Impairments to Cayuga Lake Identified by NYSDEC

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for the Water Resources Council

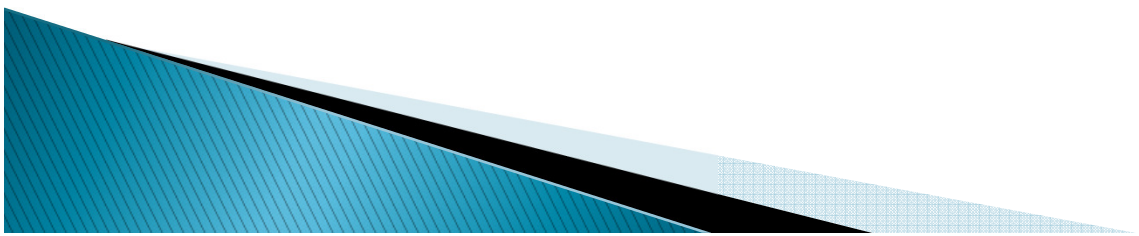
Based on presentations by Jeff Myers, NYSDEC
and Eileen O'Connor, Cayuga Co. Health Dept.

Overview of 5-year process

- Monitoring
- Modeling
- Set a limit on P in So Basin, a TMDL

- Only South Basin of Cayuga Lake

- How did we get here
- What is the process



Clean Water Act of 1972

- 2/3 of the country's waters were unsafe for fishing or swimming.
- Goal: Restore and maintain the chemical, physical, and biological integrity of our nation's waters.

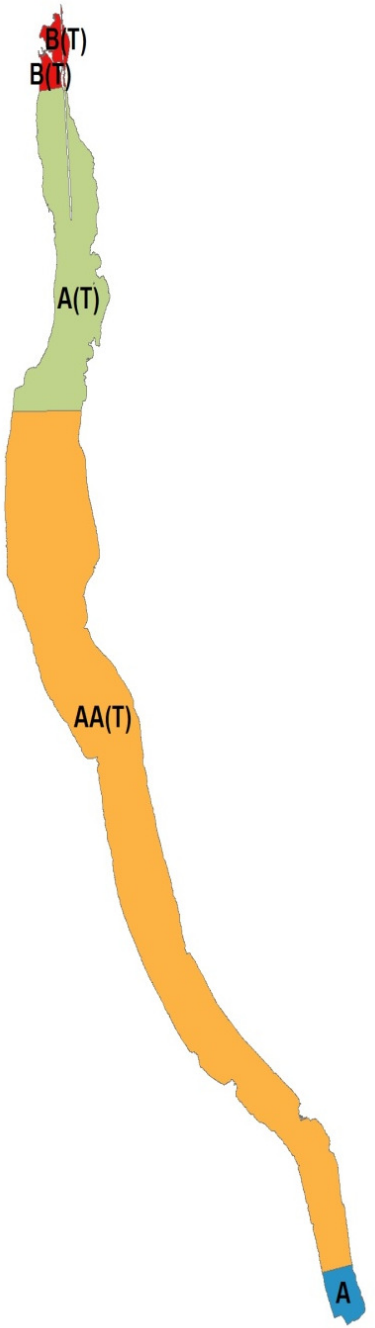
http://www.pbs.org/now/science/cleanwater.html

Point Sources Targeted

- SPDES Permits
- State Pollution Discharge Elimination System
- Examples: WWTF, LSC

