

Wayne County Hazard Mitigation Plan

Department of Homeland Security
& Emergency Management
Wayne County, Michigan

September 14, 2020

ASTI ENVIRONMENTAL

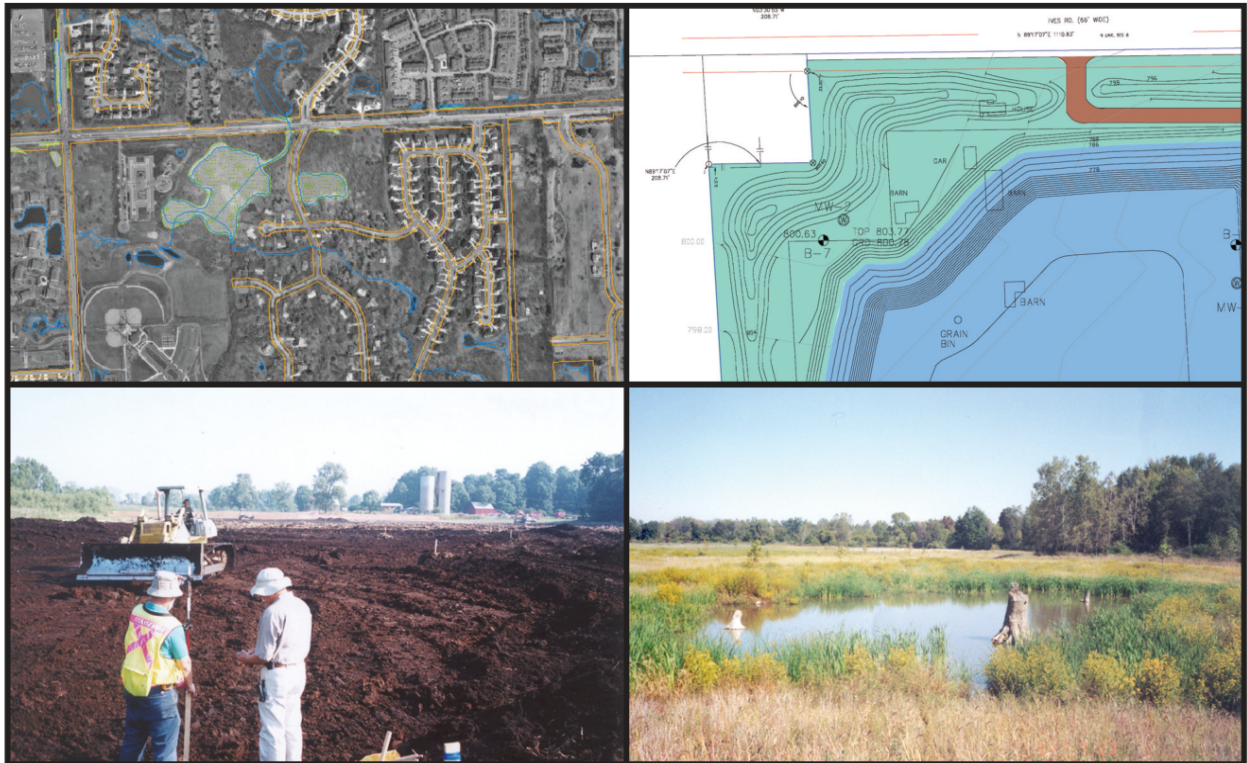


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Executive Summary

Wayne County Hazard Mitigation Plan

As with all communities in Michigan, Wayne County is subject to natural, technological, and human hazards that can threaten life and health, and can impact the quality of life, property, the environment, and infrastructure. Because of its location and land use, some hazard events in Wayne County have historically been more significant than others, and some hazard events may be more significant in the future. Providing strategies that minimize the impact of these hazards requires a commitment to a multiple-step program, including defining the problem, identifying preventive measures, implementing mitigation strategies, and incorporating hazard mitigation in County-wide planning efforts. As a first step, Wayne County has prepared this multi-jurisdictional *Hazard Mitigation Plan* (the Plan) to better understand significant Wayne County hazards and their impacts, and to identify ways to mitigate those hazards. The Plan is an update of the 2013 Hazard Mitigation Plan for Wayne County, which was in turn an update of the 2006 Wayne County HMP. The Wayne County communities listed below participated in this process and are included in the Plan. Those communities listed with an asterisk (*) were not included in the original 2006 Plan; all communities listed participated in the 2013 update. These are communities that have been approved under Public Act 390 of 1976 to have their own emergency management departments. In 2005-2006, they chose to not participate during development of the original county-side plan but elected to be part of the County's multijurisdictional planning effort during the 2013 and 2019 updates.

Forty-two (42) communities, all of the municipalities in Wayne County except the City of Detroit, were considered in the preparation of the Plan. The City of Detroit has its own, separate Department of Homeland Security and Emergency Preparedness and Local Emergency Preparedness Committee and separate hazard mitigation planning process.

Allen Park, City of	Lincoln Park, City of*
Belleville, City of	Livonia, City of*
Brownstown Township	Melvindale, City of
Canton Township*	Northville, City of
Dearborn, City of	Northville, Charter Township of
Dearborn Heights, City of*	Plymouth, City of
Ecorse, City of	Plymouth, Charter Township of*
Flat Rock, City of	Redford Township
Garden City, City of	River Rouge, City of
Gibraltar, City of	Riverview, City of
Grosse Ile Township	Rockwood, City of
Grosse Pointe, City of	Romulus, City of*
Grosse Pointe Farms, City of	Southgate, City of
Grosse Pointe Park, City of	Sumpter Township
Grosse Pointe Shores, Village of	Taylor, City of
Grosse Pointe Woods, City of	Trenton, City of
Hamtramck, City of	Van Buren Township
Harper Woods, City of	Wayne, City of*
Highland Park, City of	Westland, City of
Huron Charter Township	Woodhaven, City of
Inkster, City of	Wyandotte, City of

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The Plan Process

This Plan was completed with the assistance of the Wayne County Department of Homeland Security & Emergency Management; representatives and leaders from Wayne County communities; the Michigan State Police Emergency Management Division, Mitigation/Recovery Section; and numerous other stakeholders. Over 60 individuals were involved in the preparation, evaluation, and community outreach components of this Plan, facilitated by ASTI Environmental. The Plan was prepared by an Advisory Committee of local emergency response personnel, public works department staff, school representatives, elected officials, interested business owners, and regional agency leaders who provided evaluation and assessment and assisted with community outreach and Plan adoption.

The goal of hazard mitigation is to reduce loss of life and property from hazards that occur in the County by protecting the health, safety and economic interests of its residents. Additional goals of this Plan are:

- To retain access to Federal Emergency Management Agency (FEMA) funding for the County and its communities by complying with Section 104 of the Disaster Mitigation Act of 2000 (42 USC 5165)
- To provide a basis for identifying and mitigating hazards that affect the County and its communities
- To develop a method to incorporate hazard identification and mitigation into the planning process of the County and its communities

Specific tasks for this Plan included the following:

- Identifying Hazards and Risks
- Developing a Hazard History
- Developing a Community Profile
- Assessing Vulnerabilities
- Defining Community Goals and Objectives
- Identifying and Prioritizing Hazard Mitigation Strategies
- Developing Action Plans for a Select List of Mitigation Strategies
- Preparing a Draft Report for County, Municipal, and Public Review
- Soliciting County, Municipal, and Public Feedback
- Preparing a Final Report
- Providing Community Outreach and Communication
- Documenting the Planning Process
- Adopting the Final Plan

Hazard Assessment

A total of 40 hazards were evaluated during the planning process using a combination of historical research, surveys, workshops, and community and public meetings. Based on that evaluation, the following fourteen hazards were initially identified as deserving additional consideration for mitigation and planning.

- Extreme Temperatures - Hot or Cold

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- Flooding - Riverine & Shoreline
- Flooding - Urban (Storm water)
- Thunderstorms - Hail, Lightning, Severe Wind
- Tornadoes
- Winter Hazards - Snow, Ice, & Sleet
- Hazmat Incidents - Transportation
- Infrastructure Failure - Water & Sewer Systems
- Catastrophic Events/National Emergencies
- Civil Disturbance
- Criminal Acts - Mass Shootings/Active Assailant(s)
- Criminal Acts - Vandalism & Arson
- Public Health Emergencies - Pandemics, Epidemics, Food/Water, Opioid Crisis
- Transportation Accidents - Surface Roads/Highways

Following additional discussion, this list was further prioritized and reduced to the following six hazards, in order of priority, that are the focus of this Plan.

1. Criminal Acts - Mass Shootings/Active Assailant(s)
2. Infrastructure Failure - Water & Sewer Systems
3. Public Health Emergencies - Pandemics, Epidemics, Food/Water, Opioid Crisis
4. Extreme Temperatures - Hot or Cold
5. Hazmat Incidents - Transportation
6. Flooding - Riverine & Shoreline

These hazards were selected to represent both County-wide and local community concerns about hazards. Prioritization of these six hazards does not reduce the significance of any of the hazards evaluated but provides a method for the County to focus mitigation activities and resources.

Hazard Mitigation

The Advisory Committee reviewed the mitigation strategies from the 2013 Plan and identified new strategies for consideration, based on input from the mitigation survey, community meetings, and workshop discussions. These strategies were evaluated by the Advisory Committee, and the nine listed below were selected to develop into final county-wide Action Items. This Plan contains Action Items developed by Committee members.

Criminal Acts: Mass Shooting(s)/Active Assailant(s)

1. Continue training in most current protocols and develop a process for requesting assistance from local and state law enforcement.

Infrastructure Failure

2. Identify, prioritize, and replace or renovate aging structures and equipment. Establish procedures to protect IT systems.

Public Health Emergencies

3. Stockpile vaccines and antidotes; train & equip volunteers to staff open/closed points of dispensing (PODs)

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4. Develop and use mass media notification systems for public health emergencies (establish Wayne County geo-targeting/geo-fencing methods for notifications using Facebook, Nixle, Twitter, etc.)

Extreme Temperatures

5. Establish and build awareness of accessible heating/cooling centers in the community. Utilize all means available, including webs sites, social media, smart phone apps, mailers, etc. to inform public of impending weather threats and resources available, including heating & cooling shelters.
6. Educate the public regarding safe use of office and home space heaters, generators, smoke detectors & carbon monoxide detectors.
7. Catalog & map areas of vulnerable and other residents (unlicensed facilities, empty/vacant buildings, etc.). Provide outreach and transportation to vulnerable and normally hard-to-reach populations during extreme temperature events.

Hazardous Materials (HazMat) Incidents – Transportation

8. Utilize public warning systems and networks for public awareness and instructions in the event of hazardous materials incidents.

Flooding – River/Shoreline

9. Identify and map, or update existing maps of, floodplains and flood prone areas. Leverage new ArcGIS online application with MI CIMS sponsored by Michigan State Police and FEMA Risk MAP incorporating the Great Lakes Coastal Flood Study. Provide training for local jurisdiction use and access.

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1. Introduction

Wayne County is subject to natural, technological, and human hazards that can threaten life, health, property, and the environment. The Federal Disaster Mitigation Act of 2000 requires local governments to develop a Hazard Mitigation Plan (HMP), which identifies strategies to minimize the impact of these hazards, in order to be eligible for *pre-* or *post-* disaster mitigation funding. In response, Wayne County has prepared this multi-jurisdictional *Hazard Mitigation Plan* (the Plan) to better understand significant Wayne County hazards and their impacts, and to identify ways to mitigate those hazards.

This Plan was completed with the guidance of the Wayne County Department of Homeland Security & Emergency Management; members of the community; representatives and leaders from communities in the County; the Michigan State Police Emergency Management Division, Mitigation/Recovery Section; and numerous other stakeholders. Over 90 individuals were involved in the preparation, evaluation, and community outreach components of this Plan.

1.1 Acknowledgements

Development of this Hazard Mitigation Plan required the time, talents, effort, and ideas of numerous individuals. Over 60 stakeholders, community leaders, residents, and County staff participated in the development of this Plan. Sixty-two people attended meetings to provide input on Plan development, including staff from the Department of Homeland Security & Emergency Management and representatives and leaders from communities and non-profit organizations in the County.

Wayne County would like to acknowledge and thank the following people for their cooperation and assistance in developing this report:

Wayne County Department of Homeland Security & Emergency Management

Tadarial Sturdivant, Director
Samer Jaafer, Deputy Director
Danielle Elzayat, Chief of Staff
G. Vencil Parker

Michigan State Police Emergency Management Division, Mitigation/Recovery Section

Mike Sobocinski, Hazard Mitigation Specialist
Mitch Graham, Hazard Mitigation Specialist

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Table 1. Wayne County Hazard Mitigation Plan Advisory Committee Meeting Attendees

Name	Community or Organization	Title/Department
Douglas Lafond	City of Allen Park	Fire Chief
Robert Matthews	Brownstown Township	Police Chief
William Hayes	Canton Township	Emergency Management Coordinator
Bradley Smith	City of Dearborn	Captain, Fire
Mickey Wiewiura	City of Dearborn Heights	Battalion Chief, Fire
Lee Gavin	City of Dearborn Heights	Emergency Manager
Troy Cruzen	Ethos Corporation	Operations Manager
Scott Cruzen	Ethos Corporation	President
Jaylee Lynch	Garden City	Director of Compliance
Don Barton	Garden City	Lieutenant, Police
Catherine Harman	Garden City	Fire Chief
Derek LaPerriere	Garden City	Captain, Fire
Derek Fisher	Garden City	Superintendent, Public Schools
Matthew Lawyer	City of Gibraltar	Police Chief
Duncan Murdock	Grosse Ile Township	Fire Chief
Brian Loftus	Grosse Ile Township	Supervisor
Stephen Paloni	Cities of Grosse Pointe/Grosse Pointe Park	Director, Public Safety
Holly Krizmanich	City of Grosse Pointe Farms	Lieutenant, Public Safety
John Kosanke	City of Grosse Pointe Woods	Director, Public Safety
Anne Moise	City of Hamtramck	Police Chief
James Tolbert	City of Highland Park	Deputy Chief, Police
Chuck Hubbard	City of Inkster	Fire Chief
Bud Avery	City of Inkster	Superintendent, Public Safety
William Riley	City of Inkster	Police Chief
Lashaw Smithon	City of Inkster	Sergeant, Police
Michael Heyward	City of Inkster	Police Officer
Steve Martin	City of Lincoln Park	Fire Chief
Don Rohraff	City of Lincoln Park	Superintendent, Public Works
Jacob Rushlow	City of Livonia	Director, Public Works
Brian Kahn	City of Livonia	Emergency Manager
John Raymond	City of Livonia	Director of Security, Public Schools
Gary Mann	Madonna University	Director, Public Safety
Steve Densmore	City of Melvindale	Fire Chief
Dustin Krueger	City of Northville	Captain, Police
Mike Burrough	Northville Township	Lieutenant, Police
John Walker	Plymouth-Canton	Director, Public Schools
Dan Phillips	Plymouth Township	Fire Chief
Danny Dotson	City of River Rouge	Inspector, Police
Leonel Lopez	City of River Rouge	Police Chief

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Clifford Rosebohm	City of Riverview	Police Chief
Jill Martin	City of Romulus	Administrative Assistant, Fire
Mike Sypula	City of Southgate	Fire Chief
Jeff Smith	City of Southgate	Police Chief
Anthony Chicko	City of Taylor	Lieutenant, Police
Paul Haley	City of Trenton	Emergency Manager
Amy Brow	Charter Township of Van Buren	Fire Chief
Ed Queen	City of Wayne	Assistant Director, Public Works
Finley Carter	City of Wayne	Detective Lieutenant, Police
William Bantom	Wayne County, Public Services	Director, Roads Division
Aaron Vincent	Wayne County, Homeland Security & Emergency Mgt	Logistic Chief
Samer Jaafar	Wayne County, Homeland Security & Emergency Mgt	Deputy Director
Lisa Dirado	Wayne County, Homeland Security & Emergency Mgt	Planner
Tadarial Sturdivant	Wayne County, Homeland Security & Emergency Mgt	Director
Danielle Elzayat	Wayne County, Homeland Security & Emergency Mgt	Chief of Staff
Brian Herman	Wayne County, Homeland Security & Emergency Mgt	Finance Director
Voncil Parker	Wayne County, Homeland Security & Emergency Mgt	Office Assistant
Shanon Herron	Wayne County, Homeland Security & Emergency Mgt	Planner
Hector Roman	Wayne County, Homeland Security & Emergency Mgt	Director, IT
Matthew Connolly	Wayne-Westland Community Schools	Field Supervisor Maintenance Operations
Geno Montayne	Wayne-Westland Community Schools	Engineer Management Supervisor
Tony Spisak	Wayne-Westland Community Schools	Executive Director Maintenance Operations
Mike Stradtner	Cities of Wayne-Westland	Fire Chief
Michael Clark	City of Woodhaven	Fire Chief

Table 2. presents the names and affiliations of individuals that commented on the draft HMP and/or provided additional information specific to FEMA-requested detail. Asterisks identify those individuals that had not otherwise participated in the Hazard Mitigation Plan Advisory Committee workshops. The names of four residents from Brownstown Township (1) and the City of Taylor (3) that attended and participated in the Public meeting are provide separately in Appendix A.

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Table 2. Municipal/Agency Representatives Commenting on the Draft HMP

Name	Community or Organization	Title/Department
Douglas Lafond	City of Allen Park	Fire Chief
Tracey Schultz Kobylarz*	City of Belleville	Interim City Manager
Brian Loranger*	City of Belleville	Fire Chief
David Robinson*	City of Belleville	Chief of Police
Rick Rutherford*	City of Belleville	DPW Director
Sherri Scharf*	City of Belleville	Clerk
Robert M. Matthews	Brownstown Township	Police Chief
William Hayes	Charter Township of Canton	Emergency Management Coordinator
Bradley Smith	City of Dearborn	Captain, Fire
Steven Densmore*	City of Dearborn	Fire Chief
Lee Gavin	City of Dearborn Heights	Emergency Manager
Megan Irving*	DTE Energy Company	Regulatory Attorney
Barbara Rykwald*	DTE Energy Company	Regional Manager
Cristy Rankin*	DTE Energy Company	Emergency Management Specialist
Kyle Seidel, PE*	Senior Project Engineer	Anderson, Eckstein & Westrick, Inc. (for City of Ecorse)
Terri Capra*	Assessor	City of Ecorse
Lamar Tidwell*	Mayor	City of Ecorse
Richard Marsh*	City Administrator	City of Ecorse
Timothy Sadowski*	Finance Controller	City of Ecorse
Kevin Lawrence*	Director of Public Works	City of Ecorse
Scott Cruzen	Ethos Corporation	President
James Katona*	City of Flat Rock	Fire Chief
Jaylee Lynch	Garden City	Director of Compliance
Don Barton	Garden City	Lieutenant, Police
Catherine Harman*	Garden City	Fire Chief
Derek LaPerriere	Garden City	Captain, Fire
Derek Fisher	Garden City	Superintendent, Public Schools
Brian Finneran*	Garden City	Fire Marshall
Matthew Lawyer	Gibraltar	Police Chief
Duncan Murdock	Grosse Ile Township	Fire Chief
Brian Loftus	Grosse Ile Township	Supervisor
Stephen Paloni	Grosse Pointe City/ Grosse Pointe Park	Director, Public Safety
Holly Krizmanich	Grosse Pointe Farms	Lieutenant, Public Safety
John Schulte*	Village of Grosse Pointe Shores	Police Chief/Director, Public Safety
John Kosanke	Grosse Pointe Woods	Director, Public Safety
Anne Moise	City of Hamtramck	Police Chief
Danny Hagen*	City of Hamtramck	Fire Chief

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Vince Smith*	City of Harper Woods	Public Safety Director
James Tolbert	City of Highland Park	Deputy Chief, Police
Chuck Hubbard	City of Inkster	Fire Chief
Bud Avery	City of Inkster	Superintendent, Public Safety
William Riley	City of Inkster	Police Chief
Lashaw Smithon	City of Inkster	Sergeant, Police
Michael Heyward	City of Inkster	Police Officer
Mary Pitts*	City of Inkster	Fire Department Executive Secretary
Steve Martin	Lincoln Park	Fire Chief
Don Rohraff	Lincoln Park	Superintendent, Public Works
Jacob Rushlow	Livonia	Director, Public Works
Brian Kahn	Livonia	Emergency Manager
John Raymond	Livonia	Director of Security, Public Schools
Gary Mann	Madonna University	Director, Public Safety
Steve Densmore	Melvindale	Fire Chief
Allan Maciag*	City of Northville	Chief of Police
Dustin Krueger	City of Northville	Captain, Police
Mike Burrough	Northville Township	Lieutenant, Police
Paul Sincok*	City of Plymouth	City Manager/Emergency Manager
Al Cox*	City of Plymouth	Director of Public Safety/Police Chief
John Walker	Plymouth-Canton Public Schools	Director, Public Schools
Dan Phillips	Plymouth Township	Fire Chief
Mike Dennis*	Charter Township of Redford	Director, Public Services & Community Development Dept.
Danny Dotson	River Rouge	Inspector, Police
Leonel Lopez	River Rouge	Police Chief
Cliff Rosebohm	Riverview	Police Chief
Cindy Trombley*	City of Rockwood	City Administrator
Jill Martin	Romulus	Grants Administrator, Emergency Preparedness Coordinator
Mike Sypula	City of Southgate	Fire Chief
Jeff Smith	City of Southgate	Director of Public Safety
Joseph Marsh*	City of Southgate	Chief of Police
Anthony Chicko	City of Taylor	Lieutenant, Police
Paul Haley	City of Trenton	Emergency Manager
Amy Brow	Charter Township of Van Buren	Fire Chief
David McNally*	Charter Township of Van Buren	Fire Marshall
Ed Queen	City of Wayne	Assistant Director, Public Works
Finley Carter	City of Wayne	Detective Lieutenant, Police
Ryan Strong*	City of Wayne	Police Chief
Patrick Cullen*	Wayne County, Dept, Public Services	Division Director

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Elmeka Steele*	Wayne County, Dept, Public Services	Drain Commissioner
Beverley Watts*	Wayne County, Dept, Public Services	Director
William Bantom	Wayne County, Dept, Public Services	Director, Roads Division
Aaron Vincent	Wayne County, Homeland Security & Emergency Mgt	Logistic Chief
Samer Jaafar	Wayne County, Homeland Security & Emergency Mgt	Deputy Director
Lisa Dirado	Wayne County, Homeland Security & Emergency Mgt	Planner
Tadarial Sturdivant	Wayne County, Homeland Security & Emergency Mgt	Director
Danielle Elzayat	Wayne County, Homeland Security & Emergency Mgt	Chief of Staff
Timothy Mautz*	Wayne County, Homeland Security & Emergency Mgt	Deputy Emergency Management Coordinator
Brian Herman	Wayne County, Homeland Security & Emergency Mgt	Finance Director
Voncil Parker	Wayne County, Homeland Security & Emergency Mgt	Office Assistant
Shanon Herron	Wayne County, Homeland Security & Emergency Mgt	Planner
Hector Roman	Wayne County, Homeland Security & Emergency Mgt	Director, IT
Matthew Connolly	Wayne-Westland	Field Supervisor Maintenance Operations, Community Schools
Geno Montayne	Wayne-Westland	Engineer Management Supervisor, Community Schools
Tony Spisak	Wayne-Westland	Executive Director Maintenance Operations, Community Schools
Michael Stradtner	Wayne-Westland	Fire Chief
Michael Clark	Woodhaven	Fire Chief
Brian Zalewski*	City of Wyandotte	Chief of Police

This multi-jurisdictional Hazard Mitigation Plan was created for Wayne County, and the participating communities within Wayne County, to better understand natural, technological, and human hazards and their impacts, and to identify ways to mitigate those hazards to protect the health, safety and economic interests of its residents. The Wayne County communities listed below participated in this process and are included in this Plan. Forty-two (42) communities in Wayne County, all county communities except the City of Detroit, were considered in the preparation of this Plan. These same 42 communities participated in the 2013 HMP update as well.

