

# Owasco Lake Its Watershed and Water Quality

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## Finger Lakes Institute Mission:



### **Environmental Research & Education:**

Finger Lakes Institute is dedicated to the promotion of environmental research and education about the Finger Lakes and surrounding environments.

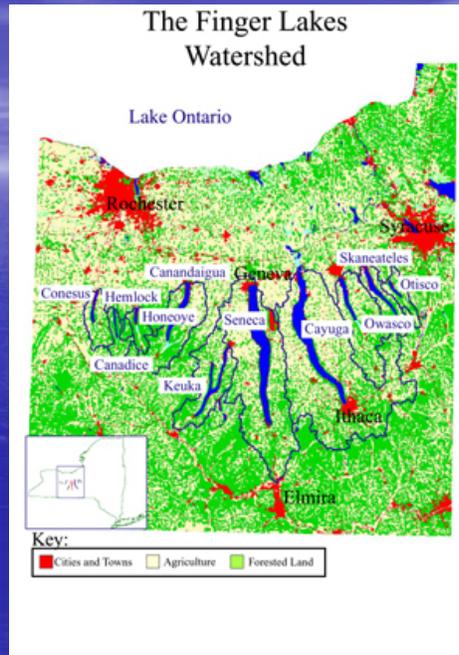
### **Environmentally-Sound Development:**

In collaboration with regional environmental partners and state and local government offices, the Institute fosters "environmentally-sound" development practices throughout the region and disseminates the accumulated knowledge to the general public.

Web site: <http://FLI.hws.edu/>

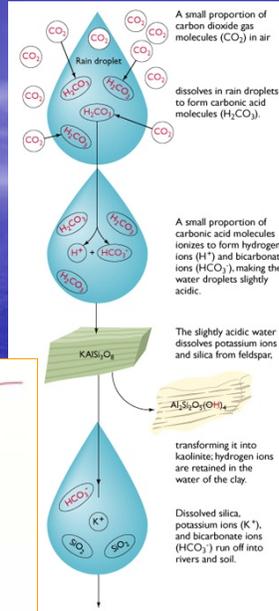
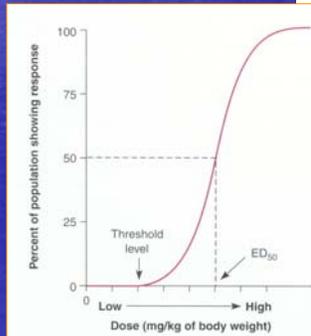
## Background Information

- **Economic Drivers**
  - Tourism
  - Agriculture
- **Class AA Drinking Water**
  - Seneca Lake
    - ~100,000 Residents
  - Skaneateles & Otisco
    - Syracuse
  - Hemlock & Canadice
    - Rochester



## Water Quality

- **Pure Water**
  - Rare
  - Rain
    - Gases & Dust
- **Weathering Reactions**
  - Dissolved Salts
  - Organics
  - Metals
- **Erosion**
  - Clay & Silt
  - Colloids
    - Bacteria
    - Viruses



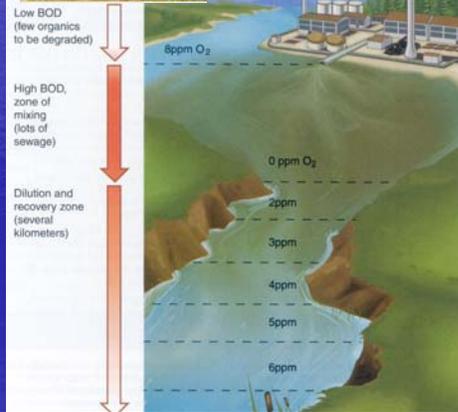
Press, Siever, Grotzinger & Jordon, 2004

# Pollutants Organic Wastes

- Sewage Outfall
  - Organic Rich
    - Disease Breeding Ground
  - Bacteria Decompose
    - Removal of Dissolved Oxygen
- Point Source
  - Downstream
  - Recovery
- Municipal Sewage Treatment
  - Remove Organics "BOD"
  - Nutrients?
- Stream Segment Analysis
  - Locate Point Source



