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Owasco Lake: The 2010 Update

Owasco Lake Watershed Association
August 4th, 2010, Meeting

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Environmental Studies Program
Department of Geoscience
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2005 Data
Water Quality & Its Protection

HOBART AND WILLIAM SMITH COLLEGES
HOBART AND WILLIAM SMITH COLLEGES
Named one of "91 Colleges with a Conscience" by The Princeton Review

Finger Lake Water Quality

Water Quality Protection ↑ Worst ↓ Best ↓

Water Quality ← Best → Worst →

Legend:

- ◇ Honeoye
- Canandaigua
- △ Keuka
- × Seneca
- * Cayuga
- Owasco
- + Skaneateles

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

Bush, 2006, Undergraduate Honors Thesis

2006 Emerson Foundation Funds
2007 NYS Funds – Senator Nozzolio

Owasco Lake Phosphates (TP)

2006 Total Phosphate Annual Averages

94 125 608

2007 Total Phosphate Annual Averages

Owasco Lake Sample Sites

Legend:

- Sample Sites
- Stream
- Lake Surface
- Lake Surface & Bottom
- Roads
- Other Roads
- State Highways
- Streams
- Owasco Lake

2006 & 2007 Stream Data

2006 Dissolved Phosphate Average Flux

2007 Dissolved Phosphate Average Flux

2006 Stream Discharge Average

2007 Stream Discharge Average

Reduction of runoff

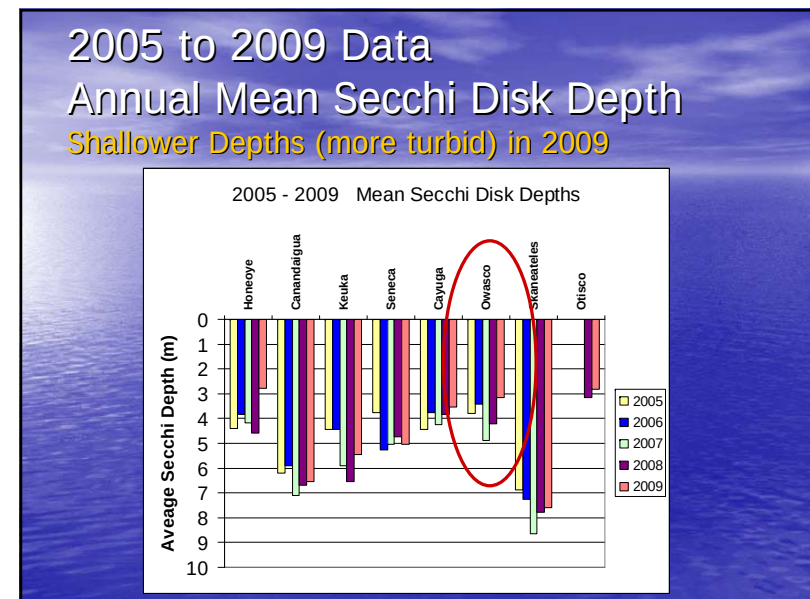
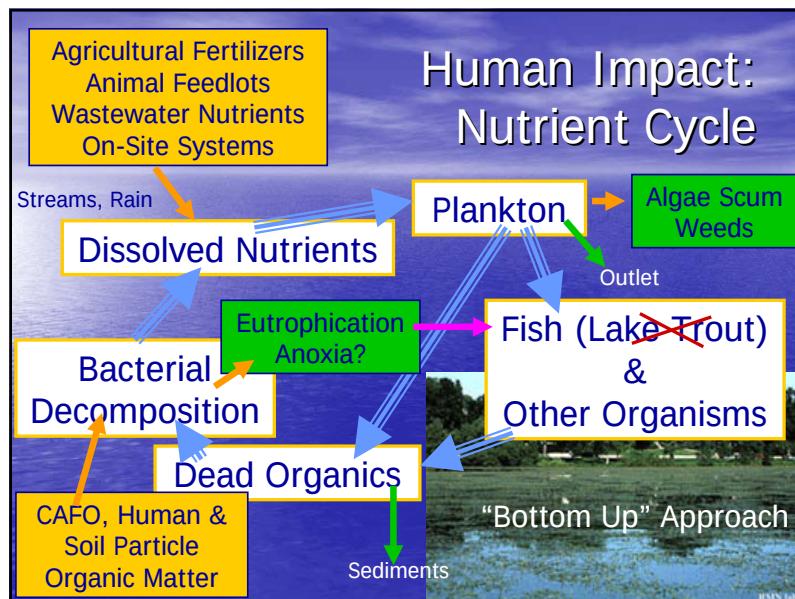
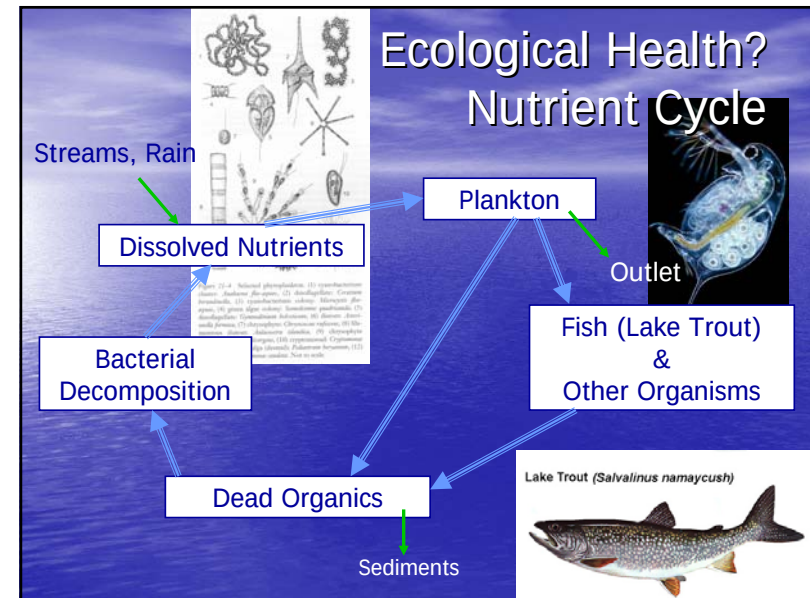
Reduction of all sources