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Allen Park, City of
Belleville, City of
Brownstown Township
Canton Township
Dearborn, City of
Dearborn Heights, City of
Ecorse, City of
Flat Rock, City of
Garden City
Gibraltar, City of
Grosse Ile Township
Grosse Pointe, City of
Grosse Pointe Farms, City of
Grosse Pointe Park, City of
Grosse Pointe Shores, Village of
Grosse Pointe Woods, City of
Hamtramck, City of
Harper Woods, City of
Highland Park, City of
Huron Charter Township
Inkster, City of

Lincoln Park, City of
Livonia, City of
Melvindale, City of
Northville, City of
Northville, Charter Township of
Plymouth, City of
Plymouth, Charter Township of
Redford Township
River Rouge, City of
Riverview, City of
Rockwood, City of
Romulus, City of
Southgate, City of
Sumpter Township
Taylor, City of
Trenton, City of
Van Buren Township
Wayne, City of
Westland, City of
Woodhaven, City of
Wyandotte, City of

2. Hazard Mitigation Plan Process

This Plan is designed to comply with requirements of the Disaster Mitigation Act of 2000, which states that local governments must have an approved Hazard Mitigation Plan in place to be eligible for pre-disaster mitigation funds after November 1, 2003, and post-disaster mitigation funds after November 1, 2004.¹ This Plan is also designed to comply with the Federal Emergency Management Act; guidance documents developed by the Federal Emergency Management Agency (FEMA) and the Michigan State Police Emergency Management Division (EMD); and other applicable federal, state, and local regulations. This was accomplished by evaluating the impacts of known natural, technological, and human hazards, prioritizing mitigation alternatives, and coordinating hazard mitigation with other County programs and policies.

A total of 40 hazards, in the three categories described below, were evaluated during the planning process. Hazard definitions are included in Section 4. These hazards were selected based on the guidelines presented in the *Local Hazard Mitigation Planning Guidebook*, Michigan Department of State Police Emergency Management Division².

Natural Hazards

- Celestial Impact
- Drought
- Earthquakes
- Extreme Temperatures
 - Including extreme heat and extreme cold
- Fires (Wildfires)
- Flooding (Non-Dam)
 - Including riverine and shoreline flooding and erosion
- Fog
- Invasive Species
- Subsidence (Natural)
- Thunderstorms
 - Including hail, lightning, and severe winds
- Tornadoes
- Winter Hazards
 - Including ice, sleet, and snowstorms

Technological Hazards

- Fires (Non-Natural)
 - Including structural and scrap tire fires
- Flooding
 - Including dam failure and other urban (stormwater) flooding

¹ Section 104 of the Disaster Mitigation Act of 2000 (42 USC 5165), 44 CFR (Code of Federal Regulations) Part 201

² Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012.

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- Hazmat Incidents
 - Including fixed site and transportation
- Infrastructure Failure
 - Including water, electrical, communication, storm water and sanitary sewer systems
- Nuclear Power Plant Accidents
- Oil and Gas Wells Accidents
- Pipeline Accidents
 - Including petroleum and natural gas
- Subsidence (Mining and Technical)

Human Hazards

- Catastrophic Events/National Disasters
- Civil Disturbance
- Criminal Acts
 - Including vandalism, arson and mass shootings
- Information Technology Intrusion
- Gas and Oil Shortages or Supply Disruptions
- Public Health Emergencies
 - Including pandemics, epidemics, and contaminated food and water
- Terrorism and Sabotage
- Transportation Accidents
 - Including air, highway, surface roads, rail, and marine
- Weapons of Mass Destruction

Although included in the hazard analysis section, this Plan does not include mitigation strategies for terrorism, the use of weapons of mass destruction, or nuclear power plant accidents. These hazards are addressed in the Wayne County Emergency Operations Plan, which is a homeland security and law enforcement sensitive document and, therefore, not available to the public. For security purposes, operational information regarding these hazards is not included in this Plan.

2.1 Plan Goals and Objectives

The general goals of any Hazard Mitigation Plan include saving lives and protecting property, preserving and protecting an area's environment and economy, and preserving and maintaining an area's essential services and quality of life. This Plan includes these general goals. In addition, specific goals of this Plan are:

- To retain access to FEMA funding for the County and its communities by complying with Section 104 of the Disaster Mitigation Act of 2000 (42 USC 5165)
- To provide a basis for identifying hazards that affect the County and its communities

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- To develop a method to incorporate hazard identification and mitigation into the planning process of the County and its communities

Through the hazard mitigation planning process presented in this Plan, Advisory Committee members also identified specific goals and objectives, consistent with the overall planning process and supported by specific mitigation strategies, to do the following:

- Protect and preserve human health and well being
- Maintain and fortify critical assets, structures and infrastructure to preserve the quality of life.
- Ensure interagency cooperation and coordination for preparedness
- Enhance emergency response capabilities (including and especially communications)
- Review and improve county-wide contingency plans for maintaining quality of life

2.2 Planning Process

This Plan was prepared to provide a basis for identifying and managing natural, technological, and human hazards, and to meet federal, state and local requirements for hazard mitigation and FEMA grant funding. Plan preparation involved completion of the following tasks:

- Identifying Hazards and Risks
- Developing a Hazard History
- Developing a Community Profile
- Assessing Vulnerabilities
- Defining Community Goals and Objectives
- Identifying and Prioritizing Hazard Mitigation Strategies
- Developing Action Plans for a Select List of Mitigation Strategies
- Preparing a Draft Report for County, Municipal, and Public Review
- Soliciting County, Municipal, and Public Feedback
- Preparing a Final Report
- Providing Community Outreach and Communication
- Documenting the Planning Process
- Adopting the Final Plan

Wayne County contracted ASTI Environmental, Inc. (ASTI) of Brighton, Michigan to facilitate the hazard mitigation planning process and prepare the final Hazard Mitigation Plan. Members of the Advisory Committee are listed in Table 2. As described below, development of this Plan involved identifying and evaluating hazards and mitigation options conducted by an Advisory Committee made up of community representatives from municipalities in the County, emergency management leaders and other stakeholders from these same municipalities, and review and input from members of the general the public. Each of these is described further in Section 2.3, Plan Participation.

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Table 2. Advisory Committee

Name	Community or Organization	Title/Department
Doug Laford	Allen Park	Fire Chief
Robert Matthews	Brownstown Township	Police Chief
William Hayes	Canton Township	Emergency Manager
Bradley Smith	Dearborn	Captain, Fire
Mickey Wiewiura	Dearborn Heights	Battalion Chief, Fire
Lee Gavin	Dearborn Heights	Emergency Manager
Troy Cruzen	Ethos Corporation	Operations Manager
Scott Cruzen	Ethos Corporation	President
Jaylee Lynch	Garden City	Director of Compliance
Don Barton	Garden City	Lieutenant, Police
Catherine Harman	Garden City	Fire Chief
Derek LaPerriere	Garden City	Captain, Fire
Derek Fisher	Garden City	Superintendent, Public Schools
Matthew Lawyer	Gibraltar	Police Chief
Duncan Murdock	Grosse Ile Township	Fire Chief
Brian Loftus	Grosse Ile Township	Supervisor
Stephen Paloni	Grosse Pointe City/ Grosse Pointe Park	Director, Public Safety
Holly Krizmanich	Grosse Pointe Farms	Lieutenant, Public Safety
John Kosanke	Grosse Pointe Woods	Director, Public Safety
Anne Moise	Hamtramck	Police Chief
James Tolbert	Highland Park	Deputy Chief, Police
Chuck Hubbard	Inkster	Fire Chief
Bud Avery	Inkster	Superintendent, Public Safety
William Riley	Inkster	Police Chief
Lashaw Smithon	Inkster	Sergeant, Police
Michael Heyward	Inkster	Police Officer
Steve Martin	Lincoln Park	Fire Chief
Don Rohraff	Lincoln Park	Superintendent, Public Works
Jacob Rushlow	Livonia	Director, Public Works
Brian Kahn	Livonia	Emergency Manager
John Raymond	Livonia	Director of Security, Public Schools
Gary Mann	Madonna University	Director, Public Safety
Steve Densmore	Melvindale	Fire Chief
Dustin Krueger	Northville	Captain, Police
Mike Burrough	Northville Township	Lieutenant, Police
John Walker	Plymouth-Canton	Director, Public Schools
Dan Phillips	Plymouth Township	Fire Chief
Danny Dotson	River Rouge	Inspector, Police

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Leonel Lopez	River Rouge	Police Chief
Cliff Rosebohm	Riverview	Police Chief
Jill Martin	Romulus	Administrative Assistant, Fire
Mike Sypula	Southgate	Fire Chief
Jeff Smith	Southgate	Police Chief
Anthony Chicko	Taylor	Lieutenant, Police
Paul Haley	Trenton	Emergency Manager
Amy Brow	VanBuren Township	Fire Chief
Ed Queen	Wayne	Assistant Director, Public Works
Finley Carter	Wayne	Detective Lieutenant, Police
Aaron Vincent	Wayne County	Logistic Chief, Homeland Security & Emergency Mgt
William Bantom	Wayne County	Director, Roads Division
Samer Jaafar	Wayne County	Deputy Director, Homeland Security & Emergency Mgt
Lisa Dirado	Wayne County	Planner, Homeland Security & Emergency Mgt
Tadarial Sturdivant	Wayne County	Director , Homeland Security & Emergency Mgt
Danielle Elzayat	Wayne County	Chief of Staff, Homeland Security & Emergency Mgt
Brian Herman	Wayne County	Finance Director, Homeland Security & Emergency Mgt
Voncil Parker	Wayne County	Office Assistant , Homeland Security & Emergency Mgt
Shanon Herron	Wayne County	Planner, Homeland Security & Emergency Mgt
Hector Roman	Wayne County	Director, IT
Matthew Connolly	Wayne-Westland	Field Supervisor Maintenance Operations, Community Schools
Geno Montayne	Wayne-Westland	Engineer Management Supervisor, Community Schools
Tony Spisak	Wayne-Westland	Executive Director Maintenance Operations, Community Schools
Mike Stradtner	Wayne-Westland	Fire Chief
Michael Clark	Woodhaven	Fire Chief

Planning Approach

Plan preparation was based on the contract titled *Professional Services Contract Between Wayne County and Applied Science and Technology, Inc. D/B/A ASTI Environmental*. The planning process involved updating background information on the

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County and hazards affecting the County from available published and internet sources, updating information on local hazard issues from individual communities, obtaining input on hazard priorities, identifying specific vulnerabilities and desired mitigation strategies, facilitating the activities of the Advisory Committee, and conducting a series of workshops and a public meeting with County officials, local stakeholders, and the general public as described below.

Information on hazards in the County, and applicable mitigation strategies to address those hazards, was also obtained from two workshops and three surveys. The first survey was provided to Advisory Committee members and resulted in a numerical ranking of 37 hazards. Information from this survey was used in the first workshop described below. The second survey was provided to the Advisory Committee to rank 228 mitigation strategies and provided opportunities to add new mitigation strategy ideas. Information from this survey was used in the second workshop described below. Additional information regarding the surveys is included in Sections 2.4.1, 5.1 and 6.2.

The workshops included individual assignments, small group assignments, and group-wide discussion and evaluation. Through a combination of pair-wise ranking exercises, worksheets, and discussion groups, workshop participants evaluated survey input, created and used evaluation criteria, identified goals and objectives, and selected options for mitigating specific hazards.

2.2.1 Existing Plans and Programs

Because a Hazard Mitigation Plan is only a part of the emergency planning, mitigation, preparedness, response, and recovery process, a second objective of this planning process was to coordinate plan preparation with existing emergency plans, programs, procedures, and organizations established by Wayne County. Future coordination of this Plan with other activities in the County will be conducted by the Hazard Mitigation Plan Advisory Committee (HMPAC) as described in Section 2.6 below. Individual members of the HMPAC are to identify opportunities, within their respective departments or organizations, to incorporate this Plan into other County plans and programs. Any such opportunities that are identified will be referred back to the HMPAC as a whole, for consideration. Incorporating this Plan into other plans and programs will ultimately be at the discretion of the County department or organization which administers these plans or programs.

In developing this Plan, existing hazard mitigation goals and objectives within the County were reviewed and are described below. It should be noted that this Plan does not replace any existing plans or programs but is intended to serve as a reference for hazard mitigation to be used in planning and program development.

Several existing documents published by county, regional, state, and federal institutions were utilized in developing this Plan, as shown in the footnotes throughout the Plan. These documents included:

- Michigan Department of State Police Emergency Management Division, *Michigan Hazard Analysis*, December 2001, July 2012, and April 2019.
- Michigan State Police, Uniform Crime Reports, Crime Statistics, Wayne County, 1997-2010.
- Michigan State Police Property Index Crime Trends, 1997-2000.

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- SEMCOG, *Land Use in Southeast Michigan, 1990-2000*, Specific to Wayne County, April 2004.
- SEMCOG, *2045 Regional Development Forecast (RDF) Forecasted Population Change*, May 2019.
- SEMCOG and Wayne County Geographic Information Systems (GIS) digital land use data. 2008 and 2012.
- U.S. Census Bureau, *Profile of General Demographic Characteristics: 2000, 2010*, Wayne County, Michigan.
- U.S. Census Bureau, Decennial Census, 2015 American Community Survey 5-Year Estimates.
- FEMA NFIRS 5.0 National Reporting, Tally by Incident Type, January 1, 1998 through December 31, 2004.
- FEMA National Flood Insurance Program Community Status Book, updated September 24, 2019.

2.2.2 County Goals and Objectives

Successful implementation of this Plan requires that it fit within, and be consistent with, other goals, objectives, and programs of Wayne County government. As such, identified goals and objectives, mission statements, and other guiding principles of relevant County agencies were reviewed as part of the planning process. The County's hazard mitigation planning process is not intended to replace any other County planning effort but should be considered in future County-wide planning. Specific goals and objectives developed as part of this hazard mitigation planning process fit within the context of the existing roles of the Wayne County Department of Homeland Security & Emergency Management listed below.

The Wayne County Department of Homeland Security & Emergency Management serves as the lead department for both development and implementation of the County's Hazard Mitigation Plan. This Plan is consistent with the mission of the Wayne County Emergency Management Division which is:³

“To take the lead role in coordinating the County's responsibility to plan, analyze, conduct and maintain programs to preserve and protect lives and property from major emergencies and disasters of all types. In this capacity, it maintains a current adequate emergency management program for the County of Wayne and all participating local municipalities.”

Furthermore, the Plan is consistent with the goals and objectives of the Wayne County Department of Homeland Security & Emergency Management which include the following:⁴

³ Source: Wayne County Emergency Management Division website, <http://www.co.wayne.mi.us/hsem.htm>

⁴ Source: Wayne County Emergency Management Division website, <http://www.co.wayne.mi.us/hsem.htm>.

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Update and maintain the Emergency Operations Plan and all related support documents.

Maintain emergency response facilities, equipment and supplies in immediately operational status.

Conduct public awareness activities designed to increase basic emergency preparedness skills and develop public confidence in the County's Emergency Management Program.

Conduct disaster response training drills and exercises designed to highlight and correct emergency planning and resource deficiencies and to otherwise maintain and improve the overall emergency response readiness level of the County and participating local communities.

Enhance Technical Support Team and Metropolitan Medical Strike Team (both counter-terrorism specialty teams) capabilities.

2.3 Plan Participation

The focus of the County hazard mitigation planning process was a series of structured discussions with, and opportunities for feedback from, county officials, Wayne County and neighboring community municipal officials, affected stakeholders including local and regional agencies involved in hazard mitigation activities and/or land use/regional planning, and the general public. In particular, these included the mechanisms for outreach and input listed below. Copies of public outreach materials describing the planning process and soliciting participation in development of the Plan are provided in Appendix A.

- A project web site that presented a summary of the planning process, relevant background materials, and a web-based comment form.
- Flyers describing the planning process available to the Advisory Committee, municipal officials, and the general public.
- On-line surveys provided to the Advisory Committee and strategic partner organizations.
- Two workshops for identifying and prioritizing hazards, hazard mitigation strategies, and action plans, with meeting minutes emailed to the Advisory Committee and community representatives.
- One public meeting.
- Copies of the draft plan distributed to all Advisory Committee members and community representatives and available for public review on the project web site.

2.3.1 County Participation

The Wayne County Department of Homeland Security & Emergency Management provided contract administration, participation on the Advisory Committee, local matching funds for the development of this Plan (in the form of staff salaries and direct expenses), and Geographic Information Systems (GIS) data.

2.3.2 Advisory Committee

An Advisory Committee was invited to participate in the planning process. Participants included emergency management and public safety directors and staff, planners, fire and police officers, public works and road agency personnel, regional infrastructure group representatives, and school district representatives. Representatives of Ethos Corporation, a firm that assists health care facilities manage risk emergency preparedness provided insight regarding the needs of hospitals and assisted care facilities. This served as the primary group providing input on the hazards and mitigation options applicable to the County, and to oversee development of the Plan.

The committee consisted of the 62 individuals listed in Tables 1 and 2. The Advisory Committee participated in hazard identification and risk assessment, evaluation of mitigation alternatives, and preparation of the final action plans through a series of workshops and surveys.

2.3.3 Community Representatives

One or more representatives from each of the 42 communities coordinated community input and discussed hazard identification, mitigation options, and community-specific vulnerabilities with Wayne County staff. Community representatives consisted of one or more key stakeholders such as the Police Chief; Fire Chief; Public Safety Directors; Mayors, Village Presidents, Township Supervisors; and Emergency Management Coordinators, school district representatives or other representatives appointed by each community. Community representatives were kept informed of planning progress through the project web site, Advisory Committee meetings, requests for participation in project meeting and three on-line surveys and invited to comment on the Draft Plan posted on the web site.

2.3.4 Public Outreach

One public meeting was held at the Heinz C. Prechter Educational & Performing Arts Center (EPAC) at the Wayne County Community College, Downriver Campus, in Taylor. The public meeting was announced via email to members of the Advisory Committee, on the project website, via press release to 84 individuals representing 31 media outlets, and a legal notice in the Detroit Free Press newspaper.

The public meeting was held at 5:30 p.m., April 23, 2019. The purpose of the meeting was to introduce project team members, provide an overview of the project, discuss the processes and purposes of the planning effort and resulting Hazard Mitigation Plan, provide the project contacts and web links individuals could use to receive further information regarding the Plan and planning process, to update the public on developments in the project, and solicit feedback on the draft plan.

As noted above, the public meeting was publicized the Sunday prior to the meeting with a legal notice in the Detroit Free Press. Copies of public meeting materials and a summary of public comments received are provided in Appendices A and B, respectively.

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Members of the public at the public meeting did not provide comment on the specifics of the HMP other than to note that flooding and erosion concerns along the Lake Erie shoreline were a high priority. The comments/questions received emphasized the importance of flooding and mechanisms to inform the public of impending high water levels as high priorities. The public comments received were incorporated into county-wide Action Plan #6. Specific comments were provided by County representatives and representatives of several local municipalities under separate reviews. These comments centered on clarification of municipal priorities and hazard mitigation actions. These are discussed further in Sections 5.2, Community Input.

2.3.5 Other Stakeholders

The Hazard Mitigation Plan Advisory Committee provided comment and information through the Plan development workshops as described previously. Additionally, the following stakeholders with land use planning and hazard mitigation/response authority were contacted to offer opportunities to comment and provide input on the draft Plan:

- American Red Cross – Southeastern Michigan Chapter
- DTE Energy
- Michigan State University Cooperative Extension Service
- Wayne County Road Commission
- Wayne County Sheriff
- Friends of the Rouge
- Clinton River Watershed Council
- Huron River Watershed Council
- Genesee County LEPC
- Lapeer County LEPC
- Livingston County LEPC
- Macomb County LEPC
- Southeast Michigan Council of Governments
- St. Clair County LEPC
- Washtenaw County LEPC
- Wayne County LEPC
- Wayne County Departments of Public and Environmental Services
- U.S. Geological Survey
- U.S. Army Corps of Engineers
- National Weather Service

2.4 Plan Activities

2.4.1 Surveys

Planning participants were asked to participate in three online surveys. Each survey was designed to provide input for one or more of the planning workshops, and to provide a basis for discussing hazard evaluation or mitigation options. The first survey provided an opportunity for participants to rank the hazards affecting the County. The second survey assisted in narrowing mitigation options acceptable to the County, and the third

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survey helped to further prioritize mitigation strategies to develop into county-wide Action Plans.

First Survey

The survey asked participants to identify the most significant hazard in each of three major categories (natural, technological, and human) and included open-ended questions that allowed other hazards to be included in the final list. Participants were also asked to select the top five hazards on a scale of 1 (Most Significant) to 5 (Least Significant). Importance was evaluated based upon the negative consequences of the hazard on the population, economy and environment of the County. These comparisons and responses were used to rank the relative importance of each hazard in order to consider its likelihood and consequence, and to identify the need for action plans to address each hazard during the workshops.

Participants were also asked to indicate the top five assets that are the most vulnerable to hazard events, in terms of the impact to population, the environment, and economic activity. Assets evaluated were commercial sites hospitals; industrial sites; open spaces; public facilities; residential areas; roads, bridges and railroads; utility facilities; schools and churches; sports and entertainment arenas; and central business district. Ranking of vulnerability was on a scale of 1 (most important overall) to 5 (least important of the top five). The responses were used during the workshops to rank the criticality of assets and assess the likelihood that each identified hazard would impact each asset.

The survey was provided to 62 individuals in the Advisory Committee in electronic form and included 40 hazards arranged in order of the three categories (Natural, Technological, & Human Related). A total of 57 participants (92%) participated in the survey. The results of the survey were presented to the Advisory Committee for review and evaluation at the first workshop.

Second Survey

Advisory Committee members were asked to evaluate possible hazard mitigation strategies in a written survey prior to the second workshop. Mitigation strategies presented in this survey were developed from the first Advisory Committee meeting, the 2013 Plan, as well as from lists of potential mitigation strategies developed by other communities undertaking hazard mitigation planning in Michigan and elsewhere. The survey listed eight or more mitigation strategies for each hazard, for a total of 228 strategies. Of the 62 committee members, 31 (50%) participated in the survey prior to the second workshop.

For this survey, Advisory Committee members were asked to rate each mitigation strategy for appropriateness in Wayne County. Participants could decline scoring items with which they were not familiar. Additional space was provided for each hazard, so that participants could suggest mitigation strategies. The survey requested open-ended input on the best mitigation strategies to address each of the 14 highest priority hazards identified by the Advisory Committee during the first workshop.

Community representatives and Advisory Committee members were asked to identify and rank those mitigation strategies they considered either Important or Very Important, with strategies rating lower rankings to be left blank. The results of this survey were presented to the Advisory Committee members during the second workshop. The top

responses were compiled into an initial list for consideration, and the committee was asked to review all applicable responses to identify other strategies that should be considered.

Third Survey

Following FEMA review and comments on the May 1 draft plan, community representatives were again surveyed to provide input specific to FEMA's request for additional information. That information (e.g., additional information regarding specific problem areas and/or locations of vulnerability for FEMA-focus hazards) was provided by Wayne County, municipal, and DTE representatives and is incorporated throughout this revised document. Much of the additional detail provided can be found summarized in Table 6 and 7, Section 5.4.2.

2.4.2 Workshops

The Advisory Committee met at the Wayne County Community College Downriver Campus, in two workshops. The following describes each workshop and the procedures used to focus this Plan on the hazards and mitigation strategies specific to Wayne County. More information on the process used and the results of the workshop activities are provided in Sections 5 and 6. Agenda, handouts, and worksheets from the workshops are provided in Appendix C.

First Workshop – Risk Analysis Workshop

The first workshop was conducted March 14, 2019. This meeting included an orientation to familiarize committee members to the hazard mitigation planning process. A risk and vulnerability assessment was also conducted to identify and rank priority hazards in Wayne County, to assess the risk from the top ranked hazards, and to determine the County's unique critical assets and specific vulnerabilities. The objective of the workshop was to use a rational approach to focus the Plan on the most critical hazards and vulnerable assets in the County.

The first task of the meeting was to identify the goals and objectives for the mitigation process. Advisory Committee members reviewed the goals set forth in the 2013 HMP and suggested additional goals based upon other County programs.

The Advisory Committee then reviewed the hazard history of the County, the hazard ranking in the 2013 Plan, and the results of the first survey. An updated hazard history for Wayne County was reviewed, and workshop participants discussed the frequency and impacts in three categories: health and safety, area affected, and economic effects. Survey results were presented and the Committee discussed the importance of each hazard and its impacts to population, environment, and the economy in each of 11 asset classes, such as residential areas, business districts, industrial sites etc., that exist in the county.

