

Near Shore Pollution Issues of Lake Ontario



Soil and Water Conservation Society
Empire Chapter
Annual Meeting Agenda
21 January 2010

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The College at
BROCKPORT
STATE UNIVERSITY OF NEW YORK



The Goal: Clean Water


**Lake Ontario
Spent >\$5.0 billion (72 to 91)
in restoration and
remediation!
What did we get for our
money?**




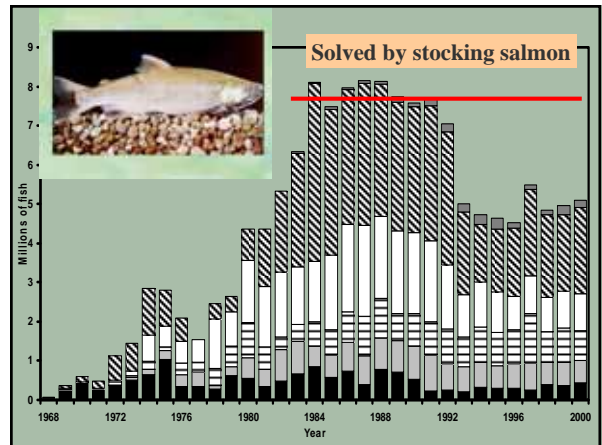



Problem: Dieback of Alewife

60s Issue









Outcomes

No alewife dieback
Maintenance of the salmon fishery
A naturally reproducing Lake Trout population
Restoration of Lake Sturgeon
Further development of the sport fishery
Charter Boat Industry

1996 - 188,219 Anglers
2.5 million in Lake Ontario
\$170 million generated as fishing trips
(Sea Grant)

70s Issue

Problem: Mirex levels in salmon tissue were high

FDA Action Level = 0.1 mg/kg
Health advisory for Lake Ontario salmon

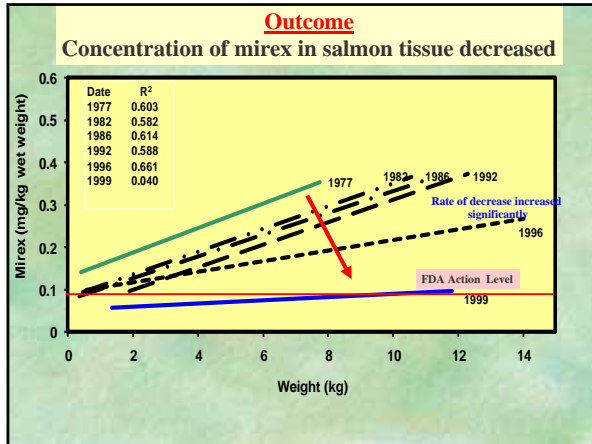
Mirex : carcinogenic and toxic
Used to control fire ants in south and flame retardant
in plastic manufacturing

Released by Hooker Chemical and Plastics and
Armstrong Cork Company

**Banned in 1977 by Canada and in 1978
by the United States**

Evidence that mirex is entering the human food chain

Lactating females eating salmon vs panfish have higher levels of mirex in their breast milk.
Mirex levels in lactating women geographically near Lake Ontario are slightly higher than those of women farther from the lake.



FROM 1992 to 1999 the rate of decrease increases significantly.

