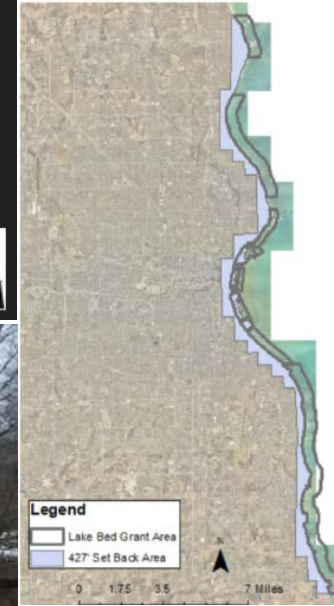


# Milwaukee County Parks

- Coastal Asset Inventory
- Coastline Management Guidelines

December 2020



*Bay View Park, 2020*



# Grant Funding - WI Coastal Management Program Grant

- File 19-342 authorized grant funding
  - Coastal Asset Inventory
  - Coastal Management Guidelines

- *Protect Milwaukee County's financial investment in County-owned assets within the Lake Michigan Coastline Management Zone.*
- *Protect the ecology, resources, and natural character of County-owned lands within the Lake Michigan Coastline Management Zone.*
- *Provide efficiency and consistency when reviewing proposals for a scope of work to be completed within the Lake Michigan Coastline Management Zone.*

# Asset Inventory

- 477 Assets inventoried.
  - 13% of assets identified were classified as being in poor condition.
  - 22% assets were deemed highly vulnerable.
  - The assets with the highest risk were the beaches, groins, and parking lots.
  - Different infiltration basins, revetments, and parking lots in the vicinity of McKinley Marina all appeared in the top 40 most at risk.
- The total Milwaukee County coastal asset valuation is estimated at \$2,927,425,276 with approximately 50% of the cost attributed to bluff stabilization needs.

FINAL

## Milwaukee County Coastal Resources Inventory



*Prepared by*

*Milwaukee County, Environmental Services Unit*

In Partnership with Wisconsin Coastal Management Program  
and  
GZA Environmental, Inc.

Milwaukee County Project 5741-19805

Coastal Resilience Grant No. 017.CR08



OCTOBER 7, 2020

# Asset Inventory Evaluations

Asset Type	Sub Asset Type	Number of Assets	Value Type	Value Cost	Value Source	Sub Asset Valuation Total
Athletic Courts	Stand-alone volleyball courts	1	Replacement	\$5,000/each	Capital Planning	\$5,000
	Tennis Courts	1	Replacement	\$115k/each		
	Track	1	Replacement	\$100k/each		
Athletic Fields	Soccer	4	Replacement	\$1,800/each		
	Multi-Use	2	Replacement	\$1,800/each		
	Archery	1	Replacement	\$1,800/each		

## Bluffs:

### Vulnerability Assessment:

Metric	High	Medium	Low	Weight
Distance from Shore	<100 ft	100-350 ft	>350 ft	25%
Shoreline Protection	Rated Poor or None	Rated Fair	Rated Good	25%
Recession Sum (5 years) <sup>4</sup>	> 1 ft	0.5-1 ft	< 0.5ft	30%
Change in Soil Volume	>7,500 ft <sup>3</sup>	0 – 7,500 ft <sup>3</sup>	<0 ft <sup>3</sup>	20%

Table 8. Vulnerability Metrics for Bluffs.

(A) Condition Value x (B) Vulnerability Value = Resiliency Rating

Where (A) and (B) are the weighting factors with high and poor scoring a 1, medium or fair scoring a 2, and low and good scoring a 3. NA conditions were considered a 3 for resiliency calculations.

Assets were grouped into three levels of priority, based on risk score:

- High Priority: Risk score below 4.5
- Medium Priority: Risk score between 4.5 and 6.74
- Lower Priority: Risk score 6.75 and above.

Shoreline Recession & Bluff Failure	High
Coastal Flooding	Moderate
Shore Protection Damage	Moderate
Beach Loss	Moderate
Beach Impairment	High
Port, Harbor, & Marina Damage	Moderate
Port, Harbor, & Marina Navigation Impairment	Moderate



# Asset Inventory Evaluation

Milwaukee County Coastal Resources Inventory - October 2020  
 APPENDIX IV – ASSET LIST BY RISK

