Safety (account for uncertainty)

- SPDES discharges - regulatory consequences of the TMDL (Waste Load Allocation).
  - **MS4 Permits:** Watershed Improvement Strategies
    - Retrofit Program with plan and schedules
    - Designation of entire watershed as MS4
  - **Construction Permits:** (disturb > 1 acre) must address Phosphorus (Design supplement)

Developing an Implementation and Monitoring Plan

- TMDL to Address Cause of Problem: Too much pollutant load
- Management for each source of POC load
  - WLA – set load limits in SPDES permits
    - Municipal, Commercial, Industrial
    - Stormwater (MS4 and Construction)
    - CSOs
  - LA – Reasonable assurance for NPS reduction
    - Agriculture
    - Septics
    - Other?
- Monitoring to demonstrate improvements