



Schoolcraft County Recession Rate Study 2018

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The shoreline of Schoolcraft County was studied to update the recession rates previously determined in 1984. The State of Michigan is required to identify changes in the long-term rate of erosion occurring along the shoreline pursuant to R 281.22(22) of the Great Lakes Shorelands Administrative Rules, promulgated pursuant to Part 323, Shorelands Protection and Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). This study identifies shorelines where recession is occurring at an average annual rate of 1 foot or more per year based on a minimum period of 15 years, R 281.22(2).

Site Description

Schoolcraft County is in the central Upper Peninsula on Lake Michigan. The county has approximately 46 miles of Lake Michigan shoreline amongst four townships: Mueller, Doyle, Manistique, and Thompson; and the city of Manistique. The county is sparsely populated, with 8,485 people (2010 census). The shoreline structure varies and includes wooded dune and swale complexes and limestone pavement lakeshore (Higman et al., 2001). Wooded dune and swale complexes are typified by low sandy ridges interspersed with wetland swales and are noted near the Thompson Creek Michigan Department of Natural Resources (MDNR) Access. Shoreline with the characteristics of limestone pavement is apparent at Stony Point.

Methods

The study area was identified for Schoolcraft County. Included were all shorelines designated in 1985, areas identified as highly erodible by the United States Army Corps of Engineers (USACE) in 1971, areas identified when viewing the 2012 USACE Oblique imagery, and those areas identified by the local sanitarian as currently being developed (*personal communication*, Jennifer Hubble, Sanitarian, Schoolcraft County).

Imagery

The historic imagery used in the study was taken from the Michigan Department of Environmental Quality (MDEQ), Water Resources Division (WRD), Aerial Imagery Archives. The available leaf-off imagery was reviewed and selected to represent the historic endpoint for the study. Efforts were made to ensure the study period was as long as possible to reflect water level fluctuations and storm events. The historic aerial imagery used for the study was from November 1983 with a scale of 1:6000. The water level was 579.95 feet International Great Lakes Datum (IGLD) 1985. Imagery was orthorectified to modern imagery collected in May 2017 with a 1-foot resolution and available through the Michigan Department of Technology,

Management and Budget's Center for Shared Solutions, and a United States Geological Survey National Elevation Dataset image with a 10-meter resolution was used to provide elevation information. The water level was 580.05 feet (IGLD 1985). The error due to orthorectification was approximately 0.2 feet (3 inches) plus or minus 0.1 feet (1 inch).

Historic water levels were obtained from the USACE in 2018. The mean long-term water level for Lake Michigan from 1918 to 2017 was 579.95 feet (IGLD 1985.) This water level is similar to the water levels when the 1985 and 2017 imagery was recorded.

Erosion Hazard Line

The erosion hazard line (EHL) as defined in R 281.21(1)(c) means the line along the shoreland that is the landward edge of the zone of active erosion or the line where the 583.7 feet (IGLD 1985) contour on Lake Michigan meets the shoreland, whichever is furthest landward. The zone of active erosion means the area of the shoreland where the disturbance or loss of soil and substrate has occurred with enough frequency to cause unstable slopes or prevent vegetation of the area [R 281.21(1)(r)]. The recession rate study compared the EHL on historic aerial photographs to the EHL on modern aerial photographs.

The historic EHL was determined by viewing the vegetation lines along the shoreline on the aerial photograph. The modern EHL was determined using the same method with the added information provided by low-level oblique aerial photographs, [2012 USACE Great Lakes Oblique Imagery](#), which shows detailed views of the shoreline from an offshore vantage point. An additional resource was the [Great Lakes Shoreline Geodatabase](#), which gives the approximate location of areas of various bluff heights, among other attributes. Cross-referencing these resources with the modern imagery was helpful in determining the modern EHL. The shoreline was reviewed and the EHL was determined for the one previously designated HREA near the Thompson Creek MDNR Access and other areas of interest. The EHLs were hand-digitized.

Fieldwork

The location of the modern EHL was verified by gathering on-the-ground data using a submeter Global Positioning System (GPS) unit, Trimble Geo7x. All location data were differentially corrected. Observational and GPS data were gathered where there was public access such as at the end of Lake Michigan Road, Manistique Township Park, Stony Point Drive, US Highway 2 at Mile Marker 230, and the Thompson Creek MDNR Access.

All data were projected to Michigan Georef Meters North American Datum 83.

