COASTAL HAZARD REGULATIONS IN GREAT LAKES STATES

A Summary Analysis

ASFPM Flood Science Center
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Contents

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NOTE ON HYPERLINKS

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EXECUTIVE SUMMARY

In conjunction with their public trust responsibilities and land use management authorities, several coastal states have enacted programs to address coastal hazards. This document is a summary of noteworthy coastal hazard regulations that states have enacted on the Great Lakes. Regulations enacted include coastal development setbacks as well as restrictions associated with shore protection structures to ensure those structures do not adversely impact neighbors or the environment. In addition, some states have passed regulations protecting dunes, bluffs, sensitive habitat**,** and viewsheds.

Minnesota and Wisconsin have shoreland setback regulations in unincorporated areas associated with all navigable waters. These regulations are not adequate to address Great Lakes coastal hazards due to the height of the bluffs on the Great Lakes coastline. The standard 75-foot shoreland setback in many cases would allow the construction of a building on the face of a bluff. Minnesota has adopted additional regulations for the north shore of Lake Superior and all bluffs in the state. Wisconsin has developed a model ordinance to address coastal hazards that has been adopted in varying degrees by eight of the 15 coastal counties in the state. Indiana, Michigan, Ohio, Pennsylvania, and New York have mapped coastal erosion hazard areas. Michigan, New York, and Pennsylvania require building setbacks in these areas. Ohio requires shore protection structures for all new or substantially improved development in coastal hazard areas they have mapped.

Coastal Development Setback or Construction Regulations: State Summary

OHWM = Ordinary High Water Mark CEHA = Mapped Coastal Erosion Hazard Area

State/ Province	Where Regs Apply	Planning Horizon (years)	Minimum Setback Req. (ft)	Erosion Ref Feature	Requirement
Michigan	CEHA	30 – movable 60 - > 3,500 sq.ft.		Bluff Top or ERF	Setback
Minnesota	Public Waters	Do not have	50 to 200	OHWM	Setback
Minnesota	Lake Superior	Do not have	75	Veg Line or OHWM	Setback
Minnesota	Lake Superior	50	30	Bluff Top	Setback
Minnesota	Bluffs	Do not have	30	Bluff Top	Setback
New York	CEHAs	40	Do not have	Bluff Top	Setback or Moveable
Ohio	CEHAs	30	Do not have	Bluff Top	Shore Protection Req
Penn-sylvania	CEHAs	50- residential	50	Bluff Top	Setback
		75- commercial			
		100- industrial			
Wisconsin	Navigable Waters		75	OHWM	Setback

INTRODUCTION

The Great Lakes have long been a navigation corridor and have developed into one of the world's greatest inland waterway systems. Coastal areas are a popular destination for tourism and recreational activities. Nationwide, people spend over $70 billion annually on visits to coastal beaches (Houston, 2008).

Thirty million people live on the Great Lakes. They are drawn to the lakes due to the economic and recreational opportunities the lakes provide. The Great Lakes coasts are attractive locations for second homes and investment properties. Property values along the coast are substantially greater than those of non-coastal properties.

Development pressure on the Great Lakes coastline continues to increase with larger and larger homes being built in this dynamic environment. However, living on the coast poses some risks. People living on the Great Lakes coastline are vulnerable to lake level changes, waves, storm surge, floods, ice shove, and landslides.

This report assesses risks associated with coastal development on the Great Lakes and provides summaries of state regulations to manage those risks.

Great Lakes Coastal Dynamics

The Great Lakes shores are fundamentally different from ocean shores in a number of ways. First, the water is fresh, making the lakes a desirable source of drinking water. Second, while the tides are much smaller (~ one inch), depending on wind conditions and ice cover, periodic seiches can be significant (up to 10 feet). Third, unlike ocean coasts, where sea level is gradually trending higher, Great Lakes water levels vary annually and over multi-decade cycles. Varying water levels have a fundamental influence on the portion of the shore face that is exposed to wave energy and the exposure of bluffs to wave attack. The relatively short fetches on the Great Lakes produce erosive, choppy wave conditions during storms, but there are limited long-period swell waves that naturally rebuild beaches during calm conditions.

Beyond the erosive nature of the waves, the shoreline is highly vulnerable to shore erosion largely because much of the coastal landforms are made up of mixed, unconsolidated glacial materials, such as gravels, lake-deposited clays, and tills. Much of the Great Lakes shoreline consists of bluffs that are made of unstable glacial deposits. Bluff erosion and slumping result in a continuously changing shoreline. While this process provides sand that builds beaches, it can undermine development constructed close to a bluff.

The terms "erosion" and "recession" are often used interchangeably. However, they are not the same. Recession is the landward movement of a feature, such as a bluff or dune crest, while erosion is the wearing away of land or the lake bottom. Recession is expressed as a distance or change in distance, while erosion is expressed as a volume or change in volume. Recession can be thought of as a consequence of erosion.

Great Lakes Coastal Erosion Risk Management

A number of Great Lakes states with significant coastal recession hazards have mapped areas with recession rates that exceed a particular threshold. Mapping coastal areas susceptible to landslides and recession usually involves identifying susceptible areas and classifying coastline reaches with related characteristics. Identifying coastal reaches with unstable bluffs and determining recession rates provides coastal communities and landowners with the information needed to avoid constructing buildings at risk. In addition, several Great Lakes states have then enacted regulations associated with building construction in the mapped erosion hazard areas.

Structural Shoreline Management

Seawalls and revetments are structures parallel to the shore intended to prevent storm waves from further damaging or moving the margins of eroding coastal land. Seawalls and revetments attempt to fix in place the edge of the land on a coast that would otherwise be receding, thus protecting fixed structures, such as buildings.

Some of the more controversial shoreline management structures are ones built perpendicular to the shore, which include solid piers, groins, and jetties. All solid shore-perpendicular structures interrupt littoral drift, causing sand to build up beaches on one side and worsen erosion on properties on the downdrift side.

Because the Great Lakes are navigable waters of the United States, permits are required from the U.S. Army Corps of Engineers (USACE) pursuant to the Rivers and Harbors Act for the placement of piers, wharves, jetties, breakwaters, and similar shoreline structures, and the Great Lakes states in conjunction with their public trust doctrine responsibilities.

Federal Consistency

Federal consistency is the Federal Coastal Zone Management Act (CZMA) requirement that any proposed federal actions (regardless of location) that have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone (also referred to as coastal uses or resources, or coastal effects) must be conducted in a manner consistent with the enforceable policies of a coastal state's federally approved coastal management program. The detailed CZMA federal consistency requirements are found within the National Oceanic and Atmospheric Administration (NOAA) regulations in 15 C.F.R. Part 930.

NOAA's Office for Coastal Management also provides a quick reference guide for CZMA federal consistency.

The Coastal Resources Management Program (CRM) within each state is responsible for coordinating federal consistency reviews and concurring with or objecting to proposed federal actions subject to the federal consistency requirements.

ANALYSIS OF GREAT LAKES STATE COASTAL HAZARD REGULATIONS

The goals of this project are to analyze and summarize Great Lakes state regulations that address coastal hazards. This report includes two components: state regulations and guidance related to building setbacks and construction in coastal erosion hazards areas; and state regulations related to the permitting of shore protection structures, solid piers, and dredging activities.

Illinois

Setbacks

Much of the natural Illinois shoreline has been developed. No coastal hazard areas have been defined. There are no statewide mandated setback requirements.

