

The background of the entire page is a photograph of a sunset over a body of water. The sky transitions from a deep purple at the top to a bright yellow near the horizon. The water reflects these colors, creating a shimmering effect. In the foreground, the dark silhouettes of trees and bushes are visible, framing the scene on the left and right sides.

LIVING *with* THE LAKES

UNDERSTANDING THE IMPACTS
OF VEGETATION REMOVAL AND
BEACH MAINTENANCE



AS A PROPERTY OWNER ALONG THE GREAT LAKES, YOU HAVE THE PRIVILEGE OF EXPERIENCING THE MAGNIFICENCE AND ASTOUNDING BEAUTY OF THE SHORELINE *every day*. AT THE SAME TIME, YOUR *actions* CAN INADVERTENTLY DESTROY THE ATTRIBUTES THAT ATTRACTED YOU TO THE SHORELINE IN THE FIRST PLACE.

DURING RECENT LOW WATER periods, some property owners along the Great Lakes shorelines perceived growth of wetland vegetation to be an invasion of “weeds.” To address their concerns, the Michigan Legislature passed Public Act 14 (PA 14) in June of 2003. PA 14 amended Michigan’s wetland law to allow certain types of “beach grooming” activities on exposed Great Lakes bottomlands through November, 2007, and authorized the removal of coastal wetland vegetation with a letter of approval from the director of the Department of Environmental Quality (DEQ) in specified pilot areas of Grand Traverse and Saginaw Bays through June of 2006.

The Legislature also required the DEQ to evaluate these activities and report results and recommendations to the legislature regarding future

changes in the law. The DEQ requested the assistance of leading Great Lakes coastal wetlands research scientists in providing a scientific evaluation of the impacts of beach maintenance and vegetation removal on coastal wetlands.

Research during 2004 and 2005 by these scientists suggests that the activities authorized by PA 14 have substantial, long-lasting negative impacts on Great Lakes coastal wetlands.

Before you engage in beach grooming activities, you should be aware of how your actions may *impact the health* of coastal wetlands and, ultimately, the Great Lakes. This brochure summarizes the findings from the research conducted and the DEQ report.



GREAT LAKES COASTAL WETLANDS are different than inland wetlands because they are influenced by large lake processes including waves, wind-driven “tides” or seiches, and especially the seasonal and long-term fluctuations of Great Lakes water levels. During low water periods, like those we are currently experiencing on Lake Michigan and Lake Huron, nearshore areas of the Great Lakes typically under water are exposed. Vegetation growth naturally increases on exposed wetlands during low water years.

Across the Great Lakes, an estimated two-thirds of coastal wetlands have been dredged, drained, or converted to other uses since pre-settlement times. The remaining coastal wetlands provide untold functions and values, and are ecologically indispen-

sable. In addition to habitat for fish and wildlife, up to one-third of the energy used in the entire Great Lakes food chain comes from coastal wetlands.

As a Great Lakes shoreline property owner, your actions can significantly impact the natural characteristics of the shore and the species that depend upon the wetlands that occur there. By engaging in beach grooming, you could be dramatically and negatively impacting coastal wetlands – some of the most valuable ecological areas in the Great Lakes. These wetlands are critical to the health of the Great Lakes and these negative effects could have major impacts on the entire Great Lakes ecosystem.

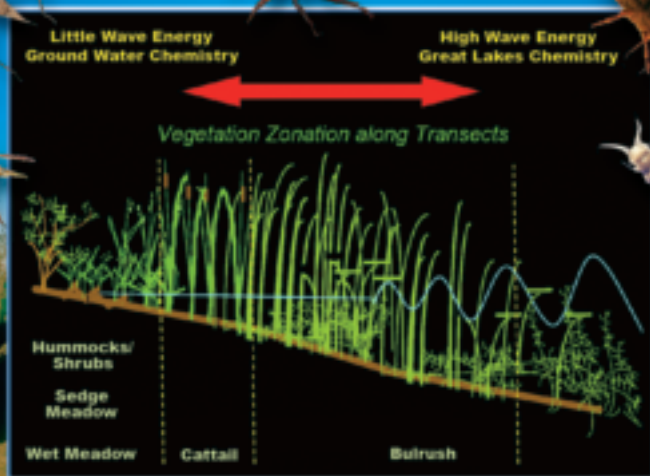
Impacts to the Physical and Chemical Conditions

