

Invited Abstract

TOWARDS A COMPREHENSIVE ASSESSMENT OF WETLAND QUALITY OF LAKE ERIE COASTAL MARSHES: COMBINING LANDSCAPE AND FOOD-WEB APPROACHES.

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Protecting habitats at risk is one of the most challenging tasks for environmental resource managers today. Coastal marshes of the Laurentian Great Lakes is an example of a threatened and endangered space that requires our immediate attention. Most of the wetlands that occurred on the shoreline of the lower Great Lakes prior to European settlement have been irreversibly destroyed for urban and agricultural uses, and those that remain are severely degraded. Because of their great value as habitat for economically and recreationally important fish and wildlife, and because they have exceptionally high biodiversity, governments in both Canada and the United States have implemented programs to prevent further losses, and to increase wetland area through restoration projects.

Recent collaborative funding is making possible the development of a binational georeferenced digital wetland inventory that can be widely accessed and updated by managers and researchers from both countries. This can only be considered the first of several critical steps towards establishment of a basin-wide conservation strategy. Another equally important step, especially where the lower lakes are concerned, is development of standardized wetland assessment tools (e.g. Index of Biotic Integrity, IBI) that can be used on a basin-wide scale to evaluate wetland quality, since degree of marsh degradation can greatly affect habitat functionality.

In this talk, we will use water-quality, land-use, zooplankton and periphyton data collected from 65 coastal marshes of the Canadian Great Lakes to show how water quality data can be used to ordinate wetlands along a degradation gradient. We will show how the relative position of wetlands along a synthetic environmental axis (Principal Component Axis which is driven primarily by the concentrations of phosphorus, nitrogen and suspended solids) is indicative of the the type of agricultural, forested and/or urban land uses in the wetland watershed. We will use empirical data to build a conceptual ecological model of a healthy marsh foodweb to support development of two alternatives to the IBI, one based on presence/absence of plant-associated zooplankton (Wetland Zooplankton Index, WZI) and the other based on biomass of periphytic algae. Finally, we will show how the WZI has been used to quantify the response of the zooplankton community to carp exclusion in Cootes Paradise Marsh.