Perhaps due to mitigation of flux from the watershed

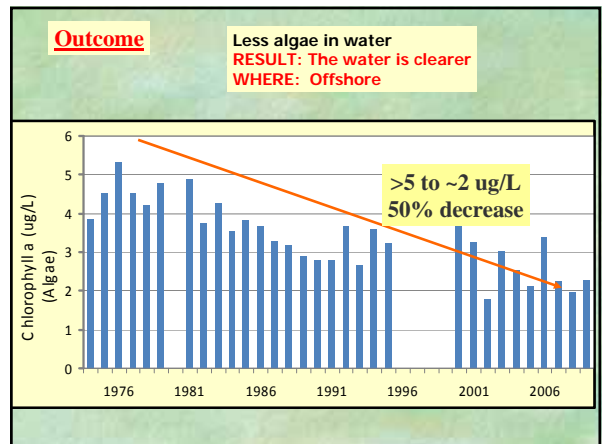
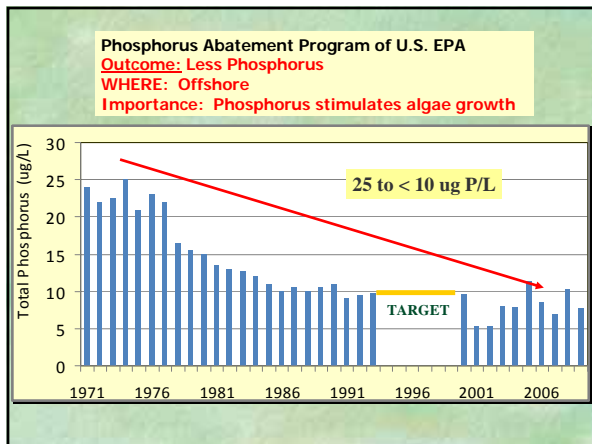
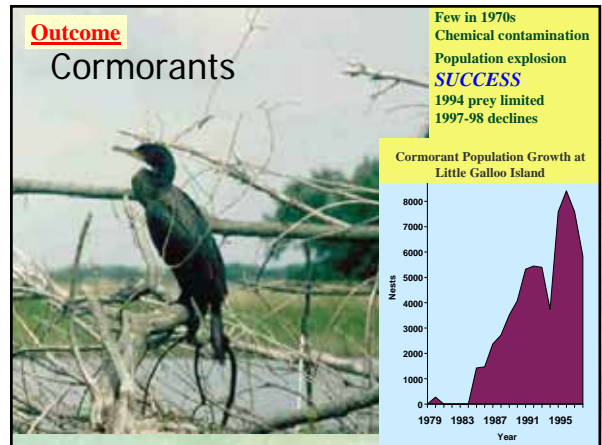
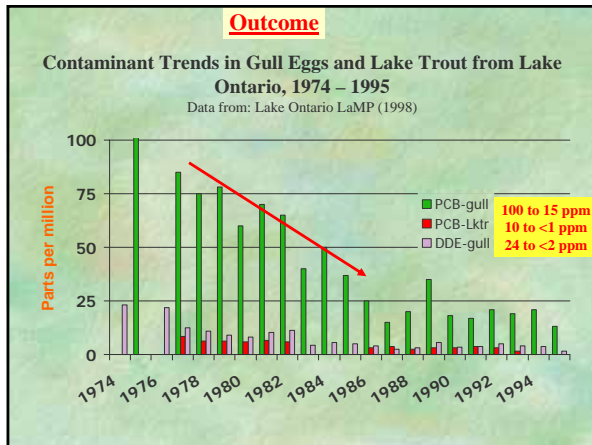
1993-1994. Slurry wall built around the entire former Hooker Plant including the landfill

1996 Bedrock and overburden collection system and treatment system installed

1996 Former sewer line carrying nonaqueous liquids including mirex to the Niagara River was cleaned plugged and converted to a treatment system

1996? Additionally the Hyde Park Landfill was enclosed and encapsulated and shunted to a treatment system

Two years of monitoring have shown that chemical concentrations in the off-site bedrock groundwater have decreased.