Enger and Smith, 2006

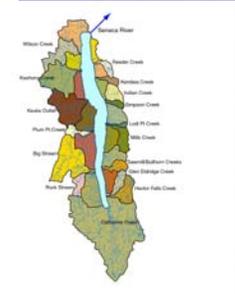
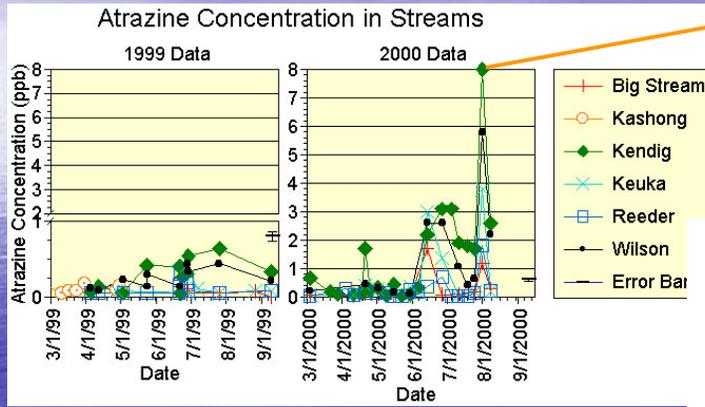


# Additional Local Concerns

- Animal Agriculture "CAFO" Operations
  - Steroids & Antibiotics
  - Animal Waste
- Plant Agriculture
  - Fertilizers, Pesticides
  - Soil Erosion