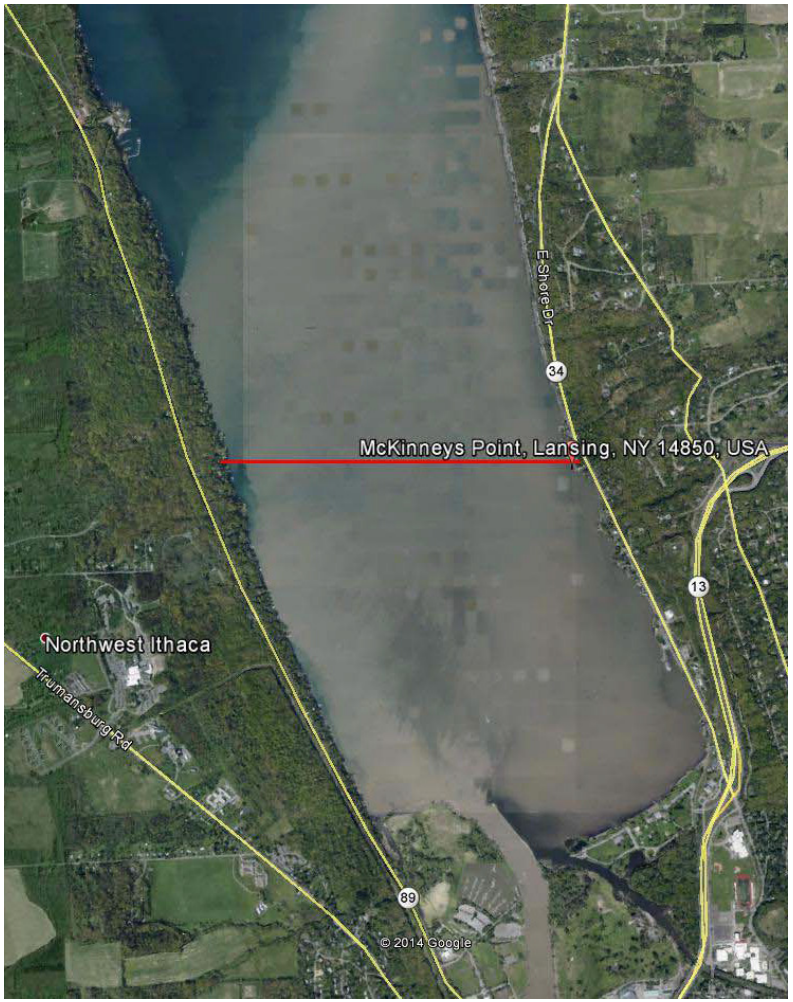
NYS Sets Designated Uses

- Southern End drinking water, recreation and protection of aquatic life
- Based on historical, existing or expected best use
- Results in a water quality standard



“Impaired”

doesn’t meet water quality standards, designated use



Current Impairments:

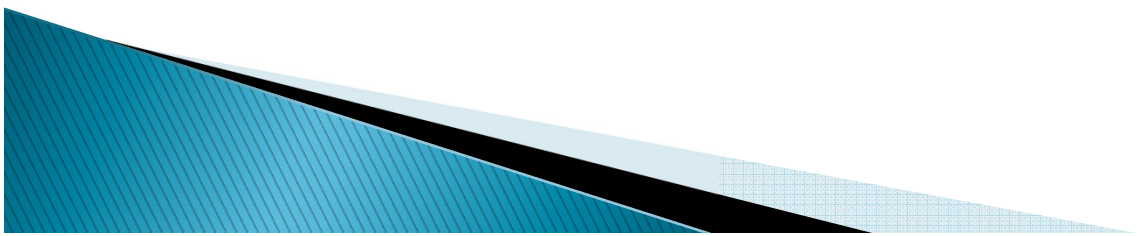
- Phosphorus
- Silt/Sediment
- Pathogens*

The current focus is on <u>Phosphorus</u>

P → Algae

Not Addressed:

Rooted plants
Other issues



NYS 303(d) list

States submit list of impaired waters to EPA

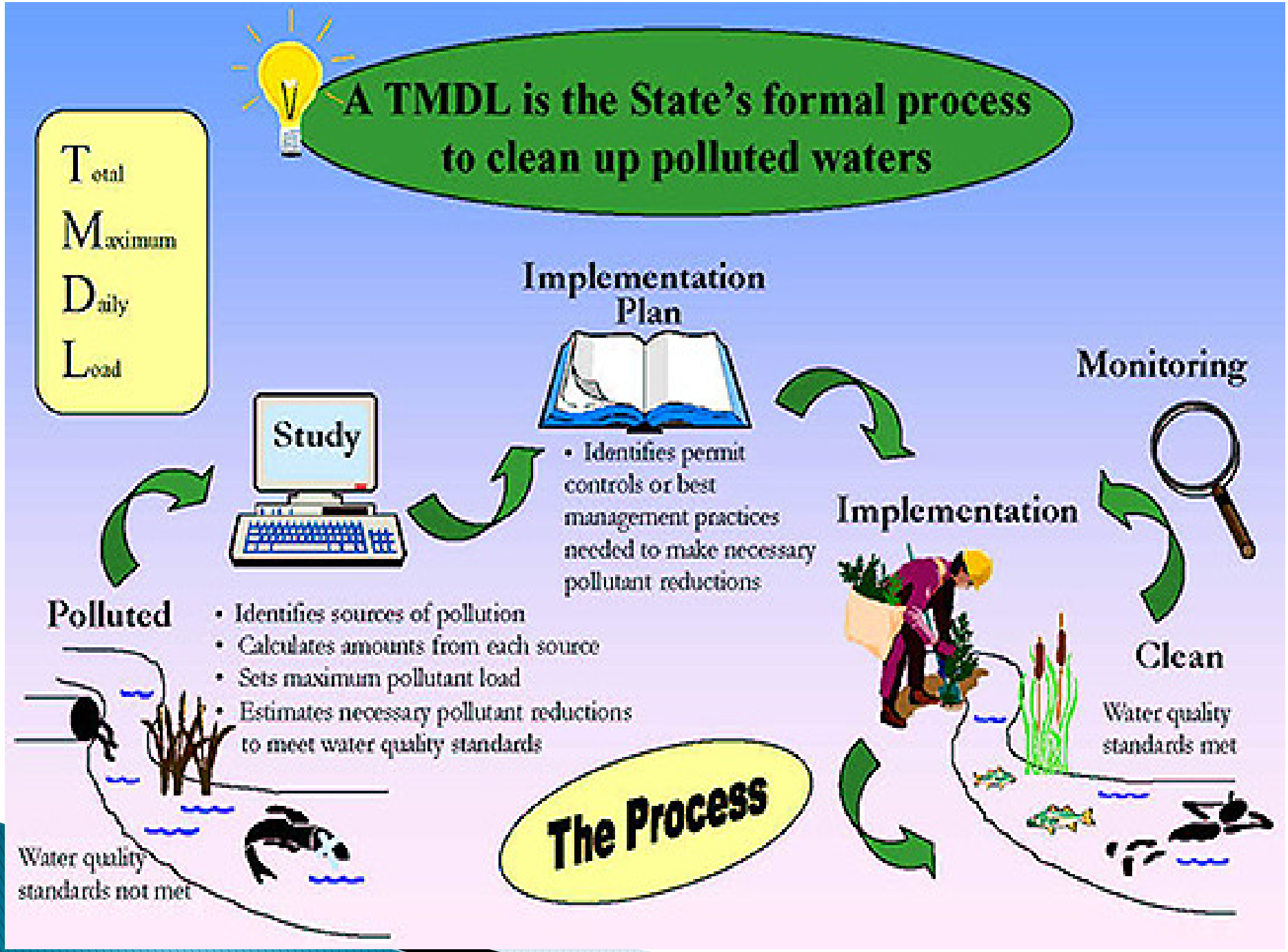
Requires strategies to reduce pollutants, restore and protect the designated uses

303(d) list → TMDL

How much P can enter the lake each day without causing harm

Questions About TMDL?

- Which form of P: hotly debated by “experts”
- Can the sources be regulated
- Are they natural or historical
- Will the lake be healthier


A TMDL is the State's formal process to clean up polluted waters
Total
Maximum
Daily
Load
Study
Implementation Plan
• Identifies permit controls or best management practices needed to make necessary pollutant reductions
Implementation
Monitoring
Clean
Water quality standards met
Polluted
• Identifies sources of pollution
• Calculates amounts from each source
• Sets maximum pollutant load
• Estimates necessary pollutant reductions to meet water quality standards
Water quality standards not met
The Process