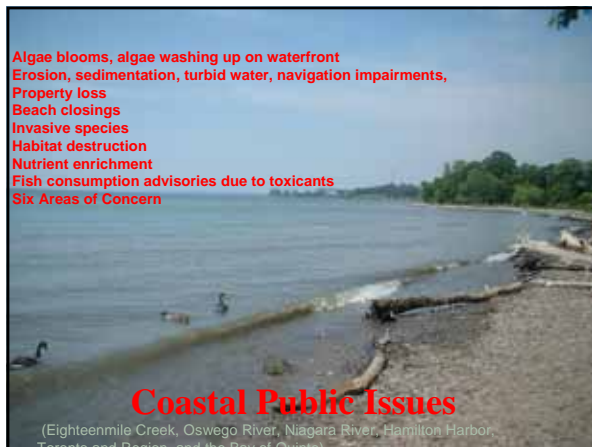
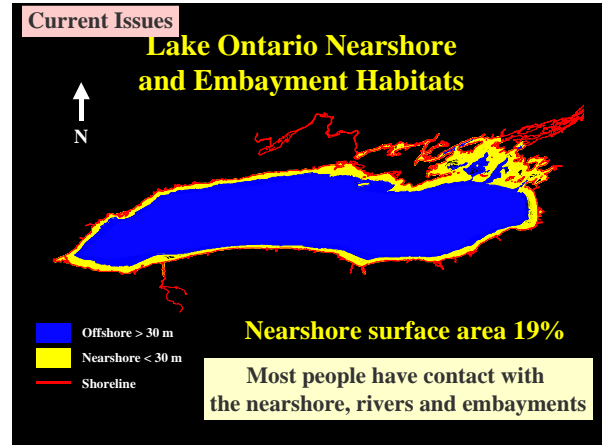
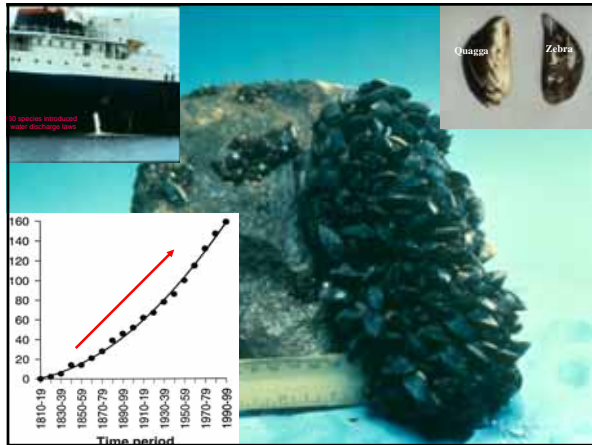
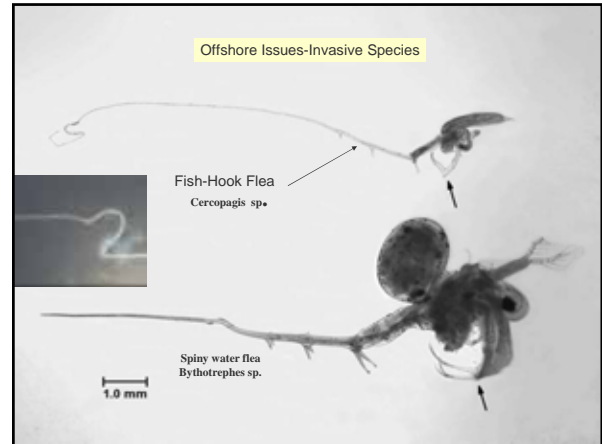


Offshore Success

Increase in transparency, decrease in algae, better water quality, better fishing – a salmonid fishery second to none, a decrease in organic chlorinated hydrocarbons (mirex, DDT, etc)

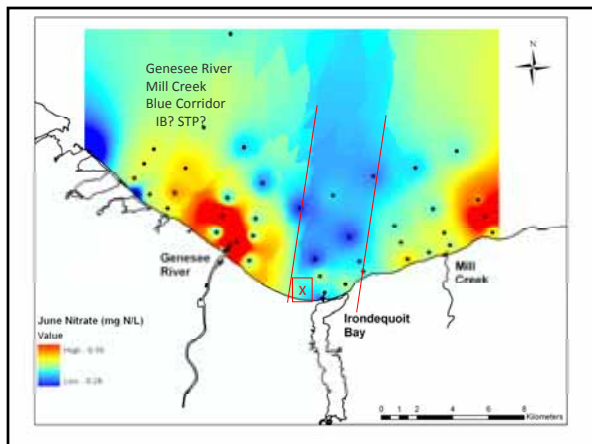
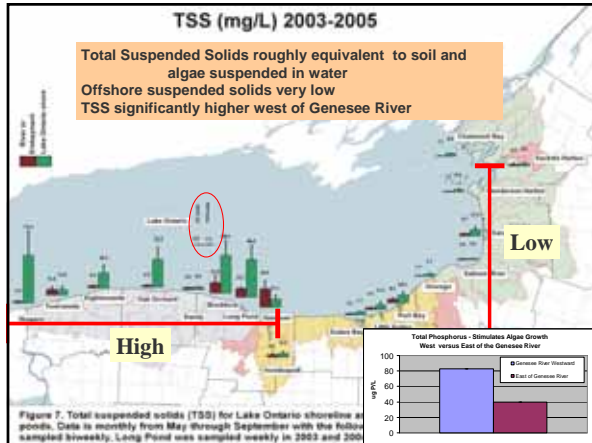
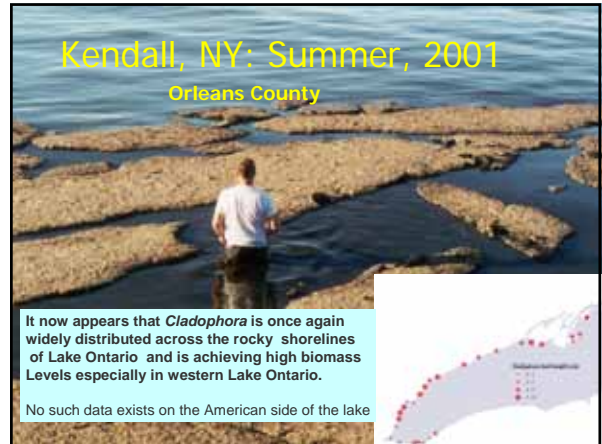
The binational Agreement between Canada and the United States has succeeded through the phosphate abatement program and various federal/provincial fishery program