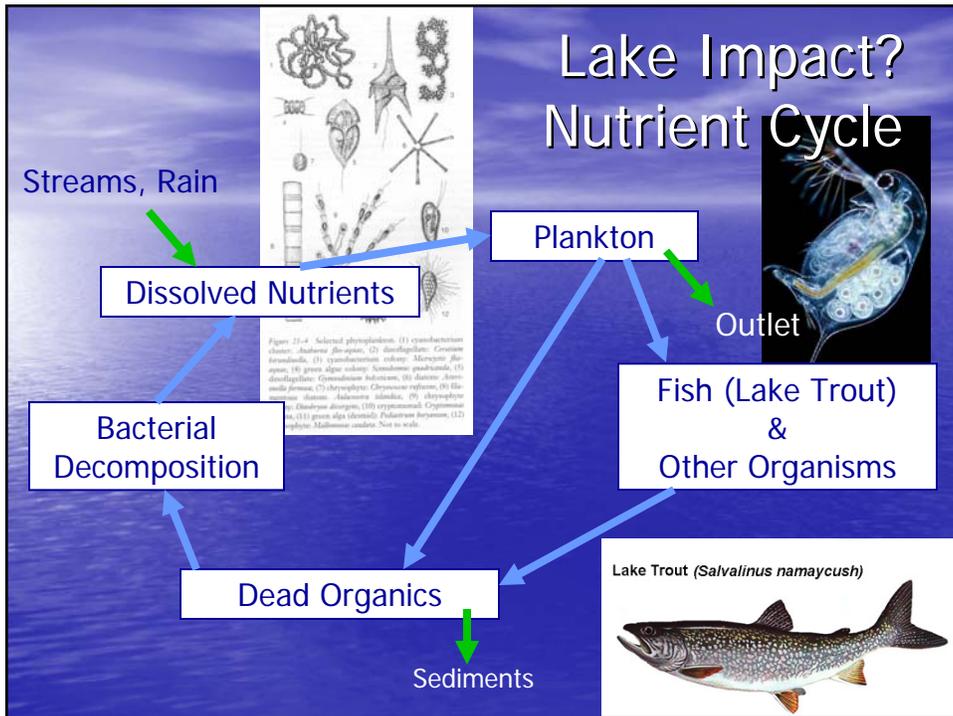


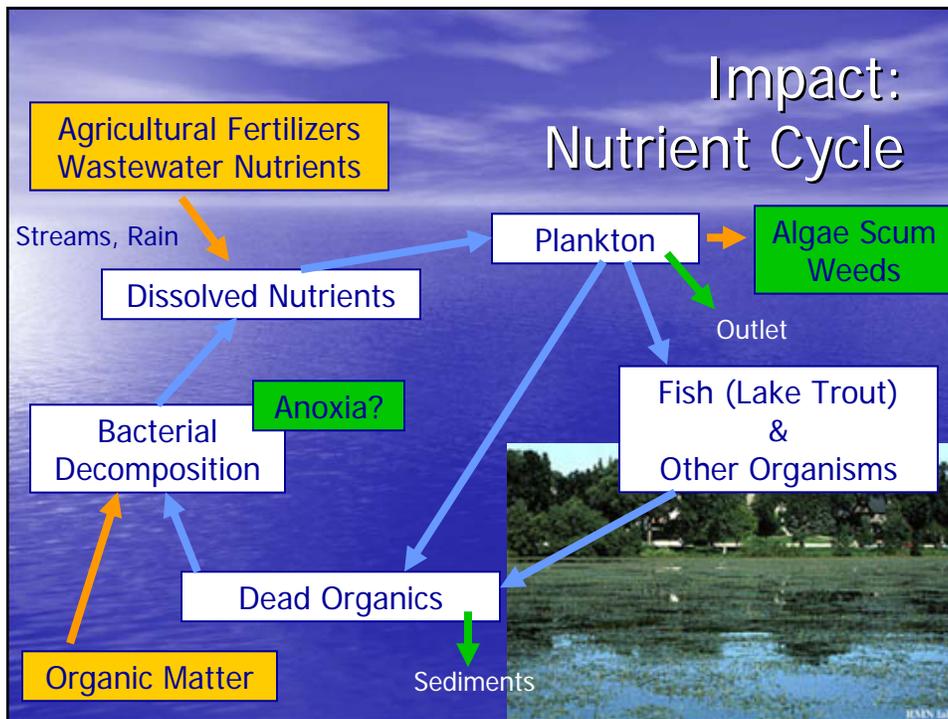
# Agricultural Impact Atrazine Runoff – Source(s)?



Cory McSweeney (WS'99) Environmental Firm  
Sandy Baldwin (WS'02), Wood Hole Oceanographic  
Support: US EPA

# Lake Impact? Nutrient Cycle





## Finger Lakes: Water Quality Impact of Land Use, Bedrock Geology & Watershed Protection Legislation

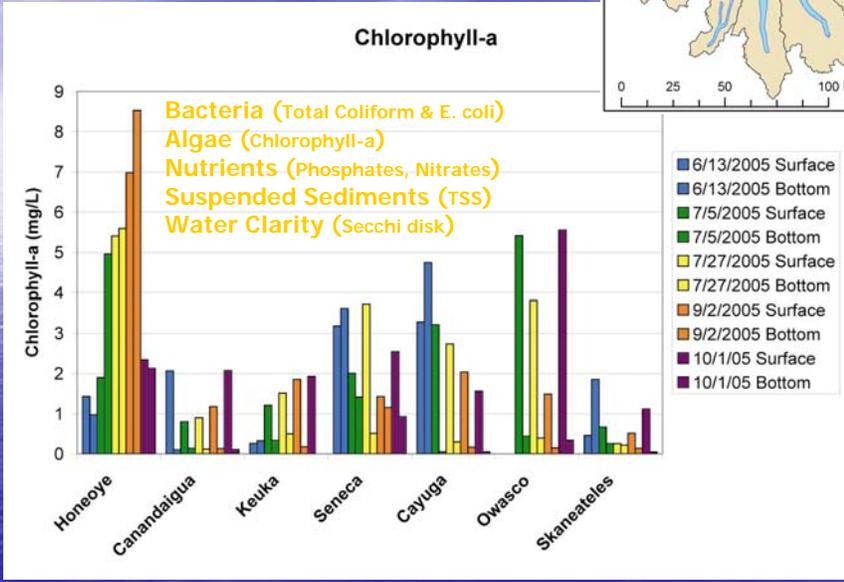
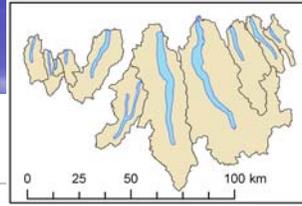
Bedrock