Permitting of Shore Protection Structures, Solid Piers, and Dredging Activities

Any activity along the Lake Michigan shoreline that is located at or below the Ordinary High Water Mark (OHWM) requires a permit from the Illinois Department of Natural Resources (IDNR), Office of Water Resources (OWR). In cases where the OHWM is lakeward of the existing bluff, the toe of the bluff is used to determine the Department's jurisdiction. Both the IDNR/OWR and the U.S. Army Corps of Engineers define the OHWM as a water elevation of 581.5 ft. International Great Lakes Datum-1985 (IGLD-85). IDNR/OWR permits are issued jointly with the Illinois Environmental Protection Agency (IEPA). The following two types of shore protection permits are issued for work in Lake Michigan:

- **General Permit No. 1-LM.** This permit is issued to expedite review of permits for certain projects in Lake Michigan. This permit is issued for minor shore-parallel protection projects that do not exceed a length of 300 ft., and which meet the special conditions of that general permit. Examples of these projects would be stone revetments or steel sheet pile bulkheads built at the toe of a bluff. This permit does not require the issuance of a public notice but does require Illinois Environmental Protection Agency approval.
- **Individual Permits.** All other types of shore protection projects proposed within or adjacent to the waters of Lake Michigan require a regular permit from the IDNR/OWR. Examples of these types of projects include but are not limited to: revetments (longer than 300 ft.); seawalls/bulkheads (longer than 300ft.); groins (requiring the placement of clean sand in an amount equal to 120% of its potential capacity to retain sand); breakwaters/offshore structures; beach nourishment; piers; and modifications to existing structures.

These types of projects require the issuance of a public notice as specified in Section 3704.60. While this section specifies a public notice period of at least 21 days, IDNR/OWR may extend the public notice period for shore protection projects to 30 days. These projects are reviewed by IDNR/OWR personnel for compliance with Part 3704 Rules, and also require IEPA approval prior to a permit being issued.

Projects That Do Not Require A Permit

Projects proposed outside of the waters of or the influence of the coastal processes of Lake Michigan do not require a permit. These include projects on a bluff and areas upslope or landward of the existing bluff toe or bluff toe protecting structure. Also, maintenance work associated with the restoration of an existing permitted project to its original specifications does not require a new permit.

General Guidance for Shore Protection Projects

Section 3704.70 specifically prohibits the conversion of public waters to private land by filling; however, fill material may be placed in public waters for such things as bank, shore, or bluff protection and beach nourishment. Section 3704.80(a) specifies that the proposed activity must not: 1) cause an obstruction to, or interference with, the navigability of a public body of water, 2) result in an encroachment on a public body of water, 3) cause an impairment of any rights, interests, or uses of the public in any public body of water or to its natural resources, or 4) cause bank or shoreline instability on other properties.

Shore-Parallel Revetments and Bulkheads

- The structure should be located as close to the existing toe of the bluff as is practicable, and should be the minimum size needed to provide shore protection.
- The materials to be used should consist of clean material, e.g., steel, wood, poured or precast concrete, or stone.

Shore-Perpendicular or Offshore Structures

- Proposed offshore structures should be located as close to shore as possible and be no larger, or extend further offshore than needed to provide a reasonable level of beach area for shore protection. As a guiding principle, private offshore structures should not extend more than 125 feet offshore from the base of a bluff.
- The size of the structure, including its height, length, offshore extent, etc. should be comparable to adjacent structures in the area. In general, structures within 1,000 feet of the project area should be considered to be adjacent.
- The materials to be used should consist of clean material, e.g., steel, wood, poured or precast concrete, or stone.
- Where possible, notably in areas where existing access along the lakeshore is available, the project should provide some type of reasonable access over or around it on the landward side.

The full guidance document is available at:
https://dnr.illinois.gov/content/dam/soi/en/web/dnr/waterresources/documents/lake-michigan-permit-guidelines.pdf

Specific Guidance for Shore-Perpendicular or Offshore Structures

As a general principle, shore-perpendicular/offshore structures have the ability to trap sand from the littoral drift. To assist in the evaluation of whether a proposed structure will result in bank or shoreline instability on other properties, applications for these types of projects should address the following:

- The submittal should include an analysis of the proposed structure on the wave climate and impacts to the movement of sand (littoral drift). The analysis should include a review of the proposed structure individually and cumulatively with adjacent structures.
- To ensure that these types of projects will not trap sand moving along the shoreline, the project should include the placement of clean sand in an amount equal to 120% of its potential capacity to retain sand. The grain size of the sand to be placed should be comparable with the natural sand and be of equal or larger grain size.
- Any beach area artificially created as part of a shoreline protection project does not become private property for the exclusive use of the owner. Any artificially created beach area is considered to be public property, and the owner of the upland property may not do anything to impair or prohibit lawful public use of such created beach area.
- Perpendicular or offshore shore protection structures with the ability to trap littoral sediments will be expected to show, by hydrographic survey, that the completed project is not trapping littoral drift sand. Hydrographic surveys are required pre-construction, post-construction at time of completion, and at one- and five-year timeframes post-construction.

Indiana

Setbacks

Much of the natural state shoreline has been developed, and there are no statewide mandated setback requirements. Indiana has identified portions of the Lake Michigan shoreline with long-term erosion rates greater than one foot per year as High Erosion Hazard Areas (HEHAs). While the Indiana shoreline of Lake Michigan includes several HEHAs, many of the areas are currently protected from erosion by manmade structures or are included in a national or state park where the natural shoreline is preserved.

Permitting of Shore Protection Structures, Solid Piers, and Dredging Activities

A person who wishes to place a permanent structure on or within the Ordinary High Water Mark of Lake Michigan must file a license application with the IDNR. The Indiana Administrative Code definition reflects the traditional common-law, or natural, OWHM as: The line on the shore of a waterway established by the fluctuations of water and indicated by physical characteristics - Section 312 I.A.C. 1-1-26(1). These physical characteristics include a clear and natural line impressed on the bank or shore, shelving, changes in the soil's character, the destruction of terrestrial vegetation, or the presence of litter or debris.

"Permanent structure" refers to a: marina, seawall, breakwater, detached breakwater, jetty, boat launch, "z" wall, binwall, sinusoidal wall, bulkhead, groin, grout tube, cable, pipeline, wharf, pier, piling, rock revetment, or similar structure.

The applicant must include plans, drawings, other specifications reasonably required for the department to determine whether placement of the permanent structure will be permitted. The applicant must demonstrate that the permanent structure will not:

1. Unreasonably impair the navigability of the lake or an adjacent navigable waterway.
2. Cause significant harm to the environment.
3. Pose an unreasonable hazard to life or property.

The applicant must evaluate the likely impact of the permanent structure on coastal dynamics, including:

1. Shoreline erosion and accretion
2. Sand movement within the lake
3. Interaction with existing structures

Michigan

Michigan has 3,288 miles of Great Lakes coastline and 38,000 square miles of Great Lakes bottomland. The state legislature has enacted several laws protecting Great Lakes shorelands, coastal dunes, floodplains, coastal wetlands, and submerged lands. The laws are codified in the Natural Resources and Environmental Protection Act, 1994 Public Act 451, as amended (NREPA). The laws are administered by the Michigan Department of Environment, Great Lakes, and Energy (EGLE).

Setbacks

County-wide recession rate studies are conducted of the shoreline to determine those reaches receding at a rate of one foot or greater averaged annually over a period of 15 years or greater. These studies are required by Part 323, Shorelands Protection and Management, of the NREPA and the promulgated Administrative Rules R 281 et seq. The studies compare the location of the landward edge of active erosion on modern aerial imagery to the same feature on historic imagery to calculate the average annual recession rate of the shoreline. Shorelines meeting or exceeding an average annual rate of one foot per year are designated as high-risk erosion areas (HREAs). Two setback distances are calculated based on the recession rates. An additional 15 feet is added to the setbacks to account for storm events. A 30-year projected recession distance (PRD) is calculated for those structures meeting readily moveable criteria. Readily moveable structures landward of the 30-year PRD can be relocated if threatened by erosion. A 60-year PRD is calculated for large structures and septic systems. These structures are considered too large to be relocated at a reasonable cost when threatened by erosion. The PRDs provide information for future planning, including acquiring a lot deep enough to relocate a structure. Buildings in HREAs which conform to, or exceed, the setbacks often do not require shore protection as the hazard due to erosion has been reduced.

Permits from the state are required for those projects proposing to erect, install, move, or enlarge a permanent structure on a parcel must obtain a permit prior to the commencement of construction. Local units of government may assume program authority through their local ordinances and may be more restrictive than state law. Information about the HREA program is available at Michigan.gov/Shorelands. High-risk erosion areas are identified by map and parcel list at the program website or by accessing EGLE's online permitting and compliance database, MiWaters.