	Type	Location	Condition	Condition	VulnerabilityScore	Vulnerability	Risk	Risk	2020Cost
1	Beach	Big Bay	1	Poor	1	High	1	High	\$ 1,121,285
2	Groin	Warnimont Park	1	Poor	1	High	1	High	\$ 454,883
3	Groin	Warnimont Park	1	Poor	1	High	1	High	\$ 343,651
4	Revetment	McKinley Marina	1	Poor	1	High	1	High	\$ 175,375
5	Parking Lot	Bradford Beach	1	Poor	1.25	High	1.25	High	\$ 6,185,435
6	Breakwater	South Shore Park	1	Poor	1.5	High	1.5	High	\$ 2,990,000
7	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
8	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
9	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
10	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
11	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
12	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
13	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
14	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
15	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
16	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
17	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
18	Groin	Sheridan Park	1	Poor	1.5	High	1.5	High	\$ 55,000
19	Revetment	War Memorial and Art Center	1	Poor	1.5	High	1.5	High	\$ 83,000

# GIS Web App Data Tool


Browser address bar: <https://mclio.maps.arcgis.com/apps/webappviewer/index.html?id=7a870052c72548a78485f9768f8ea8fd>

Browser tabs: Coastal County Data for Par...

Browser menu: File Edit View Favorites Tools Help

Browser address bar: Convert Select

Browser tabs: Form not found Hamilton COVID Data Das... Community Project Requests MCLIO Map SharePoint County of Milwaukee Home Projects Home - Dropbox Shared with me - OneDrive Home Print Safety Tools Help



Map labels: Lake Park, Bradford Beach, McKinley Park

Map controls: +, -, Home, Search, Info, Layers

Map footer: County of Milwaukee, Esri, HERE | Milwaukee County Land Information Office **esri** POWERED BY

Layers Panel (Ratings):

- Bluffs Total Risk Rating
- Bluff Condition Rating
- Bluff Vulnerability rating
- Bluffs - 2015
- Shoreline Protection Device
- Shoreline Protection Zones

Layers Panel (Reference Data):

- Photos
- Bluff Crest Line - SEWRPC Coastal Management Zone
- Bluff Toe Line - SEWRPC Coastal Management Zone
- Bluff Crest line
- Bluff Toe line
- Shoreline

# Coastline Management Guidelines Applicability

- Reference tool as the County considers conducting work or evaluates proposals for work that could impact bluff slope stability:
  - *Construction of infrastructure, occupiable buildings, and other facilities*
  - *Landscape management, such as landscape restoration, removal and/or pruning of vegetation, including invasive species*
  - *Maintenance of existing infrastructure*
  - *Shore protection modifications and structures*



# History of Coastline Damages

- Past declared storm disasters in 2008, 2010, and 2020.
- Continuous coastline impacts cause degradation to bluffs.