Based on historical information, the results of the survey, and discussion, 14 hazards were determined to be significant for the County and selected for further analysis. The committee was then asked to select and weight criteria for individually evaluating the top hazards. Participants were asked to create a list of evaluation criteria specifically applicable to Wayne County. Questions provided to stimulate thought included: "What are the top priorities for the community when considering hazard mitigation?," "What do

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community leaders represent as important?,” “What are the top priorities for emergency response agencies when considering hazard impacts?,” and “What are the top challenges facing the County when a hazard occurs?” Four criteria were developed and weighted relative to one another: Injury and Loss of Life, Geographic Area of Interest, Resulting Infrastructure Failure, and the Ability to Recover Following an Incident. These criteria were used to evaluate the top 14 hazards for consequence and frequency. Through this process the list of priority hazards was further reduced to six.

During the same interactive workshop, the committee also evaluated 11 general asset categories. These assets were evaluated to determine how critical they may be if impacted by a hazard. They were then evaluated in the context of consequence and likelihood of individual hazard impacts.

Second Workshop – Mitigation Strategies Workshop

The second workshop was conducted on March 28, 2019. This workshop focused on (1) identifying, evaluating, and prioritizing hazard mitigation alternatives for the key hazards and critical assets, (2) developing evaluation criteria to select mitigation strategies, and (3) identifying mitigation strategies to develop further as specific Action Items for the final Plan.

The committee was asked to select and weight criteria for evaluating mitigation strategies. Criteria were selected based on a review of evaluation criteria used in development of the 2013 Plan and group discussion. Four criteria were selected to evaluate and compare individual mitigation strategies: Ability to Accomplish, Technical Feasibility, Cost Effectiveness, and Effectiveness of Strategy (including downside risk).

Individual and small group work was discussed amongst the entire group to identify the final evaluation criteria for selection of mitigation strategies. The rankings of mitigation strategies from the survey plus an additional 3 community identified strategies were highlighted for consideration, for a total of 251 potential strategies. Of these, 15 were identified as the top-ranked strategies based on numerical scoring.

Survey results identifying the top mitigation strategies for each of the priority hazards were presented and the committee was divided into self-selected groups representing the six priority hazards. Each group and discussed each of the applicable top-ranked strategies and any others that were considered applicable to the County. During the discussion, strategies were revised to combine redundant strategies, and to identify additional mitigation strategies for the top hazards, if applicable.

The committee used the evaluation criteria to rank the strategies presented by the groups. After revising the top 14 strategies that were identified through the survey process, the committee considered whether any of the strategies generated through the open-ended questions in the on-line survey should be included, based on a discussion of the goals and objectives of the Plan, the needs of the County, and the critical hazards and vulnerable assets. The committee selected two additional strategies as a result of this discussion, and then removed one from the final list because it was inapplicable to some of the communities within the County. The resulting list of 15 strategies became the basis for the revision of Action Items from the 2006 Plan and the development of new Action Items.

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The final task of the committee was to evaluate each of the seven Action Items from the 2006 Plan, based on the survey results, the mitigation strategies selected during the workshop, the needs of the County, and the critical hazards and vulnerable assets. The committee made recommendations to revise Action Items to eliminate redundancy and address changes in the County. In addition, two new Action Items were recommended. Each Action Item was assigned to a committee member for further development after distribution of the meeting notes.

2.4.3 Community Input

Representatives from each Wayne County community were asked to complete three online surveys with other key stakeholders in their community. Surveys were intended to identify the most significant hazards and their impacts in the community, to review individual community goals and action plans from the 2013 HMP, and to specify any hazard mitigation programs currently being conducted or planned. Representatives were also asked to provide suggestions for desired hazard mitigation programs in their community and County-wide.

Community representatives were asked to evaluate hazards based on the history of hazard occurrence, the potential for future hazard occurrence, consequence(s) of the hazard, or hazards that are highlighted in community mitigation goals and objectives. Finally, community representatives, and other regional agencies, were asked to review and comment upon the draft Plan.

2.5 Plan Adoption

Formal adoption of a Hazard Mitigation Plan is required for FEMA approval. The Draft Plan was provided initially to the Wayne County Department of Homeland Security & Emergency Management for review for issues of security. Following incorporation of security related comments, a public review version of the draft document was provided to members of the project Advisory Committee, including the project representative from the Michigan State Police, for review and comment. Copies of the Draft Plan were also provided to each community in the County and were made available to other stakeholders and the public via the project website.

Following incorporation of review comments from all sources involved in the planning process, the Plan was presented to the County Board of Commissioners for approval and adoption. The Wayne County Hazard Mitigation Plan was formally adopted by the Board of Commissioners on [Insert Date of Adoption]. A copy of the County resolution is included in Appendix D.

FEMA and the Michigan State Police also require that all multi-jurisdictional Plans be adopted, in whole or in part, by individual municipalities within the planning area. Municipal officials were informed of this requirement and a sample resolution of adoption was provided to each community with the announcement of the final Plan. Information regarding local hazard priorities and local hazard mitigation strategies is included in separate subsections of the Plan so that each community may readily reference and adopt sections specific to their municipality. Tables 1 and 2 list those people that participated in the planning process. Participation included responding to surveys, attending meetings, and/or providing input on the draft Plan. The communities listed in

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Table 3 have adopted this Plan, either in whole or in part, as indicated. Copies of the final resolutions for each community are included in Appendix D.

2.6 Plan Maintenance

The Wayne County Hazard Mitigation Plan Advisory Committee (HMPAC) will monitor this Plan on a regular basis. The HMPAC will consist of members of the Wayne County Department of Homeland Security & Emergency Management as well as representatives of the Wayne County communities and stakeholders. Plan evaluation and maintenance is the responsibility of the County Emergency Management Coordinator.

The Plan will be reviewed annually by the HMPAC to assess progress on each Action Item, changes in hazard history, and any known changes in vulnerability. Every two (2) years, following review by the HMPAC, a description of Plan progress and any changes in circumstances or trends that may require revision to the Plan will be presented to the Wayne County Board of Commissioners.

The Plan will be reviewed, updated, and revised, as necessary every five (5) years to maintain consistency with the changing community and hazard history, as well as the goals and objectives of the County.

Each time the Plan is revised a new Revision Number and Revision Date will be inserted in the document header. Changes constituting a substantive revision to the Plan will require that the new plan be provided to the County Board of Commissioners, and the individual communities participating in the Plan, for approval and re-adoption. Review and approval will provide opportunity for public review and comment at a normally scheduled meeting(s) of the Wayne County Board of Commissioners.

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Table 3: Community Plan Adoption

Community	Items Adopted [Insert "Full Plan" or Section#s]:	Date Adopted
Allen Park		
Belleville		
Brownstown		
Canton Township		
Dearborn		
Dearborn Heights		
Ecorse		
Flat Rock		
Garden City		
Gibraltar		
Grosse Ile Township		
Grosse Pointe		
Grosse Pointe Farms		
Grosse Pointe Park		
Grosse Pointe Shores		
Grosse Pointe Woods		
Hamtramck		
Harper Woods		
Highland Park		
Huron Township		
Inkster		
Livonia		
Lincoln Park		
Livonia		
Melvindale		
Northville		
Northville Township		
Plymouth		
Plymouth Township		
Redford Township		
River Rouge		
Riverview		
Rockwood		
Romulus		
Southgate		
Sumpter Township		
Taylor		
Trenton		
VanBuren Township		
Wayne		
Westland		
Woodhaven		
Wyandotte		

3. Community Profile

3.1 Historical Overview

Wayne County was established in 1796 with the founding of the Northwest Territories. It was named for Major Anthony “Mad Anthony” Wayne (1745-1796), a Revolutionary War hero whose military service led to a lasting peace in the region. As a result, his name has found a place of honor in cities and towns throughout Michigan, Ohio, Indiana, and Illinois. At the time of its creation, Wayne County covered almost all of the Lower Peninsula of Michigan, as well as parts of Ohio, Indiana, Illinois, and even Wisconsin.

The area was settled by French explorers in the 1600’s in an expanding effort to settle strategic areas on the continent and contain the British colonies in New England. Its location along the Detroit River made it a settlement of high commercial value as well as military importance. While the French made the first lasting impact in the region, many Jesuit groups had previously moved into the area doing missionary work. Several Native American settlements were reported in the area in the 1600’s, and prior to their settlement, the area (along with much of the Midwest) was home to a people known as the Mound Builders, from the elaborate burial mounds they left behind. Mound Road in Wayne County is so named for the burial mound found in that area. Post-European settlement, the area was chiefly used for farming and lumber, but grew to encompass small industrial operations which capitalized on the iron and copper resources in the area and its easy access to shipping lanes through the Great Lakes. In the second half of the 19th century, Wayne County became a leading producer of stoves, ships, and railroad cars, as well as a leading producer of bicycles and carriages which opened the door for the explosive growth of the area with the coming of the automotive industry in the 20th century.

While the automobile was invented in the late 1800’s, it was the innovations brought about by Henry Ford in the early 1900’s that made the automobile popular and affordable. Ford’s first assembly plant was located in Highland Park and offered jobs to employees that not only had higher than average wages, but also a cohesive set of rights which led to the first Union. The population of Detroit doubled between 1910 and 1920.

Because Wayne County was the birthplace of the automotive industry, it also became the leader in roadway technologies. In 1909, the Wayne County Road Commission was the first in the world to pave a road (a small stretch of Woodward Avenue) with concrete. These technologies allowed Wayne County a number of other distinguishable ‘firsts’, including the first roadway line-painting vehicle in 1911, the first snow plow in 1912, the first roadway testing laboratory in 1910, and the first superhighway (the Davison) in 1942.

Detroit and Wayne County continued to be at the forefront of technology and industry, converting auto plants to produce aircraft and tanks during World War II, and re-converting them for auto production as the war ended. But Wayne County’s innovation and production weren’t limited to industry. The 1950’s and 1960’s saw Detroit become a producer of new music sensations in rhythm and blues that changed the nation. The Motor City became Motown.

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Industry in the county remains strong, the County is home of award-winning sports teams, and its diversity and culture make it not only resilient, but also an interesting and lively place to live and work today.

3.2 Geography and Climate

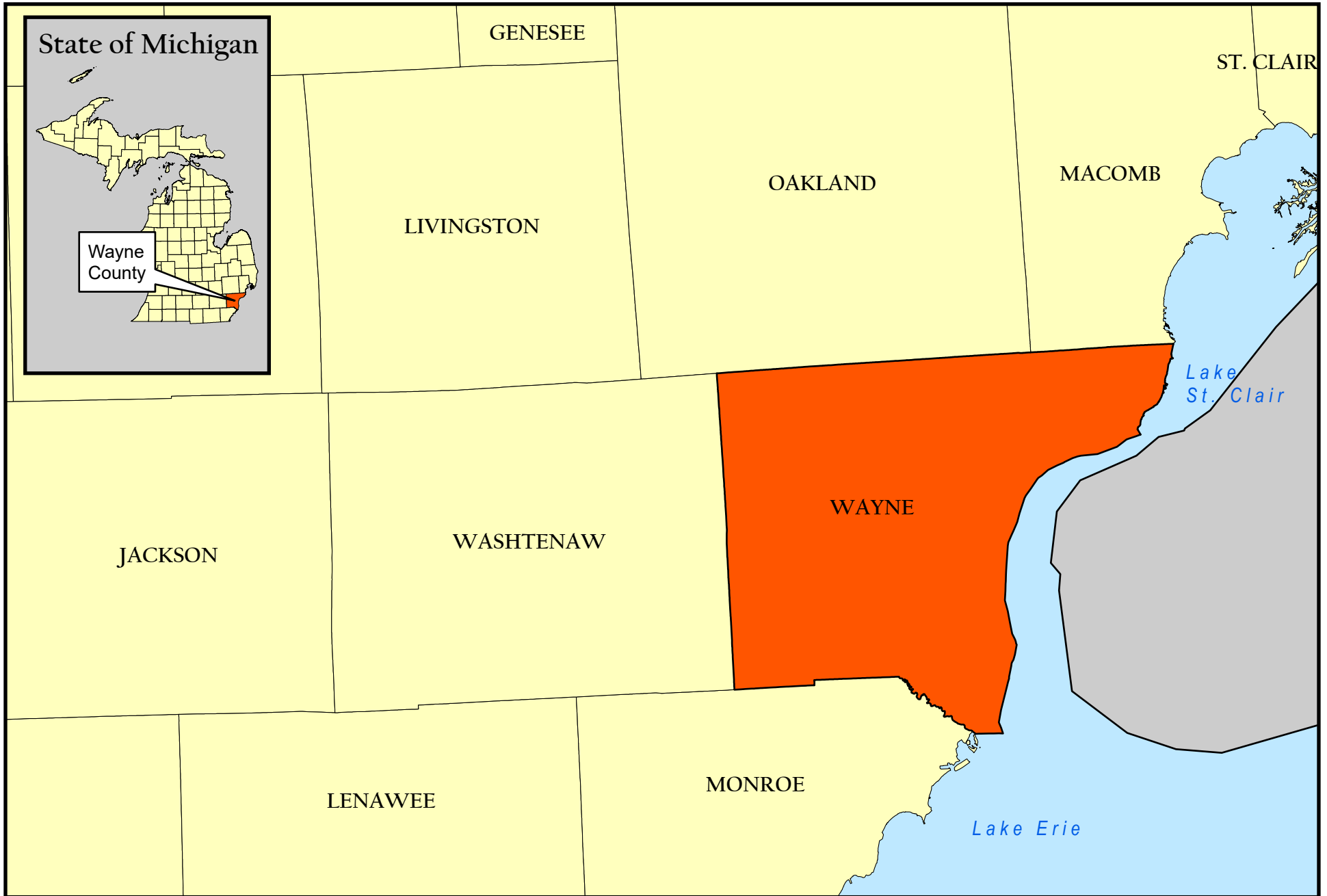
Wayne County is located in southeast Michigan, north of Monroe County east of Washtenaw County, and south of Oakland and Macomb Counties. (Figure 1) Wayne County encompasses 672 square miles. Topography in the county is generally flat, which is consistent with most of southeastern Michigan.

Weather in Wayne County is consistent with non-coastal, southeastern areas of Michigan. The following table provides average monthly weather conditions for Wayne County.

Wayne County Temperature and Precipitation Averages

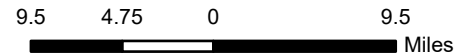
Month	Average Daily Temperature (F°)	Average Precipitation (inches)	Average Snowfall (inches)
January	23	1.76	8.5
February	25.5	1.74	8.5
March	35.5	2.55	6.4
April	47.5	2.95	1.2
May	58.5	2.92	0
June	67.5	3.61	0
July	72	3.18	0
August	70.5	3.43	0
September	63.5	2.89	0
October	51.5	2.10	0
November	40	2.67	2.2
December	28	2.82	9.9
Annual Total	-	32.62	36.7

Source: www.CRH.NOAA.gov, Updated May, 2019.



Wayne County

19176 Northrop Street
 Detroit, MI



Created for: Wayne County
 Created by: RMH, April 21, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013))

Site Location Map

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3.3 Land Use Patterns

Wayne County does not exercise land use or zoning control. Instead, each of the individual cities, townships, and villages in the County is zoned and exercises their own control regarding land use planning and permitting.

The table below presents a breakdown of land use/land cover, by acreage, for Wayne County. Although reported land use definitions/categories changed between 2000 and 2008 single-family residential remains the dominant land use/land cover in Wayne County, followed by Transportation and utility corridors. From 1990 to 2000, single-family residential lands exhibited the greatest increase in acreage and active agriculture exhibited the greatest decrease in acreage.

Land Use Patterns & Trends			
Land Use Type*	1990 Acres	2000 Acres	2015 Acres
Single-Family Residential	143,038	149,807	98,501
Multiple-Family Residential	9,622	10,160	6,814
Commercial and Office	21,736	23,547	13,414
Governmental / Institutional	16,255	17,100	14,798
Industrial	23,440	26,168	17,330
Transportation, Communication, and Utility	22,421	24,004	58,333
Park, Recreation, and Open Space	17,550	19,054	29,320
Agriculture	46,183	25,844	23,999
Water	3,813	4,152	5,481
Grassland and Shrub**	31,655	27,499	
Woodland and Wetland**	48,375	49,701	
Extractive and Barren** (Extractive 2015)	1,720	2,208	1,028
Under Development** (Vacant 2015)	1,564	5,338	36,321
Total Acres	387,372	384,582	303,861

* Land Use Type definitions have changed since 2000, so direct comparison of 2010 data set and previous years is imprecise. 2010 data derived from 2010 leaf-off aerial imagery.

** These categories not in use in 2015

Source: Southeast Michigan Council of Governments, www.semco.org, Community Profile for Wayne County, excluding Detroit.

The above table demonstrates the increasing development in Wayne County from 1990-2000. The greatest increase in land use 1990-2000 was single-family residential, followed by land actively under development (primarily residential lots under construction) and industrial use. This increase in development is also reflected by the sharp decline in active agriculture and grassland and shrub land uses. Between 1990 and 2000 there was a 14% decrease in the undeveloped lands in Wayne County.

Reported declines in some land use acreages between 2000 and 2015 are due to changes in land use classification and mapping methods. A separate assessment summarized in SEMCOG's Land Cover in Southeast Michigan; 2013 report indicates that 36% of Wayne County consists of impervious surfaces. This likely has significant

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implications in the problems noted elsewhere in this report regarding problems with flooding and insufficient storm water infrastructure.

According to the 2015 U.S. Census Bureau American Community Survey 5-year estimates, 73% of Wayne County's housing consists of single-family detached homes. Multiple family housing accounts for 17% of housing types and mobile homes account for 3%. The median home value in Wayne County (excluding Detroit) is \$107,944 and the median gross rent is \$840 per rental unit per month. According to ATTOM Data Solutions, approximately 5.6% of all Wayne County housing units were vacant in the 3rd quarter of 2018, giving the County the second highest vacancy rate in Michigan behind Genesee County and the fifth highest vacancy rate in the country.

3.4 Transportation Network

There are approximately 460 miles of interstate freeways and highways and 175 miles of county roads within the County. County roads are maintained by the Wayne County Department of Public Services Division of Roads.

Wayne County is served by two different bus systems: the Detroit Department of Transportation (D-DOT), which primarily serves the City of Detroit, Hamtramck, and Highland Park, averages 31.2 million rides per year and the Suburban Mobility Authority for Regional Transportation (SMART) system which provides transport for over 10.1 million passengers per year. These bus systems provide routes and/or connections to destinations throughout Oakland, Wayne, and Macomb Counties. SMART also provides specialized services to the elderly and handicapped.

Commercial and passenger air transportation are provided through the Detroit Wayne County Metropolitan International Airport and Coleman A. Young International Airport.

There are four major railroads in Wayne County: CSX Transportation, Norfolk Southern Railway, Conrail, and Amtrak provide passenger and shipping services to locations throughout the U.S. and Canada.

3.5 Population Characteristics

Wayne County is Michigan's most populous county and the 19th-most populous county in the United States. It is home to over 18% of Michigan's total population. With a total population (including Detroit) of just under 2 million people (2010), Wayne County is the eleventh most populous county in the United States. Census values show that Wayne County has been losing population, but that trend is projected to flatten out in the coming decades. The 2045 Wayne County population is expected to increase approximately 1% over 2010 values. The following tables contain demographic information regarding the County, as provided by the Southeast Michigan Council of Governments (SEMCOG) and the U.S. Census Bureau.

Year	Population Count/Projection
1990	2,111,687
2000	2,061,162
2010	1,106,788
2045	1,149,249

Source: U.S. Census Bureau & Southeast Michigan Council of Governments, Community Profile for Wayne County, excluding Detroit.

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Wayne County (excluding Detroit) Age, Sex, and Race Breakdown (2010 Census Data)		
Subject	Number	Percent
Total Population	1,088,895	100
Age		
Under 5 years	66,528	6
5 to 17 years	183,648	17
18 to 24 years	99,151	9
25-54 years	436,821	40
55 to 64 years	153,821	14
65-84 years	138,427	13
85 and over	24,436	13
Race		
White	823,359	76
Black/ African American	147,278	14
Asian	42,843	4
Other Race	6,052	1
Multi-racial	23,667	2

Source: U.S. Census Bureau & Southeast Michigan Council of Governments, Community Profile for Wayne County, excluding Detroit.

Household Characteristics		
Subject	Number	Percent
Total households	411,535	100.0
2+ Person Households with children	131,828	32.0
2+ Person Households without children	159,887	39.0
Average household size	2.49	-

Source: U.S. Census Bureau & Southeast Michigan Council of Governments, Community Profile for Wayne County, excluding Detroit.

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3.6 Economic Characteristics

Nearly 80% of the Wayne County population is over 16 years of age with 61% of that population in the workforce. Manufacturing and health care services employ the most Wayne County residents at 12% each. The following tables provide detailed information regarding the employed population of Wayne County.

Occupation & Industry Characteristics		
Subject	Number	Percent
<i>Employment Status</i>		
Daytime Population	1,196,372	100
Employed Residents	591,006	49
Age 15 & Under	228,714	19
Not in Labor Force	325,682	27
Unemployed	50,970	4
<i>Industry</i>		
Natural Resources, Mining, & Construction	27,362	5
Manufacturing	69,627	12
Wholesale Trade	23,705	4
Retail Trade	64,510	11
Transportation and Warehousing, and Utilities	42,357	7
Information & Financial Activities	48,640	8
Professional and Technical Services & Corporate HQ	62,227	6
Administrative, Support, & Waste Services	42,610	7
Education Services	33,115	6
Healthcare Services	71,169	12
Leisure & Hospitality	56,046	9
Other Services	36,822	6
Public Administration	12,816	2

Source: U.S. Census Bureau & SEMCOG, Community Profile for Wayne County, excluding Detroit.

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Income & Poverty Status Characteristics		
Subject	Number	Percent
Median Family Income (dollars)	\$53,307	-
Population with Social Security Income	211,545	30
Population with Supplemental Security Income	45,989	7
Population with public assistance income	36,478	5
Population with retirement income	156,146	22
Per capita income (dollars)	\$27,877	-
Poverty Status in 2015		
Number of individuals below poverty level	166,729	15.4

Source: U.S. Census Bureau & SFMCOG Community Profile for Wayne County excluding Detroit

3.7 Community Services/Organizations

Natural gas and electrical services are provided to Wayne County customers by Consumers Energy and DTE Energy. Telephone service in the county is provided by a number of different companies, but is primarily provided by AT&T and Verizon. Sewer service for most of the county is provided by the City of Detroit Water and Sewerage Department, but Canton, Northville and Plymouth Townships also receive service from the Western Townships Utilities Authority (WTUA) and the Ypsilanti Community Utilities Authority (YCUA). The City of Detroit provides water service to most of the county.

Wayne County provides a number of services to residents through various boards and agencies, including the Wayne County Board of Commissioners, the Department of Homeland Security & Emergency Management, and the Departments of Community Services, Economic Development, Environment, Family Services, Health Services, Parks and Recreation, and Public Services, and the Wayne County Sheriff's Office.

The county is served by 34 public school districts. Also, within the county are several community colleges, private colleges, private and public universities. Additional learning resources are provided through the county public library services.

Wayne County has an extensive Parks & Recreation Department which maintains 12 county parks. Also, the county is home to numerous arts and entertainment venues including shopping complexes such as Fairlane Town Center and Laurel Park. The City of Detroit is home to historic theatres such as the Fox and Fisher Theatres, and sports venues such as Comerica Park, Little Caesar's Arena, and Ford Field.

3.8 Critical Assets

The following list of critical assets was developed based on current and future land use in Wayne County, the nature of hazards which may affect the county, and the results of

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community input. The following facilities and infrastructures were identified as critical to providing essential products and services to the general public, preserving the welfare and quality of life of the community, and assuring public safety, emergency response, and disaster recovery.

