The Lake Erie nearshore and offshore nutrient study (LENONS)
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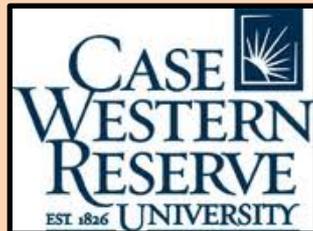
LENONS goals: to decipher the extent of a mussel-driven nearshore shunt mechanism in redirecting nutrient inputs to the nearshore benthic zone on the U.S. side of Lake Erie.

Objectives to accomplish this goal include:

a) assessments of sediment nutrient concentrations and sediment nutrient deposition rates,

b) assessment of water column, benthic algae, and bacteria nutrient uptake rates,

c) assessment of benthic organism density and nutrient mass, particularly *Dreissenid* mussels and their excretion products,

d) assessment of water column phytoplankton and zooplankton density and nutrient mass, and

e) assessment of water column nutrients.

Accomplishments to date:

1. Collecting significant data for mass balance exercise of Lake Erie nutrients

183 benthic samples collected and processed

64 phytoplankton and 128 zooplankton samples collected, in triplicate, for density, stable isotope analysis and nutrient content

64 water column chemistry sampled collected and analyzed

60 phytoplankton P-uptake and P-debt trials performed totaling 1140 and 240 measurement, respectively

240 luecine uptake measurements for bacterial production

22 atmospheric deposition samples, 258 core slices, 26 water column seston collections, and 8 sediment traps deployed to support sediment analyses using radionuclides

Regional impacts and aid to managers:

Lake Ontario experiencing some increased P delivery via Niagara River. Lake Erie work will inform that trend. Additionally, this work may be transferrable to assist lake Ontario in deciphering the strength of nearshore shunt dynamics.

This work can inform nutrient models by differentiating nearshore and offshore compartments

This work can inform managers when considering potential relaxation of P-load targets

Public benefits:

This work can assist in evaluating P-load targets...as such nuisance algal bloom (e.g., *Cladophora* or *Lyngbia*) dynamics may be better understood/controlled...cleaner beaches

New research needs/management options:

Tracking algal bloom fate...where does all that material go?

What happens when mussels die? Where do all those locked up nutrients go? Sediment bound? Dissolved? Buried? Scavenger or microbial tissue? etc

Benefits of the synthesis effort:

New collaborations.
Major proposal development
Cross-border discussions