Southeastern Wisconsin

Regional Planning Commission

Local Planning Team Meeting

Milwaukee County
Hazard Mitigation Plan Update

February 20, 2024

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Southeastern Wisconsin Regional Planning Commission
SEWRPC

WISCONSIN WEM EMERGENCY MANAGEMENT

LPT Meeting Overview

- Introduction
- Meeting Agenda Online: www.sewrpc.org/HMP
- Kick Off Meeting Summary Notes Online: www.sewrpc.org/HMP
  - April 27, 2023, LPT Meeting
- Draft Chapters 1-3 Review
- County/Community Projects and Implementation Activities (LPT Input)
- Questions/Comments/Adjourn

Chapter 1

Introduction and Background

Chapter 1 Overview

- Introduction
- Overview of Study Area
- Relationship of HMP to EOP
- Review of Existing Regs and Programs (related to HMP)
- Scope and Purpose of Plan Update
- Plan Maintenance and Implementation Activities
- Plan Development Efforts and Adoption

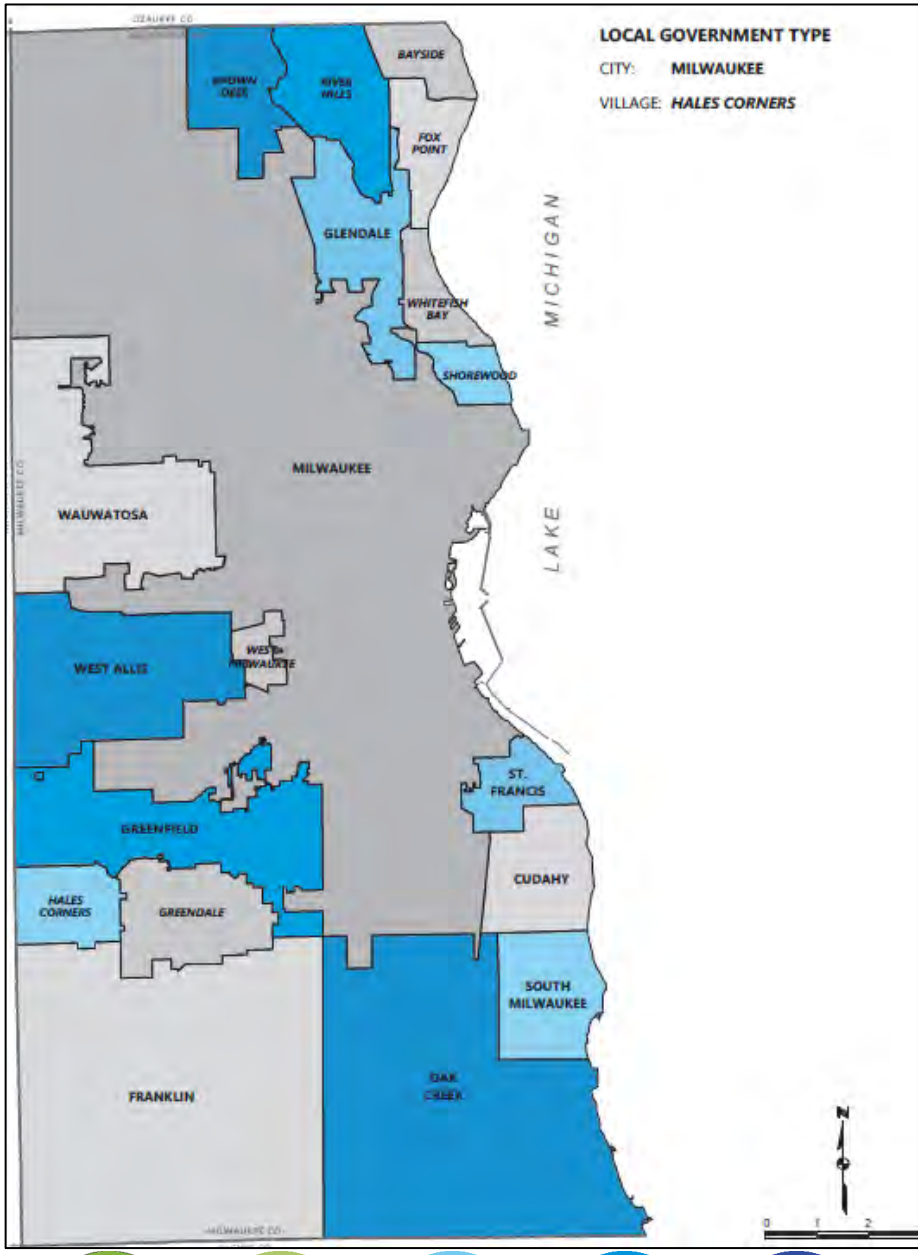
Chapter 1

Introduction

- Plan Update Began Dec. 2021
  - Updates County and City's Previous HMPs
- Plan Requirements
  - FEMA's HMGP
  - Stafford Act, Title 44 CFR Sec. 201
- Hazards Addressed
  - Natural Weather Hazards

Overview of Study Area

- Map 1.1



Chapter 1

Relation to Other Emergency Plans

- Emergency Management (CEMP)
- MMSD Emergency Action Plan

Relation to County Regulations and Programs

- Table 1.1

Table 1.1
Regulations and Programs Within Milwaukee County Related to Hazard Mitigation: 2023

Municipality	General Zoning	Floodplain Zoning	Stormwater Management Ordinance or Plan	Shoreland or Shoreland Wetland Zoning	Emergency Management Department, Ordinance, Program, or Plan
Cities					
Cudahy	Adopted	Adopted	Yes	Adopted	Yes
Franklin	Adopted	Adopted	Yes	Adopted	Yes
Glendale	Adopted	Adopted	Yes	Adopted	Yes
Greenfield	Adopted	Adopted	Yes	Adopted	Yes
Milwaukee	Adopted	Adopted	Yes	Adopted	Yes
Oak Creek	Adopted	Adopted	Yes	Adopted	YEs
South Milwaukee	Adopted	Adopted	Yes	Adopted	Yes
St. Francis	Adopted	Adopted	Yes	--[a]	--[b]

MILWAUKEE COUNTY OEM 911 est. 2015

Milwaukee County
Office of Emergency Management

Comprehensive Emergency Management Plan
2021

Scope and Purpose of Plan Update

- Plan Development and Participation
  - Table 1.2, Appendix A

Plan Maintenance and Implementation

- Outreach Activities – Table 1.3
- Implementation Activities – Table 1.4

Table 1.3
Outreach Activities by Community in Milwaukee County Related or Beneficial to Hazard Mitigation

Community	Activity
Milwaukee County	County website Social Media coverage on natural weather hazards Office of Emergency Management webpage and social media sites Participation in NWS Integrated Warning Team (IWT) Participation in Wisconsin Heat Health Network Continued participation in the ReadyWisconsin campaigns Continued participation in the NWS SkyWarn Program Continued participation in FEMA's Integrated Public Alert and Warning System (IPAWS) Continuing to encourage critical facilities to develop and maintain response and recovery plans Public informational and educational outreach projects, workshops, informational booths, and seminars on natural disaster preparedness Public awareness programs on winter, heat, tornado, hazardous materials, and family preparedness Continuation with the Milwaukee Extreme Weather Taskforce Providing in-depth hazard preparedness exercises and drills to County employees
City of Cudahy	City website City's Social Media platforms containing natural weather hazard education City's Social Media platforms used for natural weather hazards alerts and warnings City's online newsletters
City of Franklin	City website City's Social Media platforms containing natural weather hazard education City's Social Media platforms for natural weather hazards alerts and warnings City's online newsletters City's Notification System
City of Glendale	City website City's Notify Me Emergency Alert program City Newsletters

Table 1.4 (Work in Progress)
Recent Hazard Mitigation Activities/Projects in Milwaukee County: 2018-2023

Community	Activity/Project
Milwaukee County	Designation of cooling and warming shelters Removal of concrete embankments in rivers Coastal erosion and bluff erosion prevention projects Removal/acquisition of structures in floodplain Warning system tests and upgrades Conducted an Emergency communications system tests Conducted an Emergency public information system tests Conducted an Emergency power tests Development and maintenance of plans and procedures Countywide tornado siren replacement project Dispatch training for 911 Communications Providing shelter for the homeless during an extreme cold weather event Technology updates to enhance the availability to serve socially vulnerable populations Development of a damage assessment dashboard Developed a stormwater training module for County Employees Text-to-911 services became available in 2022
City of Cudahy	Updates to tornado sirens Stormwater improvement projects to alleys and parking lots (2018) Kingman Avenue / 3800 Allerton-Van Norman Alley Reconstruction (GI project- 2019) Storm sewer improvements project (2021) with catch basins
City of Franklin	
City of Glendale	Completed a North Shore CEMP Participated in a Tabletop exercise Kletzsch Park tornado siren repair

Plan Maintenance and Implementation

- MMSD Major Flood Efforts Projects- Table 1.5
  - KK River Watershed
  - Menomonee River Watershed
  - Milwaukee River Watershed
  - Oak Creek Watershed
  - Conservation and G.I. Projects

KK River Restoration Project, MMSD

Menomonee River Restoration Project, MMSD

MMSD Major Flood Mitigation Projects

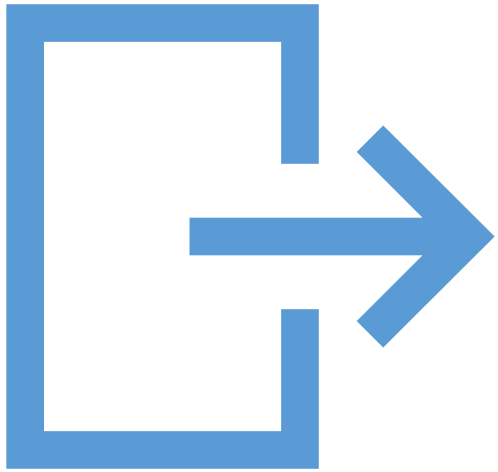
Project	Project Description	Structures Removed from the Floodplain	Cost	Completion Date
Kinnickinnic Watershed				
Kinnickinnic (KK) River Watershed Flood Management Plan - Acquisitions	This is a multiphase project to improve the KK River and tributary streams by removing concrete lining, adding storage, modifying bridges, and naturalizing the channel. The primary objective for the work is to reduce the flood risk, reduce the risk of drowning, improve habitat, and improve community access to the naturalized river corridor. The projects recommended in the plan will reduce flood risk to over 700 structures in the 100-year floodplain, remove concrete from over seven miles of stream-lined in concrete or enclosed in culverts, and make significant investments in community spaces, including several Milwaukee County Parks. The scope of one of the ongoing projects located on the KK River between 6th and 16th Street includes the acquisition and removal of 83 residential structures within this project area. The properties are needed to widen the channel cross section from 60 ft. to 200 ft. Approximately 53 of these hom floodplain. The wider channel wil flows through this section and red 300 homes and businesses within total structures removed include t part of the KK River watershed.	~55	$402M (2024 dollars)	2024
Menomonee River Watershed				
All Watershed Projects Completed So Far	Many of the Menomonee River Watershed projects work in concert to mitigate flooding. For instance, the Milwaukee County Grounds Detention Basin project described below makes downstream concrete removal and levee/floodwall projects possible.	280		
Valley Park Levee and Floodwall	This project created a levee and floodwall to help protect about 130 homes along the Menomonee River. The project is part of a group of projects that work to reduce the risk of flooding on the Menomonee River, including: a seven-foot-high, 800-foot-long levee; five-foot-high, 750-foot-long floodwall; the acquisition of 18 homes for the construction of the levee and floodwall; an increase in Milwaukee County Parks land along the Menomonee River from 1.5 acres to 3 acres; and a new 15-foot-wide access road atop the levee for maintenance and security.		$12M (2001 dollars)	2001
Hart Park	MMSD completed the Hart Park Project along the Menomonee River to reduce the flood risk in the Cities of Milwaukee and Wauwatosa. As part of this project, 80 formerly flood-prone residences and business in the area east of the Hart Park stadium were acquired and removed; the area of the park was expanded from 20 acres to 50 acres; a system of earthen levees, concrete		$48M (2007 dollars)	2007