Local units of government on the coastline often have ordinances with building setbacks unrelated to shoreline recession rates. Typically, these ordinances require a setback of 50 feet or greater from the Ordinary High Water Mark.

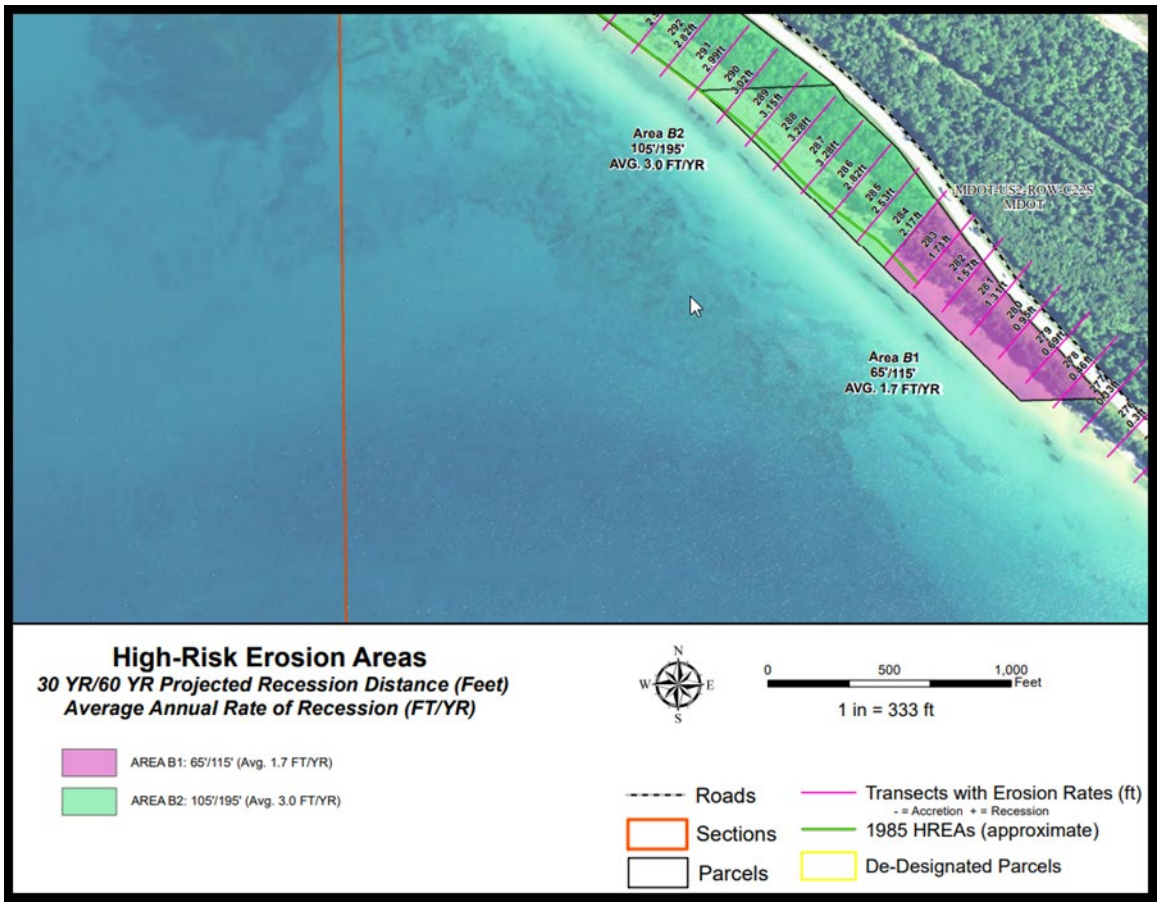

Figure 1. Designated high-risk erosion areas with 30-year and 60-year projected recession distances and average annual rates of recession. Lake Michigan, Mackinac County, 2019. See Michigan.gov/Shorelands for the entire map.

Setback Required	**Yes**
Reference Feature	• High Risk Erosion Areas -- from the Erosion Hazard Line. • Bluffs – top of bluff
Planning Horizon	• 30 years for readily-movable structures < 3,500 sq ft. • 60 years for structures > 3,500 sq ft or structures not readily movable.
Setback Amount	• Low Bluffs -- the projected recession distance from the Erosion Hazard Line. • High Bluffs -- setback distance is calculated by adding 1 to the product of the percentage points of slope over 25% and 0.05, to a maximum of 2. The answer is multiplied by the projected recession distance in feet. • There is also a 15-ft buffer added for serious storms.
Setback Established	When a permit is issued by EGLE.
Erosion Hazard Areas	Areas with an average annual recession rate of 1 ft or greater/year.
References	https://www.michigan.gov/egle/0,9429,7-135-3313_3677_3700-344443--,00.html

Readily Movable Structure Criteria
Structures proposed between the 30-year and 60-year required setback distances calculated for the site must meet readily moveable structure (RMS) criteria. A readily moveable structure is a small permanent structure which is designed, sited, and constructed to accomplish relocation at a reasonable cost relative to other structures of the same size and construction. Access to and from the site shall be of sufficient width and acceptable grade to permit the structure to be relocated. Michigan allows construction by variance on lots or parcels not deep enough to accommodate setback requirements from the current erosion hazard if the lot or parcel is deemed substandard according to administrative rule and meets the variance criteria rule.

Readily moveable structure criteria include:

- First-floor foundation of 3,500 square feet or less
- Garage of 676 square feet or less
- Foundation must be basement, crawlspace, or pilings
- Above-foundation walls must be stud frame or whole log
- No solid stone, concrete, or block walls above foundation
- No more than four living units
- Sufficient access for relocation should one decide to move the building

Permitting of Shore Protection Structures, Solid Piers, and Dredging Activities

Part 325, Great Lakes Submerged Lands, of the NREPA requires a state permit for impacts to the bottomlands including the construction of shore protection, piers, and dredging. The promulgated Administrative Rules R 322 et seq. require EGLE to consider the adverse environmental impacts of the proposed project. The program website provides details on the General Permit and Minor Project categories for small impacts which receive an expedited review. These categories include the removal of qualifying manmade structures, the replacement of an existing seawall, and the placement of riprap.

Part 353, Sand Dunes Protection and Management, of the NREPA, protects approximately 265 miles of shoreline on Lakes Superior and Michigan. Maps and information about the Critical Dune Area (CDA) program may be found at Michigan.gov/CriticalDunes. The CDAs are regulated to the water's edge. Shore protection is detrimental to the natural shoreline process of sand movement for dune and beach building. Hardening of the shoreline in a CDA requires a permit. Local units of government may also assume the state's authority; however, the local ordinance cannot be more restrictive than the state's program.

State and federal authorities have joint jurisdiction on Great Lakes bottomlands and shorelands. A single application, called the joint permit application, is used for proposed impacts regulated by Michigan and federal agencies. Applicants need only fill out one application form for review of the proposed project by both agencies. All permit applications are submitted online through MiWaters.

There is a joint permit application for the Corps and the Michigan Department of the Environment, Great Lakes and Energy (EGLE) that would be required for the installation or removal of hard structures.

Minnesota

Setbacks

Within the Lake Superior coastal area, control over the use of lands adjacent to lakes and rivers is primarily accomplished through administration of local zoning ordinances adopted in conformance with the statewide Shoreland Management Act and the North Shore Management Plan (NSMP). The "coastal area" as defined by Minnesota's Lake Superior Coastal Program boundary follows the nearest legal coastal township along the shore, or approximately six miles inland. In the metropolitan area around Duluth, it includes all of the cities of Duluth, Hermantown, Proctor, Carlton, Wrenshall and Cloquet and all or parts of the adjacent townships. While the provisions of the Shoreland Management Act apply to inland lakes and rivers located outside of the NSMP boundary in general, those of the North Shore Management Plan more specifically apply to land located along the North Shore of Lake Superior within the NSMP boundary.