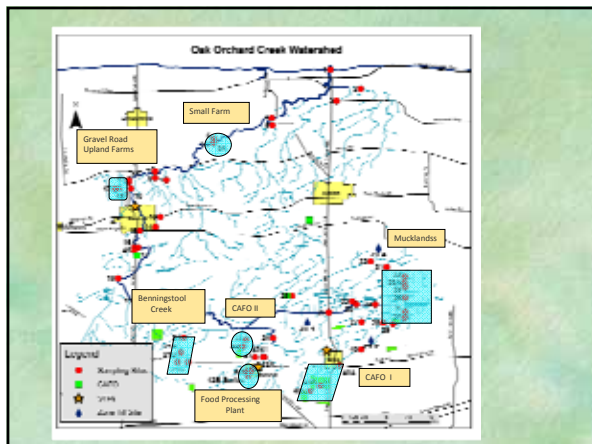
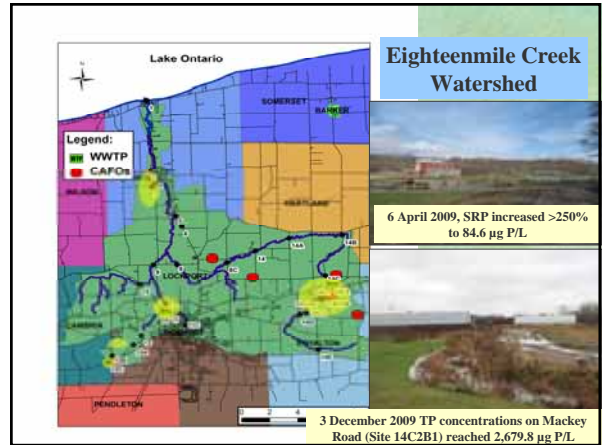
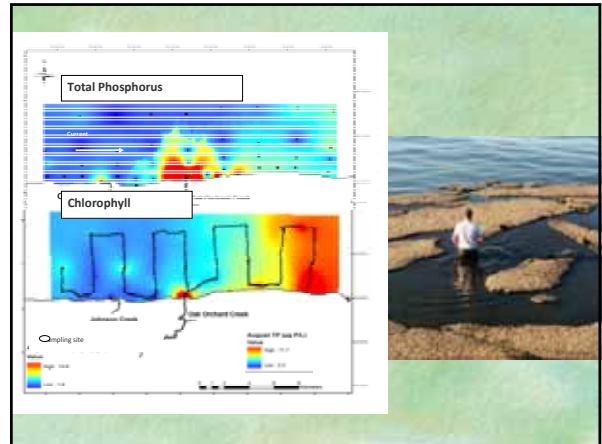
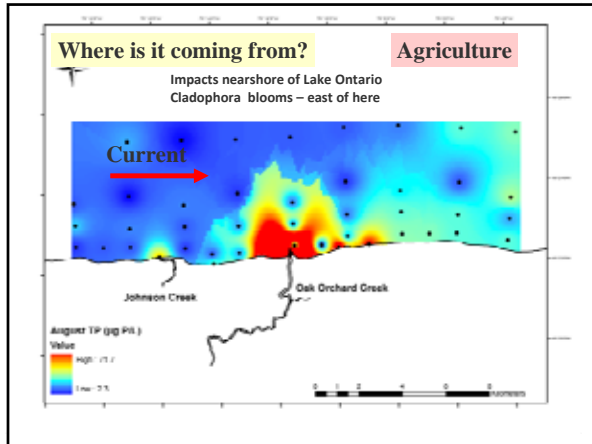
Improvements mostly in the offshore through control of point sources



Average (±SE) total phosphorus, chlorophyll, and phycocyanin concentrations at 39 sites along the New York shoreline of Lake Ontario (LO) from 2003 to 2009 (May through September). Nearshore Lake Ontario, river, and embayment values represent surface samples (minimum 1-m water depth). Lake Ontario offshore samples taken due north of Hamlin Beach, NY, from a depth of 1 m at sites with a depth of 30 and 100m. Unpublished data of Makarewicz.