Warnimont Park, 2020



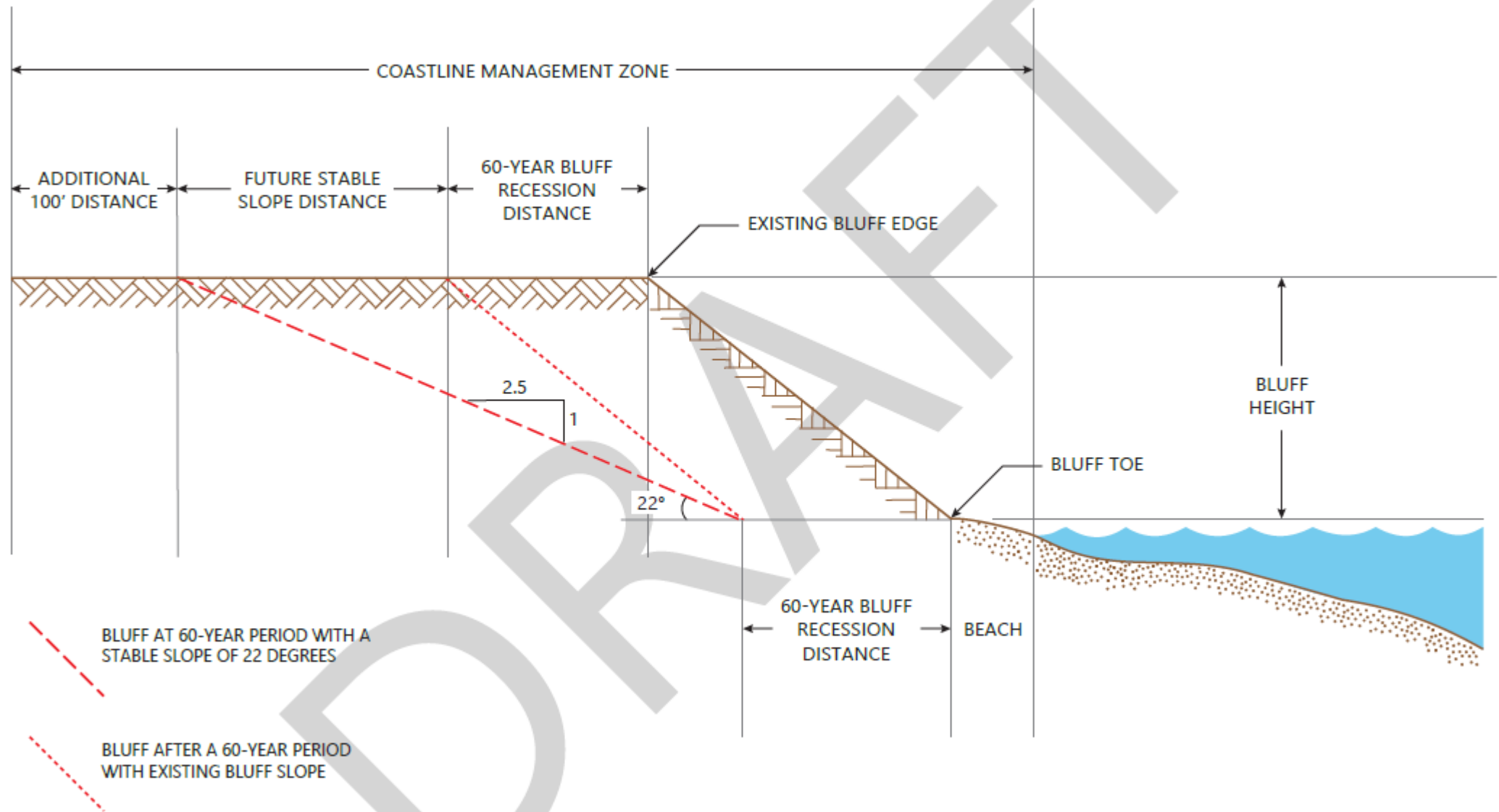
Warnimont Park, 2020



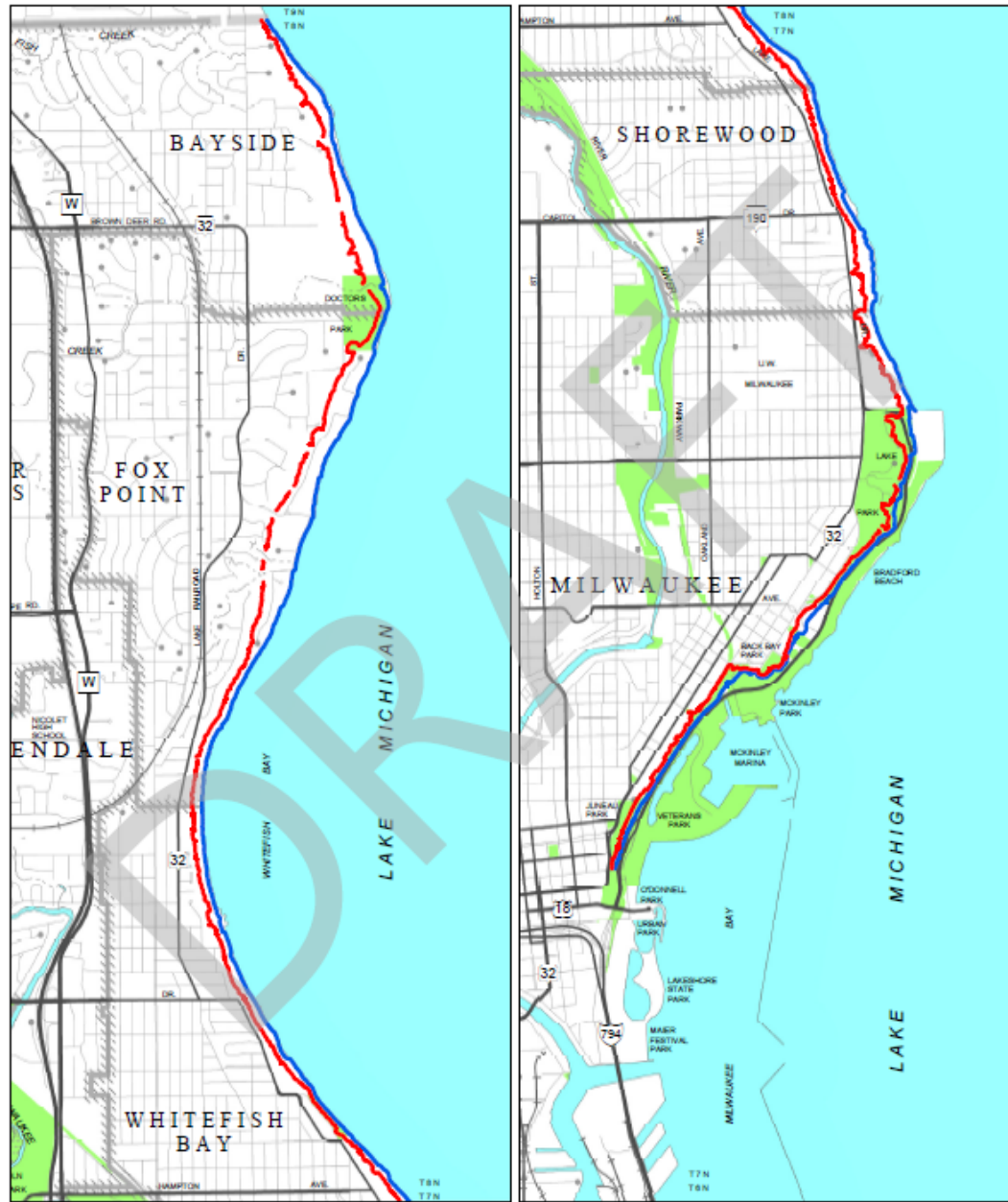
# Coastline Management Zone (CMZ)