TMDL Implementation

- TMDL plan is developed by NYS
- Approved by EPA

- Must reduce pollution levels in the water body to the specified levels

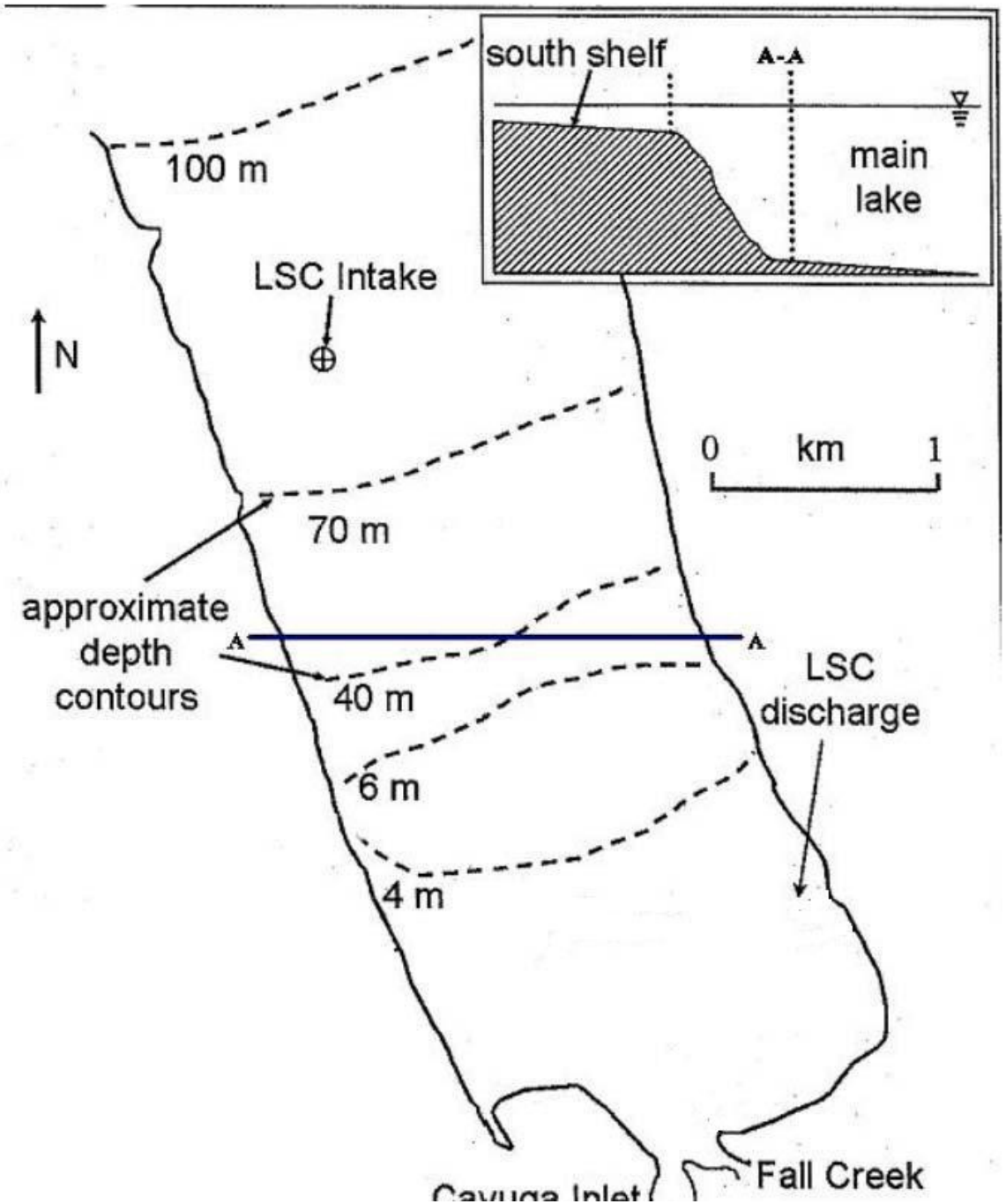
Study:
Monitoring Feeds Modeling

- Cornell funded
- DEC working closely with WRC Monitoring Partnership

Connection to the Cornell Lake Source Cooling SPDES Permit

- NYSDEC and Cornell agree: water quality model of Cayuga Lake is needed to establish whether or not the return flow from the LSC facility has any negative impacts.

Other actions also required in the LSC Permit


south shelf
A-A
main lake
100 m
LSC Intake
N
0 km 1
70 m
approximate depth contours
A
A
40 m
LSC discharge
6 m
4 m
Fall Creek

How *Could* LSC Affect Cayuga Lake Water Quality?

- Transfer of higher phosphorus water from deep lake to shallow shelf
- Maximum use of LSC during warmest months

Why LSC *Might Not* Affect Cayuga Lake Water Quality?