A healthy and properly functioning coastal wetland maintains a natural chemical gradient from the shoreline to the open water. Along this gradient, there are zones characterized by specific vegetation and aquatic species influenced by the unique physical and chemical conditions found at each point on the gradient. The nearshore waters of coastal wetlands are protected from wave action and the open water by the expanse of wetland vegetation. Due to this protection, the physical and chemical properties of the water very close to shore are similar to the ground water chemistry that feeds the wetland. The water that is at the outer edge of the wetland plant zone is similar to open lake water.

When vegetation is removed, the nearshore area of the wetland is no longer protected from wave action. This exposure to waves pushes the open water of the lake into the nearshore area and alters the physical and chemical conditions of the wetland. The resulting changes in water chemistry, clarity, and temperature dramatically impact the invertebrate and fish communities. The occurrence of those species that thrive in the original conditions characteristic of the nearshore waters, including several important game species such as largemouth bass and yellow perch, is reduced.

The impacts to the physical and chemical conditions, as a result of removal of vegetation and beach maintenance activities, also extend beyond where the management practices directly occur, affecting adjacent wetlands along the shoreline.

Impacts to the Physical and Chemical Conditions



Beach grooming alters the chemical and physical conditions in coastal waters, negatively impacting fish and their food source.

Your Shoreline Before Beach Grooming



Beach grooming destroys stands of important plants (like these) and promotes the spread of harmful invasive plant species along the shore.

Impacts to Aquatic Vegetation

As to be expected, vegetation removal and beach maintenance activities have substantial impacts on aquatic plants. Additionally, related research suggests these substantial impacts to aquatic vegetation will be long-lasting. In most instances, removing “weeds” actually results in the long-term elimination of important aquatic vegetation. Disking, raking, hand-pulling, and leveling or filling wetlands with sand all result in the elimination of aquatic plants. In most cases, beach grooming destroys the root systems of the wetland vegetation, preventing successful regeneration in the following year.

For those coastal systems where the aquatic vegetation survives beach maintenance practices or the removal of vegetation, the diversity

and number of wetland plants present within a wetland are significantly reduced. While the long-term elimination of aquatic vegetation may be the desire of some property owners, killing the vegetation and destroying the root systems can disturb the natural processes of the wetland and ecosystem’s overall ability to function properly.

Impacts to Native Species

A common concern offered by property owners is that beach maintenance helps get rid of harmful invasive plant species. If invasive species have already taken over, removal may be appropriate, but must be done using correct methods to avoid spreading the plants to neighboring shoreline owners. However, where native plants are still present, beach maintenance activities and the removal of native

vegetation actually encourages the growth and spread of invasive species. Without competition from native species, exotic species such as *Phragmites* and purple loosestrife are able to become established much more rapidly than when the characteristic Great Lakes wetland plant community remains intact.

Impacts to Invertebrates

Invertebrates include species such as dragonflies, mayflies, and other insects, small shrimp-like crustaceans, snails, and clams. While we typically do not think of these critters as important, invertebrates are the primary source of food for fish and are critical to the overall ecology of coastal wetlands and the Great Lakes.