MMSD Major Flood Mitigation Projects

Project	Project Description	Structures Removed from the Floodplain	Cost	Completion Date
Menomonee River Watershed (continued)				
Milwaukee County Grounds Detention Basin	The Milwaukee County Grounds detention basin is located in the City of Wauwatosa. This basin covers about 65 acres and has the potential to hold 315 million gallons of floodwaters from Underwood Creek and then slowly release the floodwaters to the Menomonee River. It provides flood relief benefits downstream in the Cities of Milwaukee and Wauwatosa.		$93M (2011 dollars)	2011
Western Milwaukee Flood Management Projects	The fourth and final phase of these projects is currently being completed. The purpose of this project is to reduce the risk of overbank flooding in the vicinity of West State Street on the west side of Milwaukee and east side of Wauwatosa. The project scope is to design and construct a continuation of the floodplain levee and floodwall along West State Street, east from Hart Park project to at least the east side of the former Central Redi-Mix property (now owned by MMSD).		$90M (2026 dollars)	2026
Milwaukee River Watershed				
Lincoln Creek Channel Restoration	This project included concrete channel lining removal, additional floodplain storage, and naturalizing the channel banks where possible within the public right-of-way corridor. Lincoln Creek is located in the City of Milwaukee.	~2,000	$120M (2000 dollars)	2002
Estabrook Dam Removal	In 2016, MMSD approved plans to acquire land in Estabrook Park for the demolition and removal of the Estabrook dam. The purpose of this project was to provide the benefits of flood risk reduction for at least 50 structures located in the floodplain, and to improve water quality, habitat, fish passage, river aesthetics and reduce sediment accumulation.	~50	$2.3M (2016 dollars)	2018
Structure Acquisitions	This is an ongoing effort to reduce the flood risk to structures in the Milwaukee River regulatory floodplain, focused on the City of Glendale, but MMSD is open to voluntary acquisition in other flood-prone areas in the Milwaukee River Watershed and recently acquired a clinic building in the Village of Brown Deer. Six structures were acquired for the Indian Creek project that was constructed in the early 2000s. The number of structures removed is the total as of 2023.	19	$5.5M (2023 dollars)	Ongoing

Plan Adoption

- To Receive FEMA Approval, **All Jurisdictions** (Participants) Must Adopt Plan with Documentation Proving So
- **Towns** Fall under County Adoption
  - (*No Towns in Milwaukee Co.*)



Chapter 2

Basic Study Area Inventory and Analysis

Chapter 2 Overview

- **Introduction/Background**
  - Inventory of County Assets
    - Built and Non-Built Features
- **Demographic Trends and Projections**
- **Civil Divisions**
- **Land Use and Natural Features**
- **Critical Community Facilities and Emergency Services**
- **Climate Change**

County Trends and Projections

Population (Table 2.2 and 2.3)

- 2020 – 939,489
- 2050 – 1,019,100 (8.5% increase)
- ***Vulnerable Populations*** (Appendix C, Figure 2.1, Table 2.4)

Households (Table 2.5)

- 2020 – 393,601
- 2050 – 427,800 (8% increase)

Employment (Table 2.7)

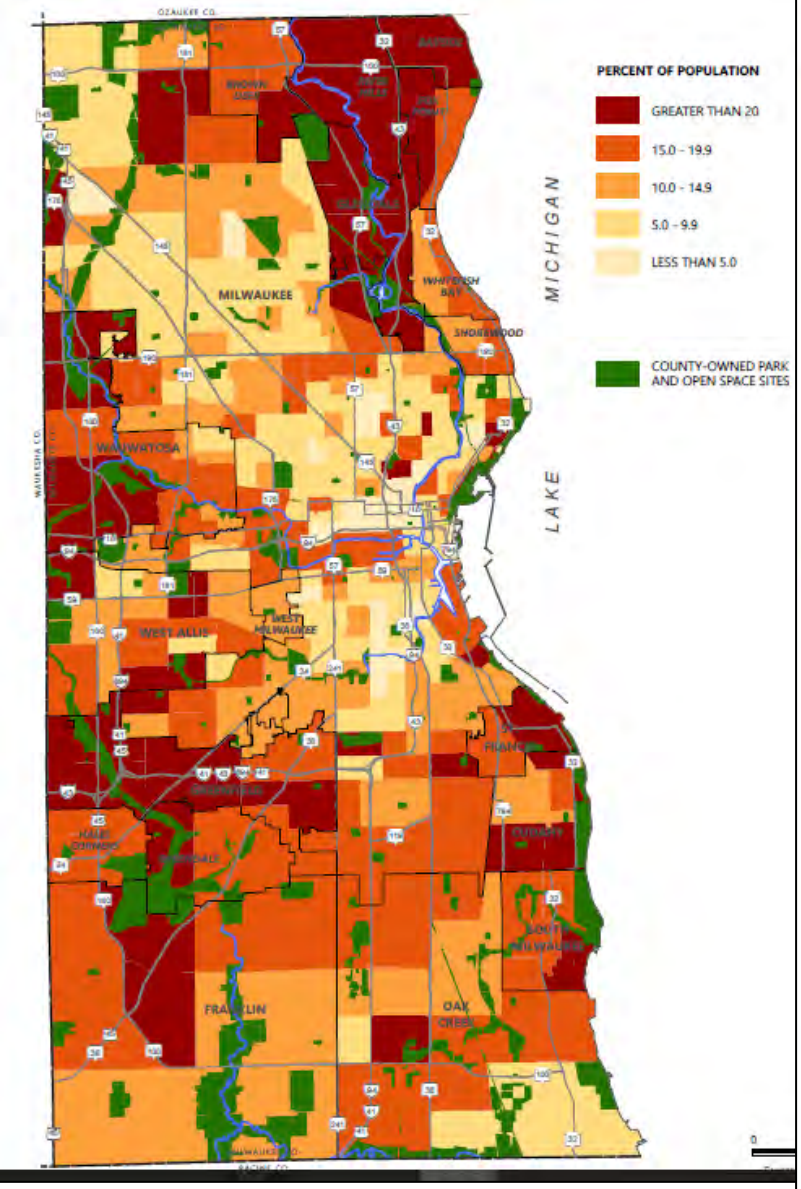
- 2020 – 578,605
- 2050 – 634,600 (10% increase)

Equalized Value (Table 2.5)