Groton

Owasco Watershed Sample Sites

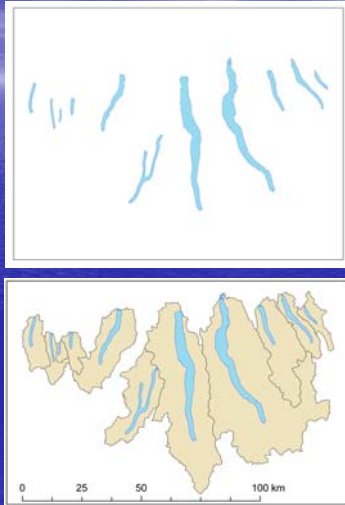
Legend:

- Watershed
- Stream
- Other Watershed
- Other Stream
- Other Watershed & Stream
- Other Stream
- Other Watershed & Stream
- Other Stream

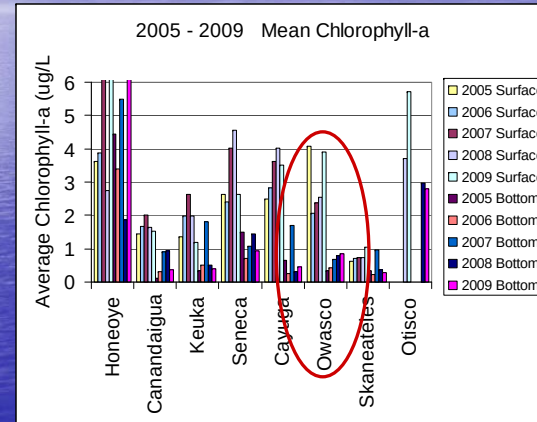


Which is the Largest Finger Lake?

