Owasco Lake
Its Watershed and Water Quality

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Hobart & William Smith Colleges

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 & Jordan, 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

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### Additional

**Local Concerns**

- **Animal Agriculture**
  - “CAFO” Operations
    - Steroids & Antibiotics
    - Animal Waste
- **Plant Agriculture**
  - Fertilizers, Pesticides
  - Soil Erosion

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*Enger and Smith, 2006*
Agricultural Impact
Atrazine Runoff – Source(s)?

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

Atrazine Concentration in Streams

Lake Impact?
Nutrient Cycle

Streams, Rain

Dissolved Nutrients

Bacterial Decomposition

Dead Organics

Plankton

Fish (Lake Trout) & Other Organisms

Lake Trout (Salvelinus namaycush)

Sediments
Impact: Nutrient Cycle

- Agricultural Fertilizers
- Wastewater Nutrients
- Streams, Rain
- Dissolved Nutrients
- Bacterial Decomposition
- Anoxia?
- Dead Organics
- Organic Matter
- Plankton
- Algae Scum
- Weeds
- Outlet
- Fish (Lake Trout)
- Other Organisms
- Outlet
- Streams, Rain
- Sediments
- Finger Lakes: Water Quality
- Impact of Land Use, Bedrock Geology & Watershed Protection Legislation
- Limestone vs. Shales & Sandstones
- Forested vs. Agricultural Landscapes
Water Quality & Its Protection

Finger Lake Water Quality

Bacteria (Total Coliform & E. coli)
Algae (Chlorophyll-a)
Nutrients (Phosphates, Nitrates)
Suspended Sediments (TSS)
Water Clarity (Secchi disk)

Legislation

Bush, 2006, Undergraduate Honors Thesis

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
  - Zebras, Diporeia & Deep-Water Biology
- Susan Cashman, HWS
  - Stream Benthic Ecology
- Jim Ryan, HWS
  - Toxicology
- Tara Curtin, HWS
  - Environmental Change
- Marion Balyszak, Finger Lakes Institute
  - Regional Water Quality Legislation
2007 – Lake & Stream Data to Date

Lake

Dissolved Phosphate Annual Averages

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Lake

Total Phosphate Annual Averages

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Stream

Dissolved Phosphate Average Flux

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Thanks - Questions?

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