- Central Business Districts
- Commercial Sites
- Hospitals
- Industrial Sites
- Natural Areas
- Open Spaces
- Public Facilities
- Residential Areas
- Roads, Railroads and Bridges
- Schools and Churches
- Sports and Entertainment Venues
- Utility Facilities

4. Hazard History

The following discussions of individual natural, technological, and human-caused hazards and disasters include information regarding historic occurrences of each hazard, damage to life and/or property where known and, based upon the County's hazard history and trends in land use climate change, etc., attempt to predict whether hazard frequencies will continue as they have been or if some change in frequency is expected.

The definitions of high, moderate, low and other hazard frequency categories used in developing a hazard history for the County are defined in the footnotes for Table 4. Terms used in the section of the Plan (e.g., High, Probable, Likely) are more general, but indicate anticipated future patterns relative to those historic averages. If trends in land use, weather or climate patterns, etc. indicate that the hazard will continue to occur, as it has on average historically or may even increase in frequency, the text here will indicate that that trend for that hazard to continue to be important is "likely" or "probable." If, however, it is anticipated that a given hazard will decrease in frequency the text will indicate that it is "unlikely" or has a lower likelihood to result in a great deal of damage.

Additional discussion of future trends that may influence the frequency and/or severity of different hazards is provided in Section 5.4.3.

4.1 Civil Disturbance

Definition

A public gathering or inmate uprising that disrupts essential functions and results in unlawful behavior such as rioting or arson. This event involves a large number of people and requires a significant response effort by law enforcement and/or emergency responders.

Historical Events

Large civil disturbances are not common in Michigan and typically are a result of the following causes:

- labor disputes,
- controversial court judgments or government actions,
- resource shortages following a catastrophe,
- demonstrations by special interest groups,
- unfair death or injury, or
- celebration following a high-profile victory or defeat by a sports team.

A total of 29 incidents of civil unrest are recorded in a listing of United States dating back to 1783, the most recent of these being in response to riots in Los Angeles in the wake of the Rodney King trial in 1992.

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Historically, most of the civil disturbances in Wayne County have occurred in the City of Detroit. These include the race riots of 1943 which resulted in 34 deaths and more than 700 injuries and the 1967 civil rights riots which resulted in 43 deaths and over 1,000 injuries. Additional looting and arson damages were estimated at over \$50 million, with 5,000 or more individuals left homeless in their wake. More recently in 1995, Detroit witnessed minor skirmishes and injuries when newspaper employees went on strike over contract disagreements.

Other civil disturbances of note in Wayne County include the "Hunger March" in Dearborn in 1932, in which 10,000 demonstrators fought with police leaving four dead and many injured.

Frequency & Probability

A civil disturbance occurs in Wayne County approximately once every 8-10 years.⁵ The most likely causes for a civil disturbance in the county would be a result of a labor dispute, a sporting event or demonstration at a college, or government or military facility within the county. There are six detention/correctional facilities located within the county which are potential sites for an inmate uprising.

The potential for this hazard to occur in Wayne County is somewhat elevated due to the number of sport/entertainment venues, educational facilities, detention facilities, large scale industrial facilities, and government facilities within the county. Racial diversity in some communities was also cited as a factor in civil disturbance, due to the potential for an influx of out-of-state protesters during community events.

Health & Safety

There have been at least 81 deaths and over 1,700 injuries from major civil disturbances in Wayne County since 1932.⁶

Area Impacted

Civil disturbance events often involve acts of arson, looting, and/or vandalism which can result in devastating levels of property damage. The 1967 riots in Detroit included looting and over 150 fires burned properties over 15 blocks. Forty-three people were killed and over 1,000 were injured during the riots. Property damage was estimated at \$50 million and over 5,000 people were left homeless; it was the largest and most destructive of any such incident in the country for that decade.⁷ Places of public gathering such as festivals, sporting and entertainment venues, colleges and universities, detention facilities, and government facilities are the most likely places for a civil disturbance to occur however, as noted, most of these venues are located within the City of Detroit, which is not included in this Plan.

⁵ Listing of US Civil Unrest Incidents, Armstrong Economics: www.armstrongeconomics.com/statistics/listing-of-us-civil-unrest-incident.

⁶ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 7.

⁷ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 340.

Economic Impact

The economic impact of a civil disturbance reaches far beyond emergency response costs and property damage. Economic recovery from civil disturbances is very slow and often requires government assistance to revive the local economy. This hazard can tarnish an area's image and deter potential investors and residents.

Critical Facilities/Services

The nature of civil disturbance is such that local emergency response services are often overwhelmed. As a result, aid is often required from other local or state units.

The high degree of property damage which can occur from this hazard can greatly impact the ability to operate or provide services at the hazard location (particularly sporting and entertainment venues, colleges and universities, detention facilities, and government facilities).

4.2 Criminal Acts

4.2.1 Vandalism

Definition

Vandalism is the willful or malicious destruction, injury, disfigurement, or defacement of any public or private property, real or personal, without consent of the owner or person having control. A vandalism offense is an act of vandalism which is reported to a law enforcement agency.

Historical Events

Examples of acts of vandalism include graffiti, tampering with traffic signs and damage to vacant buildings. In more extreme cases, vandalism to public facilities or infrastructure has the potential to result in significant impact to the community.

In February 2018, vandals smashed windows on every car (60) in an auto dealer's lot in Highland Park causing thousands of dollars damage.⁸

Frequency & Probability

Crime statistics do not report "vandalism" directly, but instead reference property crimes or damage to property. The 2017 Michigan State Police Michigan Incident Crime Reporting (MICR) online database indicates that there were a total of 68,184 "damage against property" incidents reported in Wayne County from 2013 through 2017, resulting in an average of 13,637 incidents per year.⁹

Given the well-established frequency of this hazard in recent years, it is anticipated that this hazard will continue to occur in the future.

⁸ WXYZ Detroit, <https://www.wxyz.com/news/region/wayne-county/metro-detroit-car-dealership-cleaning-up-after-vandals-bust-hundreds-of-windows>, February 22, 2018.

⁹ Michigan State Police, Michigan Incident Crime Reporting, Crime Statistics, Wayne County, 2013, 2014, 2015, 2016, and 2017. <http://www.micrstats.state.mi.us/MICR/Reports/Report02.aspx>

Health & Safety

There are no data available for death or injury rates due to acts of vandalism. It is anticipated that the majority of these acts do not pose a threat to human health or safety. This however, may not be the case in instances of vandalism involving public infrastructure.

Area Impacted

Due to the nature of vandalism, property damage can be expected with each occurrence. Data regarding property damage due to vandalism is not available for Wayne County; however, the amount of property damage is directly related to the severity of the event.

All areas of Wayne County are potential targets for vandalism. Higher rates of occurrence can be anticipated in areas of urban blight or vacant buildings.

Economic Impact

No information is available regarding the overall economic impact of vandalism in Wayne County. However, considering the effects of this crime, high rates of vandalism can decrease the attractiveness of neighborhoods or business districts. This can result in economic loss due to loss of residents or businesses, in addition to any property damages incurred.

Critical Facilities/Services

Critical facilities and services are not often directly impacted by vandalism. However, in 1984 vandals in nearby Lake Orion (Oakland County) damaged the entire school bus fleet. This is an example of the potentially far-reaching effects of vandalism. Also, the indirect impacts of vandalism, most notably the time required of police and court systems in dealing with acts of vandalism, should not be overlooked.

4.2.2 Arson

Definition

Arson is the willful or malicious burning or attempt to burn, with or without intent to defraud, a dwelling, public building, motor vehicle, or personal property of another. An arson offense is an act of arson which is reported to a law enforcement agency.

Historical Events

According to the U.S. Fire Administration, arson is the leading cause of fires and third-leading cause of fire-related injuries and deaths in the United States¹⁰.

In recent years, Wayne County has experienced numerous arson fires at both private and public properties. The night before Halloween in the city of Detroit had been known

¹⁰ U.S. Fire Administration Topical Fire Research Series, Volume 1, Issue 8, January 2001.

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as “Devils Night” which brought widespread arson. After the peak of 810 fires in 1984, that number declined to only 21 in 2017.¹¹

Frequency & Probability

Arson (intentional fires) accounts for 4.2% of the residential fires and 9.3% of the non-residential building fires in the U.S.,¹² but only 225 of intentional fires occur indoors.¹³ In 2003, arson or a suspicious fire occurred every 1 hour 2 minutes in Michigan.¹⁴ From 2013 to 2017, Wayne County experienced 4,081 arson fires, an average of 816 per year.¹⁵ This is notably less than the 6,565 total and average of 1,094 arson fires per year reported in Wayne County's 2013 Hazard Mitigation Plan.

Health & Safety

The U.S. Fire Administration reported in 2009, for the period of 1994 through 1998, that the state of Michigan averaged 16.4 civilian deaths per million population and 9.6 civilian injuries per 1,000 arson fires.¹⁶

Area Impacted

In the United States, one-fifth of all property loss is due to arson and arson is the leading cause of fire-related economic loss.¹⁷ The U.S. Fire Administration reported for the period of 2002 to 2006, that the state of Michigan averaged \$7,070 in property damage per arson fire.¹⁸ Wayne County experiences more arson fires than any other county in Michigan, accounting for more than half the arson incidents in the state annually, with 1,001 reported cases in 2017.¹⁹

Any property is a potential target for arson. Given that arson is a property crime, it is anticipated that arson will occur in areas with high property crime rates.

Economic Impact

In 2015, nearly 3,000 arson and suspicious fires in Wayne County cost County residents over \$100 million.

Critical Facilities/Services

Although not common, critical facilities and services can be directly impacted by arson. An arson fire involving any of the county's assets could temporarily impede the county's ability to provide that service.

¹¹ Trip Savvy, *History of Devils' Night in Detroit*, <https://www.tripsavvy.com/history-of-devils-night-in-detroit-1085250>

¹² U.S. Fire Administration, 2017, U.S. fire statistics, www.usfa.gov/data/statistics/

¹³ U.S. Fire Administration Topical Fire Report Series Volume 9, Issue 5 / November 2009

¹⁴ Michigan State Police, Fire Marshall Division, *2003 Michigan Fire Clock*

¹⁵ Michigan State Police, Michigan Incident Crime Reporting, Crime Statistics, Wayne County, 2013, 2014, 2015, 2016, and 2017. <http://www.micrstats.state.mi.us/MICR/Reports/Report02.aspx>

¹⁶ U.S. Fire Administration, Fire Data, Arson Fires, Civilian Injuries and Civilian Deaths, 1994, 1995, 1996, 1997, 1998

¹⁷ U.S. Fire Administration, www.usfa.fema.gov

¹⁸ U.S. Fire Administration, Fire Data, Arson Fires, Property Loss, 1994, 1995, 1996, 1997, 1998

¹⁹ Michigan State Police, Incident Crime Reporting, Wayne County, 2017

4.3 Drought

Definition

Drought is an extended period with significantly low precipitation levels that usually occurs during planting and growing seasons.

Historical Events

The U.S. Department of Agriculture (USDA) designated 21 Michigan Counties, including Wayne County, as primary disaster areas due to drought-caused losses and damage in 2016.²⁰ In 2007 and 2012, drought disaster declarations were declared by the U.S. Department of Agriculture for all 83 counties in Michigan due to drought-related crop losses.^{21,22}

Elsewhere in the state, extreme drought conditions in 1976-1977 contributed heavily to the large wildfire that struck the Seney area in Michigan's Upper Peninsula in July 1976.²³

During the drought in 1988, Michigan took several steps to combat the impacts of the drought on businesses, natural resources, and individual citizens. A statewide burning ban was enacted, and water use restrictions were put into place in many communities.

During a drought that struck Michigan from 1998-2001, one-third of the state's fruit, vegetable, and field crops were destroyed. This drought resulted in a U.S. Department of Agriculture Disaster Declaration for 82 of the State's counties, including Wayne County.²⁴

Frequency and Probability

There is one major drought event every 20-25 years, on average, that affects the entire State.²⁵ As described above, at least four drought events have been recorded for Wayne County since 2000 and climate patterns continue to trend to drier, hotter summers even though average annual precipitation is likely to generally increase.²⁶ The southeast Michigan climatic region (Region 10), which includes Wayne County, exhibits

²⁰ Michigan Farm News, January 12, 2017.

https://www.michfb.com/MI/Farm_News/Content/People/Michigan_counties_declared_natural_disaster_areas/

²¹ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, July 2012, page 132.

²² Governor Rick Snyder announcement, http://www.michigan.gov/mdard/0,4610,7-125-1572_28248-285246--,00.html

²³ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, July 2012, page 139.

²⁴ Ibid.

²⁵ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 7.

²⁶ NOAA National Centers for Environmental Information Storm Events database query

<https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, May 14, 2019

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one of the lowest probabilities in the state for drought, yet Wayne County experiences some level of drought 46% of the time, on average.²⁷

Health & Safety

The risk to human life from a drought event is low.²⁸ Possible loss of human life from a drought event is due to secondary effects such as extreme heat (refer to Section 4.5.1), fire (refer to Section 4.6), and other health-related problems such as increased pollutant concentrations in surface water due to drought-induced low water levels.

Area Impacted

Impacts of drought primarily affect those employed in agriculture. Drought affects widespread areas; however, the greatest impact is generally to agricultural lands. Natural resources such as lakes, streams, and other bodies of water could be affected by decreased water levels. Also, fires resulting from drought can result in the destruction of trees and other natural habitats, as well as homes and businesses.

The July 2001, drought affected 12 southeast Michigan counties, including Wayne County. The drought in September 2002 affected 12 counties, including Wayne County.²⁹ Drought in 2012 caused all 83 counties in Michigan to be declared primary natural disaster areas for drought and excessive heat by USDA on August 29, 2012³⁰. Wayne County contains approximately 13,060 acres of agricultural land (Figure 2).³¹

Even with over 13,00 acres in agriculture, Wayne County is primarily an urban county. Agricultural lands are primarily concentrated in the County's southwest corner in Canton, Huron, Sumpter, and Van Buren Townships. Lesser concentrations of agricultural lands are found in the southern part of the County in Brownstown Township, Flat Rock, Romulus, and Woodhaven. These eight communities are likely the most at-risk from drought.

Economic Impact

The impacts of drought on a community include water shortages; a decrease in the quantity and quality of agricultural crops; a decline of water levels in lakes, streams, and other bodies of water; poor nourishment for wildlife and livestock; increases in wildfires; and increases in insect infestations, plant disease and wind erosion.

The 1988 drought/heat wave in the central and eastern U.S. (an event that greatly impacted Michigan) caused an estimated \$40 billion in damages from agricultural losses,

²⁷ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, April 2019, page 223.

²⁸ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 7.

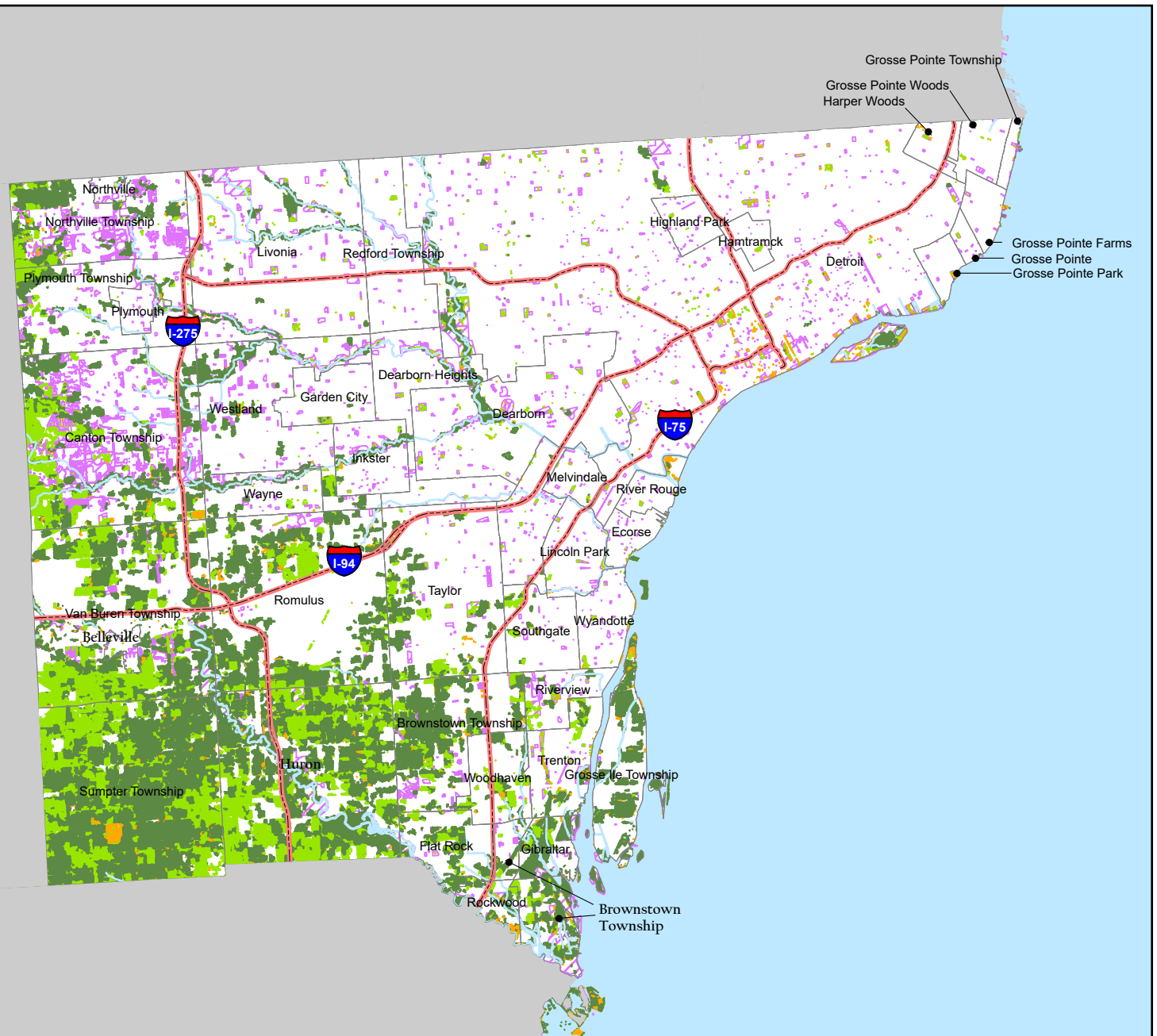
²⁹ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005

³⁰ Governor Rick Snyder announcement, http://www.michigan.gov/mdard/0,4610,7-125-1572_28248-285246--,00.html.

³¹ SEMCOG, 2008 *Land Use and 2010 Land Cover*, Specific to Wayne County, not including Detroit, May 2019.

Legend

- Active Agricultural
- Forested Woodland & Wetland
- Grassland & Shrub
- Parks
- Major Roads
- Lakes, Rivers & Streams



Wayne County



Created for: Wayne County
 Created by: RMH, April 21, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013)
 NLCD (2016), SEMCOG Land Use (2015)

Figure 2 - Hazard History:
 Fire - Forest/Field

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disruption of river transportation, water supply shortages, wildfires, and related economic impacts.³⁵

The July 2001 drought resulted in \$150 million in crop damage over an area of 12 southeast Michigan counties, reducing yields of corn, dry beans, and soybeans to 1/3 of normal.³⁶ The drought that occurred in September 2002 resulted in agriculture yields of less than 50 percent of normal and many counties across eastern Michigan were declared agricultural disaster areas.³⁷

Critical Facilities/Services

Most facilities impacted from drought would be related to agriculture. Farms, large grain facilities, fruit and vegetable vendors/markets could potentially see a significant decrease in production/sales.

Local and regional governmental services may be required to respond to drought. However, if the severity of the drought is significant, State and Federal assistance could be required.

Agricultural services and departments such as the Farm Bureau and the U.S. Department of Agriculture may also be required to provide assistance.

4.4 Earthquakes

Definition

An earthquake is a sudden movement or motion in the earth caused by an abrupt release of slowly accumulating strain, which results in ground shaking, surface faulting, or ground failures.

Historical Events

Most earthquakes that occur in Michigan are minor tremors resulting in little damage. No severely destructive earthquake has ever been documented in Michigan. However, several mildly damaging earthquakes have occurred since the late 1700s.³⁸ Michigan has fault lines in the bedrock geology that are considered stable; however, data is poorly documented. Michigan is most likely to be affected by earthquakes which occur in the New Madrid Seismic Zone (centered near the Arkansas/Tennessee state line) and upstate New York.

³⁵ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 139.

³⁶ NOAA National Centers for Environmental Information Storm Events database query <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, May 14, 2019

³⁷ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, May 14, 2019.

³⁸ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 168.

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There is no record of an earthquake originating within Wayne County. However, there have been several low-magnitude earthquakes centered outside of the county which have been felt in the county.³⁹

Frequency and Probability

Since 1793, there have been eight earthquakes in Michigan, one centered in the Lansing area and the other centered near Kalamazoo. Since 1793, there have been approximately 43 earthquake related disturbances in Michigan.⁴⁰ An earthquake of significant magnitude is unlikely due to Wayne County's distance from the fault and the type of fault in Michigan. The frequency is assumed to be once every 50 or more years. Although a small disturbance from an earthquake is possible, the probability for a significant earthquake to occur in Wayne County is very low.

Health & Safety

There have been no recorded deaths or injuries related to earthquakes in Michigan. The risk rating for human life related to earthquake events is low, with less than one event annually.⁴¹

Area Impacted

The number of people affected is dependent upon the earthquake magnitude and distance from the epicenter. Typically, an earthquake affects a large region, not a specific location. Because earthquakes typically have regional affects, the entire Wayne County population could be affected. However, given the historic severity, only a fraction of the population would be affected by a typical event. The impact of an earthquake would be primarily on water, sewer, and gas pipelines, which are located throughout Wayne County.

Economic Impact

Damage occurs primarily to any type of structure or improvement. The amount of damage is directly proportional to the earthquake magnitude and a large amount of property damage could be anticipated due to the high development density in southern Wayne County. Given the historical severity, economic impacts are expected to be minimal. Since 1793, only a few earthquakes (most of which were minor tremors) resulted in minimal structural damage such a cracked plaster and damaged chimneys. In Wayne County, the impact of an earthquake would be primarily on water, sewer, and gas pipelines. The United States averages approximately \$550,000 per accident to natural gas and liquid pipelines due to earth movement.

³⁹ United States Geological Survey, *Earthquake History of Michigan*, www.neic.cr.usgs.gov/neis/states/Michigan/michigan_history.html

⁴⁰ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, July 2012, page 170.

⁴¹ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, April 2019, page 41.

Critical Facilities/Services

Due to the low probability of a severely destructive earthquake, response would most likely be limited to primary utility services and pipeline owners. Due to the lack of earthquake events in Michigan, additional investigation of the impact to critical facilities/services is not recommended at this time.

4.5 Extreme Temperatures

4.5.1 Extreme Heat

Definition

A prolonged period of extreme heat, often accompanied by conditions such as high humidity, high winds and lack of rain. Although no standardized temperature is used to define extreme heat, the Centers for Disease Control and Prevention define extreme heat as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks.⁴² In Michigan, heat advisories refer to times when the heat index, a combination of relative humidity and temperature, is calculated to exceed 100 degrees for at least three hours in duration. An excessive heat warning occurs if the calculated heat index is at least 105 degrees for three or more hours.⁴³ Prolonged periods of temperatures greater than 90° Fahrenheit are of concern. The minimum mortality temperature threshold is lower in northern latitudes (from 65° to 70° F) than in the southern United States (from 76° to 90° F). Human health effects of heat are also dependent upon the age, health, and physical activity of an individual, as well as humidity and access to air conditioning.

Historical Events

The highest temperature ever recorded in Michigan was 112 degrees Fahrenheit on July 13, 1936 in Mio. During that week, 570 people died statewide and 5,000 deaths were attributed to the heat wave nationwide.⁴⁴

During a heat wave in the summer of 1988, thirty-nine days had temperatures of 90 degrees or more. The temperature in southeast Michigan topped the 100-degree mark on 5 occasions.⁴⁵

In July 1999, a heat wave that struck the Midwest and East Coast resulted in an estimated 256 heat-related deaths in 20 states, including one death in Michigan. A

⁴²U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, http://www.bt.cdc.gov/disasters/extremeheat/heat_guide.asp

⁴³ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, April 2019, pages 91-92.

⁴⁴ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103. July 2012, page 85.

⁴⁵ Ibid.