The NSMP area boundary is defined along the 40-acre subdivision lines of the rectangular coordinate system established in the U.S. Public Land Survey, nearest to the landward side of a line 1,000 feet from the shoreline of Lake Superior or 300 feet landward from the center line of U.S Highway 61, whichever is greater. These local ordinances regulate development activities within shoreland areas in order to preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of water and related land resources of the state.

Placement and height of structures: Structures must meet minimum setbacks from public waters that range from 40 feet to 200 feet. Within the NSMP boundary, the maximum building height for all structures is 35 feet from top of building to average natural grade line, unless a local unit of government sets a lower height restriction. The top of the building is defined as the peak of the roof. Outside (landward) of the NSMP boundary, the height of structures is also limited to a 25-foot maximum within residential districts in municipalities in order to minimize the visibility of these structures from a waterbody. This height limit would generally keep structures below the height of the surrounding trees, thereby preserving the natural screening of the structures.

Another setback requirement that applies to structures statewide is the setback from a bluff. A "bluff" is land that slopes toward a waterbody and rises at least 25 feet above the waterbody at an average slope of 30 percent or greater. A minimum setback of 30 feet from the top of a bluff applies to all buildings. Only stairways, lifts, and landings are allowed to be constructed on a bluff.

State statutes recognize the Lake Superior North Shore Management Plan and require those counties and cities designated by the commissioner to adopt land use regulations that comply with the plan. The North Shore Management Plan (adopted 11/29/88) requires erosion hazard setbacks in areas with recession rates greater than 1 ft/yr (called erosion hazard areas). Setback requirements apply to structures and wastewater disposal systems.

Setback Required:	Yes
Setback Reference:	Top edge of eroding bluff
Planning Horizon:	50 years
Setback Amount:	• The annual erosion rate x 50 years, + 25 ft (to allow for structure relocation). If long-term erosion data is unavailable, the setback is 125 ft. • 40 feet horizontal distance from the permanent vegetation line of Lake Superior or 75 feet horizontal distance from the average water level, which is an elevation of 601.5 feet above sea level, whichever is greater.
Covenant Recorded:	At the time of permitting and/or sale of a property within an Erosion Hazard Area, a covenant is recorded against the property that states that it is in an Erosion Hazard Area and notes that there may be future restrictions subject to local ordinances.
Setback Established:	At time of permitting
Erosion Hazard Areas:	Areas with recession rates greater than 1 foot per year.

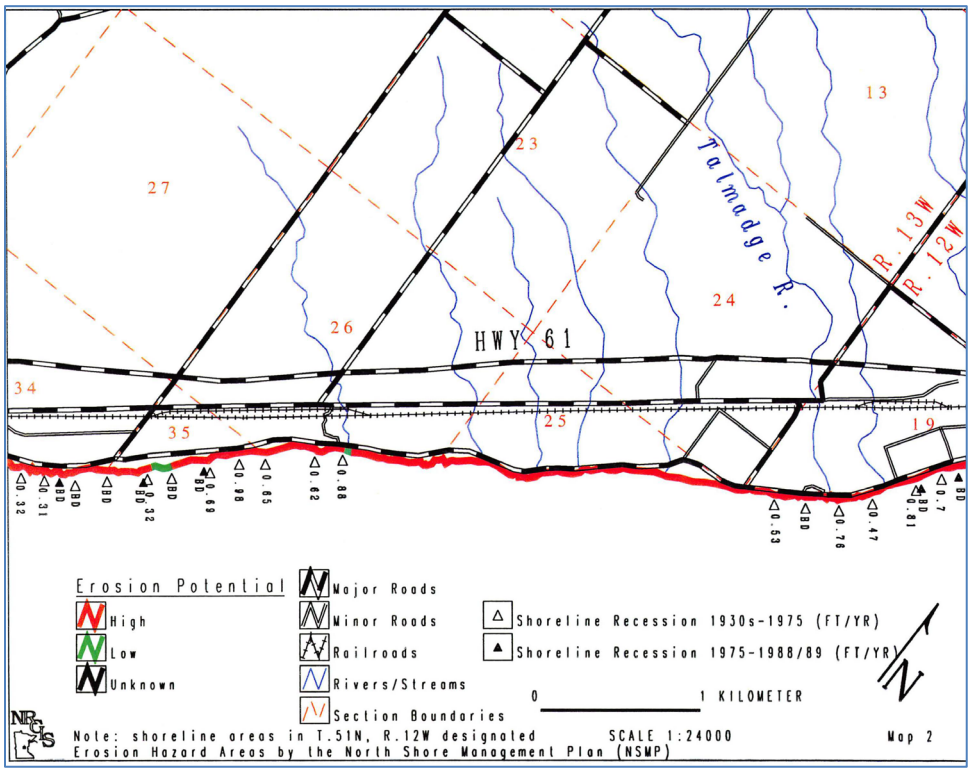

Figure 1. Example of 1988 map included in the North Shore Management Plan.

New York

Overview

Under Article 34 of the Environmental Conservation Law "Coastal Erosion Hazard Areas" (CEHA) and Title 6 of the New York Codes, Rules and Regulations Part 505 "Coastal Erosion Management" (6 NYCRR Part 505), the New York State Department of Environmental Conservation (DEC) maps and regulates coastal shorelines where Natural Protective Features are present, and areas with historically high erosion rates. Natural protective features are comprised of the beaches, dunes, and bluffs that protect coastal and inland communities from erosion and flooding, and the nearshore areas critical to maintaining sand transport along the shoreline. DEC maps and regulates these areas through their Coastal Erosion Hazard Area (CEHA) Permit Program.

Coastal Erosion Hazard Areas (CEHAs) are areas of shoreline that include a Natural Protective Feature Area or Structural Hazard Area. The CEHA Program allows communities to locally administer the Program provided it is approved by DEC. DEC maintains oversight of these locally administered programs and they must use the regulatory maps developed by DEC. There are currently 85 communities within New York State with regulated CEHAs. These communities are located along the shorelines of Lake Ontario, Lake Erie, Long Island Sound, and the Atlantic Ocean. Of these 85 communities, 50 are administered by DEC and the remaining 35 are locally administered. A Coastal Erosion Management Permit is required to undertake any regulated activity within a CEHA.

CEHAs are comprised of two different jurisdictions: Natural Protective Feature Areas and Structural Hazard Areas. Each jurisdiction has differing regulatory requirements and restrictions. In general, new construction within a Natural Protective Feature Area is limited to stairways, walkways, docks, and erosion protection. New construction is permitted within Structural Hazard Areas provided that the development is movable and meets setback requirements from the Natural Protective Feature Area. DEC or local community staff review permit applications for construction and other regulated activities within these areas.

Setback Required	Yes
Setback Reference	Top of bluff, landward toe of dune, change in vegetation on a beach
Planning Horizon	30 years
Setback Amount	25ft – 100+ ft depending on the jurisdiction and feature type
Setback Established	At the time of mapping and remains static
Covenant Recorded	None
Terminology	**Natural Protective Feature Area** – Primary CEHA jurisdiction comprised of beaches, dunes, bluffs, and nearshore areas, and the vegetation thereon, the alteration of which might reduce or destroy the protection afforded other lands against erosion or high water or lower the reserves of sand or other natural materials available to replenish storm losses through natural processes.

	Structural Hazard Area – Secondary CEHA jurisdiction located landward of natural protective features and having shorelines receding at a long-term average annual recession rate of one foot or more per year.