Limestone vs. Shales & Sandstones  
Sedimentary Rocks

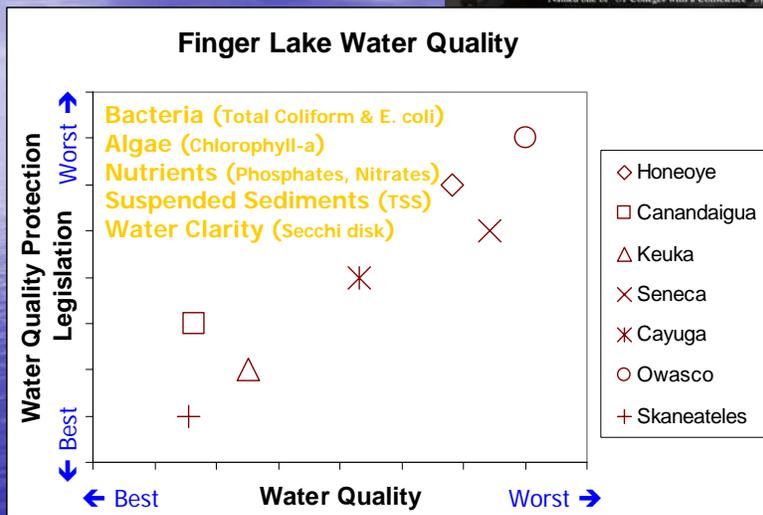
Land Use

Forested vs. Agricultural  
Landscapes

# Algae (TSS, Secchi)



# Water Quality & Its Protection



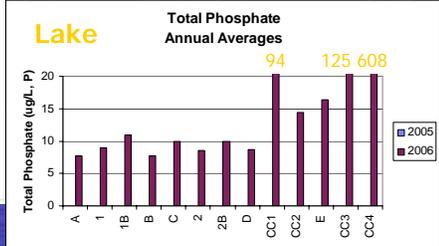
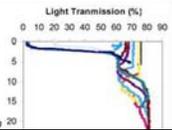
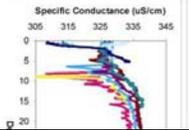
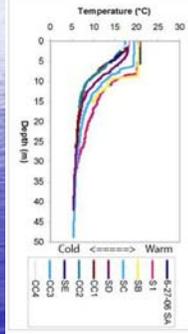
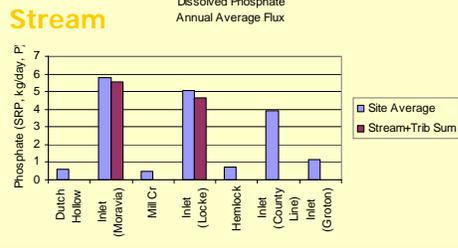
Bush, 2006, Undergraduate Honors Thesis

# Owasco Lake - 2006

## Owasco Inlet Impact



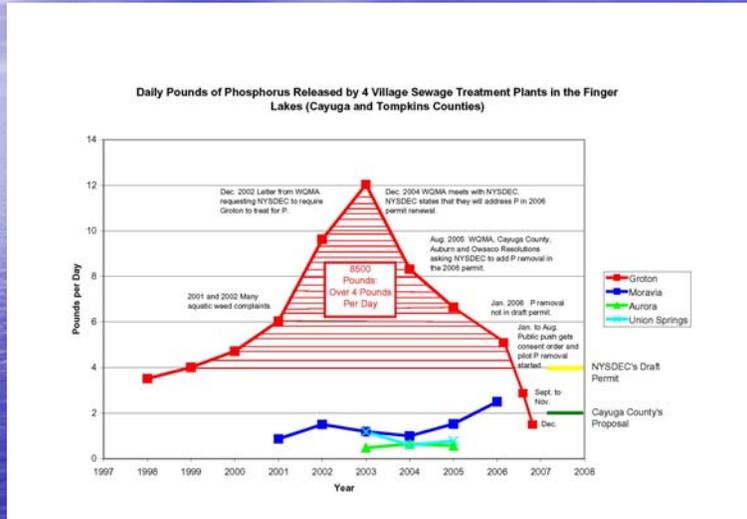
Owasco Lake  
6-27-06



Halfman, Holler & Philip, 2006, A preliminary water quality study of Owasco Lake, NY and its watershed. [http://li.hws.edu/pdf/halfman\\_owasco.pdf](http://li.hws.edu/pdf/halfman_owasco.pdf)