	Total Phosphorus (µg P/L)	Chlorophyll (µg/L)	Phycocyanin (µg/L)
Nearshore Lake Ontario	62.0±7.4	19.1±4.1	17.8±2.2
Rivers/Creeks	83.8±6.5	6.5±0.8	13.2±3.0
Embayments	129.7±59.6	20.0±2.4	237.5±207.6
LO - 30m depth	9.9±0.7	2.0±0.17	5.5±1.2
LO - 100m depth	9.5±0.7	2.6±0.26	6.1±1.3



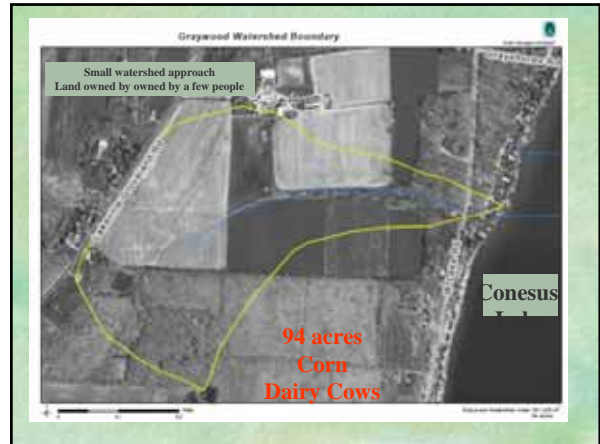
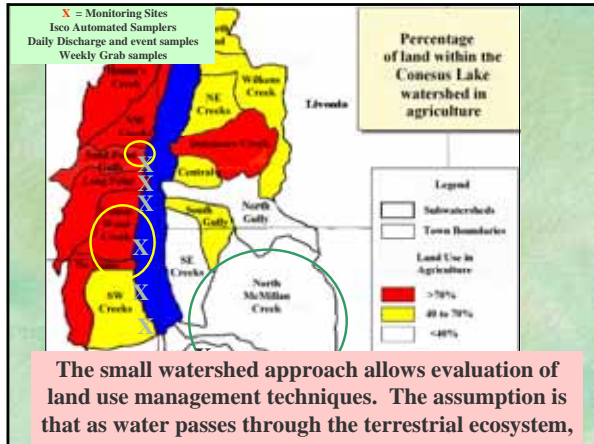


Where are the soil and nutrients coming from?

Total phosphorus (e.g., 5 to 12 mg P/L*)

- Nitrate from the muckland - often in the 3 to ~28 mg N/L range
- Maximum allowable in sewage plant effluent is 1 mg P/L
- New York existing ambient water quality standard is 20 µg P/L

The Mucklands



AEM Planning (All Exp. watersheds)

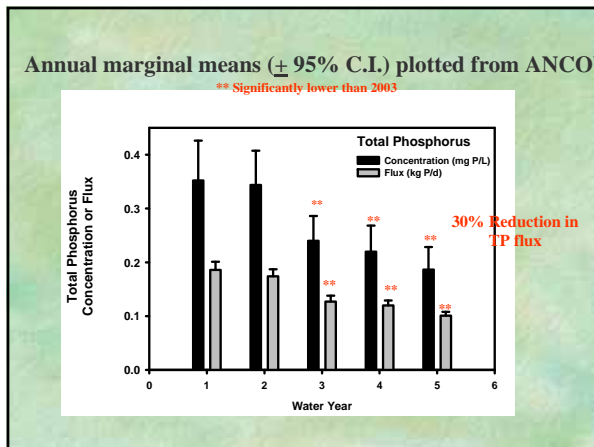
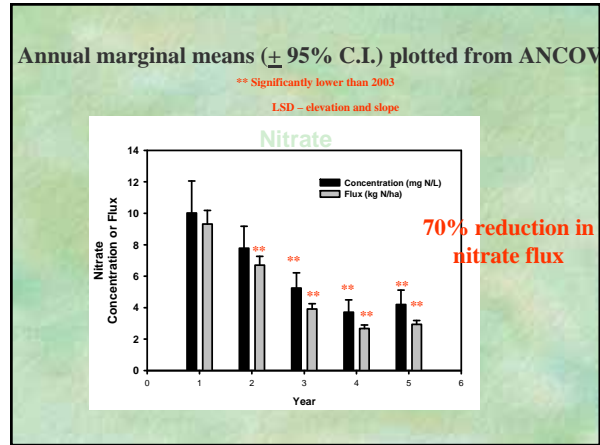
- ***Total farm planning**
- ***Nutrient Reduction**
- ***Runoff reduction**
- ***Strip cropping**
- ****Eliminated winter manure spreading**

