



Research Needs Workshops

Series 4: Land and Lake Nutrient Issues

Watershed-based nonpoint nutrients and nearshore ecosystem behaviour in Lake Erie

March 20 - 23, 2007
Vanier Hall - University of Windsor
Windsor, Ontario, Canada

Goals:

1. to develop and evaluate an integrated assessment program from land to lake that will detect the effects of nutrient management on land
2. to suggest summary indicators that can inform on the status of land-derived nutrients and the nutrient-dependent ecological condition of the nearshore
3. to design sampling approaches that would determine whether strategies for managing nutrients were effective in improving ecological condition of the nearshore

Research Needs Workshop 4.11

From Land to Lake: Nutrient effects at the Coastal Margin & Nearshore

**Oak Room of Vanier Hall
University of Windsor**

1:00 p.m. 20 March - 1:00 p.m. 21 March

There is increasing belief that aquatic habitat characteristics reflect dynamic interactions among environmental, hydrological, geological, and biological features. Strategies for long-term habitat protection and restoration depend on understanding the dynamics as well as by characterizing the habitats themselves. We believe that Lake Erie's nearshore biological processes are affected by quantity, timing, and nature of nutrient inputs from the adjacent landscape. However, the relationships are not well understood. It is unclear what proportion of nutrients driving food web processes in the basin represent loads from the land, and what proportion are internally recycled. At the invitation of the Lake Erie LAMP and in cooperation with the Water Quality Board of the International Joint Commission, the LEMN is hosting a workshop to determine how we would assess the aspects of nutrient loading from tributaries that most strongly influence nearshore community condition/processes

In this workshop, we will address the following questions preparatory to developing research and action plans for creating and sustaining desirable Lake Erie ecosystem objectives:

What are the key indicators of ecological condition and the underlying processes in the nearshore zone?
What are the critical variables to measure in the basin?
What are the target and actionable levels of these variables in the nearshore zone?
Which of these variables is outside of the recommended range needed to achieve LAMP ecosystem objectives?

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Provisional Agenda (Continued)

Tuesday March 20 - Oak Room of Vanier Hall

- 1:00 Welcome and Introductions - John Gannon
 1:10 LEMN – History & workshop structure - Jeff Reutter
 1:15 LAMP Objectives & workshop needs - Phil Ryan & Scudder Mackey
 1:30 Previous findings & recommendations from PLUARG, LETS, IFYLE - Jan Ciborowski
 1:35 Workshop Task Summary - Russ Kreis
- 1:45 **Lake Erie Nearshore Dynamics and Interactions** - *What do we know about how the nutrient loads entering tributaries affect the nearshore community and its processes?*
- 1:45 Habitat zones, layers, and linking processes - Scudder Mackey
 2:00 Changing temporal patterns of nutrient loading - Peter Richards
 2:15 Nearshore patterns of nutrient transport and effects - Todd Howell
 2:30 The nearshore shunt - biological alteration of nutrient dynamics - Bob Hecky
 2:45 *Cladophora* phenology and distribution- nutrients and hydrodynamics - Luis Leon
 3:00 Nutrients & the structure of the nearshore food web - Phil Ryan

3:15 Break (Crocodile Lounge), and adjourn to breakout session room

3:30 Breakout 1: University Club of Vanier Hall

3:30 Breakout 1: “Understanding and tracking nutrient-regulated nearshore ecological characteristics”

Breakout Groups: a) Coastal Wetlands
 b) Coastal Margin
 c) Nearshore
 d) Offshore

Framing Challenge: Nutrient management efforts in the Lake Erie Watershed can be best justified if we know the relationship between local loadings and the conditions of the coastlines, the part of the lake that humans are most likely to experience. How can the “land” and “water” focused nutrient management efforts be better integrated?

General Questions:

What are the essential components by which we recognize ‘ecosystem health’ & status
 What are the key variables to track? How should this be done? Where? When?
 What critical aspects/processes for nutrient management not yet well understood?

Aggregating Our Collective Contributions:

Each Workshop attendee may bring along and display up to 2 PowerPoint slides that focus on an aspect of nutrient management on land and/or in tributaries being worked on or that can be contributed to. Slides will be collaged under the breakout group themes and will contribute to the workshop findings report.

- 4:30 Reporting out
 5:00 Next Day Plans; Close for the day

Research Needs Workshop 4.11: Nutrient effects at the Coastal Margin & Nearshore
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Provisional Agenda (Continued)

Wednesday March 21 - Oak Room of Vanier Hall

- 8:00 Reconvene
- 8:15 Welcome; tasks for the morning - Chris Marvin & Jeff Reutter
- 8:20 Reporting out from Tuesday
- 8:45 **Tracking and Summarizing nearshore nutrients and ecological condition**
- 8:45 The Lake Erie LAMP indicators matrix - Luca Cargnelli
- 9:00 Remote sensing technology to assess nearshore conditions - C.K. Shrum
- 9:15 Real time technology for monitoring nearshore conditions - Russ Kreis
- 9:30 **Breakout 2: “Towards Integrated Aquatic Ecosystem Performance Measures”**
(Breakout groups as before)
- Framing Challenge: Lake Erie watershed aquatic ecosystem health impairments associated with nutrients must be tracked with appropriate performance measures across multiple trophic levels in the nearshore.
- General Questions:
- What are the most easily understood indicators of nutrient and biological conditions and the underlying processes controlling biological integrity?
 - What are the units and typical values of those variables? What are important covariates affecting their variability?
 - Is there a **desirable** value indicative of ideal conditions? What value is **undesirable**?
 - What is the likely **best achievable** value, using practical technology?
 - What effort (spatial and temporal resolution) is needed to achieve acceptable precision for a sampling design in space and time?
- Collective Contributions: Each Workshop attendee may bring along and display up to 2 PowerPoint slides that focus on an aspect of aquatic ecosystem performance measures for the land-tributary-lake nutrient pathway that they are working on or can contribute to. Slides will be collaged under the breakout group themes and will contribute to the workshop findings report.
- 10:45 Break
- 11:00 **Breakout 3: “Integrated Research and On-the-ground Action Opportunities”**
(Breakout groups as before)
- Framing Challenge: Integrated research and monitoring opportunities can/should be undertaken in the Lake Erie watershed should be reflected in to mitigate aquatic ecosystem health impairments associated with nutrients. Vision and direction is needed.
- General questions:
- What are essential research and/or action opportunities where land-tributary-lake integration is needed?
 - What are key aspects must be brought together? How should this be done? Where, when?
 - Are critical elements to make this happen adequately understood in this watershed?
- Collective Contributions:
- Each Workshop attendee will bring along and display up to 2 PowerPoint slides that focus is on aspects of nutrient research or management action on land and/or in tributaries being worked on or that can be contributed. Slides will be collaged under the breakout group themes and will contribute to the workshop findings report.
- 12:00 Working lunch, Reporting and Summary of Workshop 4.11 findings & recommendations.
(joined by Workshop 4.12 participants as observers)
- 1:00 Close workshop 4.12.