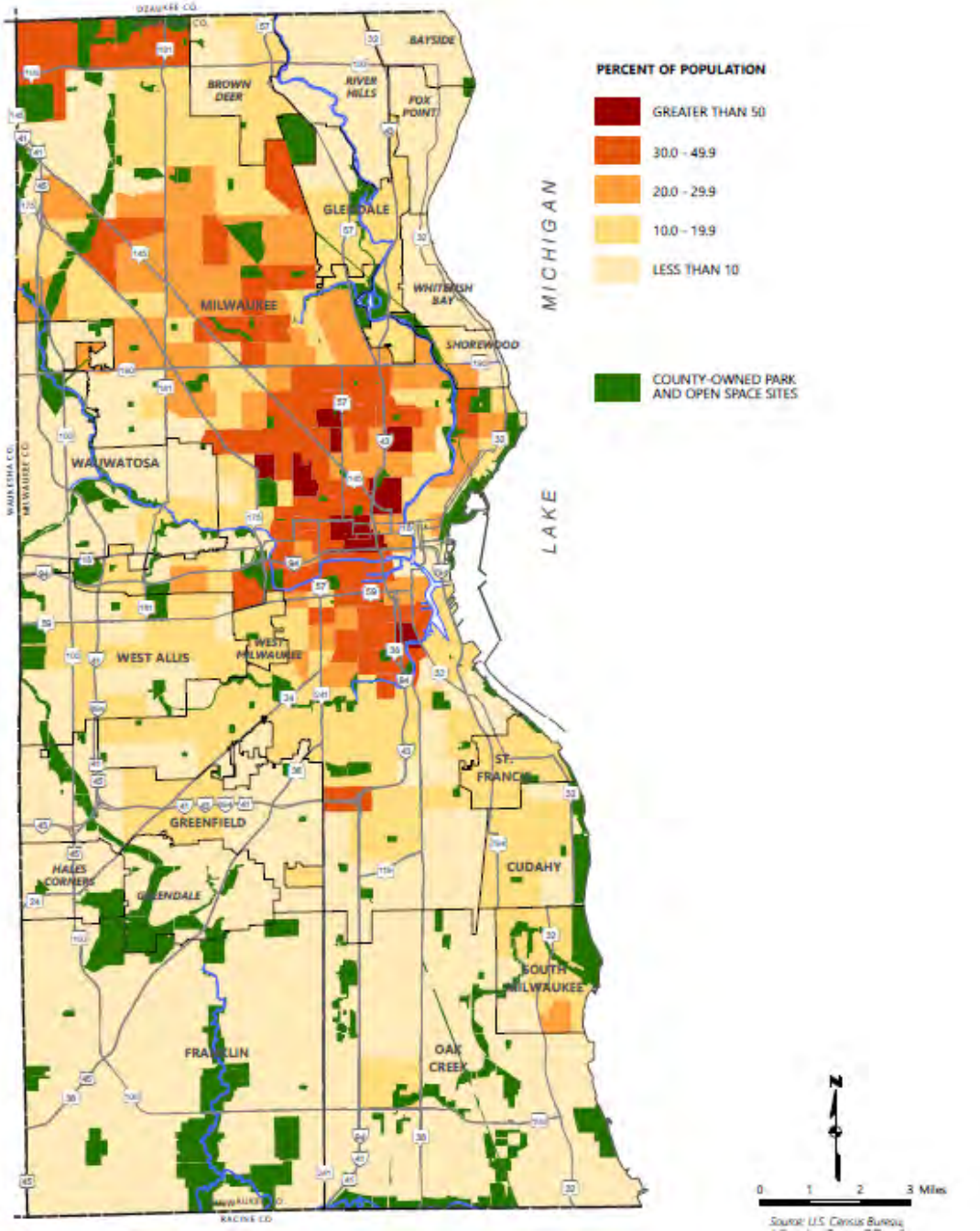
- 2022 - $87 Billion

Appendix C Examples

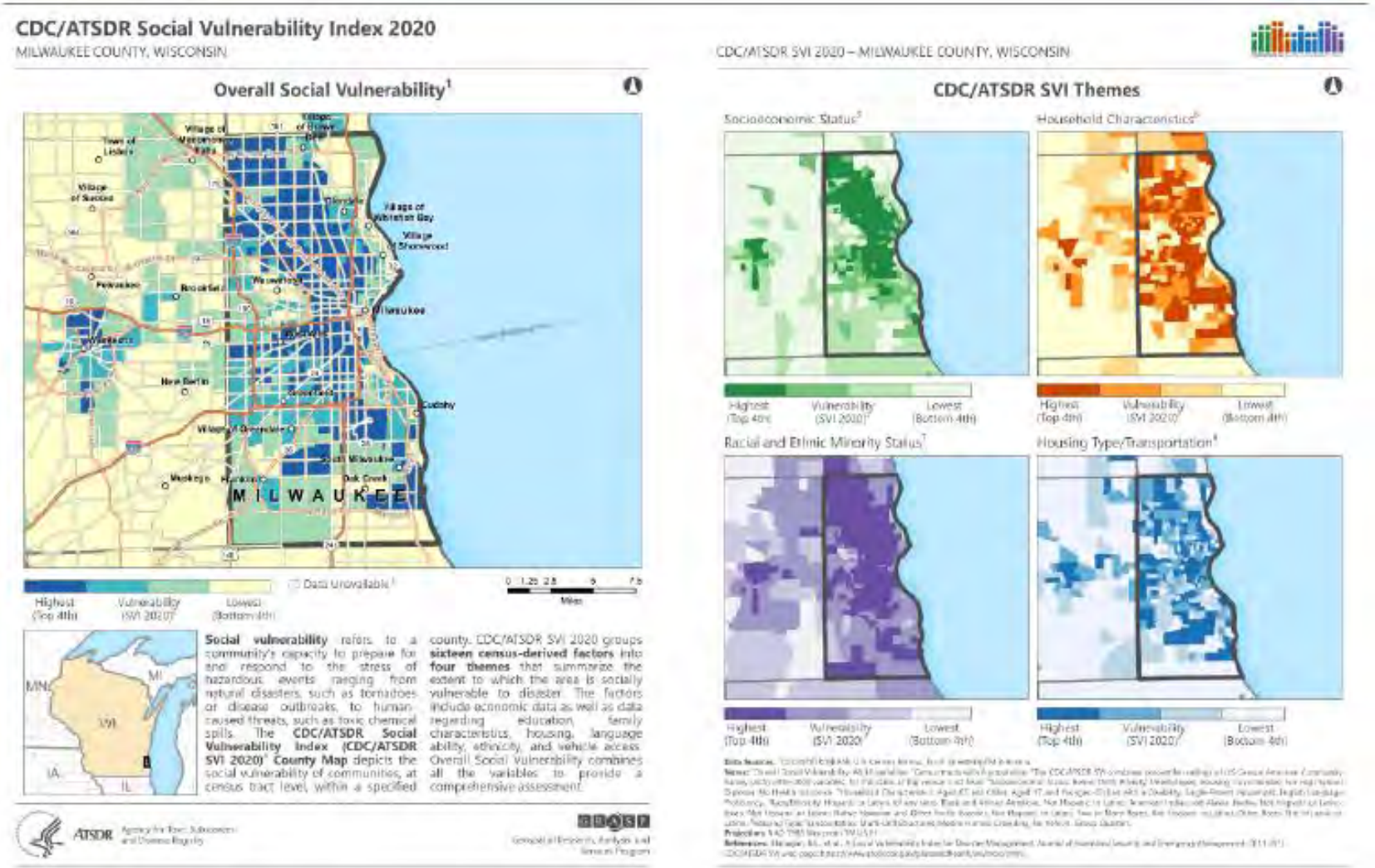
Map Appendix.xx
Milwaukee County Percent of Population that are Elderly: 2023



Map Appendix.xx
Milwaukee County Pecent of Population with a Below Poverty Income: 2023



Social Vulnerability Index 2020



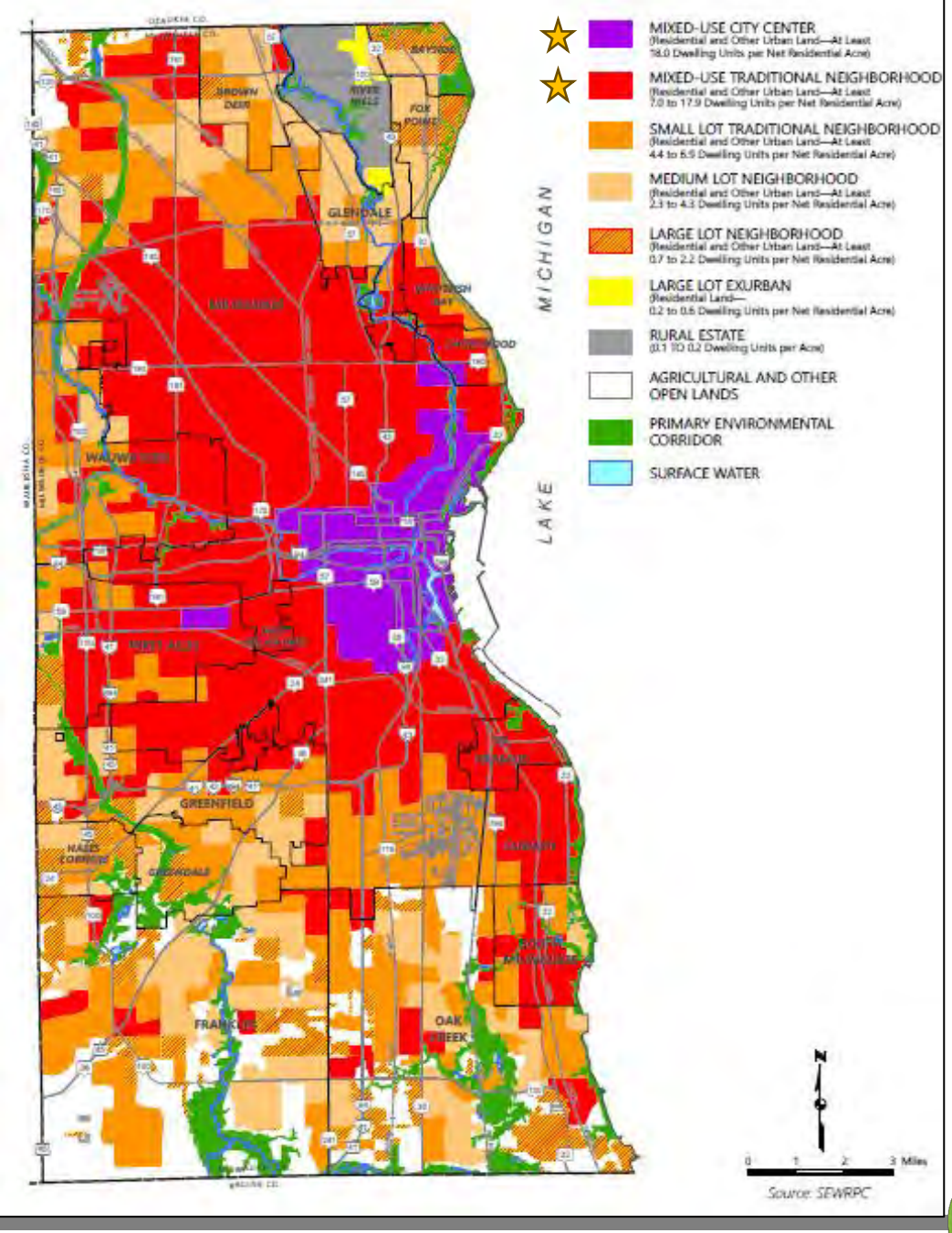
Source: Agency for Toxic Substances and Disease Registry

2015 Land Use

Table 2.9
Existing Land Use in Milwaukee County: 2015

Land Use Category[a]	Acres	Percent of Subtotal	Percent of Total
Urban[a]			
Residential	51,868	44.1	33.4
Commercial	7,981	6.8	5.1
Industrial	6,993	5.9	4.5
Transportation, Communications, and Utilities	34,104	29.0	22.0
Governmental and Institutional[b]	8,719	7.4	5.6
Recreational[c]	8,000	6.8	5.1
Urban Subtotal	117,665	100.0	75.7
Nonurban			
Agricultural	8,507	22.6	5.5
Wetlands	7,440	19.8	4.8
Woodlands	5,691	15.1	3.7
Extractive, Landfills, and Other Open Lands	14,483	38.4	9.3
Surface Water	1,555	4.1	1.0
Nonurban Subtotal	37,676	100.0	24.3
Total	155,341	--	100.0