Emerson Foundation

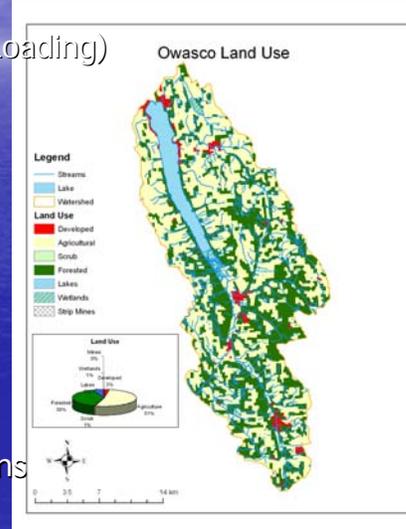
# Wastewater Phosphorus Effluents



From: Bruce Natale, CC WQMA Chair

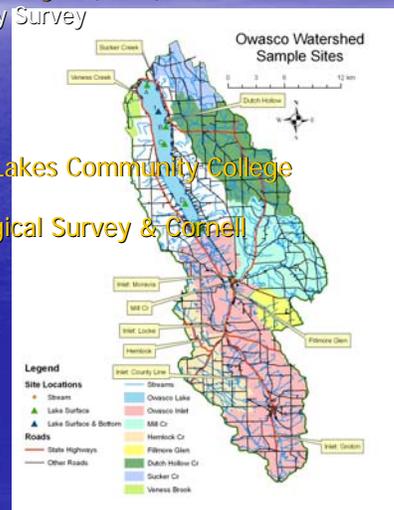
# Preliminary Recommendations

- Groton Wastewater Plant (P-N Loading)
  - Moravia P Load Limits OK
- Agricultural Sources (BMPs)
  - Animals & Crops
- Onsite Systems
- Watershed Inspector(s)
  - \$4/User/Inspector is a Deal!
- Owasco Inlet
  - Owasco Flats - Floodplain
  - Remediate Channelization
  - Remove Flood Fluxes
- Update Water Quality Regulations
- Research & Education

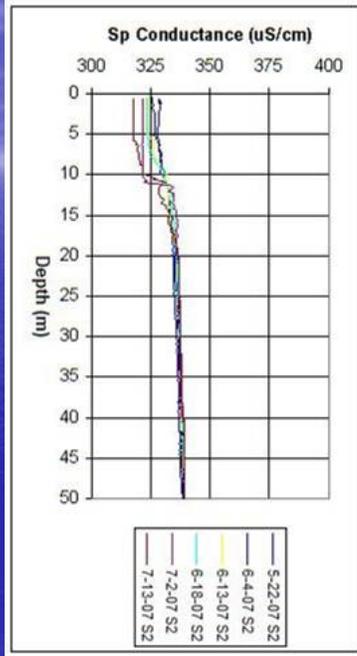
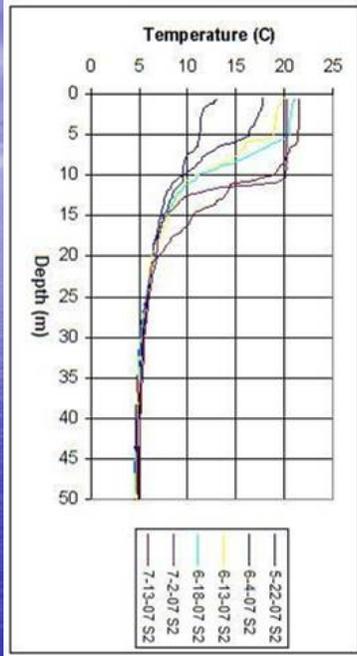