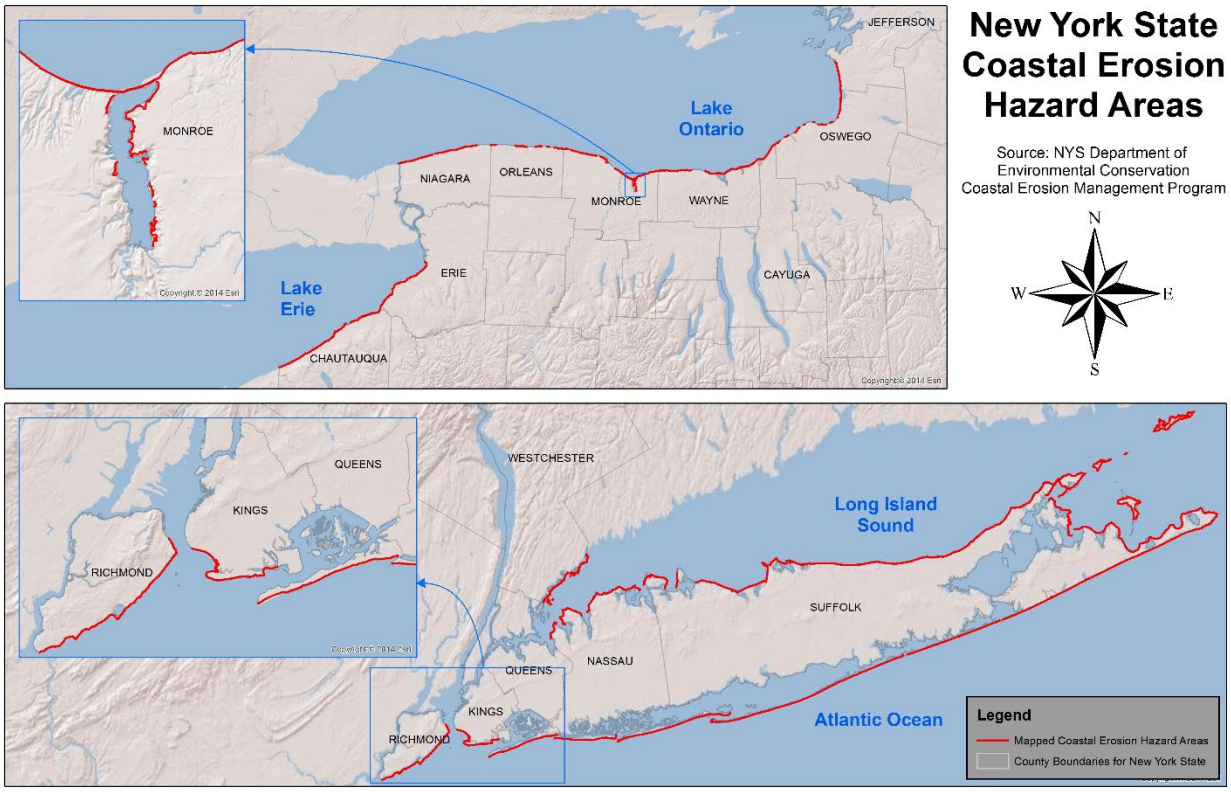

Figure 3. Overview map of Coastal Erosion Hazard Areas within New York State. The Regulatory Coastal Erosion Hazard Area Maps are available upon request from the DEC.

CEHA Mapping

Natural Protective Feature Areas (NPFA) are mapped by first identifying the most landward natural protective feature (beach, dune, or bluff) using aerial/satellite imagery, LiDAR, and/or field inspections. The following distances are then used to determine the landward limit of the NPFA:

- Dunes: 25 feet from the landward toe of the dune
- Bluffs: 25 feet from the peak of the bluff
- Beaches: 100 feet landward from the line of permanent vegetation

Structural Hazard Areas (SHA) are those areas located landward of the NPFA and having shorelines receding at a long-term average annual recession rate of one foot or more per year. The inland boundary of a SHA is calculated by starting at the landward limit of the NPFA and measuring along a line which is perpendicular to the shoreline horizontally landward. This distance is determined by multiplying the long-term average annual recession rate by 40.

After the maps are finalized, both jurisdictions become static until the next round of mapping. Property owners can appeal the location of the CEHA jurisdiction on their property if they believe the jurisdiction was incorrectly established on their property at the time of mapping.

Permitting of shore protection structures

DEC regulates all erosion protection structures within identified CEHAs. The CEHA Program recognizes that the construction of erosion protection structures is expensive, often only partially effective over time, and may even be harmful to adjacent or nearby properties. Non-structural and Natural and Nature-Based options are preferred and encouraged by DEC over shoreline hardening when applicable. DEC recently developed a guide for shoreline property owners on erosion protection, which can be found here. DEC has also developed guidance on Natural and Nature-Based features, which can be found here.

The state has developed a Joint Application Permit Form to address the permit requirements in the State of New York, including in coastal areas. There is also the Great Lakes General Permit Application that may be used to make the permitting process quicker and simpler for common repair and stabilization activities. Depending on the shoreline location and activity type, permits may also be required from the Army Corps of Engineers, New York State Department of State, and the New York State Office of General Services.

The construction of erosion protection structures is regulated in coastal areas subject to serious erosion to assure that, when the construction of erosion protection structures is justified, their construction and operation will minimize or prevent damage or destruction to manmade property, private and public property, natural protective features, and other natural resources.

Ohio

Setbacks

Ohio does not require setbacks. Under Title XV Chapter 1506 in the Ohio Revised Code, the Coastal Management Program is authorized. The Ohio Department of Natural Resources (ODNR) is responsible for managing coastal areas by analyzing recession of the Lake Erie shore and forecasting erosion rates every ten years. Areas with significant predicted recessions rates are designated as Coastal Erosion Areas. In a Coastal Erosion Area, new development on land parcels or additions to existing development greater than 500 square feet require a state permit.

Jurisdiction	Coastal Erosion Area – an area predicted to erode 9 feet or more in 30 years (will vary based on calculated accuracy limit) – calculated using erosion rates associated with shore normal digital transects on maps developed by Ohio DNR.
Reference Feature	Top of bluff, bank, or beach ridge.
Planning Horizon	30 years
Covenant Recorded	No. However, a seller must disclose that all or part of the property is within a designated Coastal Erosion Area on the Seller Disclosure Form, which is required with all residential real property transactions in Ohio.
Setback Amount	No setback required.
Permit Required	A Coastal Erosion Area Permit is granted by ODNR provided the site will incorporate an erosion control measure that will effectively protect the building or septic system.
Terminology	Coastal Erosion Area – land projected to be lost if mitigating actions are not taken. Areas delineated on maps and in tables published by and available from ODNR.
Source	Ohio Coastal Management Program (OCMP) Coastal Guidance Document https://ohiodnr.gov/static/documents/coastal/permits-leases/packet-CoastalGuidance.pdf

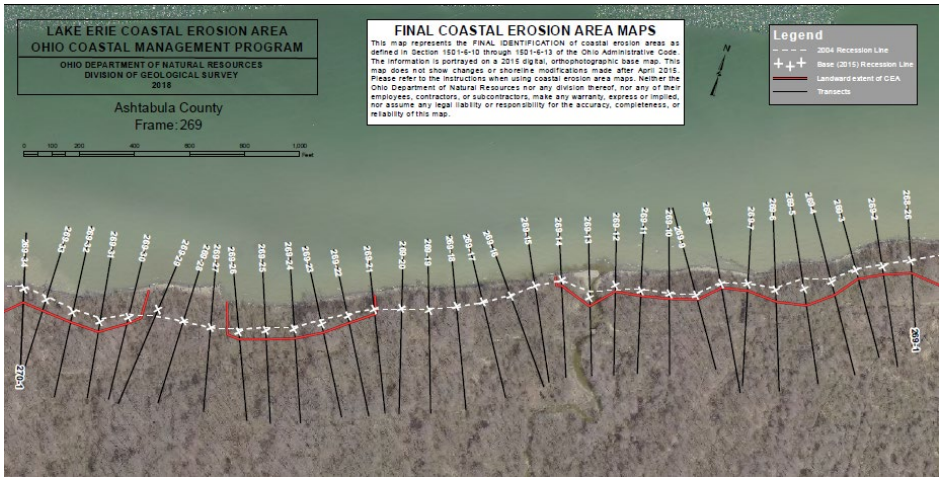

Figure 2. A 2018 Ohio Coastal Erosion Hazard Area map for Ashtabula County

Permitting of Shore Protection Structures, Solid Piers, and Dredging Activities

In 1955, the State of Ohio began requiring permits for the construction of shore erosion, wave, and flood control structures as an early effort to protect and manage Ohio's Lake Erie shore. Permits were initially issued by the Ohio Department of Natural Resources (ODNR) through its Division of Shore Erosion, then after 1961 through its Chief Engineer, and then through the Division of Water. Since July 1, 2007, Shore Structure Permits have been issued by the ODNR Director after review by the Office of Coastal Management.