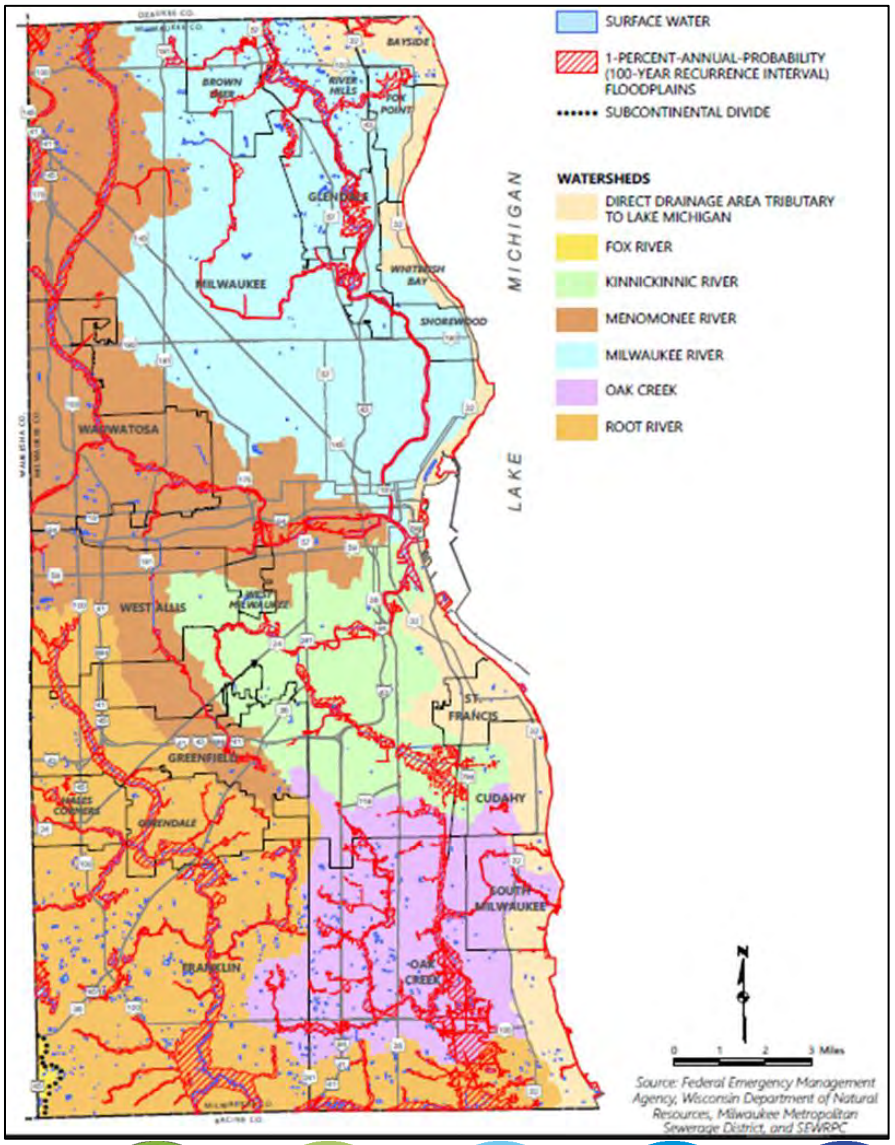
Map 2.4
VISION 2050 Planned Land Use



Natural Resources

Surface Waters and Floodplains (Map 2.5)

- **Watersheds**
  - 7 Major
- **Streams**
  - Stream Channel Characteristics (2019)- Map 2.6
- **Lakes, Ponds, and Wetlands**
- **Floodplains** (Map 2.7 and Table 2.10)
  - 1-Percent-Annual-Probability



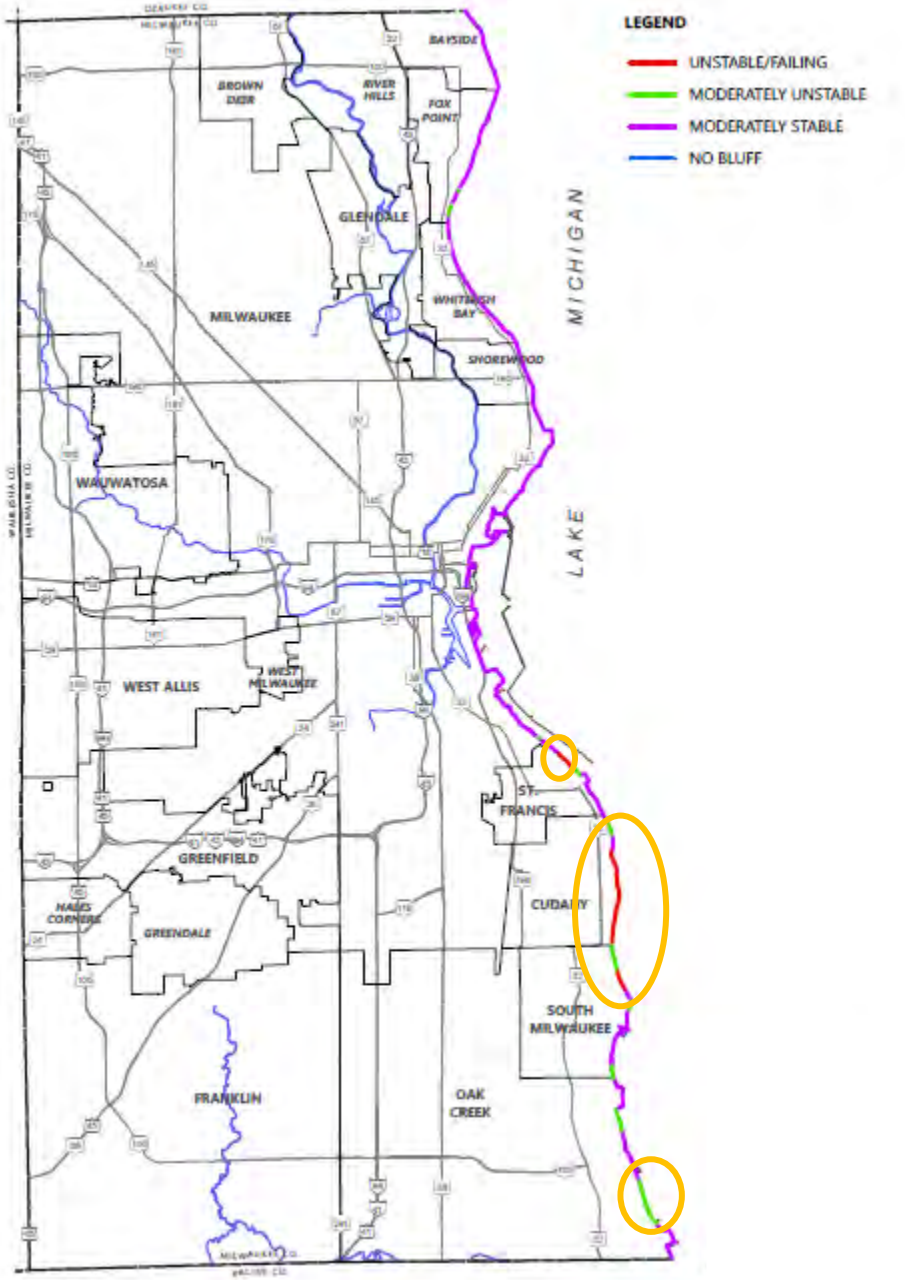
Land Use and Natural Resources

- **Lake Michigan Coastline**
  - Characteristics
  - Coastal Communities (Table 2.11)

  - **Studies and Assessments on County Coastal Conditions**
    - Bluff, Beach, and Shoreline
    - Map 2.8
    - Milwaukee County Coastal Resources Inventory
      - County-owned Assets At Risk

- **Environmental Corridors** (Map 2.9)

Map 2.9
Bluff Conditions in 2018



Emergency Services and Critical Facilities

Emergency Services

- Fire and Rescue (Map 2.10, Table 2.12)
- Law Enforcement (Map 2.11, Table 2.13)
  - Dispatch (Table 2.14)
- Telecommunications and Alerting Services
  - Interoperable Communications
  - EAS/WEA/IPAWS
  - Outdoor Sirens

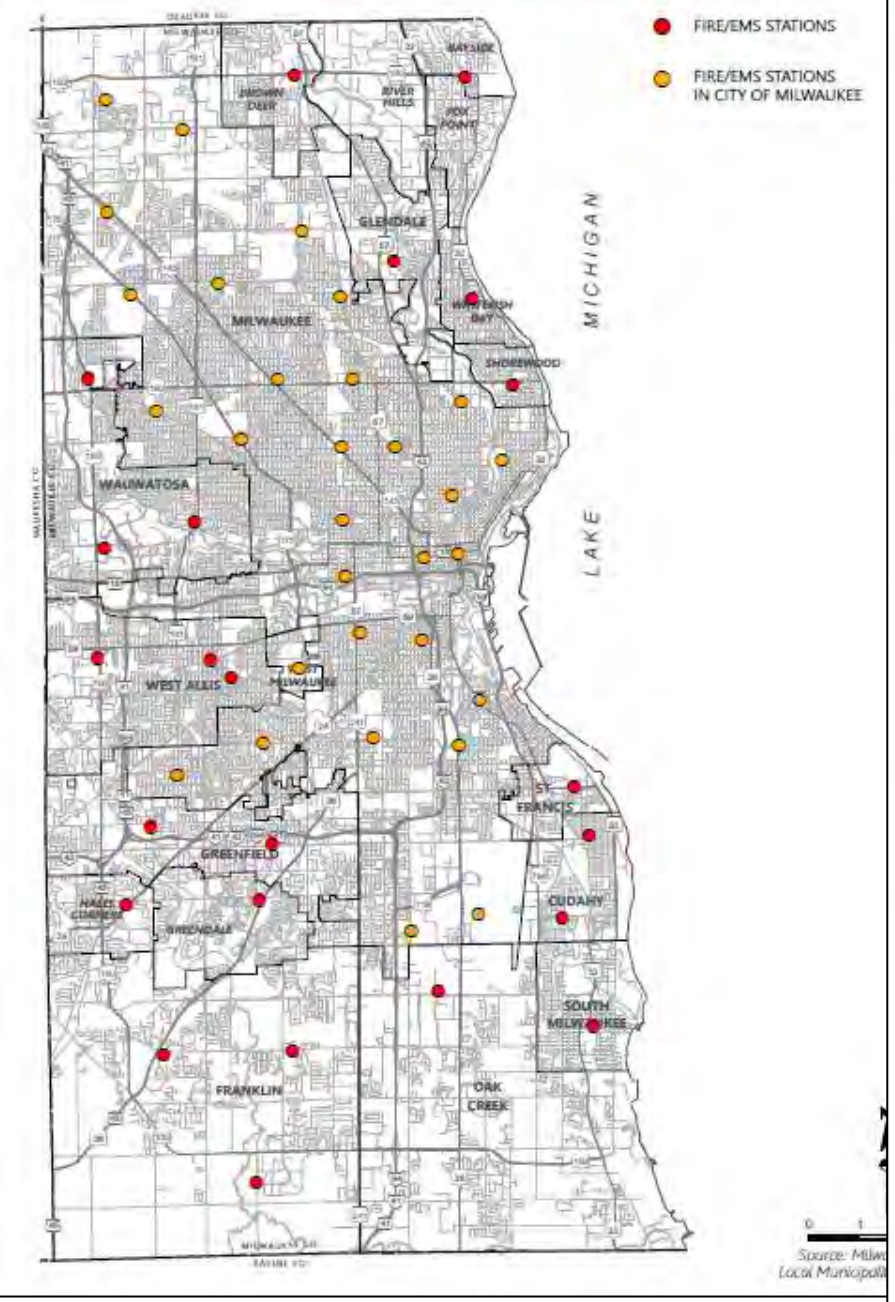
Critical Community Facilities/Infrastructure (Appendix E)

- Hospitals/Clinics
- Schools
- Government Facilities
- Assisted Living

❖ Transportation Systems (Maps 2.12 and 2.13)