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number of people were treated at area hospitals, including in Detroit, for heat-related problems ranging from dehydration to heat stroke.⁴⁶

Between January 2013 and April 2018, four extreme temperature events were reported in Wayne County.⁴⁷ Of the four events, one resulted in 80 injuries.

Frequency and Probability

Extreme temperature periods occur every year in the state. Wayne County experienced 14 extreme heat events between 1996 through 2016, resulting in 541 injuries and three deaths.⁴⁸ The probability of an extreme heat event occurring in Wayne County is likely, but is based on seasonal weather patterns.

Health & Safety

The major threats associated with extreme heat are heatstroke and heat exhaustion. Nationwide, approximately 135 deaths per year are attributable to extreme heat (a total of 3,311 over the 24 year period from 1986 to 2009).⁴⁹ Extreme heat primarily affects the most vulnerable segments of society such as the elderly, children, impoverished individuals and people in poor health. Within Wayne County, approximately 6% of the population is aged 0-5 years and 14% is aged 65 years or more.⁵⁰ In summary, 20% of the Wayne County population is at higher risk for impact from extreme heat based solely on age. Two deaths related to excessive heat have been recorded in Wayne County since 2000.⁵¹

Area Impacted

Extreme heat typically affects entire counties or regions of Michigan. Although the entire county would be affected, open spaces (at-risk for wildfires), elderly housing centers, and the homeless would be most impacted. The Michigan Department of Health and Human Services lists 45 nursing homes in Wayne County in their Medicaid Long Term Care Provider List.⁵²

Economic Impact

Extreme heat is usually accompanied by drought and can have hazardous effects on livestock, agricultural crops, and energy demands and is associated with forest or field

⁴⁶ Ibid.

⁴⁷ NOAA National Centers for Environmental Information Storm Events database query
<https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, April 22, 2019

⁴⁸ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103. April 2019, page 93.

⁴⁹ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103. July 2012, page 77.

⁵⁰ Southeast Michigan Council of Governments (SEMCOG), Community Profiles, Wayne County, excluding Detroit.
<https://semcog.org/Community-Profiles>

⁵¹ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, April 19, 2013

⁵² Michigan Department of Health and Human Services, Medicaid Long Term Care Provider List,
https://www.michigan.gov/mdhhs/0,5885,7-339-71551_2945_42542_42543_42546_42551-20397--,00.html

fires. Drought is discussed in Section 4.3. Medical costs and increased emergency response costs would be anticipated.

Critical Facilities/Services

Primarily, local and regional governmental services would be requested to provide assistance. Hospitals and clinics would expect an increase in heat exhaustion and other heat-related illness cases.

Utility companies (Consumers Energy, DTE Energy, etc.) would be essential in providing enough resources to supply an increased demand for power (increased use for air conditioning).

If the severity of the extreme heat is significant enough to cause a drought hazard, state and federal assistance could be available. Agricultural services and departments such as the Farm Bureau and the U.S. Department of Agriculture will be the most likely type of agency to provide assistance and aid.

4.5.2 Extreme Cold

Definition

Prolonged period of extreme cold; temperatures around or below zero degrees Fahrenheit, usually occurring in Wayne County from late November to early April.⁵³ Also similarly to extreme heat, human mortality temperature thresholds vary with latitude. Areas of the southern United States are susceptible to human health impacts from cold at higher temperatures than people in northern regions. Human health effects vary with wind chill and an individual's age, physical condition, physical activity, and access to heated buildings.

Historical Events

The lowest temperature ever recorded in Michigan was -51 degrees Fahrenheit on February 9, 1934 in Vanderbilt.⁵⁴

The National Storm Events Database lists 14 extreme temperature events reported for Wayne County between January 1, 1950 and 2019.⁵⁵ These events resulted in a total of 8 deaths and 34 injuries. This includes the "polar vortex" that affected Michigan and 21 other states January 29 through 31, 2019, shortly before the writing of this Plan. During that period temperatures across the state hovered at or below zero; On January 30th, Harbor Springs, Michigan reported the warmest temperature in the state at 5 degrees Fahrenheit, Ironwood in the Upper Peninsula recorded the coldest temperature at -26

⁵³ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103. April 2019, page 88.

⁵⁴ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103. July 2012, page 86.

⁵⁵ NOAA National Centers for Environmental Information Storm Events Database query <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, April 22, 2019

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degrees. Two Wayne County residents died during the event, in the City of Detroit and in Ecorse.⁵⁶ Other injuries involved frostbite and slip and fall accidents.

Following an explosion at a natural gas compressor station in Macomb County, during the same cold weather event, Consumers Energy and Michigan's Governor Whitmer asked residents to reduce their use of natural gas. The US Postal Service even suspended mail delivery in parts or all of several Midwest states including Michigan.

Another extreme cold event occurred on January 11, 1999 and resulted in more than 120 water main breaks in the City of Detroit. In Adrian, in Lenawee County, a water main break caused a water shortage for that City's 22,000 residents. Together, the infrastructure damage in Detroit and Adrian caused an estimated \$250,000 and \$1,000,000 in property damage, respectively.⁵⁷

On December 22, 2000, several freighters got stuck in ice on both the Detroit River and Lake St. Clair and blocked the shipping channel, bringing dozens of ships to a halt.⁵⁸

Frequency and Probability

Michigan has 90 to 180+ days per year below freezing but Wayne County is categorized as an area of relatively low risk with zero to 9.9 days per year with temperatures at or below zero degrees Fahrenheit.⁵⁹ The probability for an extreme cold event in Wayne County to occur is likely, is based on seasonal weather patterns and, since 2000, occurs once every 1.4 years on average. Global climate change patterns indicate that this rate may increase in the future.

Health & Safety

Extreme cold poses a significant health risk to the same segments of the population as extreme heat. Although extreme cold would affect the entire population, the population most at-risk for health hazards from extreme cold includes children, the elderly, disabled and impoverished persons. Nationally, extreme cold is responsible for approximately 700 deaths per year.⁶⁰ Hypothermia and frostbite are the most common conditions associated with extreme cold. Over half of the approximate 700 deaths are persons 60 years of age or older. The Michigan Department of Health and Human Services lists 45 nursing homes in Wayne County in their Medicaid Long Term Care Provider List.⁶¹

⁵⁶ Detroit News. 2019. <https://www.detroitnews.com/story/weather/2019/01/30/arctic-cold-lingers-over-metro-area-wednesday/2719279002/>

⁵⁷ NOAA National Centers for Environmental Information Storm Events Database query <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, April 22, 2019

⁵⁸ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103. April 2019, page 109.

⁵⁹ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103. April 2019, page 104.

⁶⁰ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103. July 2012

⁶¹ Michigan Department of Health and Human Services, Medicaid Long Term Care Provider List, https://www.michigan.gov/mdhhs/0,5885,7-339-71551_2945_42542_42543_42546_42551-20397--,00.html

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Statistics indicate that death due to cold is more frequent among males than females in most age groups.

Within Wayne County, approximately 20% is aged 60 years or more and therefore at higher risk from extreme heat based solely on age. ⁶²Seventeen extreme cold or wind chill events, resulting in 11 deaths and 10 injuries, were reported in Wayne County between 2000 and 2019. ⁶³

Area Impacted

Extreme cold can affect water supply lines and secondary effects, such as winter storms, can greatly impair transportation. Although the entire county would be affected, the impacts of extreme cold, other than those impacts to human health, would primarily occur to infrastructure (gas and water lines) and to shipping channels.

Economic Impact

Damage to infrastructure (gas and water lines) could result in repair costs. Medical costs and increased emergency response costs would be anticipated. Shipping delays could cause a short-term increase cost in consumer products.

Critical Facilities/Services

Primarily, local and regional governmental services would be needed to provide assistance in times of extreme cold. Local churches, community centers, and other nonprofits and governmental groups opened warming centers during the 2019 polar vortex event and the Wayne County Sherriff's Office assisted by transporting individuals to area shelters. Similarly, the Michigan Humane Society responded to calls of animals exposed to the cold.

Hospitals and clinics would see an increase in hypothermia, frostbite, and other cold-related illness cases. Coast Guard icebreaker assistance has been used to free shipping lanes from ice.

Utility companies (Consumers Energy, DTE Energy, etc.) would be essential in repairing lines and providing enough resources to meet increased demands for heat.

4.6 Fire Hazards

4.6.1 Forest/Field Fire

Definition

An uncontrolled fire within an open space, forested area, brush or grassed area, or wildland.

⁶² Southeast Michigan Council of Governments (SEMCOG), Community Profiles, Wayne County, excluding Detroit. <https://semcog.org/Community-Profiles>

⁶³ NOAA National Centers for Environmental Information Storm Events Database query <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, April 22, 2019

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Historical Events

A total of 1,669 occurrences from forest/field fires occurred between January 1, 1998 and December 2004 in Wayne County.⁶⁴ Between 1998 and 2003, Wayne County averaged 278 forest/field related fires per year. Updated county-specific data is not available for the period since 2003.

In October 1871, Michigan's first recorded catastrophic fire occurred after a prolonged drought over much of the Great Lakes region. The wildfire killed 200 people and burned 1.2 million acres in Michigan's Lower Peninsula.⁶⁵

Forest/Field Related Fire Incidents in Wayne County 1/1/98-12/31/04			
Type	Number	Deaths/ Injuries	Property Loss
Natural Vegetation	514	1/2	\$11,054
Forest, woods, or wild land fire	81	0/0	\$154
Brush, or brush and grass mixture	553	0/1	\$223,215
Grass fire	521	0/0	\$9,719
Cultivated vegetation, grain or crop, orchard, vineyard, trees, or nursery stock	147		1/4 \$24

Source: NFIRS 5.0 National Reporting, Tally by Incident Type, January 1, 1998 through December 31, 2004, filtered for Wayne County Reporting only.

Note: deaths & injuries are civilian and fire fighters combined.

Frequency and Probability

On average, one major event requiring MDNR involvement occurs per decade in Michigan. Michigan reported 431 wildfires in 2018 totaling 3,786 acres.⁶⁶ Wayne County had two wildfires reported between 1981 and 2018 (MDNR jurisdiction only).⁶⁷ The probability for a major forest/field fire to occur in the county is low, but smaller scale occurrences such as localized grass or brush fires are likely to occur.

Health & Safety

Between January 1, 1998 and December 31, 2003, one death was reported from natural fires. A total of 3 injuries (civilian and fire fighter) resulted.⁶⁸

Generally, heat exhaustion and smoke inhalation would represent the greatest risk to firefighters and/or civilians. The risk to human life is low to moderate for wildfires.⁶⁹

Area Impacted

⁶⁴ Federal Emergency Management Association Website, www.nfirs.fema.gov, *NFIRS 5.0 National Reporting*, October 3, 2005, Filtered for Wayne County Reporting Only

⁶⁵ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103. July 2012

⁶⁶ Insurance Information Institute: <https://www.iii.org/fact-statistic/facts-statistics-wildfires>

⁶⁷ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, April 2019, page 247.

⁶⁸ Federal Emergency Management Association Website, www.nfirs.fema.gov, *NFIRS 5.0 National Reporting*, October 3, 2005.

⁶⁹ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 7.

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In Michigan, 4% of all forest/field fires are caused by lightning strikes and the rest are caused by human activity.⁷⁰ Forests cover approximately 55% (20.4 million acres) of Michigan's total land base.⁷¹ The amount of area potentially affected by wildfire in Wayne County varies depending upon how land use/land cover data is classified: only 9.2% of Wayne County's is categorized as park, recreation or open space land uses.⁷² Agricultural lands make up an additional 7.9% of Wayne County. However, 60% of the County is covered by trees or open space.⁷³ Wayne County contained approximately 77,000 acres of scrub, grassland, and forest land in 2000.⁷⁴ (Figure 2)

Populations adjacent to open space or vacant land will be directly affected. The extent of the affected area depends greatly on response time and fire control. Open spaces and vacant land are most at-risk for forest/field fires. In 2000, there was approximately 114,209 acres of undeveloped land in Wayne County.⁷⁵ However, this number is expected to be less due to growth in the county over the past four years. Over 60% of Wayne County's land is developed.

Economic Impacts

The risk rate for property damage resulting from a wildfire is moderate to high (very high for timber loss).⁷⁶

Total property loss for vegetation, forest, woods, wildland, brush, and grass fires between January 1, 1998 and December 31, 2004 was \$24,414. Total property loss for fires on cultivated agricultural lands was \$242,976.⁷⁷ Secondary effects of forest/field fires include infrastructure damage, timber loss, property loss, wildlife loss and loss of life or injury to persons.

Critical Facilities/Services

There are 45 fire departments which respond to fires within Wayne County. Emergency response assistance is provided to fire departments through mutual aid arrangements. Between January 1, 1998 and December 31, 2004, no firefighter deaths were reported and 2 firefighter injuries were reported from related forest and field fires.⁷⁸

⁷⁰ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, April 2019, page 234.

⁷¹ Ibid

⁷² Southeast Michigan Council of Governments (SEMCOG), Community Profiles, Wayne County, excluding Detroit. <https://semcog.org/Community-Profiles>

⁷³ Southeast Michigan Council of Governments (SEMCOG), Quick Facts: Land Cover in Southeast Michigan, 2013. <https://www.semcoog.org/publications>

⁷⁴ SEMCOG, *Land Use in Southeast Michigan 1990-2000*, Specific to Wayne County, April 2004.

⁷⁵ SEMCOG, *Land Use in Southeast Michigan 1990-2000*, Specific to Wayne County, April 2004.

⁷⁶ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 7.

⁷⁷ Federal Emergency Management Association Website, www.nfirs.fema.gov, *NFIRS 5.0 National Reporting*, October 3, 2005.

⁷⁸ Federal Emergency Management Association Website, www.nfirs.fema.gov, *NFIRS 5.0 National Reporting*, October 3, 2005.

4.6.2 Scrap Tire Fire

Definition

Scrap tire fires are large fires which occur at a location where scrap tires are being stored for processing, recycling, or re-use.

Historical Events

Michigan generates 7.5 to 9 million scrap tires annually and Wayne County has an extensive history of scrap tire fires. Over the last decade, there has been a decrease in both the frequency and severity of fires at scrap tire disposal sites due to the cleanup of existing stockpiles and an increase in compliance at collection sites. The Michigan State Police list 16 significant fires at tire storage locations from 1987 to 2010. One of these was in southwest Detroit in 2005; that fire injured three firefighters and destroyed buildings on-site.⁷⁹

The Michigan Department of Environmental Quality requires a scrap tire collection site to be registered if it exceeds established tire storage thresholds. Scrap tire collection sites can include businesses such as scrap tire processors, new tire retailers, junkyards, farms, and go-kart tracks. It is estimated that there are over 650,000 scrap tires stored in Wayne County at registered and unregistered scrap tire collection sites.

Frequency & Probability

In Michigan there were sixteen major scrap tire fires from 1987 to 2010.⁸⁰ However, since the MDEQ Michigan Scrap Tire Program began in 1991, Michigan's scrap tire stockpile has been reduced from 31 million to about 3,400,000 (2012).⁸¹

Health & Safety

Scrap tire facilities present significant environmental and fire hazards. In addition, scrap tires are known for providing breeding grounds for mosquitoes, thus contributing hazards to public health. Scrap tire fires are also capable of producing acrid smoke and an oily residue which can leach into the soil.

Area Impacted

Scrap tire fires can be difficult to contain and, aside from the fire hazard presented by scrap tire fires, inhaling the smoke produced from the fire can be hazardous to human health. As a result, scrap tire fires often require people in surrounding areas to evacuate or seek shelter-in-place.

The oily material produced by scrap tire fires can also negatively impact the soil, and possibly groundwater and surface water, in the area of the fire. If groundwater or

⁷⁹ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 216.

⁸⁰ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 216.

⁸¹ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 214.

surface water is impacted, the effects can potentially extend well beyond the boundaries of the fire.

Economic Impact

A scrap tire fire will inevitably result in property damage and inventory loss to the collection site. In addition, environmental clean-up costs after the fire is extinguished can be significant.

Due to the amount of response required, extinguishing a scrap tire fire can be financially draining for local emergency response departments. For example, the largest scrap tire fire in recent Michigan history occurred in Osceola County in 1997. That fire burned over 1.5 million tires and cost approximately \$300,000 to extinguish. The State of Michigan paid \$100,000 to Osceola County as reimbursement for fighting that fire.

Critical Facilities/Services

Scrap tire fires can be very difficult to extinguish, often lasting for extended periods, and can require a substantial amount of resources from local emergency response departments. The response effort typically requires assistance from neighboring fire departments.

4.6.3 Structural Fire

Definition

A structural fire is a fire of any origin that ignites one or more structures and causes loss of life and/or property.

Historical Events

Structural fires are commonly known as the “universal hazard” because they can occur anywhere. The Michigan State Police, Fire Marshal Division estimated that, in 2003, a structural fire occurred in Michigan every 28 minutes and 6 seconds.⁸² Wayne County has experienced numerous structural fires throughout its history.

Frequency & Probability

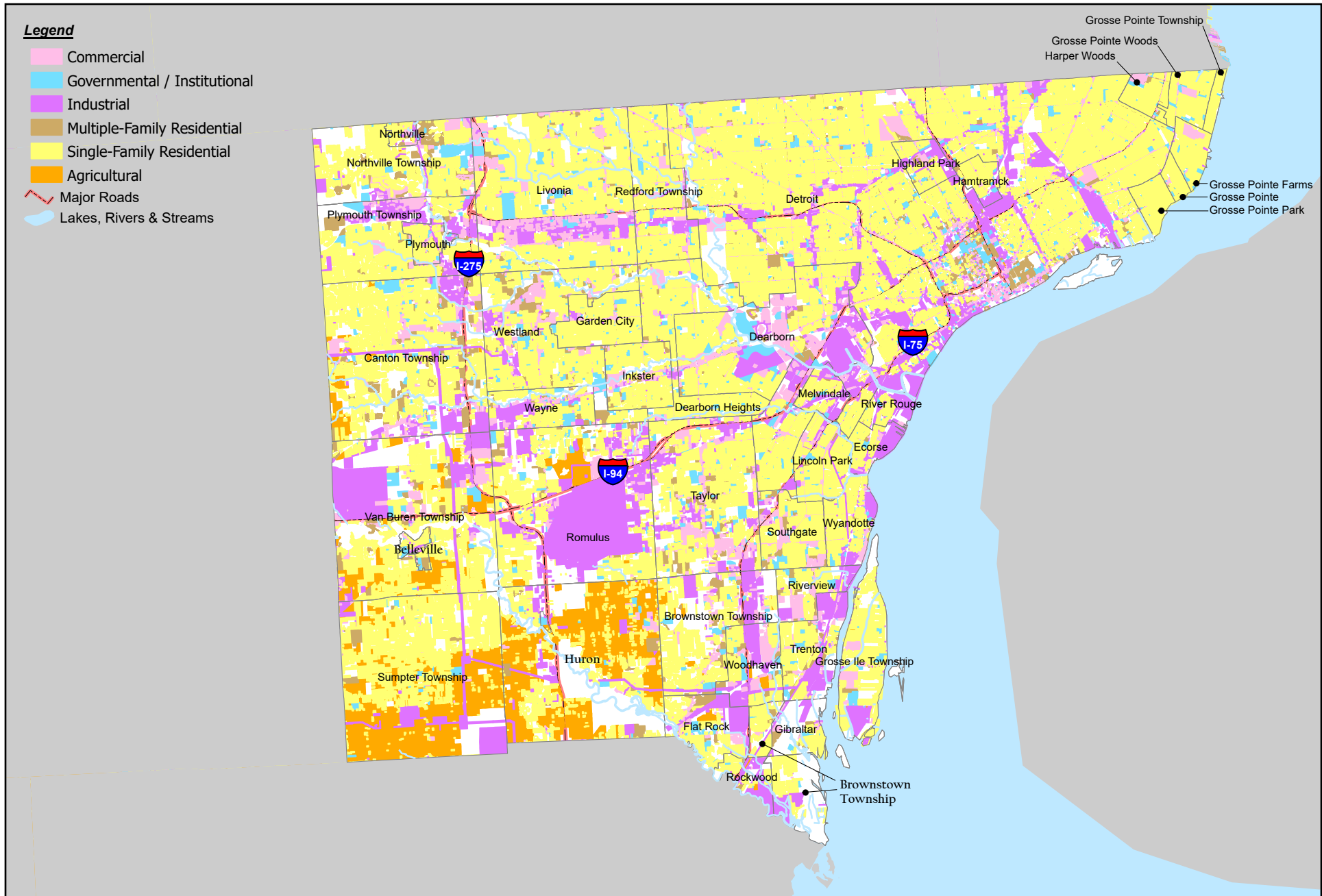
From 1998 through 2004, 8,674 structural fires in Wayne County were reported to the Federal Emergency Management Agency, National Fire Incident Reporting (NFIR) System.⁸³ Updated, Wayne County-specific information was not available for the writing of this report but national data from the U.S. Fire Administration notes and estimated 1,319,500 fires in 2017, with 29.1% of those impacting residential structures and another 8.3% involving nonresidential structures.⁸⁴ The Detroit Fire Report indicates there were 2,981 structural fires in the City of Detroit in 2015 and that 91% of those impacted

⁸² Michigan State Police, Fire Marshal Division, 2003 Fire Clock.

https://www.michigan.gov/documents/dleg_bccfs_03fireclock_94774_7.pdf

⁸³ NFIRS 5.0 National Reporting, Tally by Incident Type, January 1, 1998 through December 31, 2004, report generated on October 3, 2005, filtered for Wayne County reporting only.

⁸⁴ U.S. Fire Administration. U.S. Fire Statistics: <https://www.usfa.fema.gov/data/statistics/>



Wayne County

Created for: Wayne County
 Created by: RMH, April 22, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013), SEMCOG Land Use (2015)

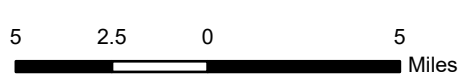


Figure 3 - Hazard History:
 Fire - Structural

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residential buildings.⁸⁵ Although the number of structural fires nationally is declining, fires within Wayne County have a well-established history and this hazard will continue to occur in the future (Figure 3).

Health & Safety

Structural fires occur in Michigan roughly 22,000 times per year and cause approximately 210 deaths and 670 injuries per year. Residential fires account for 74% of structure fires and 80% of fire deaths. Residential and other county land uses are shown in Figure 4. From 1998 through 2004, there were a total of 56 deaths and 330 injuries due to structural fires in Wayne County. This equates to an average of 8 deaths and over 47 injuries per year.⁸⁶

Area Impacted

Structural fires can occur on any parcel within which a structure is present.

Economic Impact

Property loss and contents loss can be very high as a result of structural fires. From 1998 through 2004, Wayne County experienced a total of \$230,531,796 in property and content loss from structural fires, an average of \$32,933,114 per year, or \$26,577 per structural fire.

Critical Facilities/Services

35 fire departments, acting from 57 fire stations had responded to structural fires within the Wayne County communities covered in the 2019 Plan.⁸⁷ There are a total of 44 fire departments and 80 stations in the county, including those that respond to private, transportation, or port industries.⁸⁸

4.7 Flooding

4.7.1 Dam Failure

Definition

The failure of an impoundment located in a river, stream, lake or other waterway resulting in downstream flooding.

Historical Events

⁸⁵ Loveland Technologies. 2015. The Detroit Fire Report: an in-depth look at a year of fires in the City of Detroit, January 1 - December 31, 2015. <http://detroitfires.squarespace.com/#cover>

⁸⁶NFIRS 5.0 National Reporting, Tally by Incident Type, January 1, 1998 through December 31, 2004, report generated on October 3, 2005, filtered for Wayne County reporting only.

⁸⁷ Ibid.

⁸⁸ National Fire Department Census Database, report generated July 1, 2013, <http://apps.usfa.fema.gov/census/>.

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Dam failure can result in loss of life, property, and natural resources for miles downstream of a dam. Dam failures are not only caused by flood events, but can also be caused by poor operation, lack of maintenance, and vandalism.

Examples of dam failures in Michigan include: 1) in Marquette (2003) an earthen dam failed causing over \$10 million in property damages, 2) in September 1986, an intensive rainfall caused 11 dams to fail in the Lower Peninsula of Michigan, and 3) in August 2018, the Blackwater Dam near Coldwater was reported to be in a "state of failure," as water began undermining and flowing through portions of the earthen berm adjacent to the dam gates.