- Based on recommendations for bluff setbacks published by the University of Wisconsin Sea Grant Institute in 2008.
- **Projected 60-year bluff recession distance from the current bluff toe** (*calculated using a minimum recession rate of one foot per year — unless information revealed during the site analysis necessitates using a greater recession rate per year*)
- **Future stable slope distance** (*calculated from the existing bluff toe to the future stable bluff crest using the ratio of a one-foot vertical rise to a 2.5-foot horizontal run*)
- **Setback distance of 100** (*provides for uncertainties related to future recession rates, stable slope angles, the effect of nearby shore protection structures, fluctuations in Lake Michigan water levels, and other factors*)

**Figure 3.1**  
**Coastline Management Zone: 2020**







— BLUFF CREST  
— BLUFF TOE  
■ MILWAUKEE COUNTY OWNED PROPERTY

Note: (Based on 2015 Lidar Topo but aligned in various locations to data provided to SEWRPC by Wisconsin Coastal Management Program)

Source: Wisconsin Coastal Management Program and SEWRPC



— BLUFF CREST  
— BLUFF TOE  
■ MILWAUKEE COUNTY OWNED PROPERTY

Note: (Based on 2015 Lidar Topo but aligned in various locations to data provided to SEWRPC by Wisconsin Coastal Management Program)

Source: Wisconsin Coastal Management Program and SEWRPC

# Review by Project Type

*Submittals to be prepared by third parties (and their consultants) for County staff review.*

## Infrastructure & Buildings

- A proposal prepared by a Professional Engineer (P.E.) or Registered Architect (R.A.)
- Stormwater management
  - Direct away from the bluff
  - Low-impact development (LID)
  - Maintain existing stormwater drainage patterns and protect tributary ravines.

## Landscape Management

- A proposal prepared by a Landscape Architect, and stability analysis performed by a Professional Engineer (P.E.)
  - Vegetation Inventory
  - Describe the vegetation to be removed and the means of removal
  - Identify replacement vegetation
  - Proposals related to viewshed management should account for the need to retain and maintain bluff vegetation in a variety of heights to promote bluff stability.

## Shore Protection & Structures

- A proposal prepared by a Professional Engineer (P.E.)
  - A site investigation of slope stability, lakeshore erosion, and near-shore bathymetry
  - A plan for ensuring adequate quality control of materials used in the designed structure; and
  - Adequate monitoring and maintenance plans, as determined by Milwaukee County.

## Bluff or Shoreline Modification

- A proposal prepared by a Professional Engineer (P.E.)
  - A slope stability analysis
  - A no adverse impacts (NAI) analysis stamped by a PE
  - A landscape management plan
  - Adequate monitoring and maintenance plans
  - A statement from the P.E. establishing that the proposed scope of work will not decrease the stability of the bluff area.

# Questions

*Final Guideline Documents Planned for January 2021*



Cupertino Pier – Image Captured May 2018, Source: MCLIO



South Shore Breakwater – Image Captured May 2018, Source: MCLIO



Cupertino Pier Debris – Image Captured January 2020, Source: MCOEM



South Shore Breakwater Damage – Image Captured January 2020, Source: MCOEM