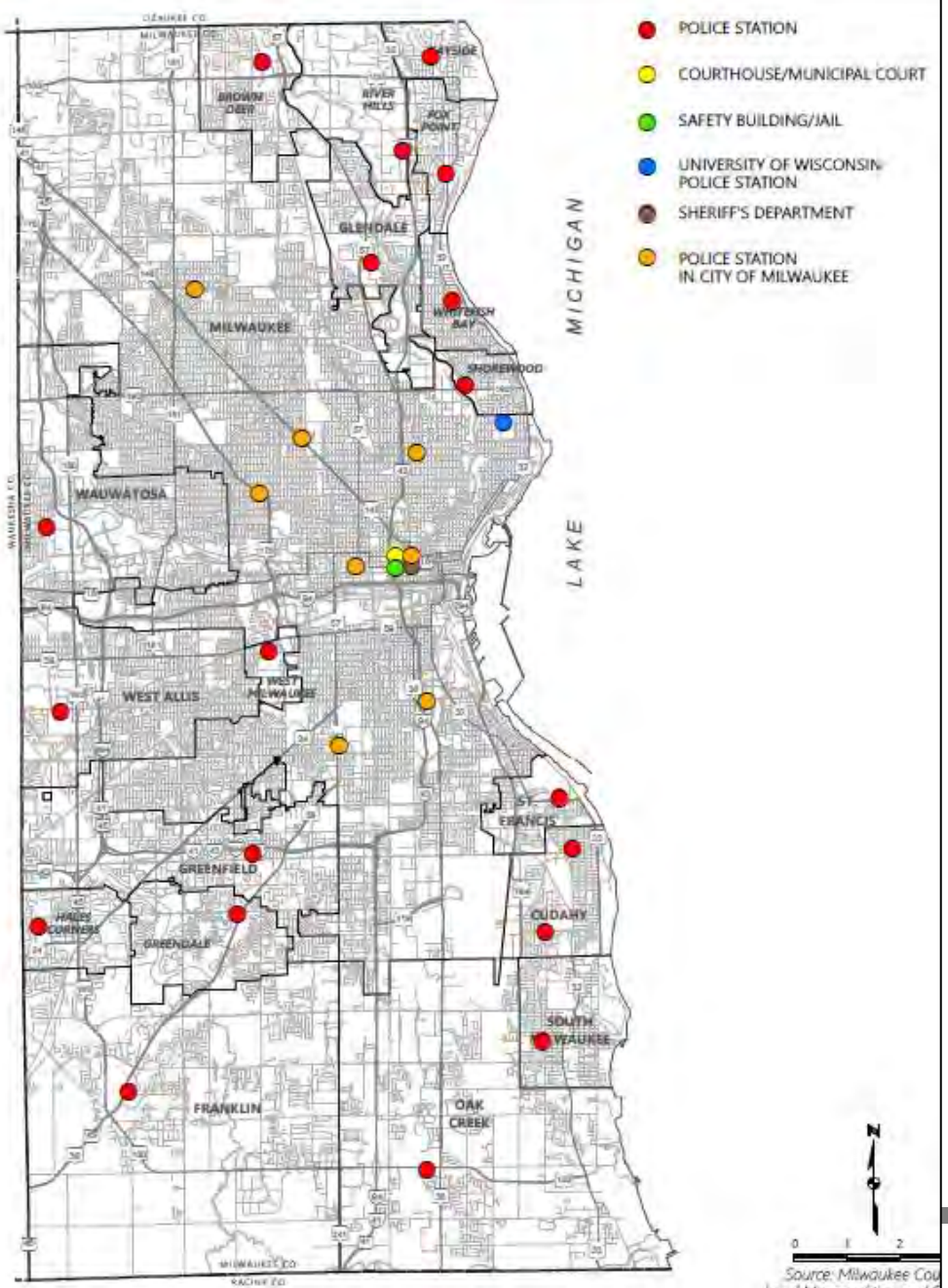
❖ Historic Sites

Map 2.10
Fire Stations and Emergency Medical Services in Milwaukee County: 2023



Source: Milw
Local Municipali

Map 2.11
Law Enforcement Stations in Milwaukee County: 2023



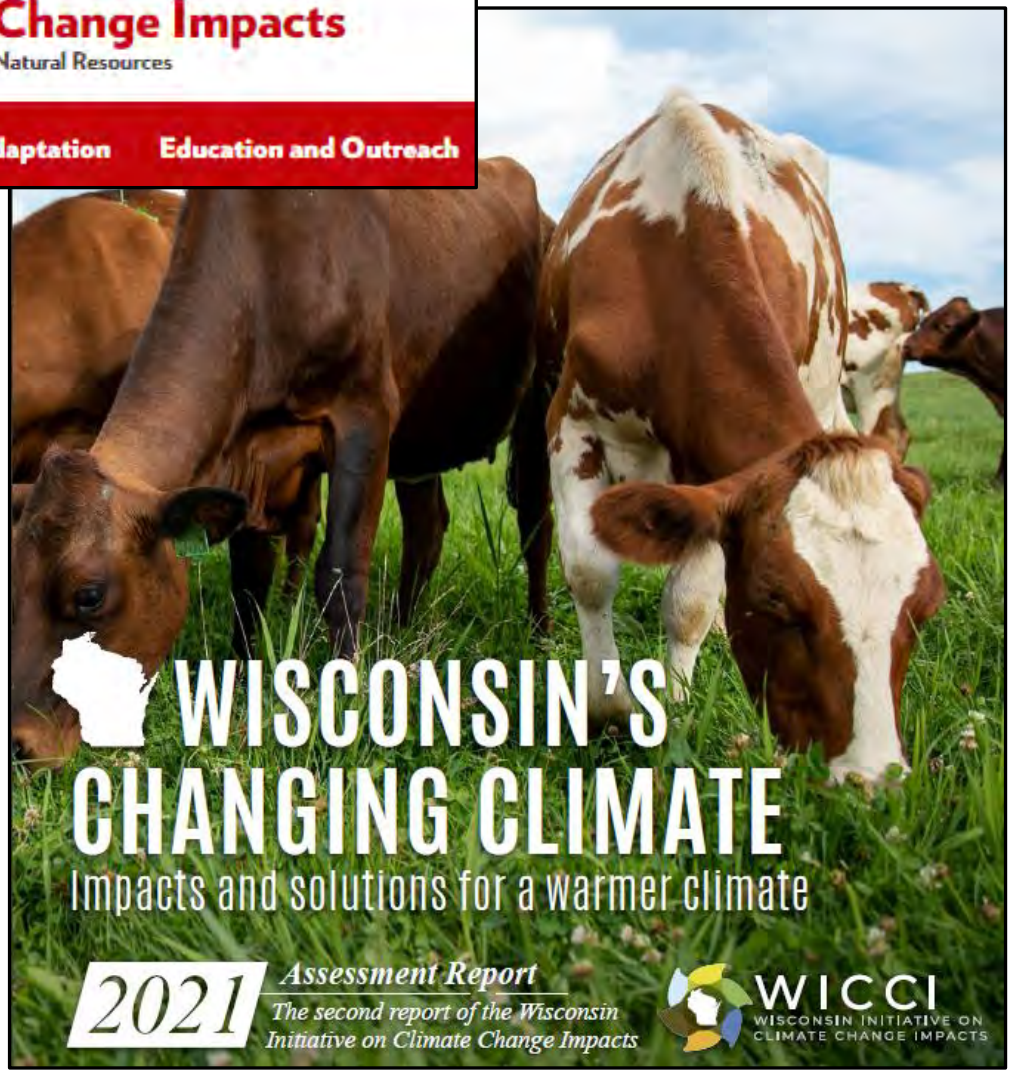
Source: Milwaukee Cou
Local Municipalities, and S

Climate Change

- **WICCI Data**

- **Trends and Projections**
  - Online, 2011 and 2021 Data/Maps
  - 1950-2018: Trends
  - 2041-2060: Projections
  - **Figures 2.2-2.5**

- **Impacts to Each Hazard**
  - Flooding and Extreme Temps



Chapter 3

Analysis of Hazard Conditions

Chapter 3 Overview:

Hazard Identification Process:

- Summary and Results of HVA (Table 3.1)
- Hazard Rankings (Table 3.2)

Description of Risk Analysis

Hazard Vulnerability and Risk Assessment Profiles:

- Flooding ⟸
- Severe Weather
- Tornadoes
- Winter Storms
- Extreme Temperatures ⟸
- Lake Michigan Coastal Hazards ⟸
- Drought

Hazard Rankings

Table 3.1
Perceived Risks of Hazards as Determined by Hazard Vulnerability and Risk Assessment Survey: 2022

Hazard	Probability[a] *Likelihood this will occur*	Human Impact[a] *Possibility of death or injury*	Property Impact[a] *Physical losses and damages*	Business & Agency Impact[a] *Interruption of services*	Preparedness[a] *Mitigation or pre-planning*	Total Risk[b] *Relative threat*	Rank[c]
Ice Storm	2.533	2.600	2.533	4.733	2.200	19.422	1
High Straight-Lined Winds	2.600	2.267	2.333	2.333	2.067	12.653	2
Lightning	2.733	2.400	2.000	1.867	2.067	11.480	3
Blizzard	2.533	2.467	2.000	2.467	2.600	10.978	4
Heavy Snowstorm	2.600	2.267	2.067	2.533	2.733	10.747	5
Tornado	1.867	2.533	2.600	2.533	2.067	10.453	6
Hail	2.667	2.000	2.000	1.733	2.000	9.956	7
Drought	2.267	2.000	1.733	1.600	1.133	9.520	8
Extreme Cold	2.467	2.267	1.667	2.067	2.333	9.044	9
Extreme Heat	2.267	2.200	1.733	2.000	2.133	8.613	10
Thunderstorm	2.867	1.933	1.733	1.600	2.400	8.218	11
Stormwater Flooding	2.133	1.533	2.133	1.867	2.000	7.538	12
Fog	2.600	1.733	1.267	1.333	1.467	7.453	13
Riverine Flooding	1.933	1.400	2.067	1.533	1.600	6.573	14
Wildfire	1.467	1.600	1.733	1.600	1.733	4.693	15
Inland Lake Flooding	1.533	1.133	1.667	1.333	1.333	4.293	16
Land Subsidence	1.267	1.267	1.467	1.400	1.200	3.716	17
Dam Failure	1.000	1.133	1.333	1.400	1.133	2.733	18
Land Slide	1.000	1.000	1.200	1.133	0.800	2.533	19
Earthquake	0.733	1.200	1.533	1.400	0.867	2.396	20
Dust Storm	0.733	0.867	0.867	0.867	0.667	1.418	21

Note: Value is based on the weighted average of the number of votes received for each score of No Available information (NA), low (1), moderate (2), or high (3).

