

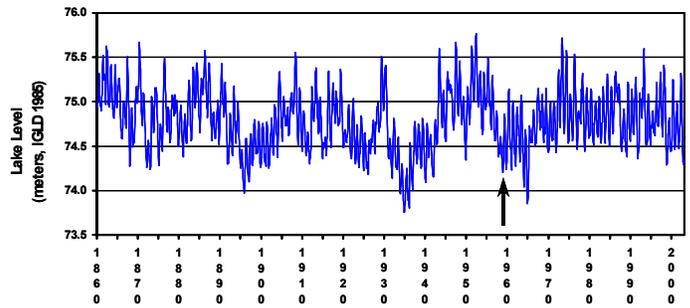


Great Lakes Science Center

Wetland Plant Community Responses to Lake Ontario Water-Level Fluctuations

Background

Lake Ontario water-level regulation, which began in 1959 and is governed by the International Joint Commission (IJC), has prompted concern for coastal habitats and wetlands in particular. In preparation for revising the water-level-regulation plan for Lake Ontario, the IJC launched a new study to evaluate effects of water-level regulation on the Lake Ontario ecosystem. USGS and Environment Canada scientists collaboratively are evaluating past effects of water-level regulation on Lake Ontario coastal wetlands to develop predictive models for testing new regulation plans.



Lake Ontario water levels. Arrow denotes beginning of water-level regulation.



Satellite photo of Lake Ontario. (Source: Jacques Descloitres, MODIS Land Rapid Response Team, NASA/GSFC.)

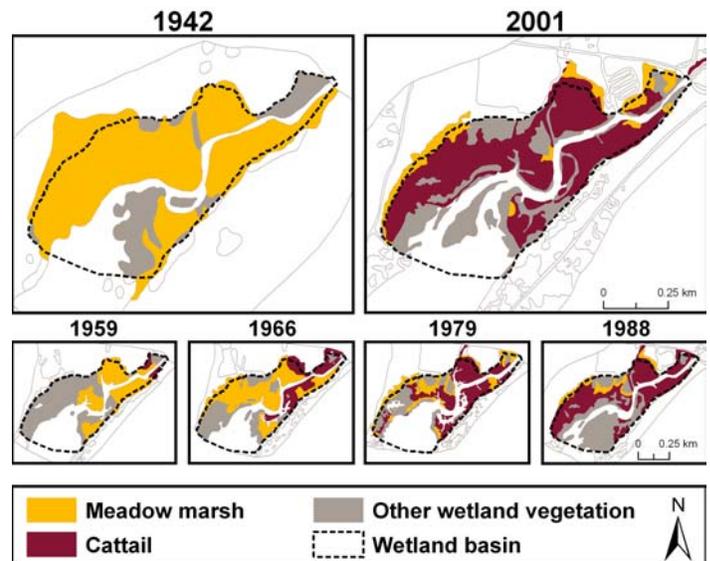
GIS Model

Quantitative vegetation sampling was conducted to characterize current vegetation along elevation contours representing specific wetland flooding and de-watering frequency scenarios. These data, along with bathymetric and topographic models, were used to construct GIS models to predict potential wetland responses to water-level fluctuation in proposed new regulation plans.

Vegetation Change Analysis

To determine the relations between water-level regulation and wetland plant community changes, a component of the USGS study tracked vegetation change in Lake Ontario coastal wetlands by interpreting an aerial photograph series from 1938 to 2001. Interpreted vegetation patterns were digitized into a geographic information system (GIS), and vegetation community data were collected, analyzed, and compared to water-level data.

Time-series analyses showed a dramatic increase in cattail communities since regulation began. Generally higher lake levels and lack of extreme low levels allowed cattails to invade and replace meadow marsh communities that are more tolerant of drier conditions.



Time-series maps of South Colwell Pond, showing conversion from meadow marsh to cattail communities.