- Water quality impacts in the Lake predate the Cornell LSC discharge
- Significant reductions of phosphorus from WWTPs to date have not resulted in improved water quality
- Slight increase in the amount of phosphorus in deep lake, throughout Finger Lakes

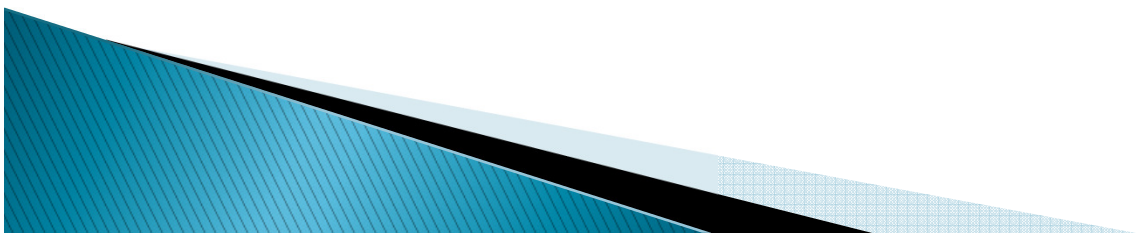
Cayuga Lake Water Quality Modeling Project

Goal:

A model to provide better understanding of Cayuga Lake water quality under varying conditions in order to develop an effective TMDL Plan.

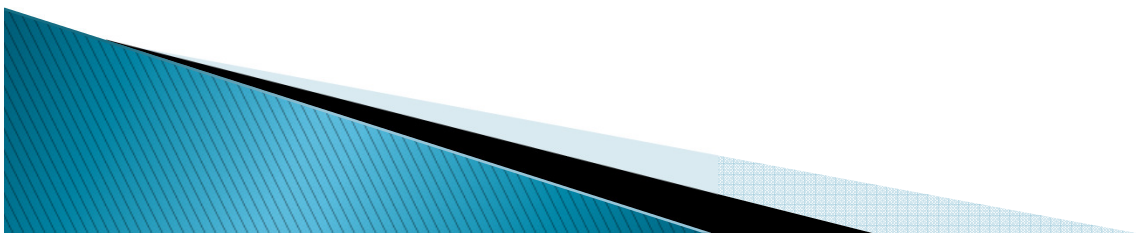
Reality:

Project expected to answer some of the questions but not all.



The Cayuga Lake TMDL Process

- Collection of Data
- Development of Model
- Use of Model to Develop TMDL
- Stakeholder Input to TMDL
- DEC Proposes/EPA Approves TMDL
- TMDL Implementation



Monitoring

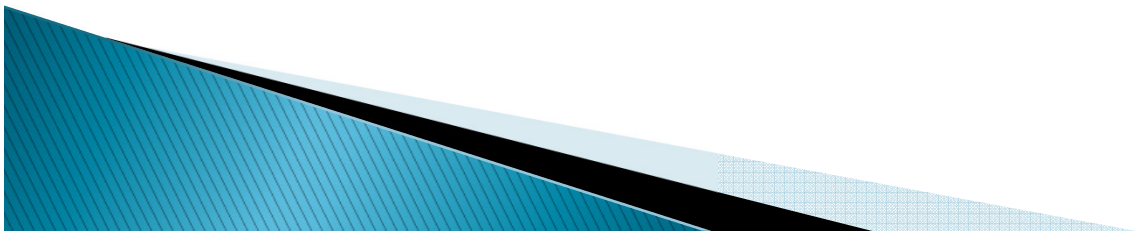
Lake Monitoring

- Entire Lake
- Phosphorus, Turbidity/Clarity, Chlorophyll

Watershed Monitoring

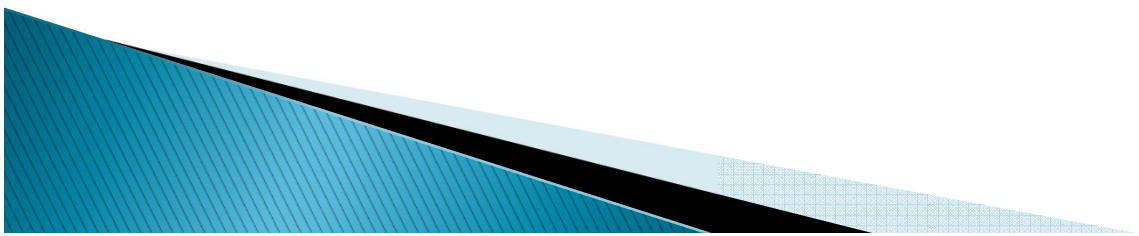
- Input from Tribs (Fall, 6-Mile/Inlet, Salmon)
- Focus on Storm/Snowmelt Events
- Phosphorus, Sediment