[a] *Severity = Sum of Impact – Preparedness*

[b] *Total Risk = Probability x Severity*

[c] *Perceived threat/rank is based on Total Risk score.*

Summary and Results of Hazards

Table 3.2
Summary of Hazards to be Considered in the Milwaukee County Hazard Mitigation Plan

Hazard	Risk of Occurrence[a]	Damage to Property[a]	Threat to Life Safety[a]	Duration of Impact[b]	Size of Area Affected[c]
Flooding and Stormwater Drainage Problems	Medium	High	High	Moderate	Large
Thunderstorm, High Winds, Hail, Lightning	High	Medium	High	Long	Large
Tornadoes	Medium	High	High	Short	Small
Winter Storms	High	Medium	High	Medium	Large
Temperature Extremes	High	Medium	High	Long	Large
Drought	Low	Low	Low	Long	Large
Coastal Hazards	Medium	Medium	Medium	Short	Medium

Table 3.4
Natural Hazard Events Recorded in Milwaukee County: 2000-2022

Event	Number of Events	Average Number per Year	Deaths	Injuries	Property Damages ($)[a]	Crop Damages ($)[a]
Dust Storms	0	0.00	0	0	0	0
Wildfires/Forest Fires	0	0.00	0	0	0	0
Drought	14	0.61	0	0	0	322,369
Tornadoes/Waterspouts	18	0.78	0	176	22,458,481	9,310
Lightning	20	0.87	0	2	1,964,126	0
Flood	45	1.96	4	0	170,829,985	155,615
Fog	61	2.65	0	0	0	0
Temperature Extremes	83	3.61	45	69	29,169	2,043
Hail	111	4.83	0	0	11,481,820	3,516
Winter Weather	187	8.13	0	0	144,418	22,548
Thunderstorms/High Winds	208	9.04	1	2	10,752,089	771,986
Total	747	2.95	50	249	217,660,088	1,287,387

Hazard Profiles

- Definition and Description of Each Hazard
- Description of Notable Events that Have Affected the County
  - "**Recent Events**" (2011-2022)
- Assessment of Vulnerabilities to the Hazard and it's Impact on Community and/or Community Assets
  - "**Vulnerability and Community Impact Assessment**"
- Description of Potential Future Changes in Impacts due to the Changing Climate
  - "**Future Changes and Conditions**"
- Discussion of Any Differences Among Communities at Risk
  - "**Multi-Jurisdictional Risk Management**"

1. Flooding

- 103 Miles Major Streams
- 7 Major Watersheds
- 11,616 Acres Of 1-Percent Floodplain

Flooding (cont.)

Types of Flooding Concerns

- Riverine
- Stormwater Drainage
- Dam Failure
  - DNR Dam Inventory (Map 3.1, Table 3.6)
    - 9 Active Dams in County
    - 1 with “High” hazard potential
- Ice Jams
- Flash Flood
  - 14 between 2011-2022

Recent Events (Table 3.7)

- 20 flood events 2011 – 2022
- Over $12 million in damages (2022 dollars)
- 2020 Event-$57,000 in Property Damages

Flooding (cont.)

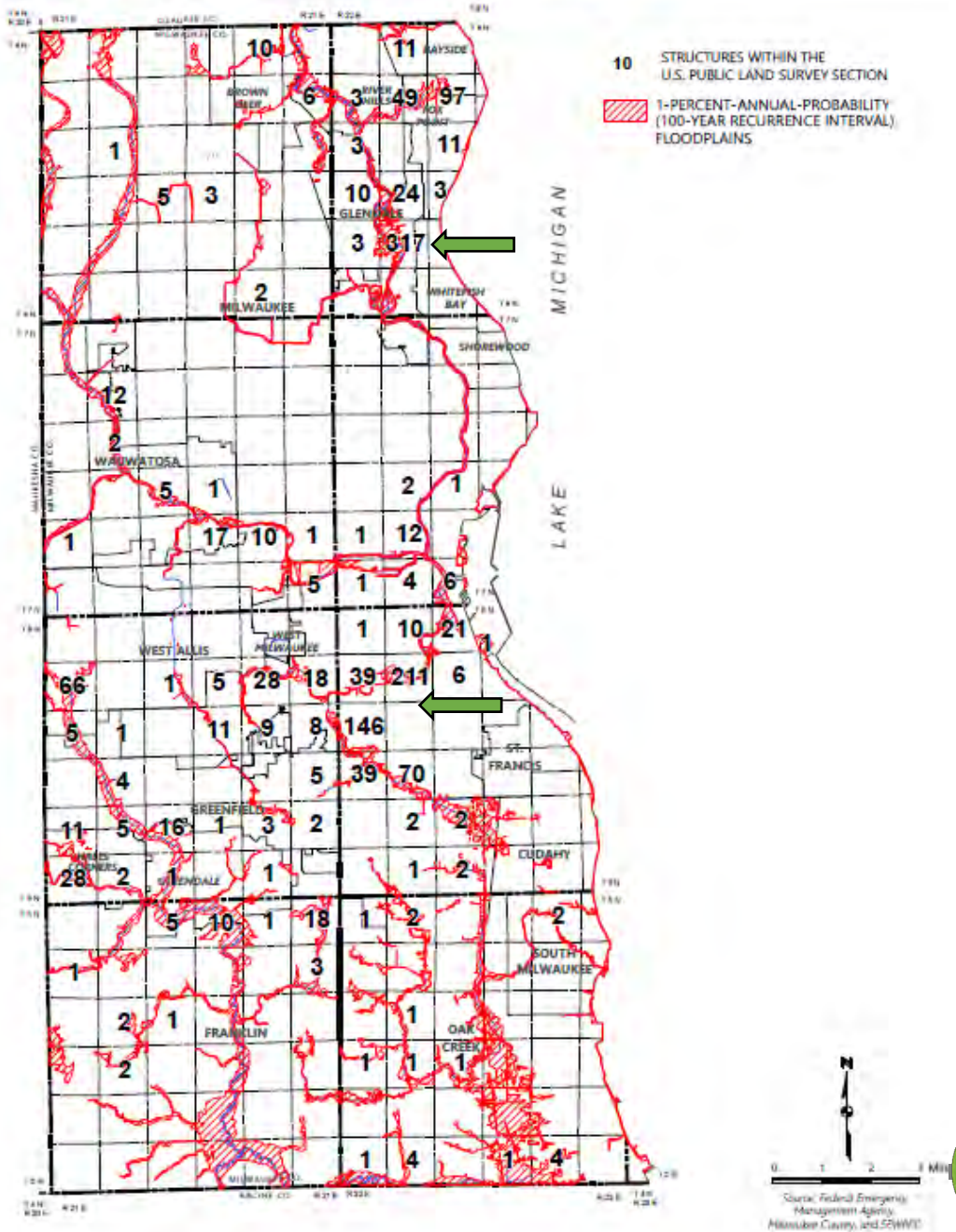
Vulnerability and Community Impact Assessment

- Parcel-Based Loss Analysis (Tables 3.8 and 3.9 and Map 3.2)
  - **1,483** structures in 1-percent-probability floodplain
    - Community, Watershed, Structure Type
  - $166 million – estimated damages for a 1-percent floodplain
  - 4 critical community facilities located in 1-percent floodplain
- Repetitive or Severe Repetitive Loss Structures (Table 3.10)
  - **271** total structures (231 in City of Milwaukee)
- Roadway Flooding Concerns
- Milwaukee Flood and Health Vulnerability Assessment Tool (MFHVA)

Future Changes and Conditions

Multi-Jurisdictional Risks

Map 3.2
Structures Located within the 1-Percent-Annual-Probability Floodplain: 2023



Source: Federal Emergency Management Agency, Milwaukee County, and SEWRPC

Flooding (Cont.)

Table 3.9
Number of Structures in the 1-Percent-Annual-Probability Floodplain in Milwaukee County by Structure Type: 2023

Civil Division	Number of Flooded Structures								Total Number of Flooded Structures
	Apartment	Condominium	Residential	Commercial	Critical Facility	Mobile Home	Parks	Utility	
Cities									
Cudahy	0	0	0	0	0	0	0	0	0
Franklin	1	0	8	2	0	16[d]	0	0	27
Glendale	0	0	350	3	0	0	0	0	353
Greenfield	0	4	11	5	0	0	0	0	20
Milwaukee	12	7	538	123	3[b]	0	1	1	685
Oak Creek	1	0	11	4	0	0	0	0	16
St. Francis	0	0	0	0	0	0	0	0	0
South Milwaukee	0	0	2	0	0	0	0	0	2
Wauwatosa	0	0	14	24	0	0	0	0	38
West Allis	8	0	48	16	0	0	0	0	72
Villages									
Bayside[a]	0	0	60	0	0	0	0	0	60
Brown Deer	0	0	3	10	0	0	0	0	13
Fox Point	0	0	109	0	0	0	0	0	109
Greendale	0	0	25	7	1[c]	0	2	0	35
Hales Corners	0	2	36	3	0	0	0	0	41
River Hills	0	0	10	2	0	0	0	0	12
Shorewood	0	0	0	0	0	0	0	0	0
West Milwaukee	0	0	0	0	0	0	0	0	0
Whitefish Bay	0	0	0	0	0	0	0	0	0
Total	22	13	1,225	199	4	16	3	1	1,483

[a] *Milwaukee County portion only.*

[b] *The three critical facilities in the City of Milwaukee are St. Luke's Medical Center; Adult Day Services of Wisconsin, LLC; and the Lake Express High-Speed Ferry.*

[c] *The critical facility in the Village of Greendale is College Park Elementary School.*

[d] *The mobile (manufactured) home community in the City of Franklin is the Franklin Mobile Estates property.*

Flooding (Cont.)

Table 3.8
Estimated Flood Damages for a 1-Percent-Annual-Probability Flood in Milwaukee County by Watershed: 2023

Watershed	Structures	Flood Damages[a]		
		Direct ($)	Indirect ($)	Total ($)
Kinnickinnic River	624	50,069,660	16,159,260	66,228,920
Lake Michigan Drainage Basin	28	853,790	128,070	981,860
Menomonee River	86	10,872,120	4,096,910	14,969,030
Milwaukee River	541	45,870,310	12,380,720	58,251,030
Oak Creek	10	4,234,470	1,681,310	5,915,780
Root River	194	14,506,190	5,103,920	19,610,110
Total	1,483	126,406,540	39,550,190	165,956,730

Note: Estimated damages are based on assessed improvement values in 2022.

[a] *Dollar values were adjusted to year 2022 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.*

Lake Michigan Coastal Hazards

- **Types of Lake Michigan Coastal Hazards**
  - Erosion of coastal bluffs, beaches, and near shore lake beds
  - Bluff failure/collapse
  - Coastal flooding
  - Damage and failure of shoreline (protection) structures
- **Lake Level Fluctuations (Fig. 3.6)**
- **Shoreline Erosion and Bluff Conditions**
  - Past Studies/Reports
  - Wisconsin Shoreline and Oblique Photo Viewer
- **Coastal Flooding**
- **Recent Events**
  - January 11, 2020- $12 million in damages.

Lake Michigan Coastal Hazards (Cont.)