There are 2,400 dams identified statewide and there have been 287 documented dam failures in Michigan since 1888.⁸⁹

Frequency and Probability

Over 300 dams and critical culverts exist in Wayne County.⁹⁰ Wayne County has eight high or significant Class I dam hazards.⁹¹ Wayne County has had two documented dam failures.⁹² However, dams upstream of Wayne County also increase the frequency and probability of dam hazards that would affect Wayne County. It is probable that a dam failure or a hazard resulting in an upstream dam failure will occur in the future within the county.

Name	Hazard	Height
Nankin Mill Dam	High	17
Newburgh Dam	High	29
Phoenix Dam	High	24
Wilcox Dam	High	27
Waterford Dam	High	22
Flat Rock Dam	High	16.5
French Landing Dam	High	35
Maybury Fish Pond Dam	Significant	18.5

Source: State of Michigan Department of Environmental Land and Water Management Division.

Health & Safety

No deaths or major injuries have been reported as a result of dam failure in the State.⁹³ Still, the risk to human life as a result of dam hazards is moderate to high.⁹⁴

⁸⁹ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 124.

⁹⁰ Wayne County Michigan Pre-Disaster Mitigation Plan, Wayne County Department of Homeland Security & Emergency Management, March 2005

⁹¹ Michigan Department of Environmental Quality, Land and Water Management Division, List of Dams in Oakland County and Dams Upstream of Wayne County, September 7, 2005

⁹² Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 76.

⁹³ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 126.

⁹⁴ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 8.

Area Impacted

Floodplain areas downstream of dams are at greatest risk for impact from a dam break. There are 3,820 enrollees in the National Flood Insurance Program within 100-year floodplains in Wayne County⁹⁵ and there were approximately 9,500 structures⁹⁶ located within FEMA-mapped 100-year floodplains within Wayne County in 2004.

Economic Impact

The risk of property damage as a result of dam hazards is moderate to high.⁹⁷ Property loss and content loss can be very high as a result of a dam failure. Variable costs to repair a damaged dam are anticipated.

Critical Facilities/Services

Flooding events can require a substantial amount of resources and assistance from multiple agencies and departments including local emergency response departments, as well as state and federal departments such as the MDEQ Land and Water Management Division, Dam Safety Program staff and FEMA. If flooding from a dam resulted in significant damage to homes, The American Red Cross may also assist.

4.7.2 Riverine Flooding

Definition

The periodic occurrence of over-bank flows of rivers and streams resulting in partial or complete inundation of the adjacent floodplain.

Historical Events

Wayne County experienced significant riverine flooding during the writing of this report. Over a seven-hour period from April 30 to May 1, 2019, 3.6 inches of rain (approximately a 100-year storm) resulted in widespread flooding in Dearborn Heights, Detroit, and other communities, impacting approximately 3,000 homes in the county, forcing closure of the Southfield Freeway, and affecting residents within a six county area in southeast Michigan. Wayne County Executive, Warren Evans, declared a county state of emergency and Governor Gretchen Whitmer followed by declaring a State of Emergency for Wayne County.

On August 11, 2014, southeast Michigan experienced record rainfall of more than six inches in some areas. Metro Detroit and surrounding communities, as well as the Flint and Saginaw areas farther north were the hardest hit. Wayne, southern Oakland and Macomb Counties experienced the worst flooding with four to six inches of rain over a four hour period. Approximately 75,000 homes and businesses were impacted with damages in Detroit Metro area estimated at 1.8 billion dollars. The severe and

⁹⁵ FEMA (Federal Emergency Management Agency), National Flood Insurance Program, NFIP Insurance Report by State, County, Community, January 23, 2006.

⁹⁶ ASTI Environmental, unpublished analysis of FEMA 100-year floodplain overlays and AeroData, Inc. 2004 aerial photography, Wayne County.

⁹⁷ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 126.

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widespread flooding prompted President Obama to declare a major disaster for Macomb, Oakland and Wayne Counties.

On July 16, 1995, heavy rainfall of around two inches in two hours caused the Middle Rouge River near Garden City to crest near flood stage.⁹⁸ A similar occurrence occurred again on August 3 and October 5, 1995. On June 30, 2004, a Presidential Disaster Declaration was issued for Wayne County, and 22 other counties in Michigan, to provide individual assistance to households and individuals affected by flooding.⁹⁹ In September of 1986 and 1987, a county/state disaster declaration was issued for downriver floods (Gibraltar and Brownstown) and (Gibraltar, Brownstown, and Riverview), respectively.¹⁰⁰ In May 2004, overflows from the Ecorse Creek caused the flooding of an estimated 1,500 homes in the downriver communities Ecorse Creek passes through.¹⁰¹

Frequency and Probability

Although the Michigan Hazard Analysis indicates that Michigan averages one major riverine flood every two years,¹⁰² NOAA's extreme weather database includes reports of six flood and flash flood events since 2013, which does not include the 2019 event described above. Wayne County includes portions of the Detroit River, the Huron River, the Rouge River, Ecorse Creek, and the Combined Downriver Watersheds (Blakely Drain, Frank & Poet Drain, and Detroit River South sub watersheds). Riverine flooding generally occurs every year in Wayne County and areas like Hines Drive may flood frequently each year.

Further, climate change is likely to increase the frequency of floods in Michigan. Over the last half century, average annual precipitation in most of the Midwest has increased by 5 to 10 percent. But rainfall during the four wettest days of the year has increased about 35 percent. During the next century, spring rainfall and annual precipitation are likely to increase, and severe rainstorms are likely to intensify. Each of these factors will tend to further increase the risk of flooding.¹⁰³

The Wayne County Parks Department has developed a system for quick response, road closings, and public notification for flooding of Hines Drive. It is highly probable that riverine flooding will continue to be a hazard in Wayne County.

⁹⁸ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005

⁹⁹ Federal Emergency Management Agency Website, Disaster Declarations, www.fema.gov/news/event.fema?id=3147, September 24, 2004.

¹⁰⁰ Wayne County Michigan Pre-Disaster Mitigation Plan, Wayne County Department of Homeland Security & Emergency Management, March 2005

¹⁰¹ Press & Guide Newspapers, www.pressandguide.com/cgi-bin/printme.pl

¹⁰² Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 97.

¹⁰³ US Environmental Protection Agency, 2015. What Climate Change Means for Michigan. EPA 430-F-16-024. August 2016.

Health & Safety

Although frequent and widespread, less than 10 deaths from riverine flooding were recorded in Michigan in the 25 years prior to 2001 and 140 nationally per year.¹⁰⁴ The risk to human life is generally considered low.¹⁰⁵ However, at least one more death was attributed to riverine flooding in 2018 when a 12-year old boy in Houghton was trapped in the collapse of his basement.

Area Impacted

A riverine flood in Wayne County would primarily affect streets and infrastructure located near floodplains and in areas with inadequate drainage. The Combined Downriver watershed includes 11 communities and encompasses approximately 85.9 square miles and in 2000, had 244,259 people living within its boundaries (2,844 people per square mile).¹⁰⁶ The Ecorse Creek Watershed includes 11 communities and encompasses 27,791 acres or 43.4 square miles.¹⁰⁷ The Rouge River basin has four tributary branches totaling 126 miles located in mostly urban areas of Wayne County.¹⁰⁸ The Rouge watershed extends over 438 square miles within three counties, including Wayne County.

The Detroit Free Press reports that the First Street Foundation, a nonprofit group, utilizing different models than FEMA to identify parcels at risk of flooding, has identified as many as 46,609 Wayne County parcels in flood zones (6%).¹⁰⁹ The City of River Rouge is reported as having the highest percentage of its total parcels at flood risk (81%), with Grosse Pointe Woods the next highest (60%).

Economic Impact

Flooding is the most costly and common natural disaster in the United States. Property and content loss can be very high. Property damage as a result of flooding in Michigan averages more than \$100 million each year.¹¹⁰ Michigan had 20,378 flood insurance policies in place as of June 30, 2018. The number of flood insurance policies has been declining in recent years, despite the fact that homes in a high-risk areas have at least a 26% chance of being damaged by a flood over the course of a 30-year mortgage, compared to a 9% chance of being impacted by fire. Additionally,

During the period, January 1, 1996 to April 30, 2017, Wayne County communities (including Detroit) experienced a total of 65 flood events, beginning on 54 separate days,

¹⁰⁴ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 8.

¹⁰⁵ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 8.

¹⁰⁶ Draft Combined Downriver Watershed Management Plan, CDWIC, August 5, 2005

¹⁰⁷ Draft Ecorse Creek Watershed Management Plan, August 1, 2005

¹⁰⁸ www.waynccd.org/index/files/Page_703.htm,

¹⁰⁹ Detroit Free Press, June 29, 2020. *First Street Foundation's flood assessment method finds 70% more parcels at flood risk nationwide than are noted by FEMA.*

<https://www.freep.com/in-depth/news/local/michigan/2020/06/29/flood-risk-michigan-homes-map-first-street-foundation/3258043001/>

¹¹⁰ Michigan Department of State Police, Emergency Management and Homeland Security Division, April 2019. *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 145.

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and amassing over a billion dollars in property damage (\$1,123,800,000).¹¹² One hundred thirty seven properties, in the portions of Wayne County covered in this plan, have experienced repeated flooding and have filed flood insurance claims for repetitive losses. Costs for damages due to repetitive flooding loss in Wayne County, per the September 30, 2018 list, average \$18,326 per property.¹¹³

Critical Facilities/Services

Flooding events can require a substantial amount of resources and assistance from multiple agencies and departments including local emergency response departments, state and federal departments (e.g., FEMA), and non-profit organizations such as the American Red Cross. If loss to significant yields of crops results from a flood event, agricultural service agencies such as the Michigan or U.S. Departments of Agriculture may be called upon to offer assistance. The National Weather Service and local media issue flood watches and warnings to give advanced notice of potential flooding to areas. Watershed management programs and community/government programs, such as Friends of the Rouge River, the Rouge River Wet Weather Demonstrating Project, the Rouge River Watershed Alliance, and the Huron River Watershed Council also provide data and information.

National Flood Insurance Program (NFIP) Participation

Part 31, Water Resources Protection, Michigan Act 451 of 1994, as amended, regulates activities that result in occupation, fill, or grading of land within floodplains along watercourses with a drainage area in excess of two square miles. Such activities require an application, review, and permit issuance from the Michigan Department of Environment, Great Lakes, and Energy (EGLE) prior to floodplain disturbance. Of the 42 communities in Wayne County, 36 participate in the National Flood Insurance Program¹¹⁴ and DFIRM data is available for all. Those communities not listed as participating are the cities of Belleville, Hamtramck, Harper Woods, Highland Park, Melvindale, and Van Buren Township. There are 4,050 flood insurance policy holders enrolled in the National Flood Insurance Program in Wayne County.¹¹⁵ Analysis of aerial photographs indicates that approximately 9,500 structures were located within the FEMA-mapped 100-year floodplains in 2004.¹¹⁶

¹¹² Michigan Department of State Police, Emergency Management and Homeland Security Division, April 2019. *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 147.

¹¹³ FEMA (Federal Emergency Management Agency), National Flood Insurance Program, Repetitive Loss Summary for Wayne County, Michigan. provided by the Michigan State Police, Emergency Management Division, September 30, 2018.

¹¹⁴ FEMA National Flood Insurance Program Community Status Book, <http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book>, updated 6/15/2012

¹¹⁵ from NFIP Policy Information by county for current month, <http://www.fema.gov/policy-claim-statistics-flood-insurance/policy-claim-statistics-flood-insurance/policy-claim-13>, updated 1/ 7/2013

¹¹⁶ ASTI Environmental, unpublished analysis of FEMA 100-year floodplain overlays and AeroData, Inc. 2004 aerial photography, Wayne County.

Repetitive Loss

FEMA identifies 169 repetitive loss properties in Wayne County, with 32 of those within the City of Detroit.¹¹⁷ The 137 repetitive loss properties within the remainder of the county covered by this plan represent a 12 percent increase from the 122 noted in the 2013 Wayne County Hazard Mitigation Plan update.

Severe repetitive loss properties are defined as residential properties covered under an NFIP flood insurance policy, and: (a) that have at least four NFIP claim payments (including building and contents) over \$5,000 each, with the cumulative amount of such claims payments exceeding \$20,000; or (b) for which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building. For both (a) and (b), at least two of the referenced claims must have occurred within any 10-year period and must be greater than 10 days apart.

Repetitive loss properties comprise approximately one percent of currently insured properties but account for 25-30% of flood claims.¹¹⁸ They constitute a significant expense of the NFIP. Flood mitigation activities for reducing the potential of further damages to these properties are a priority. By addressing these high-priority at-risk properties, not only would all of the normal benefits of hazard mitigation be enjoyed, but the reduction in insurance claims would be expected to help keep flood insurance costs lower for everyone else in these NFIP-participating communities.

The following table summarizes the number and types of repetitive-loss properties by community in Wayne County.

¹¹⁷ FEMA (Federal Emergency Management Agency), National Flood Insurance Program, Repetitive Loss Summary for Wayne County, Michigan. provided by the Michigan State Police, Emergency Management Division, September 30, 2018.

¹¹⁸ The Pew Charitable Trusts. 2016. Repeatedly Flooded Properties Cost Billions (infographic). https://www.pewtrusts.org/~media/assets/2016/10/repeatedly_flooded_properties_cost_billions.pdf?la=en

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Jurisdiction	Total Number of Properties	Number classified as "mitigated"	Property type(s)	Total damages
Allen Park	6	0	Single-family Residential	\$66,142
Brownstown Twp.	8	4	Single-family Residential	\$216,402
Dearborn	1	1	Other residential	\$91,425
Dearborn Heights	16	1	Single-family Residential	\$390,770
Ecorse	2	0	Single-family Residential	\$13,076
Gibraltar	85	83	(see below)	\$1,427,272
Grosse Ile Twp.	4	0	Single-family Residential	\$57,326
Grosse Pointe	1	1	Single-family Residential	\$5,683
Grosse Pointe Park	1	0	Single-family Residential	\$22,517
Lincoln Park	2	0	Single-family Residential	\$42,933
Northville Twp.	1	0	Single-family Residential	\$41,174
Plymouth Twp.	1	0	Single-family Residential	\$20,296
Redford Twp.	3	0	Single-family Residential	\$21,040
Rockwood	1	1	Single-family Residential	\$3,816
Trenton	3	0	(see below)	\$17,317
Wyandotte	2	1	(see below)	\$73,432
TOTAL	137	92		\$2,510,621

In the City of Gibraltar, 83 of the 85 repetitive loss properties are classified as "mitigated." These include 82 single-family residential properties plus one non-residential property. The two Gibraltar unmitigated properties are single-family residential properties. Trenton's three properties involve two single-family residential and one "other residential" property. Wyandotte's mitigated property is multi-family residential and the unmitigated property noted above is listed as "other non-residential."

4.7.3 Urban Flooding

Definition

Urban flooding involves the overflow of storm sewer systems and is usually caused by inadequate drainage following heavy rainfall or rapid snowmelt. Urban flooding is typically the result of intense rainfall, snowmelt, ice jams, dam failures (considered separately above), or a combination of these factors. Secondary hazards associated with urban flooding include infrastructure damage, dam failure, riverine flooding, and shoreline flooding and erosion.

Historical Events

Since the National Centers for Environmental Information Storm Events Database began recording this category in 1996, a total of 51 individual flood or flash flood events have

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been recorded in Wayne County, not including the most recent events here in early May 2019.¹¹⁹

In April 1947, a combination of snow and rainfall that began in late March affected areas surrounding the Rouge River.¹²⁰

On May 9, 1996, a flash flood caused flooding on I-94 in Wayne County.¹²¹

On February 7, 1997, the Lower Rouge River at Inkster went above its 10.0-foot flood stage and crested at 10.1 feet.¹²²

Presidential and Gubernatorial Disaster Declarations were issued for flooding that occurred in July 1997, which caused flood-related damage to the public water and sewer systems in Wayne and Macomb Counties totaling nearly \$300,000.

In February 1998 a rain event caused a State of Emergency Declaration to be issued in Wayne County. Taylor, Dearborn Heights, Westland, and Gross Ile were among the hardest hit communities. Urban flooding was a significant problem. Hundreds of basements and many streets were flooded in the cities west and southwest of Detroit. Rainfall totals during the three-day event were commonly over 2 inches.¹²³

On September 11, 2000 widespread, severe, urban flooding resulted in a Presidential Disaster Declaration for Wayne County.¹²⁴ Over 15,000 residences and other structures in the county suffered flood damage. In Allen Park, an estimated 40% of all streets flooded at some point during the event. Underpasses flooded in Dearborn. The Southfield Freeway was covered with two to three feet of water. A home in Riverview had its basement collapse and three feet of water covered Fort Street in Wyandotte. Wayne County suffered an estimated \$19 million in property damage as a result of the event.

In May 2004, the combination of heavy rain and power failure at the Wyandotte pumping station resulted in basement flooding in Dearborn Heights, Romulus, and Allen Park.

¹¹⁹ NOAA National Centers for Environmental Information, Storm Events Database, <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, *Query for Wayne County Michigan Flood and Flash Flood Events, May 1, 2019*.

¹²⁰ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 81.

¹²¹ NOAA National Centers for Environmental Information, Storm Events Database, <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, *Query for Wayne County Michigan Flood and Flash Flood Events, May 1, 2019*.

¹²² *Ibid.*

¹²³ NOAA National Centers for Environmental Information, Storm Events Database, <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, *Query for Wayne County Michigan Flood and Flash Flood Events, May 1, 2019*.

¹²⁴ *Ibid.*

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The intersection of Telegraph and I-94 was closed due to flooding. Approximately 350 homes in Allen Park were damaged by flooding.¹²⁵

Edward Hines Drive has been closed numerous times between at least 1994 and May 2005 in Garden City due to cresting of the Middle Rouge River. The road is located within a floodplain of the Rouge River.

Finally, as noted above in the Riverine Flooding section of this report, severe rainfall that overwhelmed stormwater drainage systems caused widespread flooding in both August 2014 and May 2019, resulting in federal and state declarations, respectively, and millions to billions of dollars in damage. The most recent flood events closed portions of the Southfield Freeway and streets in Taylor, Dearborn Heights, and Allen Park.¹²⁶

Frequency and Probability

The frequency of urban flooding is dependent on seasonal weather patterns. Urban flooding is usually caused by inadequate drainage following heavy rainfall or rapid snowmelt. Urban flooding is more likely to occur during the spring, when thunderstorms and snow melt are more prevalent or during mid-summer thunderstorms. Many areas of Wayne County are heavily urbanized and are located along river corridors. Most of these areas are connected to aging municipal storm sewer systems that can exacerbate flooding. It is highly probable that urban flooding will continue to occur in the county. As development continues, and as stormwater infrastructure continues to age, an increase in urban flooding may occur. Additionally, scientists predict that climate change will increase the number of extreme rainfall and storm events, leading to more flooding throughout the Midwest and costing taxpayers as much as \$480 million annually just to adapt stormwater systems to handle the increased runoff.¹²⁷

Health & Safety

Possible loss of life would be primarily from drowning incidents. Other potential health-related problems could be from sewer back-ups and increased pollutant concentrations.

One man drowned in West Bloomfield Township, in neighboring Oakland County, on June 18, 1996, when he drove his car across a flooded parking lot into a pond, which was obscured by flood waters.¹²⁸

During July 2000, a stranded family was rescued by a boat in Novi after their car stalled in flood waters.¹²⁹

¹²⁵ NOAA National Centers for Environmental Information, Storm Events Database, <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, *Query for Wayne County Michigan Flood and Flash Flood Events, May 1, 2019*.

¹²⁶ Detroit Free Press. <https://www.freep.com/story/weather/2019/05/02/detroit-area-rain-total-shatters-record/3649336002/>, May 2, 2019.

¹²⁷ USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018

¹²⁸ NOAA National Centers for Environmental Information, Storm Events Database, <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, *Query for Wayne County Michigan Flood and Flash Flood Events, May 1, 2019*.

Area Impacted

An urban flood in Wayne County would primarily affect streets and infrastructure located in or near floodplains and in areas with inadequate drainage. Approximately 9,509 structures are located within the FEMA 100-year floodplain within 42 of the communities covered by this Plan. Figure 5 shows the location of all floodplains and flood-prone areas within the county.

Economic Impact

It is estimated that flood damages in Michigan are between \$60 and \$100 million per year.¹³⁰

The 51 individual flood or flash flood events recorded in Wayne County since 1996, not including the most recent events here in early May 2019, have resulted in property damage totaling an estimated \$1,123,600,000 dollars, an average of more than \$51 million dollars per year.¹³¹

From 2000 to 2008, Michigan experienced eight flood disasters that resulted in either a Presidential Major Disaster Declaration or a Governor's Disaster Declaration. These flood disasters have damaged homes, businesses, personal property and agriculture, resulting in hundreds of millions of dollars' worth of damage.¹³²

Critical Facilities/Services

Flooding events can require a substantial amount of resources and assistance from multiple agencies and departments including local emergency response departments, as well as state and federal departments including FEMA and the American Red Cross. Thirty-six communities in Wayne County participate in FEMA's National Flood Program

The National Flood Insurance Program (NFIP) was instituted in 1968 to make flood insurance available in those communities agreeing to regulate future floodplain development. In February 2013 there were 26,247 flood insurance policies in force in Michigan, which amounts to approximately \$4.5 billion worth of coverage.¹³³ There are 4,050 flood insurance policy holders enrolled in the National Flood Insurance Program in Wayne County.¹³⁴

¹²⁹ Ibid.

¹³⁰ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 97.

¹³¹ NOAA National Centers for Environmental Information, Storm Events Database, <https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, *Query for Wayne County Michigan Flood and Flash Flood Events, May 1, 2019*.

¹³² FEMA, Disaster Declarations by State/Tribal Government. <https://www.fema.gov/disasters/state-tribal-government/0/MI>

¹³³ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 84.

¹³⁴ from NFIP Policy Information by county for current month, <http://www.fema.gov/policy-claim-statistics-flood-insurance/policy-claim-statistics-flood-insurance/policy-claim-13>, updated 1/ 7/2013

In 2002, Wayne County set up a subscription, online, emergency alert service that sends notices via e-mail, text message, or pager, of flooding along Edward Hines Drive and other emergencies.

4.7.4 Shoreline Flooding & Erosion

Definition

Shoreline erosion hazards typically involve the loss of property as shoreline soil is removed by water action and is carried away over time.

Historical Events

Shoreline flooding and erosion typically occurs along the Great Lakes shoreline and connecting waters (i.e., Lake St. Clair and the Detroit and St. Clair Rivers) and is caused by high water levels, frequently exacerbated by high winds from the east. During the writing of this plan, the U.S. Army Corps of Engineers (USACE) reported that all of the Great Lakes hit record high water levels as heavy winter snowpack across the north added to rain swollen rivers. The high lake levels have caused both flooding and shoreline erosion in coastal areas across Wayne County. In September 2020, Lake Erie is currently at its record high monthly mean value set previously in 2019; Lake St. Clair is three inches above the previous high monthly mean for September, again set in 2019. These lake levels are 27 and 30 inches higher than the long-term averages for September in Lakes Erie and St. Clair, respectively.

No discernible pattern of high and low lake levels has been derived from U.S. Army Corps of Engineers data recorded since 1918-2011. However, analysis of Lake Michigan beach ridges and radiocarbon dating of soil cores Yield a 4,700-year record of Lake Michigan-Huron water levels. From these data, scientists have identified a general rise and fall cycle lasting approximately 120-200 years. They have also identified a shorter-term fluctuation, ranging from 2 to 38 years (average = 32 years) within the longer cycle.

In general, the Great Lakes system experienced extremely low levels in the late 1920s, mid-1930s, and the mid-1960s. From 1999 to 2014, the lakes experienced an unprecedented period when water levels for Lake Michigan-Huron and Superior fell below their long-term average for 15 years. Record high water levels have been recorded in the late 1980s and currently.

Great Lakes water levels have been trending upward since 2013. That was the low point of the above-referenced 15-year period that resulted in the stranding of recreational boats and forced commercial vessels to lighten their loads.