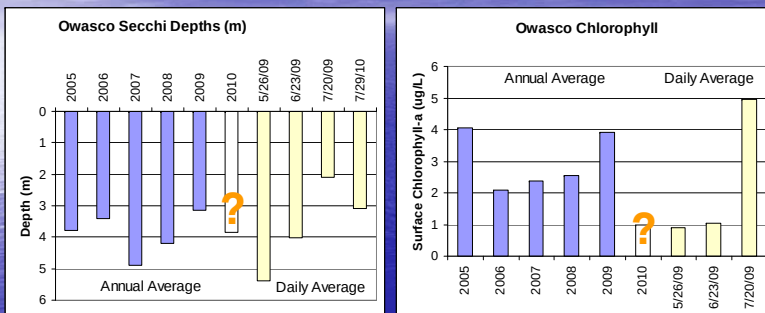
- Canadice
- Canandaigua
- Cayuga
- Conesus
- Hemlock
- Honeoye
- Keuka
- Seneca
- Skaneateles
- Otisco
- Owasco



2005 to 2009 Data Annual Mean Chlorophyll Data More algae in 2009 surface water

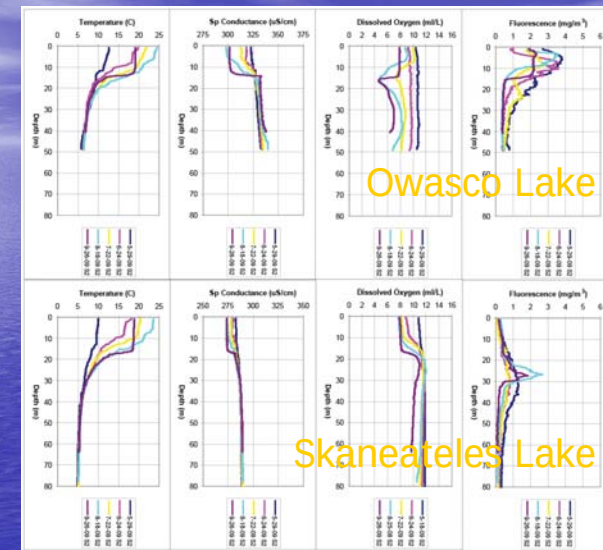


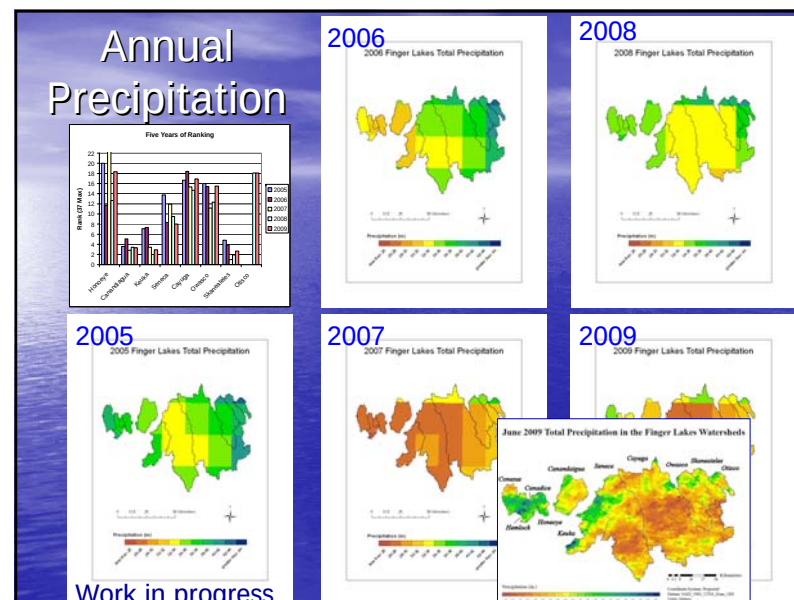
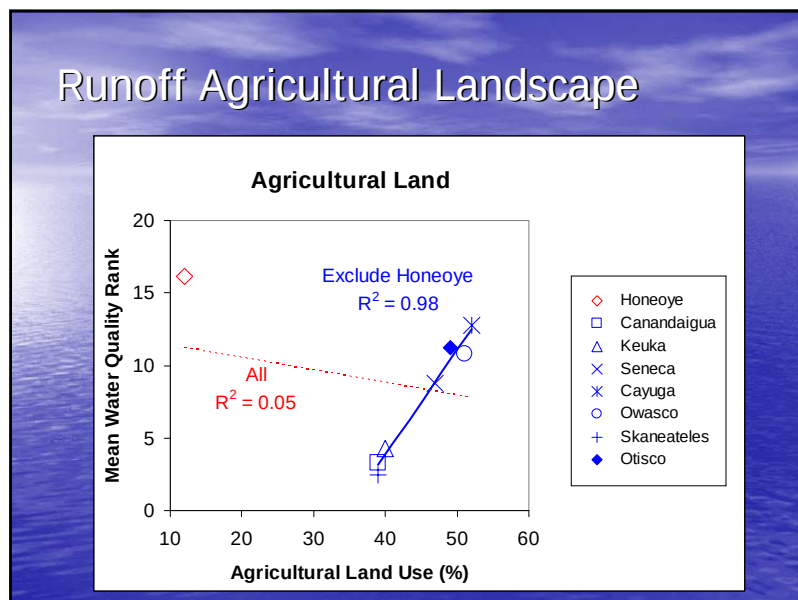
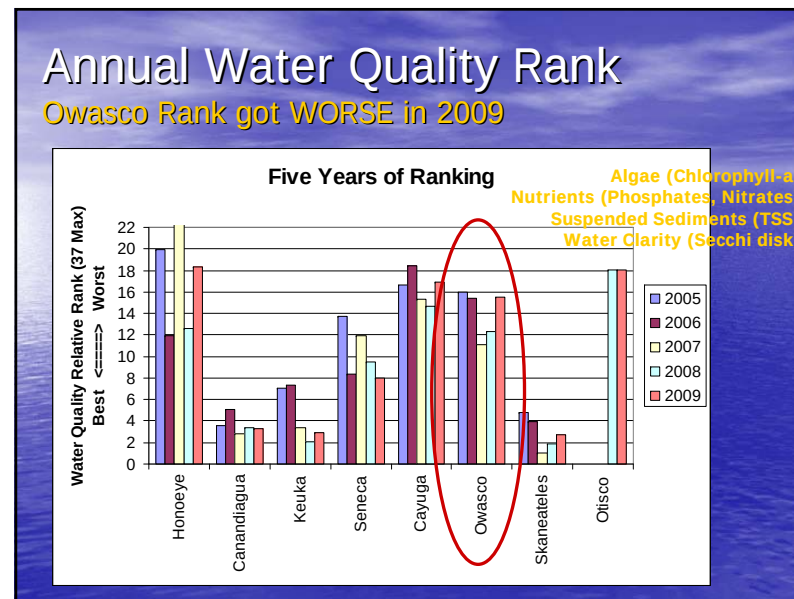
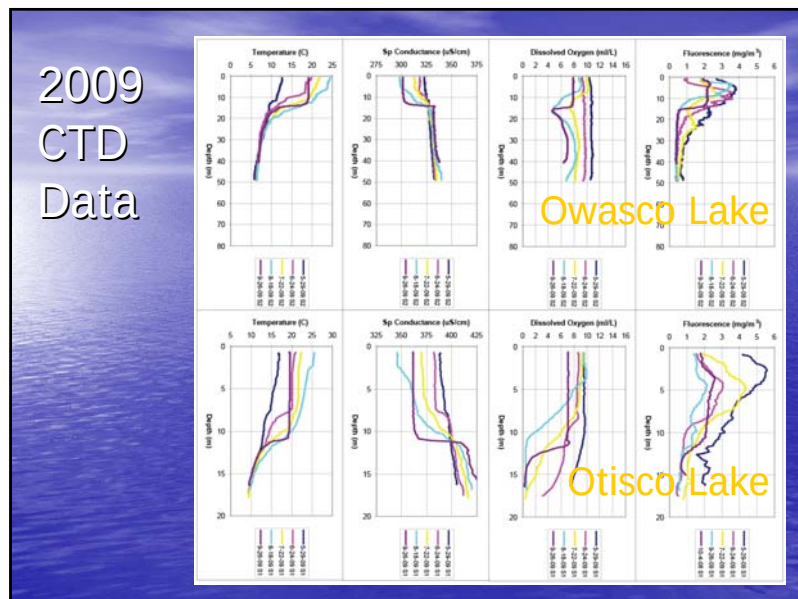
Add 2010 Lake Data

