THE LAKE HURON CENTRE FOR COASTAL CONSERVATION

Coastal Wetlands

SPRING 2000

Critical Ecosystems along Lake Huron

Wetlands are an interface between land and water environments, and are areas that are permanently or temporarily submerged or water saturated, such that the vegetation growing within them are adapted to wet soil conditions. The development and ecological integrity of wetlands depend on water saturation for at least part of the year within the wetland complex. The length of time the water is retained in the wetland, and the depth of the water within the wetland are key influences on the amount and variety of vegetation, as well as their distribution and ecological diversity. In Great Lakes coastal wetlands, the water table is tied to lake levels.

GREAT LAKES WATER LEVELS

Three types of water level fluctuations occur on the Great Lakes. (1) ***Short-term fluctuations*** are measured in minutes, hours or days; (2) ***Seasonal fluctuations*** follow a regular seasonal cycle; (3) ***Long-term fluctuations*** reflect changes in water levels over years or decades.

SHORT-TERM VARIABILITY

Temporary water levels extremes can occur through phenomena like storm surges and seiches caused by winds or atmospheric pressure changes, and tend to occur locally. They tend to occur over a short time span since the water levels return to the way they were in a few hours or days. The impact of this type of fluctuation on coastal wetlands ecology is minimal.

SEASONAL FLUCTUATIONS

Lake levels are affected seasonally by evaporation, precipitation, watershed runoff and groundwater flow. Water levels have a fairly regular seasonal cycle, with minimum levels in winter, and maximum levels in summer.
Levels are low in winter because precipitation as snow, storage of the water on the land as snowpack, and frozen conditions, reduce runoff.

SPECIAL POINTS OF INTEREST:

- *The conditions present in Great Lakes coastal wetlands are linked to lake levels.*
- *Over half of the approximately 120 species of fish that inhabit the Great Lakes depend on coastal wetlands for at least part of their life cycle.*
- *Many species of waterfowl, reptiles, amphibians, mammals and invertebrates also rely on these special wetlands for feeding, resting and rearing their young.*

During spring, levels rise due to runoff, increased groundwater flow and spring rainfall, and reach a summer maximum on Lake Huron in July. The combined effects of higher air temperatures, increased evaporation and reduced runoff lead to a decline in water levels through the autumn.

Coastal wetland at MacGregor Point Provincial Park on Lake Huron.

LONG-TERM VARIABILITY

Long-term fluctuations in water levels do not occur cyclically, since there are no regular patterns, or predictable changes. The range in these fluctuations can be up to two metres between maximum and minimum levels. On Lake Huron, record high levels occurred in 1986; record low levels occurred in 1964. Long term fluctuations are due to climatic variations which occur over several years. Precipitation, evaporation and temperature are the dominant factors which control water levels on the Great Lakes. Changes in these elements caused by climatic variations affect the supply of water to the lakes.

On Lake Huron, record high levels occurred in 1986; record low levels occurred in 1964

Coastal wetlands along the Great Lakes, which consist primarily of marshes and swamps, are affected most by long term water level fluctuations. These wetlands are different than the wetlands found inland because they tend not to develop into more xeric (dry soil) communities, due to a buildup of sediments, soil and organic material. They are also in a continual process of adapting to the long-term fluctuations in water levels. Water level change is necessary for these wetlands to maintain optimum productivity and diversity of vegetation.

Long-term fluctuations in water levels can dramatically change vegetation patterns within a coastal wetland. It can take up to three to five years to re-establish vegetation communities. While water levels may not necessarily eliminate a particular vegetation community, individual species can disappear once their tolerance threshold for disturbance has been reached.