Vulnerability and Community Impact Assessment

- **Wisconsin Shoreline Inventory and Oblique Photo Viewer**
  - Maps 3.5 – 3.12, Tables 3.20 – 3.22
  - St. Francis, Cudahy, South Milwaukee, Oak Creek– unstable or failing bluffs

- **SEWRPC Parcel-Based Analysis-Coastal Flooding** (Map 3.12)
  - 15 structures- $325k in potential damages
  - Village of Fox Point, Port of Milwaukee

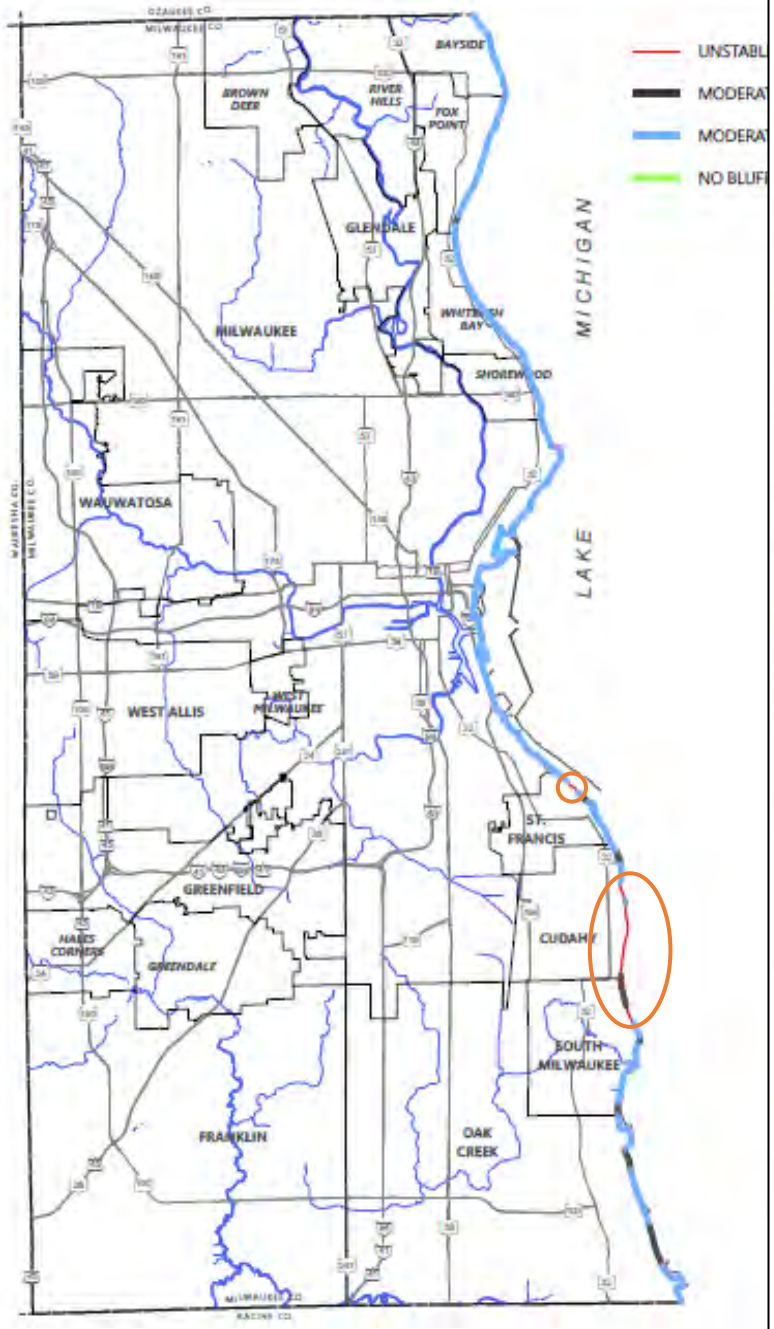
- **WEM Coastal Erosion Risk & Vulnerability Assessment** (Table 3.22)

- **Milwaukee County Coastal Resources Inventory, 2020**
  - County-owned Assets (i.e., Parks) at Risk and Vulnerable
  - 13% poor condition, 22% highly vulnerable
  - Nearly $3 Billion