- A **Shore Structure Permit** (Ohio Revised Code §1506.40) is required to construct a beach, groin, revetment, seawall, pier, breakwater, jetty, or other structure to arrest or control erosion, wave action, or inundation along or near Ohio's Lake Erie shoreline (including the islands, bays, and inlets). For more information or an application, contact the Office of Coastal Management or go to: coastal.ohiodnr.gov/permits#SHO.
- A **Submerged Lands Lease** (ORC §1506.10 and §1506.11) must be entered into with the State of Ohio to place improvements on Lake Erie submerged lands. A Submerged Lands Lease is required for an improvement, or portion thereof, that occupies land lakeward of the water's edge prior to placement of any fill including structures. To enter into a Submerged Lands Lease, the local authority (i.e., port authority, city, or township) must first pass a resolution declaring that the submerged lands specified in the application are not needed for any public improvements and that their use complies with local waterfront plans. For more information or an application, contact the Office of Coastal Management or go to: coastal.ohiodnr.gov/permits#SUB.
- A **Coastal Erosion Area (CEA) Permit** (ORC §1506.07) is required to erect, construct or redevelop a permanent structure if the structure, or portion thereof, is located within Ohio's Lake Erie Coastal Erosion Area. A permanent structure is defined as a residential, commercial, industrial, institutional, or agricultural building, or a septic system, or an addition 500 square-feet or greater at ground level to an existing permanent structure. For more information or an application, contact the Office of Coastal Management or go to: coastal.ohiodnr.gov/permits#CEA.
- A **Water Quality Certification** may be required from the Ohio Environmental Protection Agency (OEPA), under Section 401 of the federal Clean Water Act (33 U.S.C. Section 1341). A Water Quality Certification is required for any placement of dredged or fill material (including armor stone) into waters of the United States.

Pennsylvania

Setbacks

The Pennsylvania Bluff Recession and Setback Act (BRSA) was passed in 1980 to prevent damage associated with coastal recession hazards. The act requires new residential, commercial, and industrial structures to be outside of Bluff Recession Hazard Areas (BRHA)—areas designated as hazardous due to active bluff recession. The act requires a minimum setback distance, determined by estimating the economic life of a structure and multiplying the result by the local bluff recession rate per year (in feet).

Setback Required	Yes
Setback Reference	Top edge of eroding bluff
Planning Horizon	50 years – residential 75 years – commercial 100 years – industrial
Setback Amount	The annual erosion rate x planning horizon.
Setback Established	At time of permitting

Analysis: The bluffs on Pennsylvania's Lake Erie shoreline are made up of glacial sediments that in some cases rise 180 feet above the lake. These unconsolidated (loose) glacial sediments include sand, gravel, and clay, all of which are very susceptible to erosion. Waves undercut the bluffs and cause slumping, which can be accelerated by groundwater seepage and surface water runoff. Pennsylvania's bluffs are receding at a rate of approximately one foot per year.

The Bluff Recession and Setback Act (BRSA), passed in 1980, regulates the siting of new buildings and improvement to existing buildings located in Bluff Recession Hazard Areas. The BRSA seeks to protect property owners and their investment decisions, prevent damage to utility lines, and eliminate hazards created by the collapse of structures into Lake Erie. There are nine shoreline municipalities with designated active bluff recession areas. These municipalities have enacted local zoning ordinances that place restrictions on development in these areas. The State of Pennsylvania developed a model ordinance for municipalities to follow and provides financial and technical assistance for local administration and enforcement of the BRSA.

The Pennsylvania Coastal Resource Management (CRM) Program uses a system of control point monuments, global positioning system (GPS) technology, regular physical inspection, low-level flyovers, aerial photography, and laser mapping to monitor bluff recession rates. A geographic information system (GIS) is used to store and manage all related bluff information.

The CZM Program offers technical advice to bluff property owners at no cost in an effort to fully inform residents of the dynamic processes of bluff recession and shoreline erosion. Structural shoreline stabilization, biotechnical slope restoration, vegetation management, and site-specific best management practices are all activities property owners may undertake to slow the rate of bluff recession. Beyond local building permits, other construction activities in bluff areas that have impacts on wetlands and watercourses may require additional permits from the Pennsylvania Department of Environmental Protection Waterways and Wetlands Program or the Erie County Conservation District, as a delegated permitting authority. Encroachments in the area between the regulated Ordinary High Water Mark (572.8 ft.) and regulated Ordinary Low

Water Mark (568.2 ft.) require a state permit and may require a joint state and federal permit. Construction below the Ordinary Low Water Mark requires a submerged lands license and fee from the Commonwealth and also requires a federal permit, per the [Pennsylvania Coastal Resources Management Program.]

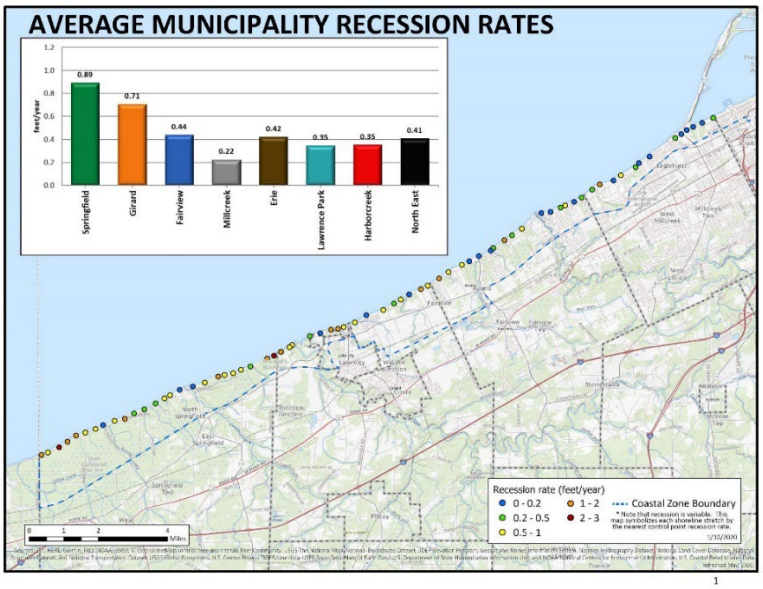

Figure 5. 2018 Map Depicting Average Bluff Recession Rates on Lake Erie; Average Municipality Recession Rates in Pennsylvania, 2018/2019

Permitting of Shore Protection Structures, Solid Piers, and Dredging Activities

In Pennsylvania, permitted structures in Lake Erie (any body of water) in the Commonwealth are regulated under [Title 25: Environmental Protection], [Chapter 105: Dam Safety and Waterway Management]. Chapter 105 referenced the 1955 IGLD to establish the jurisdictional OHWM and OLWM boundaries. Chapter 105 defined the Ordinary High Water Mark (OHWM) and Ordinary Low Water Mark (OLWM) within the regulations for Lake Erie using the 1955 International Great Lakes Datum (IGLD). Since they are defined so specifically, that is what the Department must use for permitting purposes. Emergency permits are also issued under Chapter 105.

For a description of regulated activities and boundaries, see Chapter 105, General: §105.3. Scope:

> (b) For the purposes of this chapter, the Department's jurisdiction in and along Lake Erie will be defined by the high water elevation of 572.8 feet International Great Lakes Datum (IGLD) and low water elevation of 568.6 IGLD. Dams, water obstructions and encroachments constructed between elevation 572.8 IGLD and elevation 568.6 IGLD require a permit under section 6 of the act (32 P.S. § 693.6). Dams, water obstructions and encroachments constructed lakeward of elevation 568.6 IGLD require both a permit under section 6 of the act and a Submerged Lands License Agreement under section 15 of the act (32 P.S. § 693.15).