Prior to the current high levels, the most recent high-water period in Michigan was in 1997-98. During this period, the Great Lakes were at or near record levels set in the mid-1980s. In 1985-86, record high lake levels resulted in a Governor's disaster

declaration for 17 shoreline counties. During 1972-73, high water levels caused flooding in 30 counties in Michigan.¹³⁵

Frequency and Probability

Long-term and seasonal variations in precipitation and evaporation rates contribute to the fluctuation of water levels. Several manmade factors can also affect water levels such as diversion of water for resource use, dam regulations, and dredging. Shoreline flooding and erosion that occurs along the Great Lakes is caused primarily by natural factors. Although Wayne County coastal areas do not exhibit the dramatic bluffs and dunes found on Lake Michigan, it does contain flood prone coastal areas.¹³⁶ The NOAA Storm Event Database records 16 lakeshore flood events in Wayne County during the last 32 year cycle, all of which were recorded in 2019 and 2020.¹³⁷ Shoreline erosion and flooding are likely to continue in Wayne County in communities along Lake St. Clair, the Detroit River, and Lake Erie and are likely to increase in frequency and severity due to project climate changes.

Health & Safety

No deaths or casualties were recorded for the shoreline erosion and flooding events along Lake St. Clair, the Detroit River, and Lake Erie noted above, but seiche events do periodically result in drownings. Deaths and casualties from this hazard are of low probability, but property damage potential is moderate to high. Low-lying areas prone to flooding and erosion should have restrictions limiting or preventing access.

Area Impacted

Communities in Wayne County along the shoreline of Lake St. Clair, the Detroit River, and Lake Erie are Grosse Pointe Shores, Grosse Pointe Farms, Grosse Pointe, Grosse Pointe Park, Detroit, River Rouge, Ecorse, Wyandotte, Riverview, Trenton, Gibraltar, and Brownstown Township. Grosse Ile, being an island, has shoreline on all sides. Low-lying areas along coastal areas are prone to shoreline flooding during both high and low lake water periods (Figure 5).

Economic Impact

No values for economic impact were provided for the 2019-2020 lakeshore flooding events. During 1972-73, high water levels caused flooding in over 30 counties, resulting in excess of \$50 million in public and private damage. Thousands of people were forced to evacuate their homes. Shoreline flooding would have similar economic impacts from damage to or loss of property as urban flooding.

¹³⁵ Flesher, John, Associated Press. May 6, 2019.

<https://www.apnews.com/2af073fe3a634f68b80bdfb419e53a33>

¹³⁶ Michigan Department of Environmental Quality Land and Water Management Division

¹³⁷ NOAA National Centers for Environmental Information, Storm Events Database,

<https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, *Query for Wayne County Michigan Lakeshore Flooding, September 12, 2020.*

Critical Facilities/Services

The United States Army Corps of Engineers (USACE) implemented its Advance Measures Program, and the State of Michigan implemented three unique shoreline flooding and erosion programs aimed at reducing future flood impacts to shoreline communities and homeowners.¹³⁸ The Detroit District USACE has been involved in thousands of projects related to shoreline erosion and flooding. Other critical facilities/services may be found in Sections 4.7.2 and 4.7.3 regarding riverine and urban flooding.

The US Army Corps of Engineers have identified the following areas in need of shoreline stabilization:

- Brownstown Township, especially in vicinity of Maple Beach
- City of Gibraltar
- Grosse Ile Township
- City of Trenton
- City of Ecorse (Ecorse Creek)
- Belle Isle, Detroit
- Detroit, vicinity of Detroit Towers condominiums
- Jefferson Chalmers
- Grosse Pointe
- Milk River

4.8 Hazmat Incidents

4.8.1 Fixed Site

Definition

A Hazardous Material (Hazmat) Incident – Fixed Site is defined as an uncontrolled release of a hazardous material originating from a building, structure, or fixed equipment which is capable of posing a risk to life, health, safety, property or the environment.

Historical Events

There are around 500 facilities that store hazardous substances within the county.¹³⁹ Although most hazmat incidents occur at industrial facilities, this is not always the case.

¹³⁸ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 109.

¹³⁹ Wayne County LEPC Facility List, supplied by Wayne County Emergency Management Division, November 4, 2005.

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For example, one of the most common hazmat occurrences reported in Wayne County are gasoline and oil related incidents at gas stations and auto shops.¹⁴⁰

Frequency & Probability

From 1998 to October 2005, there were a total of 610 fixed site hazmat incidents in Wayne County, an average of 76 incidents per year.¹⁴¹ As the county continues to develop and attract new business and industry, it is anticipated that the probability of occurrence for this hazard will increase.

Health & Safety

Given the frequency of hazmat incidents in Wayne County, the number of deaths and injuries from this event is extremely low. From January 2000 to October 2005, there was one fixed site hazmat related death and a total of 11 injuries, an average of just over two injuries per year.¹⁴²

Area Impacted

In Wayne County, fixed site hazmat incidents have rarely required evacuation. For the period of 1999 to October 2005, only six incidents required evacuation and both evacuations were limited to the site of the release.¹⁴³

The majority of hazmat material releases in Wayne County are releases to water, followed by land and air.¹⁴⁴ Environmental contamination which results from this hazard can extend to offsite locations. A high profile example of this was an oil spill on the Rouge and Detroit Rivers discovered April 8, 2002. Originating from a fixed site draining to the Rouge River, it resulted in oil slicks on the Rouge and Detroit Rivers and Lake Erie, from Zug Island to Pointe Mouillee. In all, more than 45,000 gallons were recovered from the rivers, at a cost of \$3 million.¹⁴⁵

Economic Impact

The economic impact due to this hazard can be highly variable, especially when including the costs of environmental remediation. According to the U.S. EPA HazMat Response Team, costs for responding to a hazmat incident can range from \$1,000 to over \$100,000. Some property damage from this type of event can be expected, especially if the release results in a fire or explosion. Additional impact, in the form of lost business revenue, can result if the incident causes a business to close.

Critical Facilities/Services

Although major fixed site hazmat incidents are not common in Wayne County, the potential for such an incident is high. A significant incident would likely involve response efforts from multiple agencies and departments. Additional impact could result from

¹⁴⁰ U.S. Coast Guard, National Response Center website, www.nrc.uscg.mil/foia.html, Standard Query Report for Wayne County, Fixed Incidents, October 21, 2005.

¹⁴¹ Ibid.

¹⁴² Ibid.

¹⁴³ Ibid.

¹⁴⁴ Ibid.

¹⁴⁵ Patterson, Delores. 2002. *Officials narrow search for suspects in oil spill*. Detroit News, May 11, 2002.

environmental remediation and restoring public confidence in the environmental health of the county.

4.8.2 Transportation Incidents

Definition

Hazardous Material (Hazmat) Incident – Transportation is defined as an uncontrolled release of a hazardous material during transport which is capable of posing a risk to life, health, safety, property or the environment.

Historical Events

One of the most significant responses required for a hazmat transportation incident in Wayne County occurred on May 27, 2000. The incident involved a fuel tanker roll-over. As a result of the accident, fuel released from the damaged tanker ignited as it spilled down storm drains, damaging the roadway, blowing nearby manhole covers off, mortally injuring the driver, and causing smoke and vapors that disrupted the surrounding communities and events. A similar event occurred on October 3, 2003 when a gasoline tanker overturned and partially fell off the ramp from I-75 north to I-94 east. The accident and fire killed the driver, damaged the ramp causing it to be closed for several months, and required Hazmat teams to clean the area.

Frequency & Probability

Almost a million shipments of hazardous materials traverse the United States each day by highway, rail, air, water, and pipelines. Approximately 95% of those shipments, and more than half of the hazmat tonnage transported, move via trucks on highways and roads.¹⁴⁶

From 1999 to December 2005, there were a total of 159 transportation related hazmat incidents in Wayne County, 119 occurring on roadways and 40 on railroads. This equals an average of almost 23 incidents each year.¹⁴⁷ From 2000 to 2006, there were 67 reported hazmat motor carrier accidents in Wayne County that resulted in hazardous materials releases or spills. The majority (50.7%) of those involved the release of flammable liquids and just over 25% occurred on divided and limited access highways - thoroughfares that meet interstate specifications. This appears to be a significant drop from the previous seven-year period, but it appears that the probability of occurrence for this hazard will continue to be high.

Health & Safety

Compared to fixed site hazmat incidents in Wayne County, transportation related incidents are more likely to result in death or injury. From 1999 to December 2005, there

¹⁴⁶ Michigan Department of Transportation. 2012. Hazardous Materials Routing Synopsis Report, Wayne County: Proposed Recommendations. December 2012. 18 pp.

¹⁴⁷ U.S. Coast Guard, National Response Center website, www.nrc.uscg.mil/foia.html, Standard Query Report for Wayne County, Rail Incidents and Mobile Incidents, December 13, 2005.

have been 11 fatalities and 13 injuries from transportation related hazmat incidents, an average of almost 2 deaths and almost two injuries per year.¹⁴⁸ Deaths and injuries are typically limited to the operators of the vehicle.

Area Impacted

There are 134 miles of freight railroads, approximately 460 miles of interstate and major state highways, and 175 miles of county roads in Wayne County. Although large-scale offsite impacts are not common with hazmat transportation incidents, they are certainly possible within Wayne County. Offsite impacts can include evacuation, closure of roadways, and environmental contamination. From 1999 to June 2004, the most commonly affected environmental media was surface water, closely followed by land.

Economic Impact

The economic impact due to this hazard can be highly variable, especially when including the costs of environmental remediation. According to the U.S. EPA HazMat Response Team, costs for responding to a hazmat incident can range from \$1,000 to over \$100,000. Damage to transportation equipment is expected with this event, however, these costs are the responsibility of the transporter. Costs to the public can include response efforts, commuter delays, and damage to transportation infrastructure.

Critical Facilities/Services

Transportation related hazmat incidents occur somewhat frequently in Wayne County; the potential is high. As demonstrated by the October 3, 2003 incident, a significant incident may involve response from multiple agencies and departments. Additional impact include environmental remediation and restoring public confidence.

4.9 Infrastructure Failure

Definition

An infrastructure failure is the failure of a critical public or private utility infrastructure which results in a short-term loss of service.

4.9.1 Water Systems

Historical Events

Wayne County has not had significant loss of water due to failures in the water distribution system. However, Wayne County's 3,700-mile water distribution network, is aged and degraded. As a result, the county's distribution system lost an average of 35 billion gallons (17% of the total water pumped) to leaks in the system between 1995 and 2001.¹⁴⁹ While not directly related to Wayne County's water distribution network, the county and those surrounding it lost water service for several days, and 4.3 million customers were on a boil advisory for six days, following the 2003 blackout.

¹⁴⁸ U.S. Coast Guard, National Response Center website, www.nrc.uscg.mil/foia.html, Standard Query Report for Wayne County, Rail Incidents and Mobile Incidents, December 13, 2005.

¹⁴⁹ The Detroit News, *Aging Water Pipes Leak \$23 Million a Year*, July 22, 2002.

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Supply system components, including transmission and distribution pipelines, make up most of the state's water infrastructure and significant portions of these systems exceed 50 years of age and their design lives. Approximately 80% of the Detroit community water system transmission and distribution network was constructed prior to 1940.¹⁵⁰

Frequency & Probability

Water system failures can be attributed to causes such as construction/excavation activities, underground freezing, power outages, and system blockages.

Every year, there are numerous water line breaks, most of which are related to poor insulation and sub-freezing temperatures. The majority of water line breaks do not create a water crisis situation. It is estimated that this hazard will be somewhat more likely to occur in the future as water system structures age, and county-wide development continues. A water main break caused by a construction contractor in the City of Northville in May 2019 led to a drinking advisory.¹⁵¹ A water main break in May 2012 led to closure of the Lodge Freeway.¹⁵²

Health & Safety

The availability of clean drinking water is crucial to the health and safety of the public. Water service interruptions can cause untreated or poorly treated drinking water to enter the water supply, resulting in boil water advisories and public health concerns. Public Sector Consultants report that, statewide, drinking water system owners (municipalities, et al.) underfund system improvements by an estimated \$284 to \$563 million annually.

Area Impacted

The water system for Wayne County is operated and/or maintained by the Detroit Water and Sewerage Department (DWSD) and/or local municipalities (Figure 4). The impact of line breaks is highly variable.

Economic Impact

Water is vital to the operation of schools, hospitals, and businesses, and in maintaining public health. Information regarding the economic impact of water system failures is not available. Service interruption may be extremely costly, depending of the number of affected customers and duration of the event.

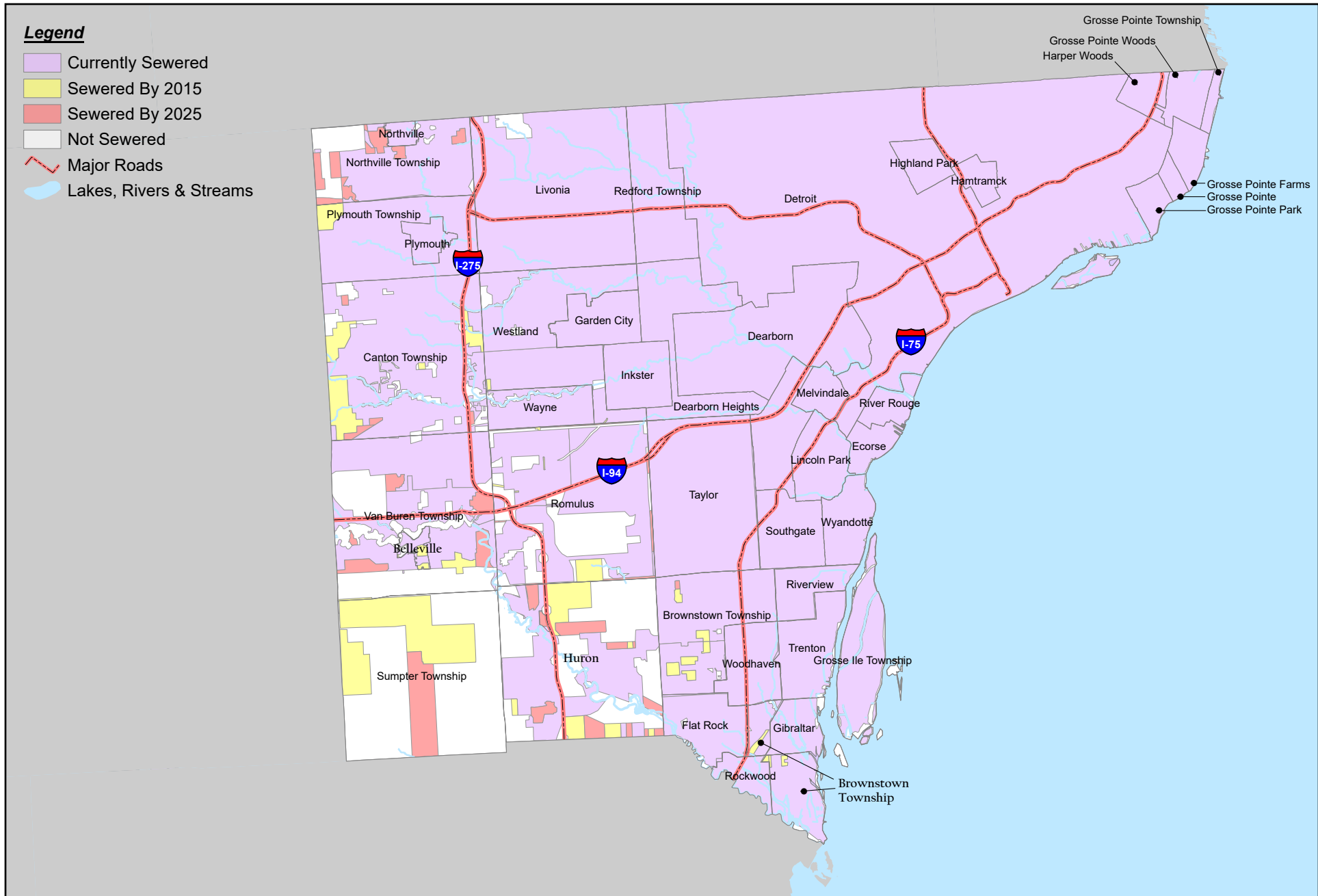
Critical Facilities/Services

Maintaining a functional water system is a critical service. Loss of water service can make it difficult to operate other critical facilities such as schools, hospitals, businesses, and sports/entertainment venues. A water main break in the Detroit Police headquarters knocked their 911 call center offline for a short time in 2004.

¹⁵⁰ American Society of Civil Engineers (ASCE), Michigan Section. 2018 Report Card for Michigan's Infrastructure. infrastructurereportcard.org/michigan.

¹⁵¹ The Detroit Free Press, *Northville boil water alert to remain in effect through weekend*, May 17, 2019

¹⁵² The Detroit Free Press, *Lodge reopens after flooding halts traffic near water main break*, June 1, 2012.



Wayne County

Created for: Wayne County
 Created by: RMH, April 23, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013))

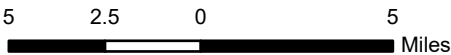
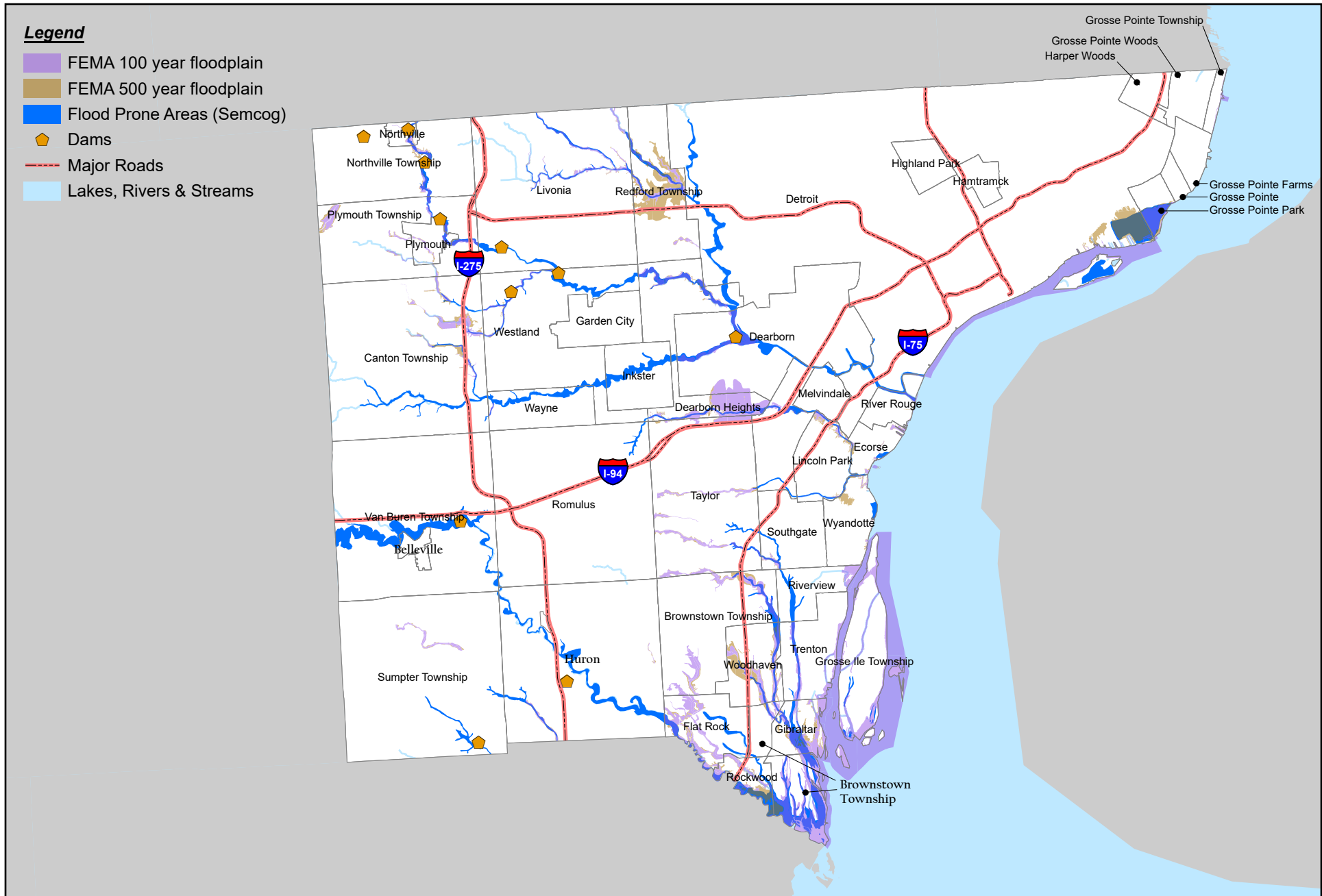


Figure 4 - Hazard History:
 Infrastructure Failure



Created for: Wayne County
 Created by: RMH, April 23, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013), USDA (2010), SEMCOG (2008 & 2012), National Inventory of Dams (2013)

Figure 5 - Hazard History:
 Flooding

4.9.2 Electrical Systems

Historical Events

The largest, and arguably most infamous, electrical system failure in the United States occurred on August 14, 2003. This system failure started at 4:10 p.m. in southern Ohio and within seconds, 50 million people in North America were left without electricity. The blackout affected millions of customers in southeast Michigan, including Wayne County. In many ways, this event was a worst-case scenario electrical failure.

Frequency & Probability

Electrical service for the majority of Wayne County is provided by DTE Energy. Electrical failures, like the August 2003 blackout, although rare, can occur due to problems within the electrical system and from secondary causes such as weather and human/animal interference. Ice storms have an established history of causing electrical service interruptions. Electrical outages are often related to severe weather events, which occur 30-40 days annually within Wayne County. DTE states that the risks posing the greatest threat to the electrical system are storm-related downed wires and outages, and substation-related forced outages.

DTE continuously evaluates its system and has developed programs to mitigate risk. In response to review comments on the draft Plan from FEMA Wayne County solicited information about hazard mitigation to gas and electrical lines. DTE representatives provided a summary of their protocols for reinstating power following outages. Because DTE states that they will implement these strategies using their own corporate resources. As such it is not provided as an action plan with the HMP, but the document provided by DTE is included in Appendix B.

As the county continues to grow and demand for electrical service increases, it is possible that this hazard will occur more frequently and with greater consequence. Additionally, at least one new gas-fired high efficiency plant is required to offset the coal plants expected to go offline and to stabilize the grid in southeast Michigan.¹⁵³

Health & Safety

Electrical service is incredibly important in maintaining the health and safety of the public. Electricity is required to heat and cool homes, operate traffic signals and operate hospitals and emergency services. Power outages can be particularly dangerous during times of extreme heat or cold. In addition, power outages can have a negative impact on the infirm. The number of people impacted by a power outage is highly variable with each event.

Economic Impact

Electricity is a vital component to operating businesses and county services. Information regarding the economic impact of electrical outages is not available. It is anticipated that

¹⁵³ American Society of Civil Engineers (ASCE), Michigan Section. 2018 Report Card for Michigan's Infrastructure. infrastructurereportcard.org/michigan.

an outage can be extremely costly, depending of the number of affected customers and duration of the event.

Critical Facilities/Services

As demonstrated by the August 2003 blackout, electricity is an integral part of every service the county provides to its residents. The blackout caused traffic backups, loss of water service, and gasoline shortages - making it difficult to provide even the most common services. Fortunately, large-scale electrical failures are not common. However, the blackout was a good "test" for the county's systems to determine effectiveness under disaster conditions.

4.9.3 Communications Systems

Historical Events

Wayne County operates internal communications systems such as the 911 Call Center and an emergency public radio system.

Telephone service for Wayne County residents is available from numerous service providers. The most widely used telephone service provider was formerly SBC and is now AT&T. In April 2003, a significant ice storm affected Wayne County. Ice downed phone lines, cutting service to numerous customers throughout the county. In 2003, SBC experienced four major communications failures throughout the state of Michigan.¹⁵⁴ Each failure was a result of severe weather or flooding.

The continuing transition from land to cellular communications has resulted in more citizens having only a cellular phone. This can result in better communications during storm events that would otherwise occur during power outages, but also leave citizens more vulnerable to problems experienced by cellular providers.

Frequency & Probability

Communications failures most frequently result from severe weather events or other interferences which affect phone lines, such as animals or auto accidents involving utility poles. Very rarely does a communications failure result from a problem within the communications system.