Hazard Area Identification

Transects were drawn perpendicular to the shoreline at 150-foot intervals and recession rates calculated along the transect lines. Digital Shoreline Analysis Software was used to determine recession rates. Average recession rates were calculated within each area (Procedure WRD-SWAS-028). Parcel boundaries and owner data were received from the Schoolcraft County Equalization Department. The current area and parcel data were compared to the 1985 data to determine designation changes.

Within these hazard areas, placement of new construction requires a permit and must meet setback distances based on projected recession distances when combined with the type of construction and other site-specific conditions. The projected recession distance is the calculated rate of recession for the area over a 30-year [for readily moveable structures, as defined in R 281.21(1)(k)] or 60-year [for permanent structures, as defined in R 281.21(1)(i)] period as determined by R 281.22(2). The required setback distance is based on this rate but may be greater in areas of bluffs over 25 feet in height.

Results

There are approximately 46 miles of Lake Michigan shoreline in Schoolcraft County. During the current study, 24 percent (11 miles) of the shoreline was identified as needing study because it was either previously designated or was currently under development. Fieldwork indicated approximately three miles of shoreline warranted a digital comparison of EHLs. None of the shoreline studied was determined to be in an area of high risk for erosion. The study period spanned 34 years. In 1985 approximately 0.6 miles of Schoolcraft County shoreline was designated as being at high risk for erosion. None of the originally designated shoreline will remain designated. Descriptive statistics for the county and Thompson Township are provided in Appendix 1.

All imagery and data are in Lansing, Michigan, with the MDEQ, WRD, Surface Water Assessment Section's Great Lakes Shorelands Unit and Wetlands, Lakes, and Streams Unit, Sand Dunes Protection and Management.

Doyle Township

This shoreline was accessed at the end of Lake Michigan Road. This area is also in a Critical Dune Area regulated by Part 353 of the NREPA. The shoreline is flat and wide. There was no evidence of shoreline erosion typical of a high risk erosion area. This location was not included in the analysis of historic and modern EHLs.

Manistique Township

The shoreline was accessed at the Manistique Township Park. Visual observations noted the area is a coastal wetland with adjacent upland supporting jack pine. The shoreline is flat and wide without erosion typical of a high risk erosion area. Dwarf lake iris, *Iris lacustris*, and gaywings, *Polygala pauciflora*, were in bloom on the back dune. Dwarf lake iris is federally and state listed as a threatened species. This location was not included in the analysis of historic and modern EHLs.

Thompson Township

The shoreline was visited at Stony Point, US Highway 2 at Mile Marker 230, and the Thompson Creek MDNR Access. Stony Point was typical of the limestone pavement community type found in 14 locations of the state. The slopes are nearly flat, and the characteristic ridge of low cobbles was observed. The shoreline was found to be accreting at approximately 0.2 foot per year.

The EHL was recorded spatially beginning at Mile Marker 230 on US Highway 2 and working south. There was a well-defined EHL between the lakeward edge of the beach grass and the impacts of wave action. The spatial data collected on-site in 2018 was used to identify the modern EHL in the study. The study period was 35 years. The shoreline was determined to be accreting at approximately 0.7 foot per year.

The existing area at the Thompson Creek MDNR Access was receding at a rate of 1.9 feet per year in 1985. The current study determined the area is no longer eroding at this rate but is accreting at approximately 0.5 foot per year. The shoreline is a coastal wetland with the invasive plant species, *Phragmites australis*, present.

The study will affect a total of two parcels in the township. The previously designated parcels, 70-008-082-002-00 and 70-008-950-008-00, were found to not be eroding at an average annual rate of one foot or greater. The high risk erosion area designation will be removed from the parcels. The parcel owners will no longer be required to obtain a permit for new structures, or additions, to be set back a specific distance from the erosion hazard line per Part 323.

Public Notification

Public notification is not required when a designation is proposed to be removed from a property, R 281.22(1). A letter removing the high risk erosion area designation will be sent by certified mail to the property owners and local officials.

Summary

The recession rate study meets the technical requirements of Subrule 2(2). The study found no areas of high risk erosion on the Lake Michigan shoreline in Schoolcraft County. The study spanned a minimum of 34 years. The high risk erosion area designations have been removed from the two parcels designated in 1985. No parcels will be designated as being in a high risk erosion area in Schoolcraft County in 2018. Future studies may indicate erosion is occurring, which meets the statutory limits for identification as a high risk erosion area as described in Part 323 and the Great Lakes Administrative Rules.