Mussels, Paleolimnology

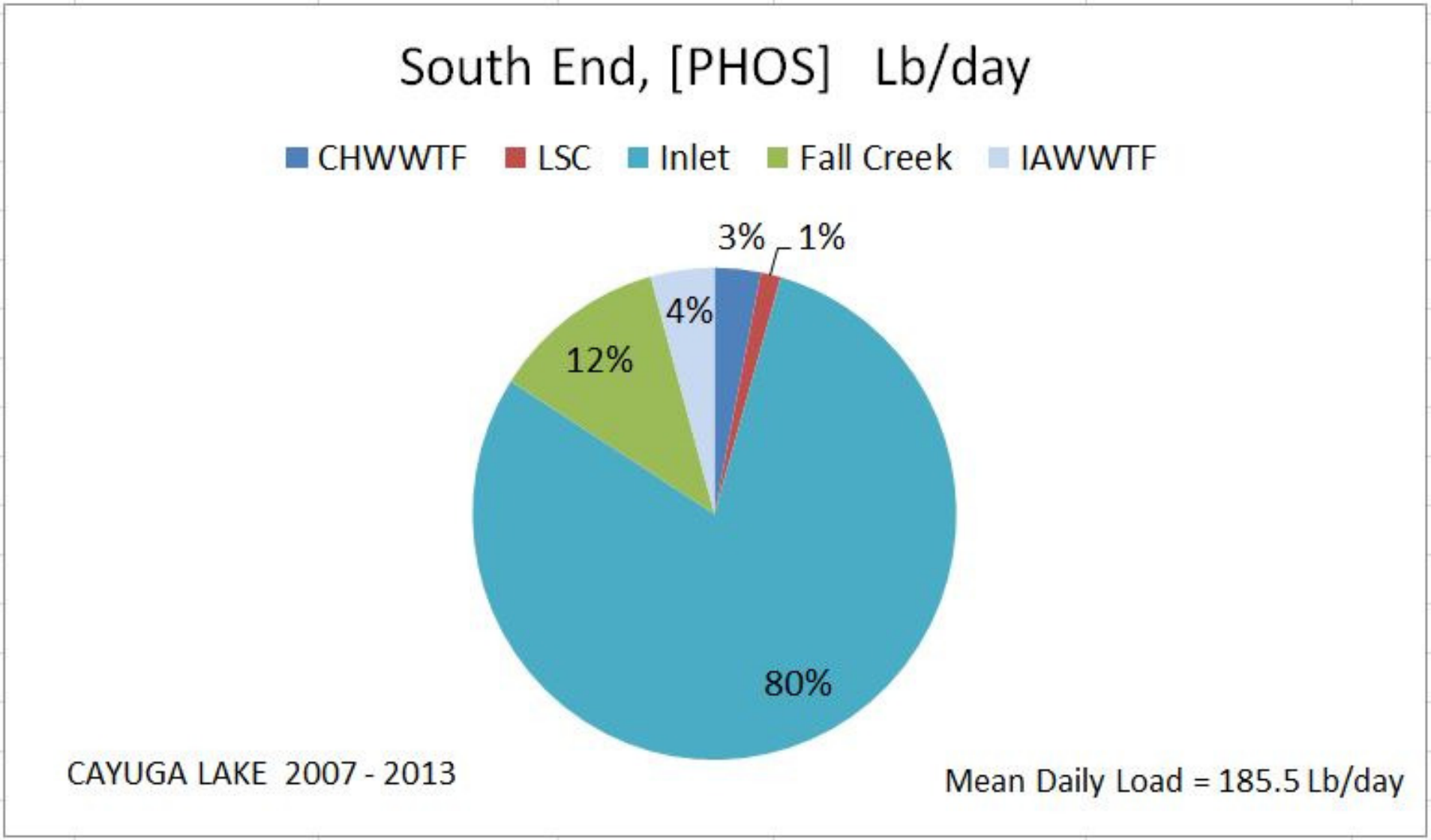


What Has Been Learned ?

1. It is still early
2. It's complicated



80–90% P from Tribs



- Available portion of P more important than Total P
- Reactive P from lake bottom may be significant
- The role of sediment could be significant
- Unknowns: how P moves in the lake, role of quagga mussels
- Will less P mean a healthier so. basin & lake?