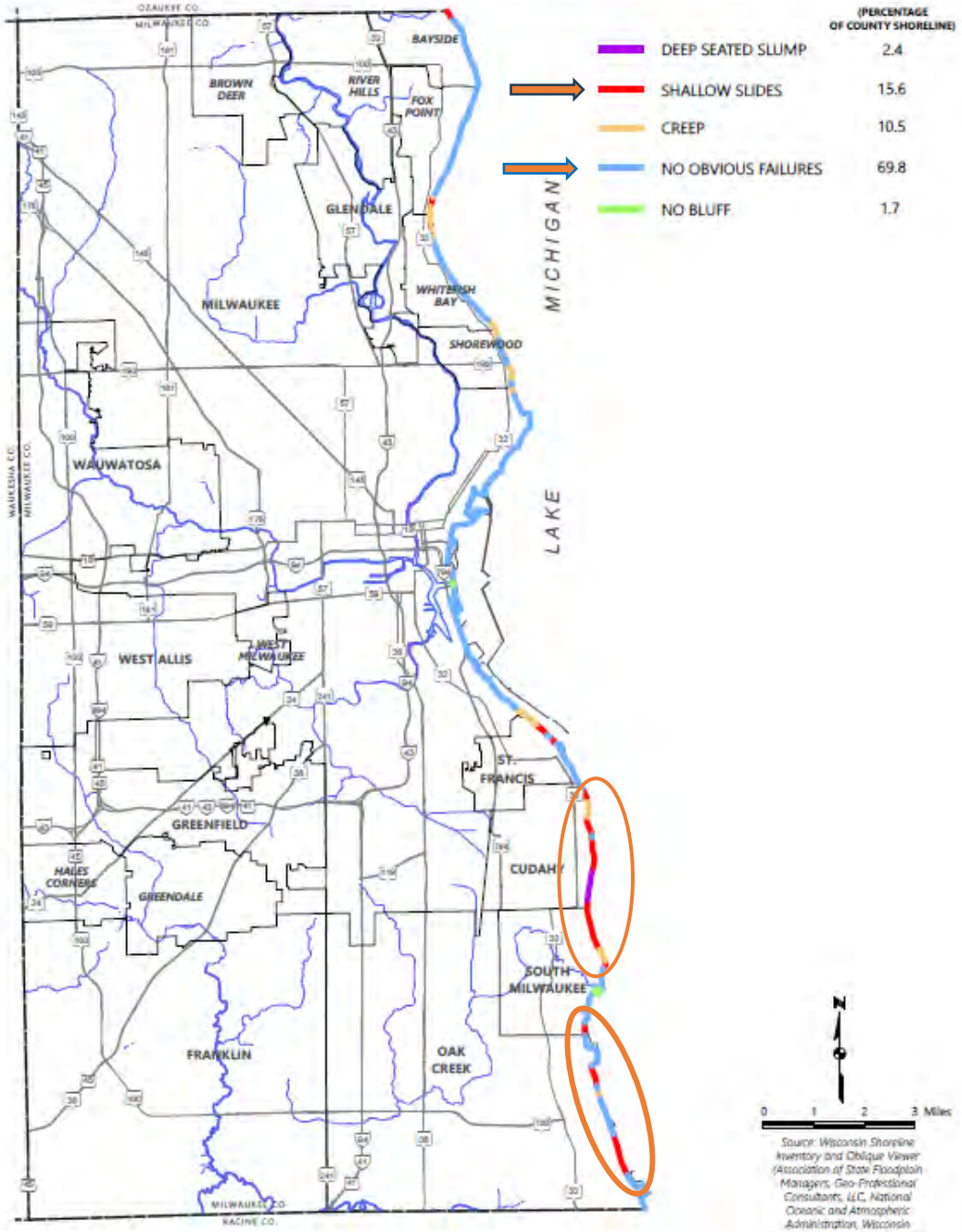
Future Changes and Conditions

Multi-Jurisdictional Risks

Map 3.6
General Bluff Conditions in Milwaukee County: 2018

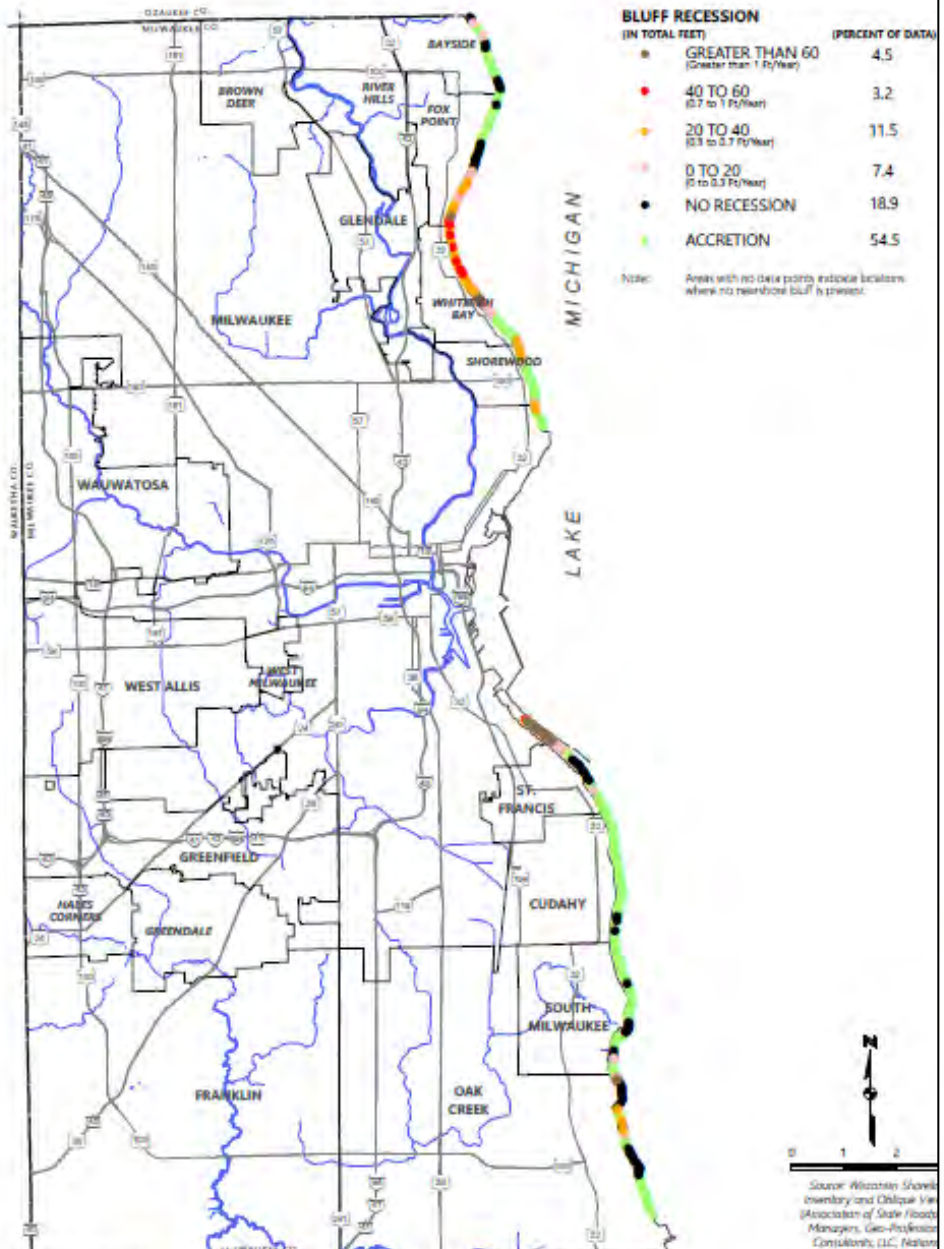


Map 3.7
Types of Bluff Failure in Milwaukee County: 2018-2019



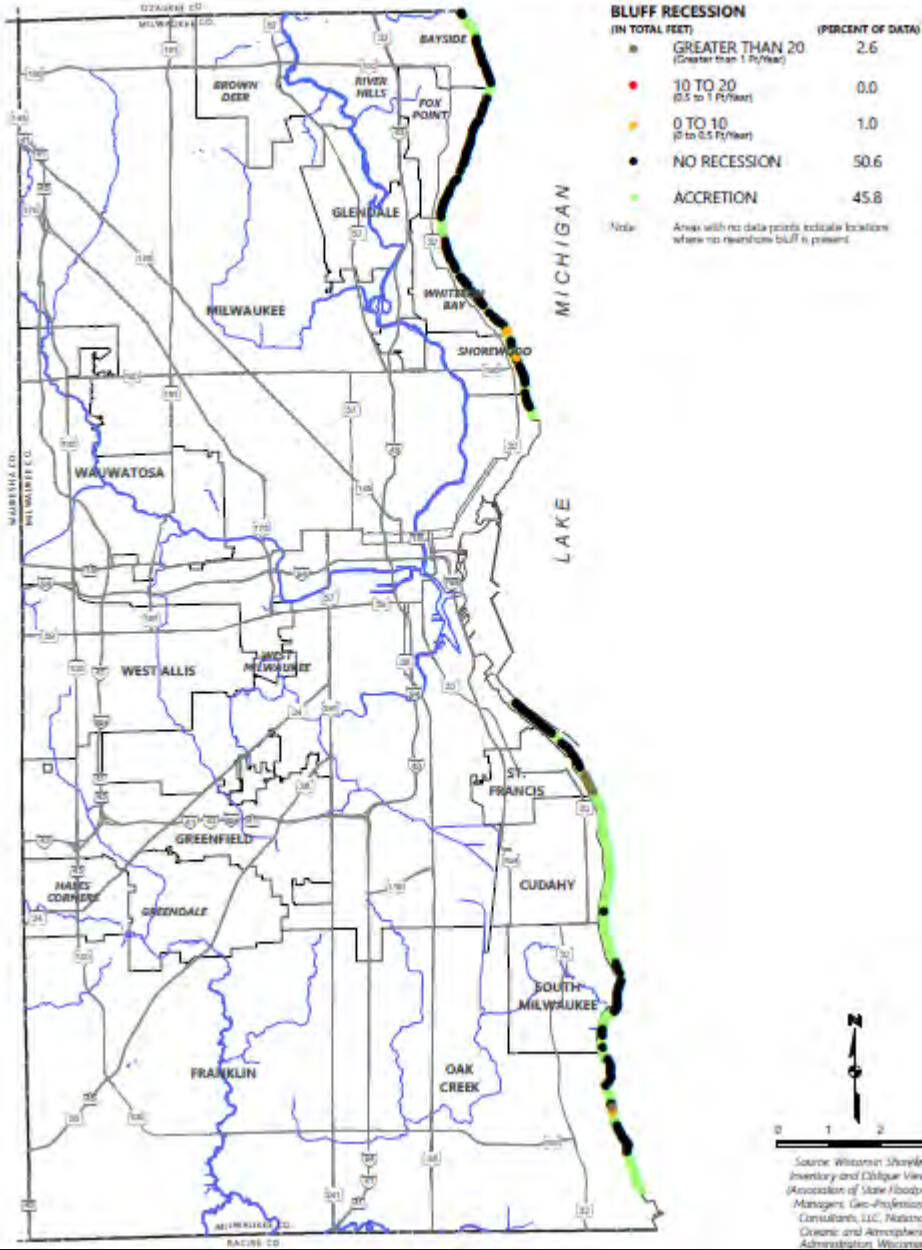
Source: Wisconsin Shoreline Inventory and Oblique Viewer (Association of State Floodplain Managers, Geo-Professional Consultants, LLC, National Oceanic and Atmospheric Administration, Wisconsin

Map 3.9
Long Term Bluff Crest Recession in Milwaukee County: 1956-2015



Source: Wisconsin Shoreline Inventory and Oblique Views (Association of State Floodplain Managers, Geo-Professional Consultants, LLC, National Oceanic and Atmospheric Administration, Wisconsin

Map 3.11
Short Term Bluff Crest Recession in Milwaukee County: 1995-2015



Source: Wisconsin Shoreline Inventory and Oblique Views (Association of State Floodplain Managers, Geo-Professional Consultants, LLC, National Oceanic and Atmospheric Administration, Wisconsin

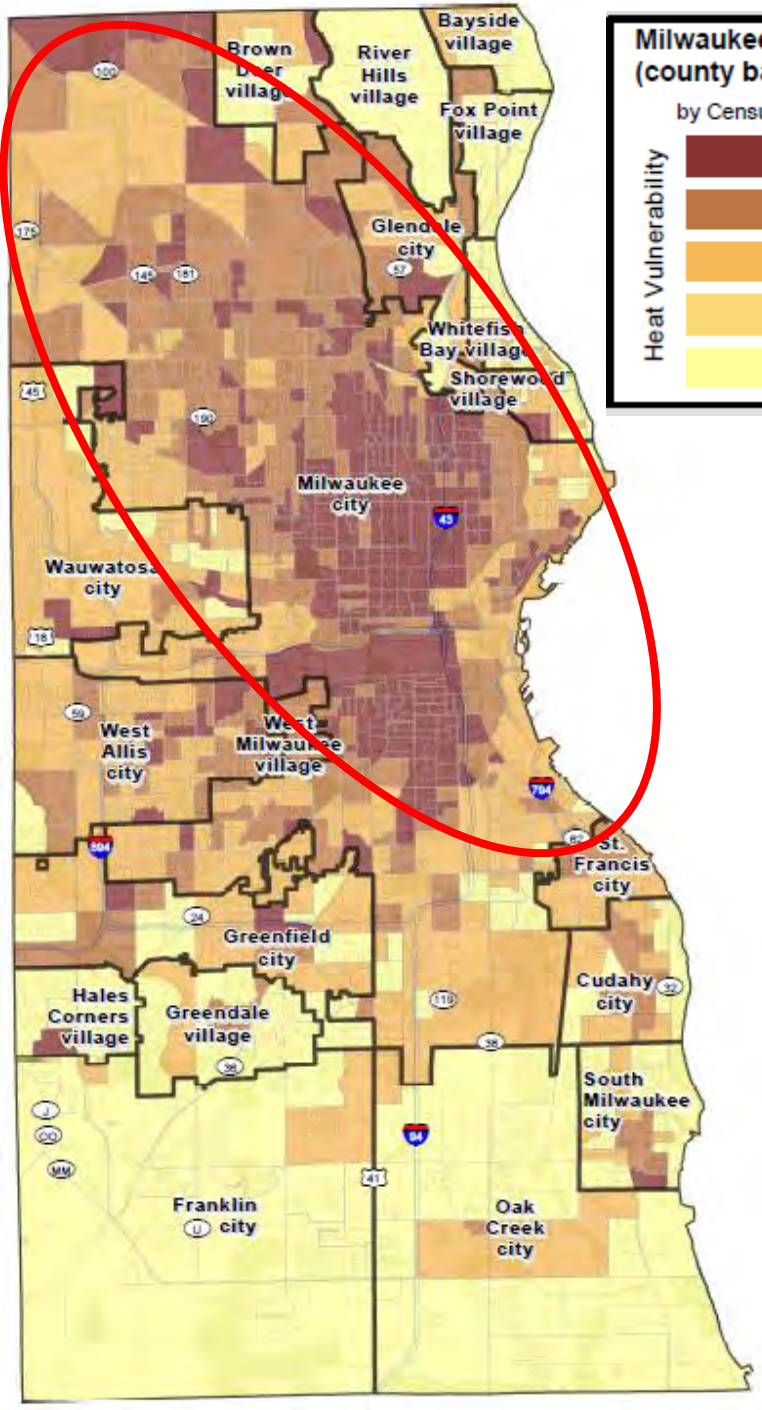
Extreme Temperatures

- **Extreme Heat**
  - Heat Index (HI)
    - Tables 3.15 and 3.16
  - **Recent Events** (2011-2022)
    - Table 3.17
    - 7 Deaths, 29 Injuries
- **Extreme Cold**
  - Wind Chill Index
    - Table 3.18
  - **Recent Events** (2011-2022)
    - Table 3.17
    - 28 deaths

- **Vulnerability and Community Impact Assessment**
  - Vulnerable Populations
    - **Heat Vulnerability Index** (Figure 3.4)
    - "Urban Heat Island" Effect
    - Appendix C
- **Future Changes and Conditions**
- **Multi-Jurisdictional Risks**

Figure 3.4

Milwaukee County BRIC Heat Vulnerability Index: 2014



Other Profiled Hazards in Plan Update

- **Severe Weather**
  - Thunderstorms
  - Lightning
  - Hail
  - Strong Winds
- **Tornadoes**
- **Winter Storms**
  - Blizzards
  - Snowstorms
- **Drought**

Project Website

- **www.sewrpc.org/HMP**
  - Agendas and other meeting materials
  - Summary notes from meetings
  - Presentations
  - Draft chapters as they are completed
  - Comment Screen
    - Or email to **mshedivy@sewrpc.org**

- **LPT Review Comments for Chapters 1-3 until 3/22/'24**

- **1st Public Meeting – Wednesday 2/21/'24** in **Fox Point** at **Fox Point Police Dept.**

Hazard Mitigation Activities and Projects Examples:

- Flooding/Stormwater (only stormwater projects completed to relieve flooding problems)
- Planning Activities
- Buyouts, demolition of damaged structures, flood proofing of structures
- New construction of dams, levees, channels, bridge/culvert replacements, pump stations, etc.
- Floodplain studies, stormwater management plans, etc.
- Severe weather training
- Channel clearing/dredging
- Stormwater detention basins or storm sewer work designed to relieve flooding
- Newly installed tornado sirens
- Newly installed tornado safe rooms
- Riverbank stabilization/Channel Rehab
- Outreach- newsletters, websites, Facebook, twitter, public meetings
- Wetland mitigation/preservation

Thank You

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