References

- Higman, Phyllis J., YuMan Lee, Jennifer A. Olson, Stephanie M. Carman, Rueben R. Goforth. 2001. Biological Inventory and Local Planner Outreach for Conservation in the Northern Lake Michigan Coastal Zone, Schoolcraft County. Michigan Natural Features Inventory.
- United States Army Corps of Engineers. 2018. Coordinated Monthly Mean Lakewide Average Water Levels, 1918-2017. www.lre.usace.army.mil/Missions/Great-Lakes-Information/Great-Lakes-Water-Levels.
- United States Census Bureau. 2010. factfinder.census.gov.
- WRD-SWAS-028. 2016. Department of Environmental Quality, Water Resources Division, Surface Water Assessment Section Procedure, Part 323 – Determining Recession Rates of Great Lakes Shorelines.

Appendix 1. Schoolcraft County descriptive statistics (all mileage is approximate).

Table 1. Countywide.

Year of Designation	1985	2018
Miles of shoreline in county = 46		
Miles of shoreline studied	unknown	11
Miles of shoreline designated	0.6	0
Miles of shoreline newly designated	0.6	0
Miles of shoreline that will remain designated	NA	0
Miles of shoreline with designation removed	NA	0.6
# of HREAs*	1	0
# of parcels designated	2	0
# of parcels newly designated	2	0
# of parcels remain designated	NA	0
# of parcels with designation removed	NA	2
Highest rate of recession (ft/yr) and PRDs** (ft)	1.9; 70/130	NA
Lowest rate of recession (ft/yr) and PRDs (ft)	NA	NA

*HREA is High Risk Erosion Area per Part 323, Shorelands Protection and Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

**PRD is the Projected Recession Distance (feet) at 30 years and 60 years, respectively, as referred to in Rule 281.22 of the Great Lakes Shorelands Administrative Rules.

Table 2a. Thompson Township descriptive statistics (all mileage is approximate).

Year of Designation	1985	2018
Miles of shoreline in township = 20		
Miles of shoreline studied	unknown	3
Historic photo year	1954 and 1938	1983
Modern photo year	1980	2017
Number of years between historic and modern imagery	26 and 42	34
Miles of shoreline designated	0.6	0
Miles of shoreline newly designated	0.6	0
Miles of shoreline that will remain designated	NA	0
Miles of shoreline with designation removed	NA	0.6
# of HREAs*	1	0
# of parcels designated	2	0
# of parcels newly designated	2	0
# of parcels remain designated	NA	0
# of parcels with designation removed	NA	2
Highest rate of recession (ft/yr) and PRDs (ft)	1.9; 70/130	NA
Lowest rate of recession (ft/yr) and PRDs** (ft)	NA	NA

Table 2b. Thompson Township average annual recession rates and projected recession distances.

Study Site Name	1985 Rate (ft/yr)	1985 30yrPRD (ft)	1985 60yrPRD (ft)	2018 Rate (ft/yr)	2018 30yrPRD (ft)	2018 60yrPRD (ft)	2018 HREA	2018 Update Code
Stony Point	NA	NA	NA	<1	NA	NA	NA	NA
US Hwy 2 – Mile Marker 230	NA	NA	NA	<1	NA	NA	NA	NA
Thompson Creek MDNR Access	1.9	70	130	<1	NA	NA	NA	Dedesignated
South of Thompson Creek	NA	NA	NA	<1	NA	NA	NA	NA

*HREA is High Risk Erosion Area per Part 323, Shorelands Protection and Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

**PRD is the Projected Recession Distance (feet) at 30 years and 60 years, respectively, as referred to in Rule 281.22 of the Great Lakes Shorelands Administrative Rules.

Appendix 2. Study sites.

Index of study sites.

Study Site Name	Municipality	Township Range Section
Stony Point	Thompson Township	T41N R16W Section 22
US Hwy 2 – Mile Marker 230	Thompson Township	T41N R16W Sections 22, 27
Thompson Creek MDNR Access	Thompson Township	T41N R16W Sections 28, 32, 33
South of Thompson Creek	Thompson Township	T41N R16W Sections 32, 33



Thompson Creek MDNR Access

*HREA is High Risk Erosion Area per Part 323, Shorelands Protection and Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

**PRD is the Projected Recession Distance (feet) at 30 years and 60 years, respectively, as referred to in Rule 281.22 of the Great Lakes Shorelands Administrative Rules.