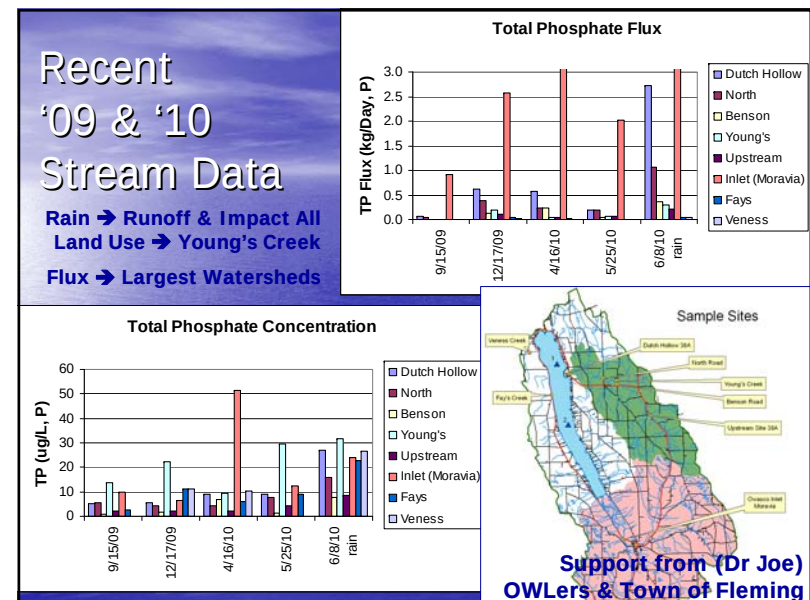
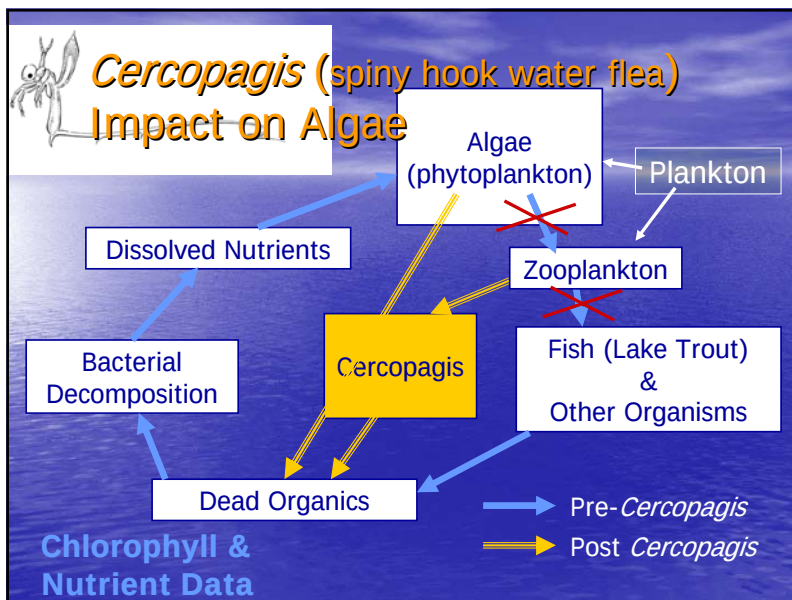
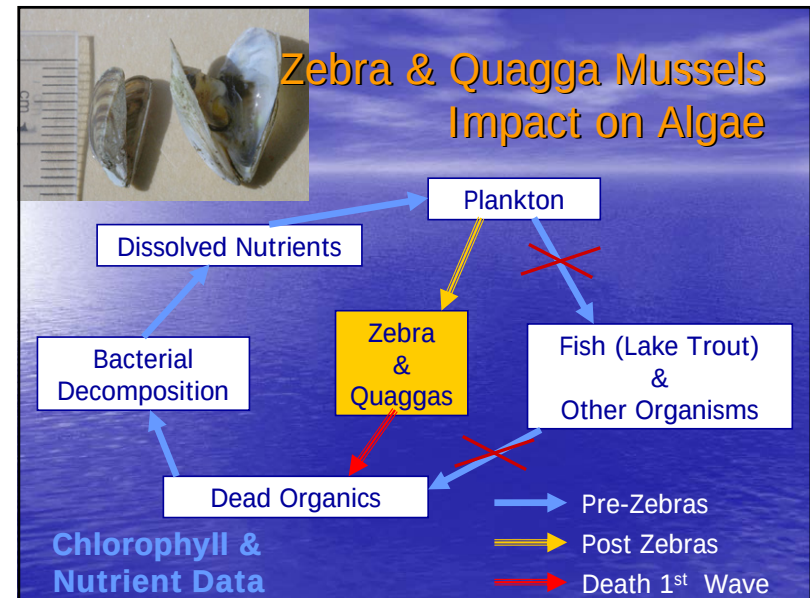
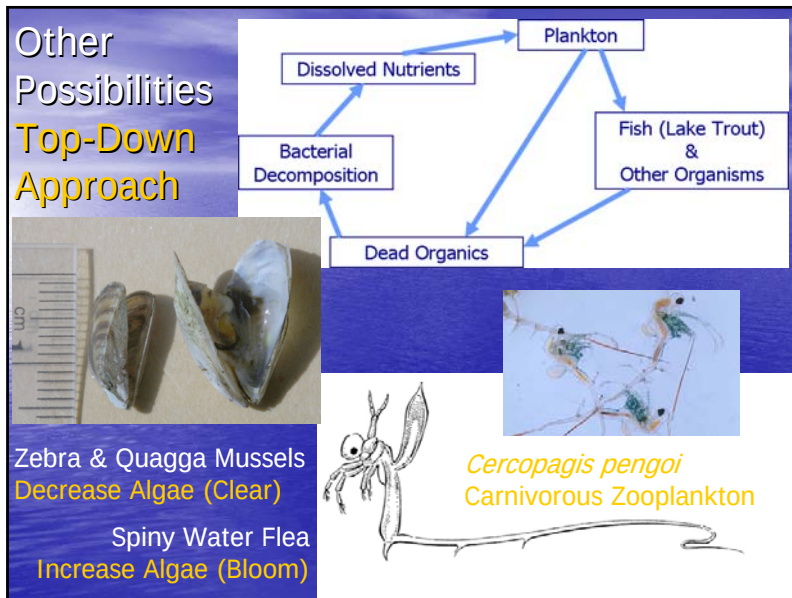