Permits are issued under Chapter 105 because in Pennsylvania, anything protruding into the water body is considered an obstruction. To summarize:

- Above the Ordinary High Water Mark, the PA Department of Environmental Protection does not have jurisdiction, and their permitting process does not apply--most often anything above the OHWM will be walls, but there is at least one project that is a revetment.
- Between OHWM and OLWM, both DEP permitting requirements will apply and Corps permits may apply --most typically, this covers groins.
- Beyond the OLWM, both DEP and Corps permitting are required. Structures require a Commonwealth submerged lands license and fee.

This is a bit different than the Bluff Recession Setback Act (Chapter 85), which uses the 1986 IGLD. The Bluff Recession Setback Act only covers municipal setback activities.

If there is an older structure in the lake—a groin that is in need of repair, for example—the Department will generally issue a repair permit as a General Permit. Often, these structures were built but not permitted, so this enables DEP to get the structure permitted, while also accommodating the need for a repair. New structures will follow the guidelines above.

Otherwise, projects will require a joint permit, which is a lengthier process. The PA DEP is encouraging less hard armoring because the Corps has included living shorelines in their nationwide permits (NWPs). NWPs streamline the permitting process for qualifying projects and can significantly reduce the costs and time associated with obtaining project approval.

Emergency permits, issued for the dredging of a stream channel, for example, are also issued under Chapter 105. The PA DEP has issued emergency permits in the last six months for two Lake Erie tributaries. This was due to major flooding issues caused by high lake levels, lack of protective ice dunes, and high water levels in the tributaries. The graphic below provides information on the regulatory boundaries in Pennsylvania's Lake Erie Coastal Zone.

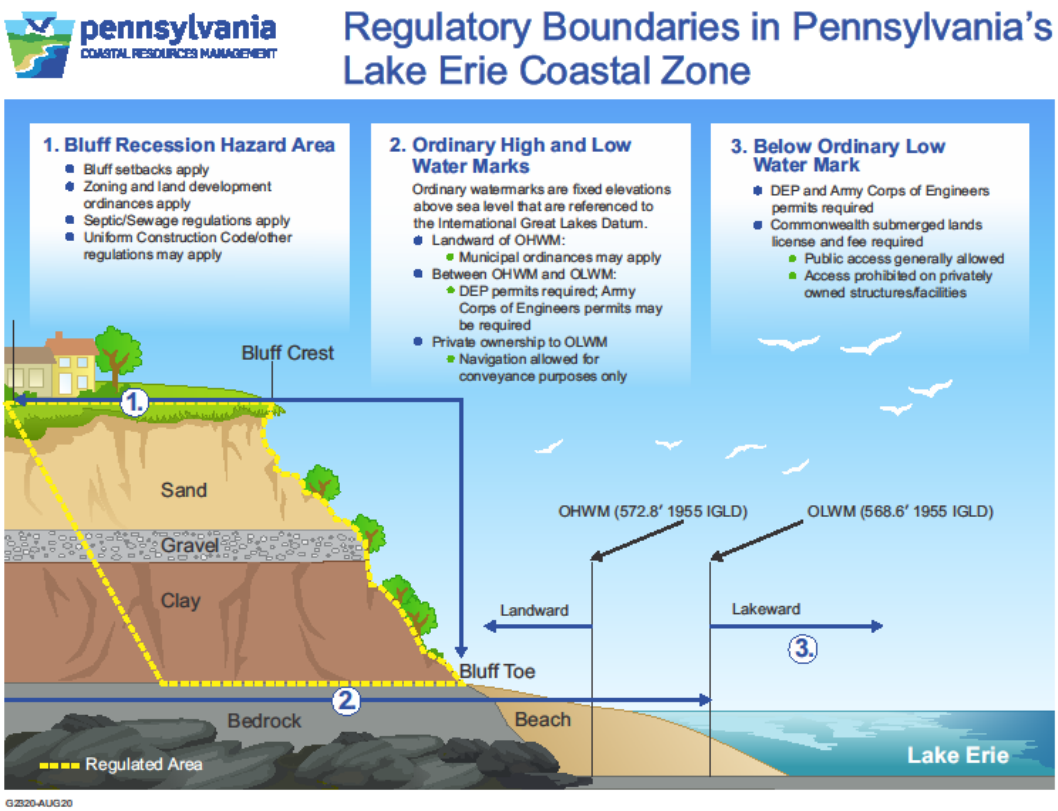

Figure 6. Graphic depicting regulatory boundaries in the Lake Erie Coastal Zone

Wisconsin

Setbacks

Wisconsin unincorporated local governments were given the responsibility to adopt, administer, and enforce minimum shoreland management regulations beginning in 1968. By 1971, all counties in Wisconsin with unincorporated townships had adopted and were administering shoreland setback ordinances. The setback regulations associated with lands adjacent to navigable lakes and rivers are primarily accomplished through the Shoreland Management Act. This act establishes a shoreland zone which is within one thousand (1,000) feet from the Ordinary High Water Mark of navigable lakes, ponds, or flowages and three hundred (300) feet of the Ordinary High Water Mark of navigable rivers or streams, or to the landward side of the floodplain, whichever distance is greater.

Within this zone, the program guides activities on shorelands for the primary purpose of minimizing the potential impacts of land development on the area's surface water and groundwater features. Building and structure setbacks are established to conform to health, safety, and welfare requirements; preserve natural beauty; reduce flood hazards; and avoid water pollution. All buildings and structures in Wisconsin unincorporated areas except piers, boat hoists, and boathouses must be set back 75 feet from the OHWM on navigable waters. The setback can be reduced by averaging to a minimum of 35 feet if there is an existing development setback at less than 75 feet.

Sec. 9-1-70 Shoreland Regulations. (a) Setback. For lots that abut on navigable waters, the following setback regulations shall apply:

(1) All permanent structures, except piers, boat hoists and boathouses shall be set back seventy five feet from the ordinary high water mark of navigable waters.
(2) A setback equal to the average setback of existing principal buildings within two hundred and fifty feet of a proposed building site on adjacent lots, shall be permitted where such existing buildings do not conform with the appropriate setback line. A minimum setback of thirty-five feet shall be required in all such areas.

Wisconsin's standard 75-foot state shoreland setback requirement applies to unincorporated areas that have been adopted by all counties in Wisconsin. However, this setback is generally inadequate to address coastal erosion hazards due to the height of the bluffs along much of the Wisconsin Great Lakes shoreline.

High Great Lakes water levels in the mid-1970s caused widespread bluff recession, damaging millions of dollars' worth of coastal development. In 1978, for example, flood damage in Wisconsin was $140 million. The Wisconsin Coastal Management Program (WCMP) funded several studies following this damaging high lake level period that included the development of a model coastal recession setback ordinance. While the Wisconsin legislature has not to-date enacted legislation making coastal setbacks mandatory statewide, communities have been

encouraged to adopt them to protect critical facilities, infrastructure, and new development from coastal hazards.

The Wisconsin model coastal setback ordinance includes a stable slope setback in addition to a recession setback.