Removing natural vegetation and converting plant-dominated areas to

open beach areas changes the physical and chemical conditions of nearshore waters and wetlands, and dramatically alters the habitat for invertebrates. Raking or other grooming activities destroy the root system of the plants that stabilize the wetland and prevent erosion of the sand; therefore, the conditions upon which certain species depend are virtually eliminated. With this significant habitat alteration or elimination, the diversity and number of species present in “groomed” wetlands are greatly reduced. As is evident with the alteration of the physical and chemical characteristics of the wetlands, the impacts to invertebrates are not limited solely to the groomed portion of the shoreline. Invertebrate communities are disturbed (fewer numbers and kinds of invertebrates present) in areas as far as 150 feet away when vegetation is

Your Shoreline After Beach Grooming



Invertebrates, the primary source of food for fish, are dramatically reduced with a loss of habitat and changes to the coastal water.



Approximately 90 of the 200 fish species living in the Great Lakes
rely on coastal wetlands during some part of their life cycle.

removed in a way that allows offshore water to penetrate to the shoreline. Ultimately, beach maintenance and vegetation removal activities reduce the production of invertebrates – an important food source for the fish of the Great Lakes.

Impacts to Fish

Different fish species inhabit different areas of the Great Lakes. Some species rely on the cover from predators, the increased food available, and the specific chemical and physical characteristics found in coastal wetlands. Since beach grooming undeniably alters those conditions, the fish communities of the coastal wetlands and the Great Lakes are also altered. Once again, the number and types of fish found at groomed and ungroomed sites varies significantly. This change is due to alter-

ations in the plant community that creates openings allowing open lake water to penetrate to the shoreline. In particular, larval, or very young fish, use wetland vegetation as protection and feed on the invertebrates that inhabit the coastal wetlands. Their numbers are reduced substantially when the vegetation and subsequent food supply is decreased. Specifically, the research shows a decrease of important sport fish, such as yellow perch, smallmouth bass, and largemouth bass, in the groomed areas. As with the other effects of beach grooming, the impacts to fish communities are not limited to the altered shoreline but extend laterally along the shoreline into intact wetland areas. The extent and strength of wave action determines how much of the shoreline is actually impacted by an individual beach grooming action. However,

evidence indicates that the overall impacts to fish of the Great Lakes are substantial and extend as far as 150 feet laterally at sites where there is greater exposure to waves from the open lake.

Beach maintenance and removal of vegetation significantly alters the

chemical and physical conditions of nearshore waters, kills aquatic vegetation, increases the spread of invasive species, decreases the number of invertebrates (the source of food for fish), and reduces fish populations in the Great Lakes. Taken together, these impacts equal disaster for our Great Lakes coastal wetlands.

Beach grooming activities pose SERIOUS THREATS to the natural functions of coastal wetlands, including wildlife habitat, erosion control, and water quality protection. Before you engage in beach grooming, recognize the substantial and long-lasting adverse impacts you could impose not only upon your property, but also on your neighbor's property and on the forty million residents who rely upon the Great Lakes for their hunting, fishing, and other recreational opportunities, as well as their QUALITY OF LIFE.

Because different types and frequency of management practices result in varying levels of destruction to coastal wetland ecosystems, you can take actions to reduce negative impacts to the Great Lakes shoreline. If you must conduct beach maintenance, mowing plants to a height above 2 inches seemed to have the least impact on the Great Lakes wetlands.

The research also determined that if the plant community is allowed to recover during and after mowing, there were minor impacts to the physical and chemical conditions, vegetation, invertebrates, and fish community. However, repeated mowing without time for recovery has the same impacts as the other forms of vegetation removal.

If you still intend to conduct beach maintenance activities or remove vegetation from the Great Lakes bottomlands, ensure that your activities are within the scope of State and Federal law. You may be required to obtain a permit from the U.S. Army Corps of Engineers or the Michigan Department of Environmental Quality.

**Michigan Department of
Environmental Quality – Land and
Water Management Division.**

517-373-9244

www.michigan.gov/deqwetlands

**U.S. Army Corps of Engineers,
Detroit District.** 313-226-2218

www.lre.usace.army.mil/

The DEQ *Report on the Impacts of Beach Maintenance and Removal of Vegetation under Act 14 of 2003*

can be accessed at:

www.michigan.gov/deqwetlands

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For more information about Great Lakes coastal wetlands,
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