Beware: 2010 Data Incomplete
7/29/10 sampling - plea from Dr. Joe...

2009 CTD Data







More '09-10 Stream Data

Rain → Runoff & Impact All Land Use → Young's Creek
Flux → Largest Watersheds

Total Suspended Solids Concentration

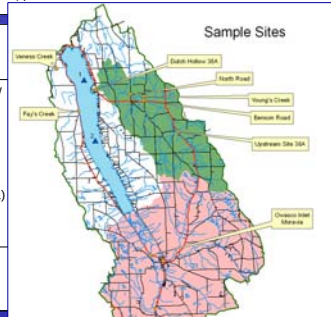
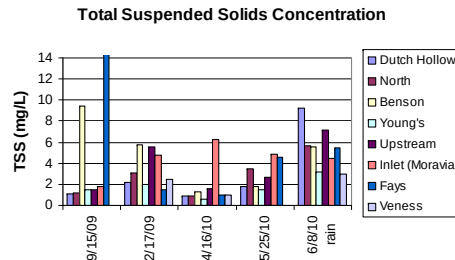
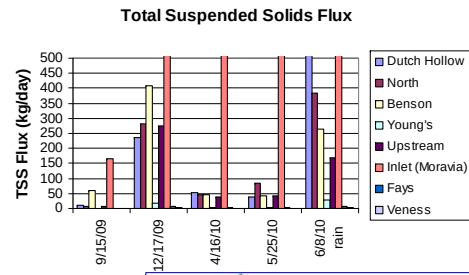
Date	Dutch Hollow	North	Benson	Young's	Upstream	Inlet (Moravia)	Fays	Veness
9/15/09	1.0	1.5	9.5	14.0	1.5	1.5	1.5	1.5
12/17/09	3.0	5.0	6.0	2.0	5.0	5.0	2.0	2.0
4/16/10	1.0	1.0	1.0	1.0	1.0	6.5	1.0	1.0
5/25/10	1.0	3.5	1.0	1.0	1.0	1.0	1.0	1.0
6/8/10	9.0	7.5	6.0	5.0	7.5	1.0	1.0	1.0
rain	4.5	5.0	5.0	4.5	5.0	1.0	1.0	1.0