# Summer 2007 Research NYS Funds – Senator Nozzolio

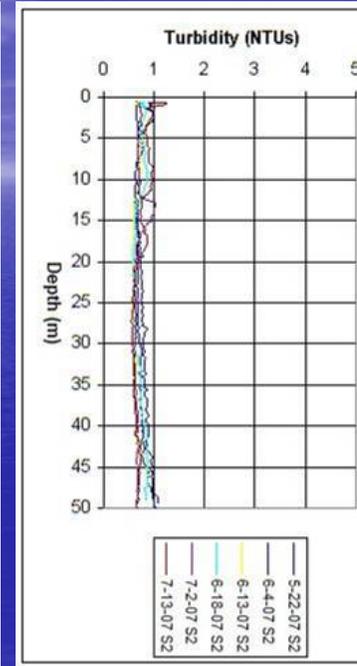
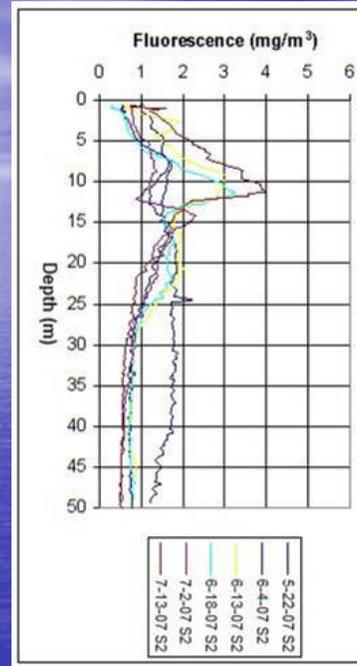
- **John Halfman, Hobart & William Smith Colleges (HWS)**
  - Expanded Lake and Stream Water Quality Survey
- **Tim Sellers, Keuka College**
  - Limitations Productivity (Nutrients, Light)
- **Meghan Brown, HWS**
  - Zooplankton Impact & Historical Record
- **Bin Zhu & Bruce Gilman, HWS & Finger Lakes Community College**
  - Macrophytes & Shallow-Water Biology
- **Dawn Dittman & Jim Watkins, US Geological Survey & Cornell**
  - Zebras, Diporeia & Deep-Water Biology
- **Susan Cushman, HWS**
  - Stream Benthic Ecology
- **Jim Ryan, HWS**
  - Toxicology
- **Tara Curtin, HWS**
  - Environmental Change
- **Marion Balyszak, Finger Lakes Institute**
  - Regional Water Quality Legislation



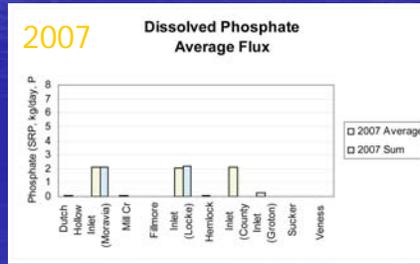
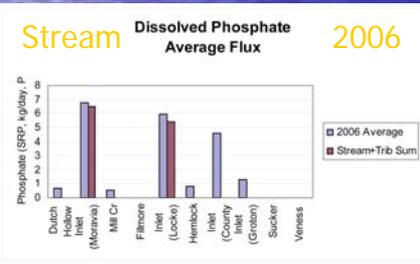
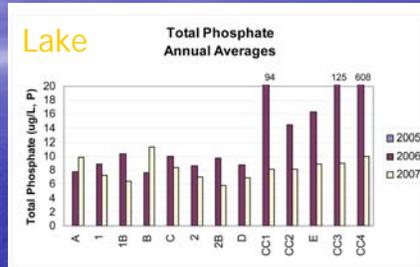
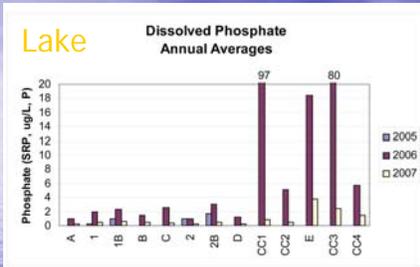
# CTD Data



# More CTD Data



# 2007 – Lake & Stream Data to Date



Thanks - Questions?

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