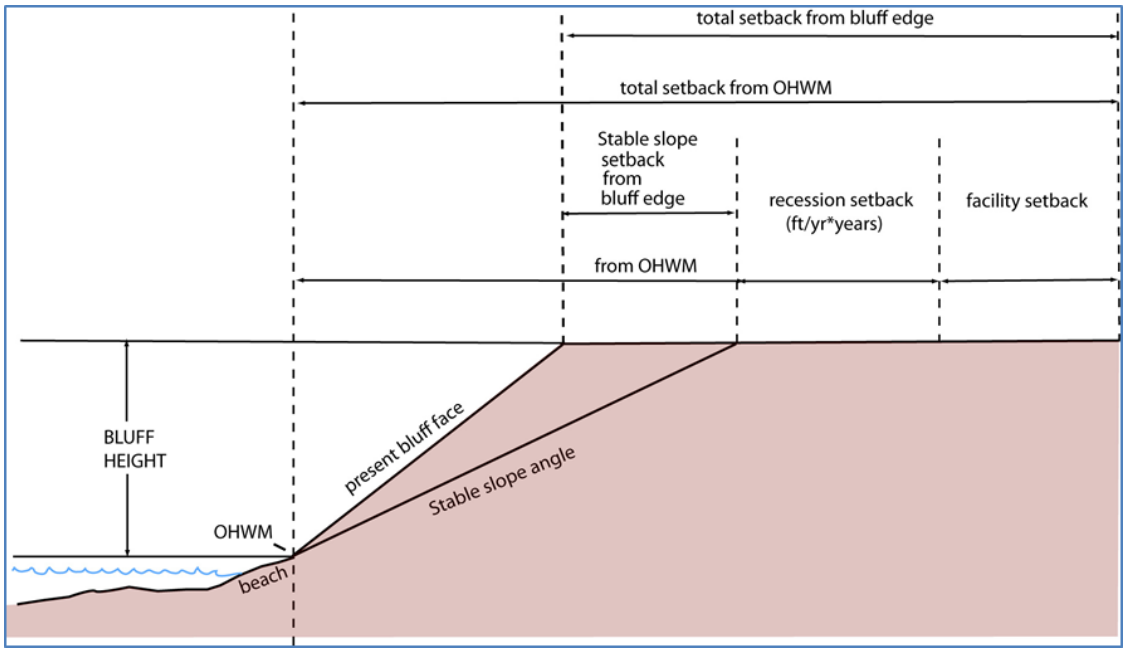

Figure 7. WI Model Ordinance Coastal Setback

When high water levels on the Great Lakes returned in 1985, a number of counties amended their ordinances to include provisions for increased setbacks in areas with unstable bluffs. Most of the more heavily populated Lake Michigan communities with unstable eroding bluffs have adopted this approach. This includes Racine, Ozaukee, Sheboygan, Manitowoc and Kewaunee Counties. Sheboygan and Manitowoc Counties have adopted the model ordinance with both stable slope and recession setback requirements for the bluff portions of their coastlines. The recession rate in both counties is assumed to be two feet per year. Ozaukee County has adopted the model ordinance with the stable slope setback for the bluff portions of their coastline with a minimum of 75 feet from the bluff top. In addition, they require a 75-foot setback from the bluff top in ravines. Racine County has adopted the stable slope setback and requires shore protection to be constructed. Kewaunee County requires a 125-foot setback from the toe of the bluff where the coastal bluff is greater than 10 feet high.

Figure 8. WI counties with coastal setback regulations

The adoption of increased setbacks along the Great Lakes coastline reduces the risk to new development in the unincorporated areas of these counties.

Permitting of Shore Protection Structures, Solid Piers, and Dredging Activities

State law requires any material or structure that is placed below the Ordinary High Water Mark in the Great Lakes be authorized by the Department of Natural Resources. " Ordinary High Water Mark" or "OHWM" means the point on the bank or shore up to which the presence and action of water is so continuous as to leave a distinct mark either by erosion, destruction of terrestrial vegetation or other easily recognized characteristic. Furthermore, additional state permits may also be needed to:

- Authorize earth-moving (grading) activities on the shoreline needed to stabilize the slope of a bank.
- Authorize removal of material below the Ordinary High Water Mark (dredging), in order to properly install material to stabilize the base of the slope.

Dredge and fill activities also require a federal § 404 CWA permit. The U.S. Army Corps of Engineers and the Wisconsin Department of Natural Resources (WDNR) have a joint permit application process.

Shore erosion structures are regulated by the state under Wis. Stat. Ann. § 30.12. A permit is required for erosion control structures, with some eligible exceptions. Riparian owners are exempt if the structure or material is located in an area other than an area of special natural resource interest (ASNRI), does not interfere with the riparian rights of other riparian owners, and the project meets length and material requirement as specified in the statute and administrative code. The department may require a permit if necessary to avoid: significant adverse impacts to the public rights and interests; environmental pollution, as defined in s. 299.01(4); or material injury to the riparian rights of any riparian owner.

The department has developed General Permits (GP) for a variety of activities including seawall replacement, riprap replacement/repair, and placement of riprap on the bed or bank of a navigable water adjacent to an owner’s property. The department has also developed a statewide riprap exemption option for the opportunity to place riprap shore protection in an amount up to and including 300 continuous feet specifically on a Great Lakes shoreline without needing a permit if the project is designed and constructed to meet a specific list of design requirements. For projects not meeting exemption or GP requirements, the state has an Individual Permit (IP) process for reviewing and authorizing proposed material and structures below the OHWM. In issuing an IP, the department may include site- and project-specific conditions. State exemptions and GPs include pre-determined criteria that must be followed to be eligible for the exemption or GP, and additional conditions cannot be imposed by the state.

Mapping Coastal Shoreline Bluff Stability Conditions

The Wisconsin Coastal Management Program has funded the development of the **Wisconsin Shoreline Inventory and Oblique Photo Viewer**. This viewer displays information and data associated with several oblique photograph data collections and bluff stability analyses conducted in the 1970s and again in the 2007-2022 timeframe.

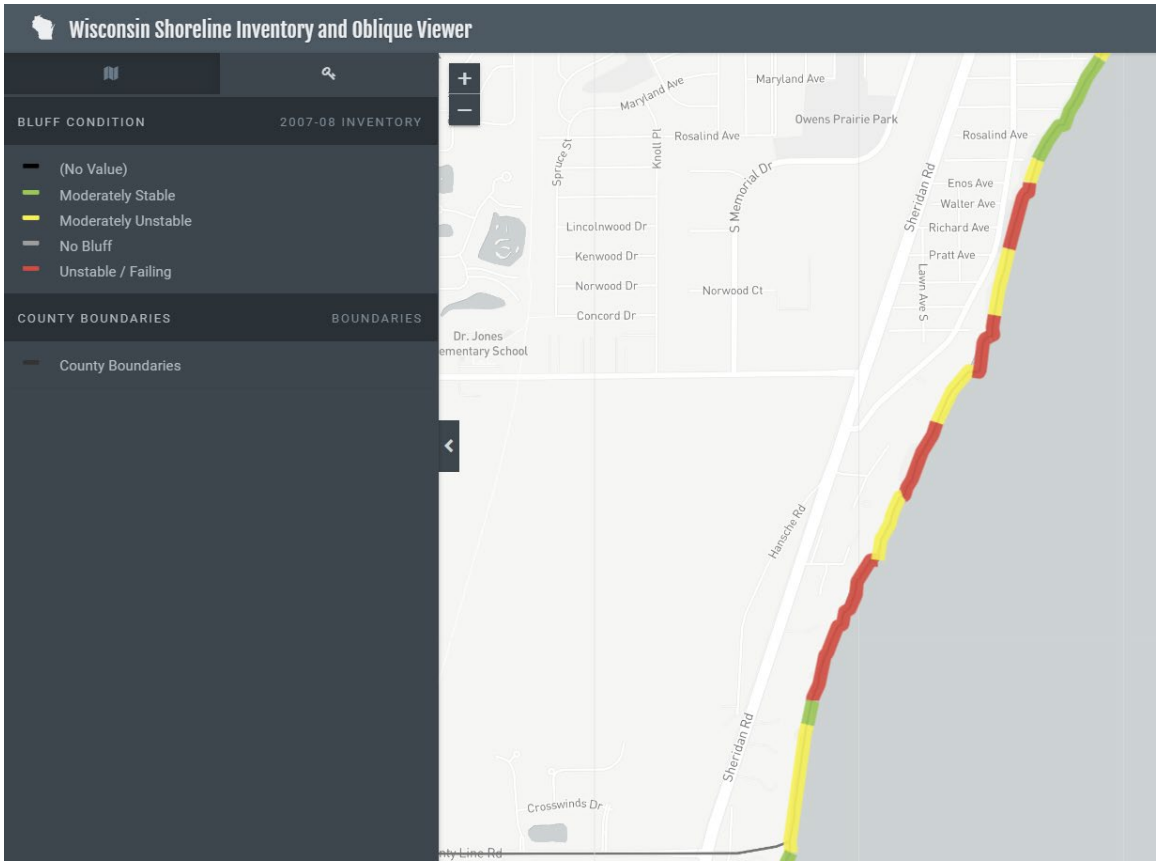

Figure 9. Snapshot showing bluff stability conditions in Racine County, WI.