Total Suspended Solids Flux

Date	Dutch Hollow	North	Benson	Young's	Upstream	Inlet (Moravia)	Fays	Veness
9/15/09	50	100	50	50	50	50	50	50
12/17/09	220	280	400	220	280	220	220	220
4/16/10	50	50	50	50	50	50	50	50
5/25/10	50	100	50	50	50	50	50	50
6/8/10	500	380	280	50	50	50	50	50
rain	50	50	50	50	50	50	50	50

Sample Sites

- Veness Creek
- Dutch Hollow SRA
- North Road
- Young's Creek
- Benson Road
- Upstream Site SRA
- Outcrop Inlet Moravia
- Fays Creek
- Inlet (Moravia)



Owasco Recommendations

- Watershed Protection Legislation
- Owasco Inlet Floodplain
 - Remove Channelization
- Agricultural BMPs
 - Contour Plowing, Buffer Strips, Minimum Tillage
 - Agricultural Environmental Management (AEMs)
- Watershed Inspector
 - Inspects Onsite & Municipal Facilities
 - CAFO Manure Storage, Disposal & Spills
 - Information about BMPs
- Education, esp. K-12
 - Educate People so they Care!
- Monitoring
 - Water Quality Status
 - Land Use and Nutrient Runoff Connection
 - New Threats – Marcellus Shale Drilling

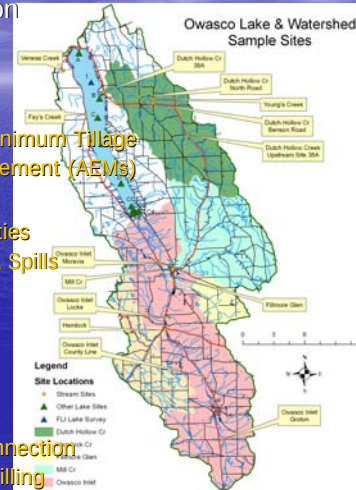
The map shows Owasco Lake and its watershed, divided into various colored regions. Key features include:

- Watershed Protection Legislation:** Indicated by a green shaded area at the top of the lake.
- Owasco Inlet Floodplain:** Indicated by a yellow shaded area at the bottom of the lake.
- Agricultural BMPs:** Indicated by a pink shaded area in the middle of the lake.
- Watershed Inspector:** Indicated by a blue shaded area on the left side of the lake.
- Education, esp. K-12:** Indicated by a light blue shaded area on the right side of the lake.
- Monitoring:** Indicated by a light green shaded area at the bottom right of the lake.

Sample sites are marked with colored triangles and labeled:

- Johnson Creek
- Dutch Hollow Cr SPA
- Dutch Hollow Cr North Road
- Young's Creek
- Dutch Hollow Cr Bottom Road
- Dutch Hollow Creek Upstream Site SPA
- Fay's Creek
- Owasco Inlet Intake
- Mt Cr
- Owasco Inlet Lake
- Hendrick
- Owasco Inlet County Line
- Elmwood Creek
- Owasco Inlet

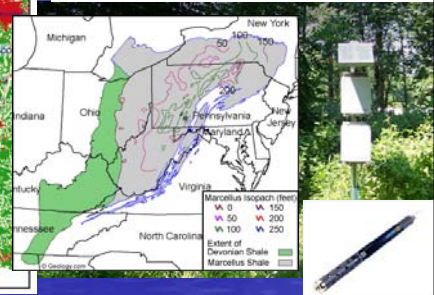
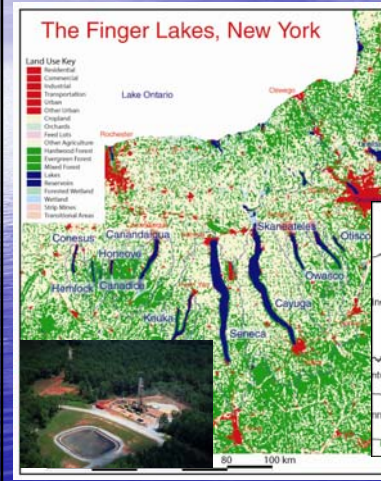
A legend identifies site locations: Stream Sites (blue triangle), Other Lake Sites (green triangle), FLJ Lake Survey (red triangle), Dutch Hollow Cr (yellow triangle), Mt Cr (pink triangle), and Owasco Inlet (blue triangle). A scale bar (0 to 12 miles) and a compass rose are also present.