Modeling: Watershed & Lake

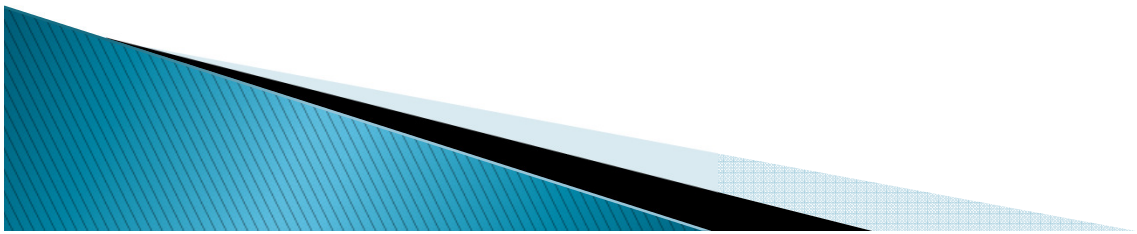
- Estimate P load from watershed to lake
- Perform management scenario testing and forecasting.

Can a TMDL Improve Water Quality?

Yes, provided…

- Good Understanding of the Dynamics
- Focus on the Right Cause, Pollutant
- Set the Right Target for Reduction
- Effective Implementation

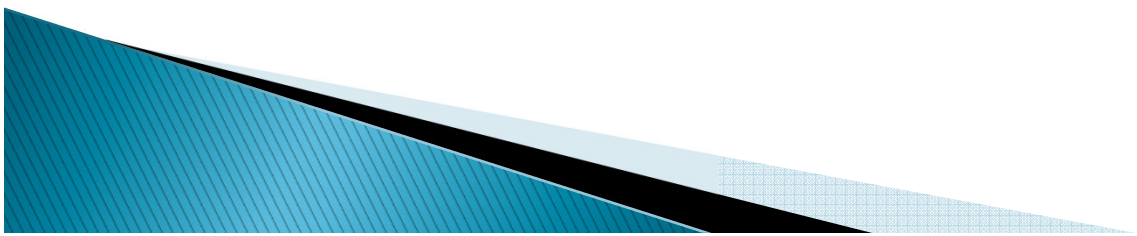
(and Takes Time)



Costs?

Enforcement?

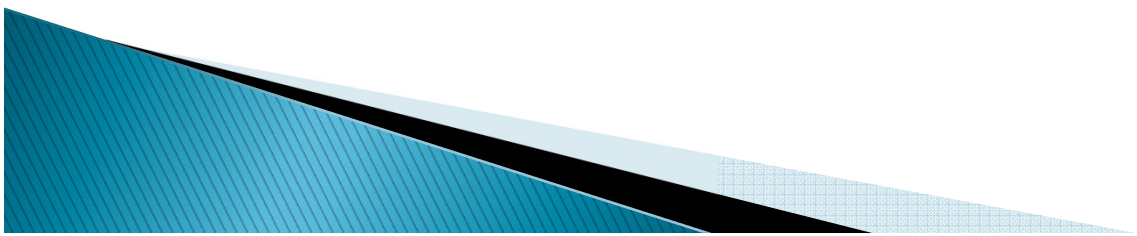
Improvements?



Could the Designated Uses Be Changed?

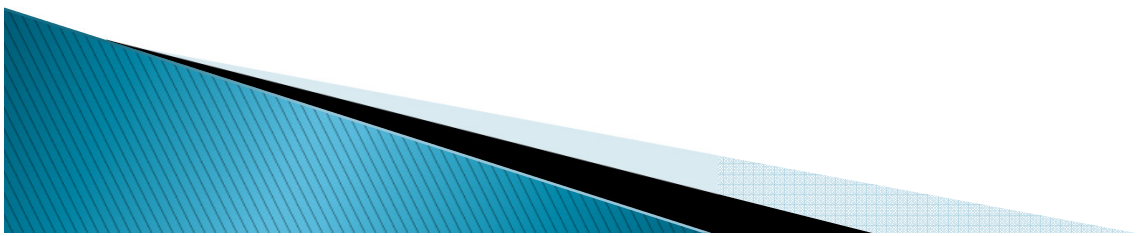
Use Attainable Analysis:

Can cost-effective, reasonable best management practices eliminate impairments?



DEC Working with Stakeholders

- WRC Monitoring Partnership: monthly
- Technical Advisory Committee
- Model Evaluation Group



Project Outreach

Public meetings at key points:
July 17, evening

Webpages and List Serves

- DEC Cayuga Lake Watershed Page
- Cornell Cayuga Lake Modeling Project
- Tompkins County Water Resources Council

- NYSDEC *"Making Waves"*

Questions?