During low water levels, plant

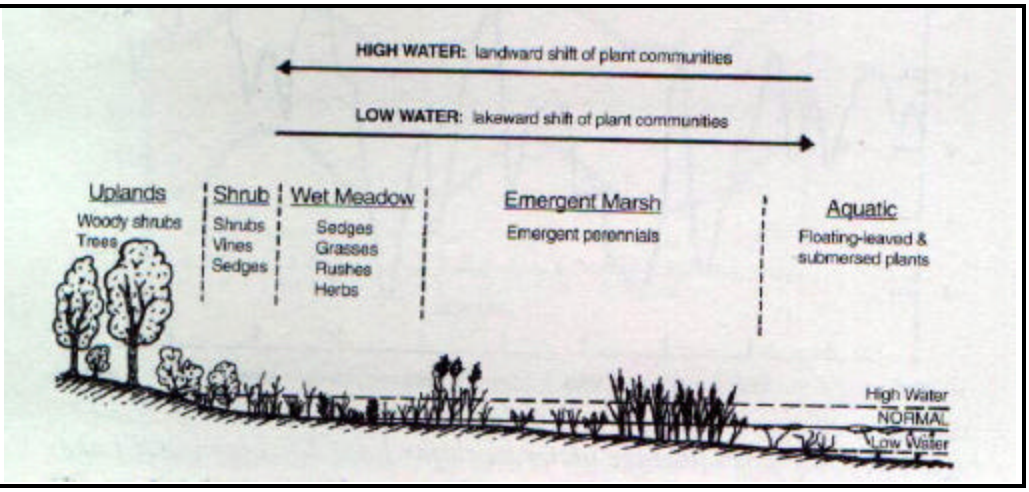
communities shift lakeward and displace plant communities as they migrate towards the shoreline. The landward margins of the wetlands become dry and mudflats are exposed. Species such as submergents and emergents either migrate or die, and they may have to colonize new areas further lakeward. They are displaced by plants with drier habitat requirements, like sedges, grasses, shrubs and trees. These plants expand into areas where the water depth was once too deep.

During high water levels, plant communities shift landward. The high lake levels flood the wetlands causing trees to die off, while emergents, grasses and sedges are flooded and replaced by submergents, floating leafed plants and open water. But this shift can only occur if the slope within the wetland is very gentle, if there are no natural or human barriers to confine this shift or the movement of water, if there is suitable soil structure, and if the rate of water level change is slow enough for vegetation to re-establish itself.

The seasonal Great Lakes water levels that rise in the spring to reach their maximum in summer, followed by a decline in the fall and reaching a minimum in the winter, is opposite to the pattern that occurs in most inland wetlands. Interior wetlands reach a maximum water level during spring, after the snowmelt, and are at their minimum during the fall.

IMPORTANCE TO WILDLIFE

Coastal wetlands are essential to maintaining fish populations. Abundance and diversity of fish is relatively high in and adjacent to shoreline marshes. The littoral zone is important for food, shelter, spawning and nursing for a wide variety of fish.



This profile of a coastal wetland illustrates what happens when water levels change for prolonged periods of time (a few years). High water kills shrubs and trees and causes vegetation to migrate inland. Low water allows shrubs, grasses and sedges to spread lakeward.

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Continued from Page 3 …

It is estimated that of the 120 Great Lakes fish species, over half are known to inhabit coastal wetlands for at least part of their life cycle.

Other wildlife, like mammals, birds, reptiles, amphibians and invertebrates are reliant on these wetlands for feeding resting, breeding and rearing their young. Vegetation patterns and changes influence the number and species of wildlife a wetland can support. Higher lake levels are preferred to maintain higher wetland wildlife diversity. Low water levels usually lead to poorer conditions for wildlife This is because wildlife depends on the diversity of plant life, size of wetland, water quality within the wetland, and soil conditions. Low lake levels tend to result in less species diversity.

Water Quality

Coastal wetlands act as a natural buffer zone, cleansing surface and groundwater before it enters the shore waters. Not only do the wetlands slow down the movement of sediments and, thereby, trap pollutants, but the vegetation absorbs many of the more persistent pollutants, such as heavy metals. Chemicals like nitrogen, phosphorous and pesticides, are taken up by the wetland plant's root system. Without these wetlands, even greater amounts of pollution would end up in the Great Lakes.

Threats

One of the greatest threats to the sustainability of these wetlands and the survival of the flora and fauna which depend on this unique habitat, is human disturbance to the shoreline. Development, dredging, building shore protection, constructing roadways, each interfere with the natual cycle of coastal wetlands. Much of this disturbance has occurred without recognizing or understanding the implications.

Conservation of coastal wetlands is an important piece of the puzzle to maintain the integrity of the Lake Huron ecosystem. Become an active steward in efforts to conserve our coast.

Information Sources:

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