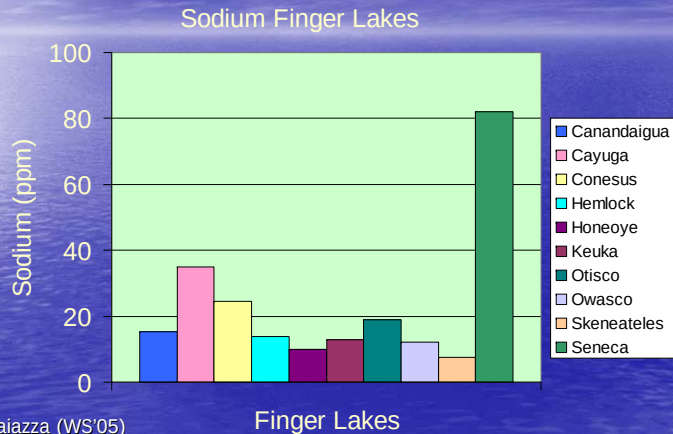
Future Monitoring: 2010 & Beyond

- **2011 & 2012?**
 - Lake Research
 - Lakes Sites 1, 2, A-E
 - Focused → Summer Months
 - Stream Research
 - Streams
 - Owasco Inlet Site(s)
 - Dutch Hollow Site(s)
 - Others?
 - Event (Rain) vs. Base Flow
 - Seasonal Differences
- **If Funding Available!**
 - Significant Effort by Dr. Joe...

The map illustrates the Owasco Lake and its surrounding watershed. The lake is depicted in blue, with various colored regions representing different watersheds: green for Dutch Hollow Cr, yellow for Hamrick Cr, pink for Filmore Glen, light blue for Mill Cr, and red for Owasco Inlet. The map includes labels for several sample sites: Venetian Creek, Dutch Hollow Cr DMA, Dutch Hollow Cr North Road, Young's Creek, Dutch Hollow Cr Benson Road, Dutch Hollow Creek Upstream Site DMA, Filmore Glen, Owasco Inlet Mileau, Mill Cr, Owasco Inlet Lander, Hamrick, Owasco Inlet County Line, and Owasco Inlet Station. A legend identifies symbols for Stream Locations (star), Stream Sites (triangle), Other Lake Sites (inverted triangle), FUL Lake Survey (circle), and the various watershed areas. A scale bar indicates distances up to 12 miles, and a north arrow is provided.

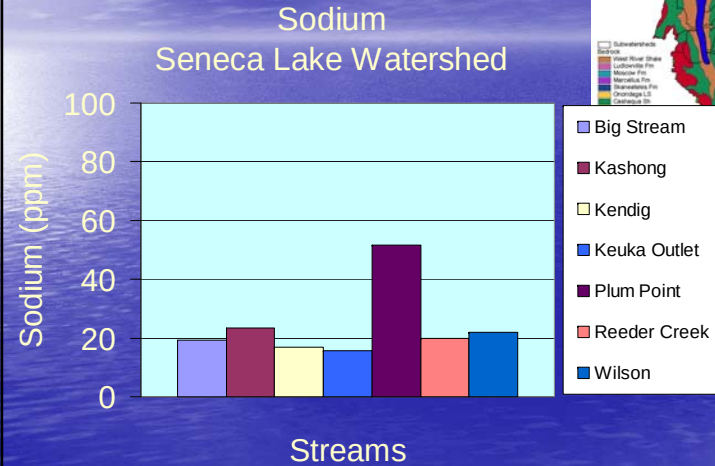
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Chloride & Sodium Mystery



Cathy Caiazza (WS'05)
Duke U. PhD Program

Sodium Input (Streams)



Another Source? Salt Mining Activities

- **Salt Mines**
 - Central New York Importance
 - Dump 2,300 metric tonnes Sodium / day into Seneca Lake
- **Impact on Lake Salt Concentration**
 - Road Salt
 - Increase Concentration Most Lakes to 25 ppm
 - Seneca Lake at 80 ppm



Source: Chloride & Sodium Ions Geochemical Approach