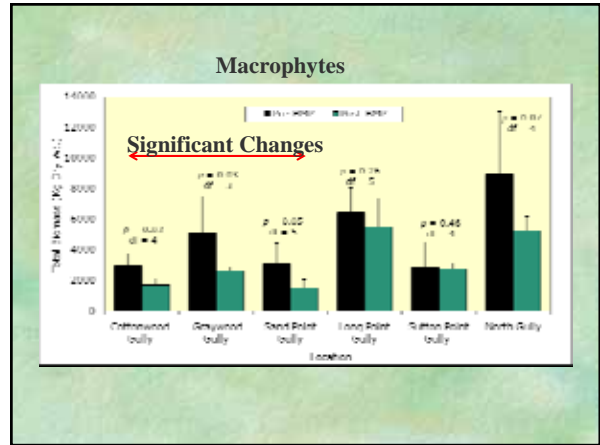
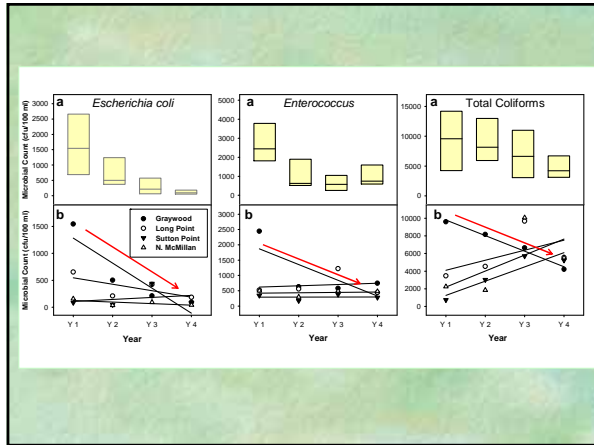
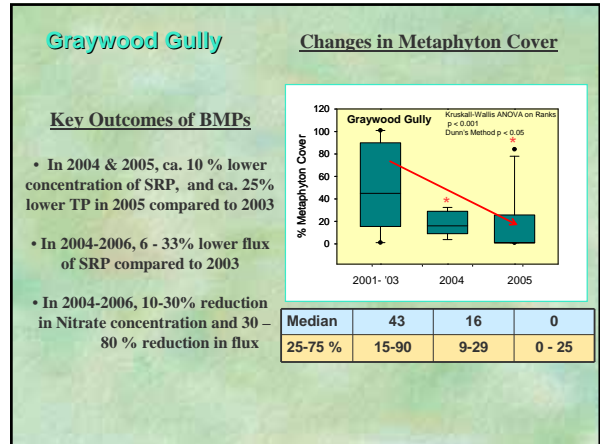
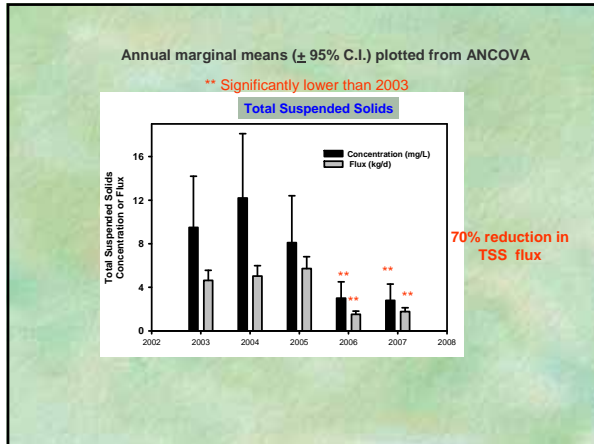
while maintaining yields in sensitive areas (LSDs) and highly erodible land (HELs)

Reduced fertilizer use (\$5,000 year⁻¹)

SRP = 210 mg SRP/L
TKN = 1000mg N/L

Graywood
Strip Cropping
Nutrient Mgmt





CEI Center for Environmental Information

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OSDA

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