Communications failures of both public and private systems are possible with any major storm event, such as ice storms, lightning, or severe winds, which occur an average of 30-40 days each year. Power outages can also interrupt operation of the 911 call center.

As the county continues to grow and demand for communications services increases, it is anticipated that this hazard will occur more frequently and with greater consequence.

¹⁵⁴ SBC News Release, *SBC Michigan Provides Excellent Service Quality in 2003*, February 3, 2004.

Health & Safety

Communications systems are a vital link between the public and emergency response services. As a result, a failure of the system can have secondary impacts to the health and safety of the affected public. The number of people that experience a loss of service due to a communications failure is directly related to the severity of the event. However, people requiring emergency services during a failure are at greater risk for impact.

Area Impacted

A failure of private telephone communications is limited to the service area network. However, a failure of the emergency communications system can impact the entire county.

Economic Impact

The majority of economic impact from this hazard would result to loss of productivity for affected businesses.

Critical Facilities/Services

The 911 Call Center and emergency dispatch systems are vital services provided to Wayne County residents. Power outages and downed lines can greatly impact the county's ability to operate these systems. Backup generators are utilized to maintain emergency communications during power outages. If phone lines to the 911 Call Center are downed, the calls are automatically re-routed to an alternate call center to maintain 911 phone services.

4.9.4 Storm Water Systems

Historical Events

In September 2000, August 2014, and May 2019 extensive rains in southeast Michigan flooded municipal storm sewers causing sewer backups in thousands of Wayne County homes and businesses. The major cause of the sewer backups was a temporary loss of power at pumping stations and insufficient capacity of the storm sewer system due to the heavy rains. Sewage backups caused extensive damage to affected homes and businesses and created a public health hazard due to potential human exposure to untreated sewage. Following both the 2000 and 2014 events, Wayne County was granted Presidential Major Disaster Declarations to provide disaster assistance to affected businesses and individuals.¹⁵⁵ Combined sewer overflows, which dump sewage into storm sewer systems during high flow events, have repeatedly been for a concern within the Rouge River watershed. Between January 3rd and 5th, 2005, the Detroit Water

¹⁵⁵ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 122.

and Sewage Department discharged 2.7 billion gallons of combined sewage due to the higher than normal rain amounts received.¹⁵⁶

Frequency & Probability

There are two primary types of storm water sewers in Wayne County – open drains and enclosed, underground systems. The primary problems associated with open drains are log jams, plugged drains, and siltation. The major dilemma with the storm water sewers, both open drains and enclosed systems, is that system capacity is too low for the county's current needs. An increased amount of developed land has resulted in less pervious ground cover; therefore, more storm water must drain to the storm sewer system.

Problems with the storm water sewer system are evident during periods of high rain or snowmelt. Some storm sewer flooding can be expected with any major rain or snowmelt event. Small, frequent events occur with regularity and are planned for. It is anticipated that this hazard will become more frequent and more severe as the system ages and new development requires greater system flow capacity.

Health & Safety

The storm water sewer system is of great importance to protecting human health and safety. Flooding that results during system failures can create safety problems and sewer backups in combined storm and sanitary systems and present a major health concern. Backups and overflows that result in the combination of sanitary and stormwater increase the risk of disease and environmental impacts downstream.

Area Impacted

County drains are found throughout Wayne County. The Wayne County Department of Environment, Facilities Management Division and the Detroit Water and Sewerage Department (DWSD) are charged with the responsibility of maintaining the county drain and sewer systems and implementing and maintaining ordinances or permits that pertain to them. The area impacted is dependent upon the drainage area for the failed storm sewer. Areas with combined sewers (storm water sewer system combined with the sanitary sewer system) can be at increased risk for sewer backups and basement flooding.

Economic Impact

As demonstrated by the September 2000 system failure, flooding can result in major property damage costs. Storm sewer system upgrades also be very costly to implement. Funding is available for maintaining county drains, however, maintenance funding is limited for approximately 200 county drains which were established under the 1956 Drain Code.

¹⁵⁶ The News-Herald, *Combined Sewers Still Create Waterway Woes*, January 19, 2005

Critical Facilities/Services

Maintaining a functional water system is a critical service provided by Wayne County. The storm sewer system is important to protect property, both public and private, and to maintain public health. Additionally, scientist predict that climate change will increase the number of extreme rainfall and storm events, leading to more flooding throughout the Midwest and costing taxpayers as much as \$480 million annually just to adapt stormwater systems to handle the increased runoff

4.9.5 Sewer Systems

Historical Events

Failures of the sanitary sewer system can result in significant risks to public health and safety. A system failure can result in sewer backups in homes or businesses and discharges of untreated sewage to rivers and lakes.

In May of 2004, high volumes and equipment failure left many downriver residents with water and sewage in their basements. Also, combined sewer overflows (CSOs) found throughout the county regularly allow untreated, partially treated, or diluted sewage to enter local waterways when input volumes exceed treatment capacity.

Frequency & Probability

A major system failure occurs within the county approximately once every 20 to 25 years on average. Smaller problems are more frequent. During major storm events, it is highly possible for a loss of power to occur at certain pump stations. Outages and higher than normal rain volumes create the potential for an overflow discharge to local rivers or lakes or, possibly worse, into residents' homes.

It is expected that problems will become more frequent as the system ages.

Health & Safety

Human exposure to untreated sewage presents a health and safety threat. Discharges of untreated sewage to lakes or rivers can also significantly impact the environmental health of local waterways. Area beaches are routinely closed during portions of the summer due to unsafe concentrations of sewage-related contaminants.

Area Impacted

Sanitary sewer systems are found throughout the county and operated and/or maintained by the DWSD and/or the local municipality.

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There are 151 CSO's or Sanitary Sewer Overflows (SSO's) within the county.¹⁵⁷ CSOs discharge to local county drains or watercourses and may affect a sizable area within, and downstream of, Wayne County.

The number of sewer users impacted by each failure is dependent upon the severity of the event. Lakes or rivers could also be impacted due to sewer overflow discharges, making them temporarily unsafe for recreational activity.

Economic Impact

Information regarding the economic impact of sanitary sewer system failures is not available. The sanitary sewer system is a vital part of the operations system for a wide range of businesses. It is anticipated that a failure could be extremely costly, depending on the number of affected customers and duration of the event.

Critical Facilities/Services

Maintaining a functional sanitary sewer system is a critical service provided by the DWSD. The USEPA estimates that \$690 million is needed to repairs and improvements for Michigan's secondary treatment needs and an additional \$702 million for wastewater conveyance systems.¹⁵⁸

Loss of sanitary sewer service can make it difficult to operate other critical facilities such as schools, hospitals, businesses, recreational areas, and sports/entertainment venues.

4.10 Nuclear Power Plant Accidents

Definition

A nuclear power plant accident would involve an actual or potential release of radioactive material at a nuclear facility in a quantity sufficient to constitute a threat to the health and safety of offsite populations.

Historic Events

There are three nuclear power plants operating in Michigan. The operation of these facilities is regulated by the federal Nuclear Regulatory Commission. There has never been an off-site release of radioactive material from a nuclear power plant in Michigan. However, an on-site release did occur on October 5, 1966 at the Enrico Fermi-1 Atomic Power Plant in Monroe County, Michigan. The release was a result of fuel melt-down; however, the radioactive material was contained within the reactor containment building. The Enrico Fermi-1 was shut down in 1972. In 1988, the Enrico Fermi-2 was opened next to the site of the Enrico Fermi-1.

¹⁵⁷ Michigan Department of Environmental Quality – Combined Sewer and Sanitary Sewer Overflow Information System – Queried for Wayne County http://www.deq.state.mi.us/csosso/find_cso_facilities.asp

¹⁵⁸ American Society of Civil Engineers (ASCE), Michigan Section. 2018 Report Card for Michigan's Infrastructure. infrastructurereportcard.org/michigan.

Frequency & Probability

Four protection action order areas have been established in the vicinity of the Enrico Fermi-2 Nuclear Power Plant and the Wayne County communities of Brownstown Township, south of Vreeland Road, and the Cities of Flat Rock, Gibraltar, and Rockwood are within Zone 4 (Figure 6). Although there has never been an off-site release from the plant, a release from the plant has the potential to impact Wayne County and its communities.

Health & Safety

An accident at a nuclear power plant could result in radioactive materials becoming airborne or in direct impacts to areas adjacent to the plant. The severity of radiological contamination from such an event is directly proportional to the type and amount of radioactive material released, weather conditions at the time of the release, and the wind direction following the release.

Wayne County communities within the protection action order areas of the Enrico Fermi-2 Atomic Power Plant are largely upwind of the facility, given prevailing wind patterns. For areas within these zones, the primary concern is radiological contamination of food sources. Procedures have been developed by the plant and emergency response agencies to prevent radiation from contaminating food supplies and to prevent contaminated foods from being consumed. The risk to human health is considered low.

Area Impacted

As noted above and shown in Figure 6, all or portions of Brownstown Township, and the Cities of Flat Rock, Gibraltar, and Rockwood are within Protection Action Order Area 4 of the Enrico Fermi-2 Atomic Power Plant. However, the actual area impacted by a release would depend greatly on the type and amount of radioactive material released, weather conditions at the time of the release, and the location relative to wind direction following the release.

Economic Impact

Due to the low frequency of this event in the United States, it is difficult to establish the economic impacts. It is anticipated that the impact could be very high, depending on the severity of the event.

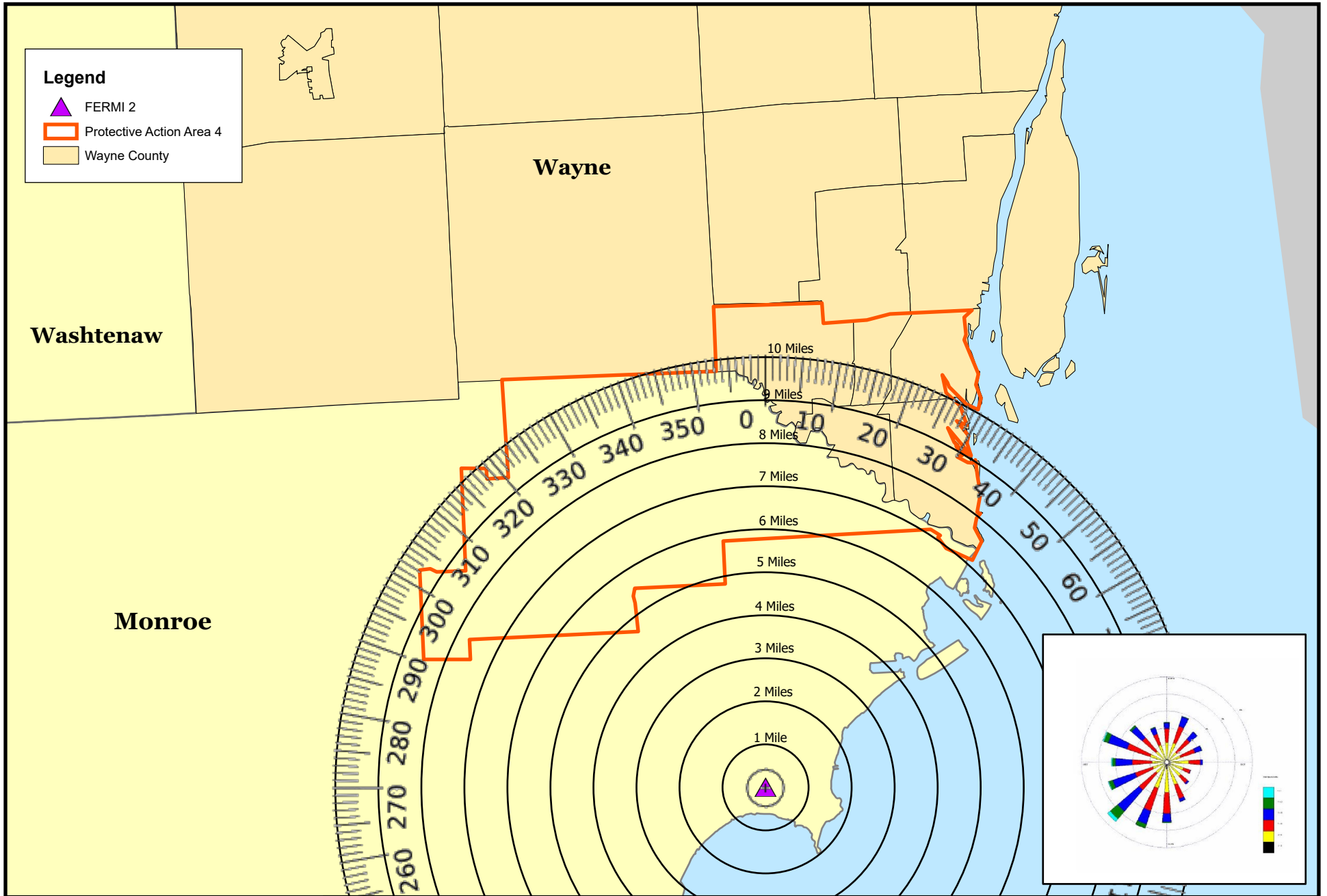
Critical Facilities/Services

Nuclear power plant owners/operators work closely with emergency planners to develop response plans in the event of a release of radioactive materials. In Michigan, the responsibility to respond to such events is shared by the plant owner/operator and all levels of government. Response to an off-site release would likely involved multiple agencies and departments from all levels of government.

4.11 Oil and Gas Well Accidents

Definition

An oil or gas well incident could involve an uncontrolled release of oil or natural gas, or a release of hydrogen sulfide gas, a by-product of production wells.



Wayne County

Created for: Wayne County
 Created by: RMH, April 23, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013))

Figure 6- Hazard Summary:
 Nuclear Power Plant

Frequency & Probability

Although there have been no significant incidents in Wayne County in recent history, the presence of active and producing wells and pipelines within the county makes it possible for this hazard to occur. Since 1973, there has been an oil or gas well incident in Michigan every 3-4 years, between 1989 and 2008, there were seven reported oil or gas pipeline accidents resulting in one death and three injuries, and average of one event every 2.85 years.¹⁶¹

Health & Safety

There are several hazards related to oil and gas wells. Producing wells can generate hydrogen sulfide gas as a by-product. Hydrogen sulfide gas is extremely poisonous and presents a number of chemical safety hazards to responders and adjacent populations. Accidental releases, fire and explosion can also result from such an event.

In Michigan, death and injury rates with oil and gas well accidents are very low. From 1973 to 2001, there was one reported death and two injuries from accidents. In those cases, death and injury resulted to those employees servicing the wells.¹⁶²

Area Impacted

Lands with oil and gas wells and surrounding areas are most at risk for impact from well accidents. As shown on Figure 7, the location of wells is concentrated in the northwestern portion of the county.

Oil and gas well accidents often result in release or potential release of hazardous gases. As a result, areas adjacent to the site of the incident may be evacuated as a precaution. In Michigan, there have been no oil or gas well accidents which have resulted in offsite property damage. However, areas of evacuation have been large enough to include residents within a one-half mile radius.

Economic Impact

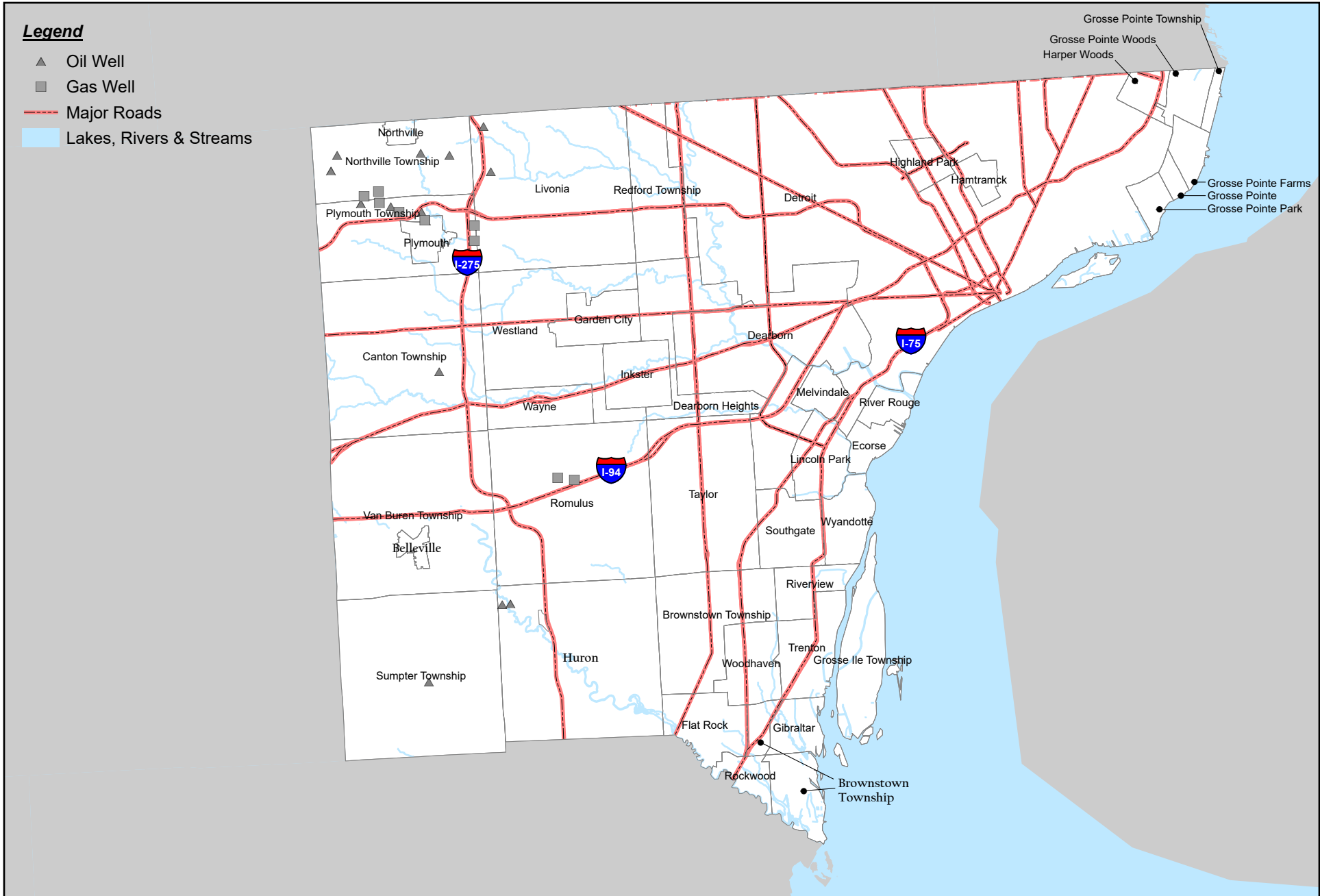
Accidents of this nature are not common within Michigan, and have not resulted in significant property damage or other loss. Therefore, information regarding the economic impact of oil and gas wells is limited and further investigation is not warranted at this time.

Critical Facilities/Services

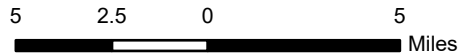
Oil and gas wells within Wayne County are owned and operated by private companies; however, response to an accident would involve public agencies. The level of public response would depend upon the severity of the accident. Due to the possibility of evacuation with this accident, involvement from multiple emergency response agencies would likely be required.

¹⁶¹ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 255.

¹⁶² Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 9, 142-143.



Wayne County



Created for: Wayne County
 Created by: RMH, April 23, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013))

Figure 7 - Hazard History:
 Oil and Gas Wells

4.12 Petroleum and Natural Gas Pipeline Accidents

Definition

A petroleum or natural gas pipeline incident would involve an uncontrolled release of petroleum, natural gas or hydrogen sulfide gas from a pipeline.

Historical Events

Michigan is a major producer and consumer of petroleum and natural gas products. Therefore, transmission and distribution pipelines are common throughout the state. According to the Michigan Public Service Commission, Michigan ranks 11th in the United States for natural gas production and 6th for natural gas consumption.

The U.S. Department of Transportation's Office of Pipeline Safety reports that Michigan gas companies had to repair 9,300 leaking underground gas lines required repair in 1998; more than twice as many as the 4,400 reported in 1991. More than 75% of these gas line breaks are caused by construction/excavation. Michigan ranks second only to Texas in the number of required repairs to damaged or leaking natural gas pipelines.

Since 1996, the Michigan Public Service Commission has investigated over 100 incidents involving pipelines, and at least half of those incidents involved injury, loss of life, or significant property damage. The pipeline accidents described in this section include the worst in recent Michigan history, which required a combined emergency response effort by pipeline companies and state and local officials. In 2003 the U.S. Department of Transportation, Research and Special Programs Administration, Office of Pipeline Safety conducted a survey of natural gas distribution pipeline accidents and ranked Michigan's 11 recent accidents third behind California and Pennsylvania for the highest in the nation.¹⁶³

Statewide there are 14,539 oil and natural gas wells in the State of Michigan but only seven of these are located in Wayne County. Despite the low number of wells, Wayne County is crisscrossed with pipelines.

Recent examples of accidents in Wayne County include a natural gas leak in Taylor (2004) that resulted in a house explosion, sending debris approximately 100 feet and shaking houses as far as one mile away; a natural gas leak that blew up a house in Canton Township (2007), injuring a woman; and a natural gas pipeline explosion in Wayne (2010) that destroyed a furniture store, killing two people and injuring another. The explosion also shattered windows at nearby businesses and resulted in one person, who had been driving by at the time of the explosion, requiring hospitalization.

Frequency & Probability

The Michigan Hazard Analysis lists seven reported oil or gas pipeline accidents between 1989 and 2008, resulting in one death and three injuries, and average of one event every 2.85 years. However, USCG records indicate that there were 45 pipeline incidents

¹⁶³ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 255.

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in Wayne County, from 1990 through October 2012, an average of over three events each year.¹⁶⁴

It is anticipated that this hazard will be more likely to occur in the future as the pipeline structures age.

Health & Safety

Pipeline accidents can pose a significant threat to the public due to the potential for fires, explosions, and ruptures. From 1990 to 2005, there were no deaths and 25 injuries from the 47 accidents which have occurred in Wayne County.¹⁶⁵

Area Impacted

As shown in Figure 8, the major natural gas and petroleum products lines are concentrated in the western half of the county. Smaller natural gas distribution lines can be found throughout the county with Consumers Energy providing natural gas services to the majority of the county. Michigan Consolidated Gas Company provides service to a smaller number of customers.

Natural gas or petroleum pipelines can be found throughout the county, which means that pipeline accidents can occur anywhere. Typically, pipeline accidents only impact the immediate area. However, evacuations of adjacent buildings can be required as a precaution.

Economic Impact

In the United States for 2003, the average property damage caused by a transmission pipeline accident was \$412,249. These costs are largely due to damage to the pipeline structures. Other impacts include the loss of life and property and decreases in product availability.

Critical Facilities/Services

Local fire and police departments would respond to pipeline accidents. This type of hazard may also require response from HazMat Teams. Gas leaks are a frequent call for service for Wayne County fire departments. From January 1998 through the end of 2004, there was a total of 1,371 calls for service due to suspected or actual gas leaks, an average of 196 calls each year.¹⁶⁶

Following review of the draft HMP, DTE Energy provided the following summary of actions they are taking to mitigate gas pipeline hazards:

“DTE diligently monitors thousands of miles of natural gas pipelines and inspect gas delivery systems, both by air and land, to look for evidence of a pipeline leak or damage.

¹⁶⁴ U.S. Coast Guard, National Response Center, www.nrc.uscg.mil/foia.html, Standard Query Report, Pipelines, Wayne County Michigan, report generated on October 15, 2005.

¹⁶⁵ U.S. Coast Guard, National Response Center, www.nrc.uscg.mil/foia.html, Standard Query Report, Pipelines, Wayne County Michigan, report generated on October 15, 2005.

¹⁶⁶ NFIRS 5.0 National Reporting, Tally by Incident Type, January 1, 1998 through December 31, 2004, report generated on October 3, 2005, filtered for Wayne County reporting only.

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DTE has established a Pipeline Integrity Management program in conjunction with federal and state regulations. Inspection and maintenance work is performed regularly, such as leak surveys and corrosion control. Pipeline segments are replaced if necessary. This program enhances preventive and mitigative measures DTE Energy already has in place to maintain the continued safe and reliable operation of our pipeline system. Across the State of Michigan, these measures include:

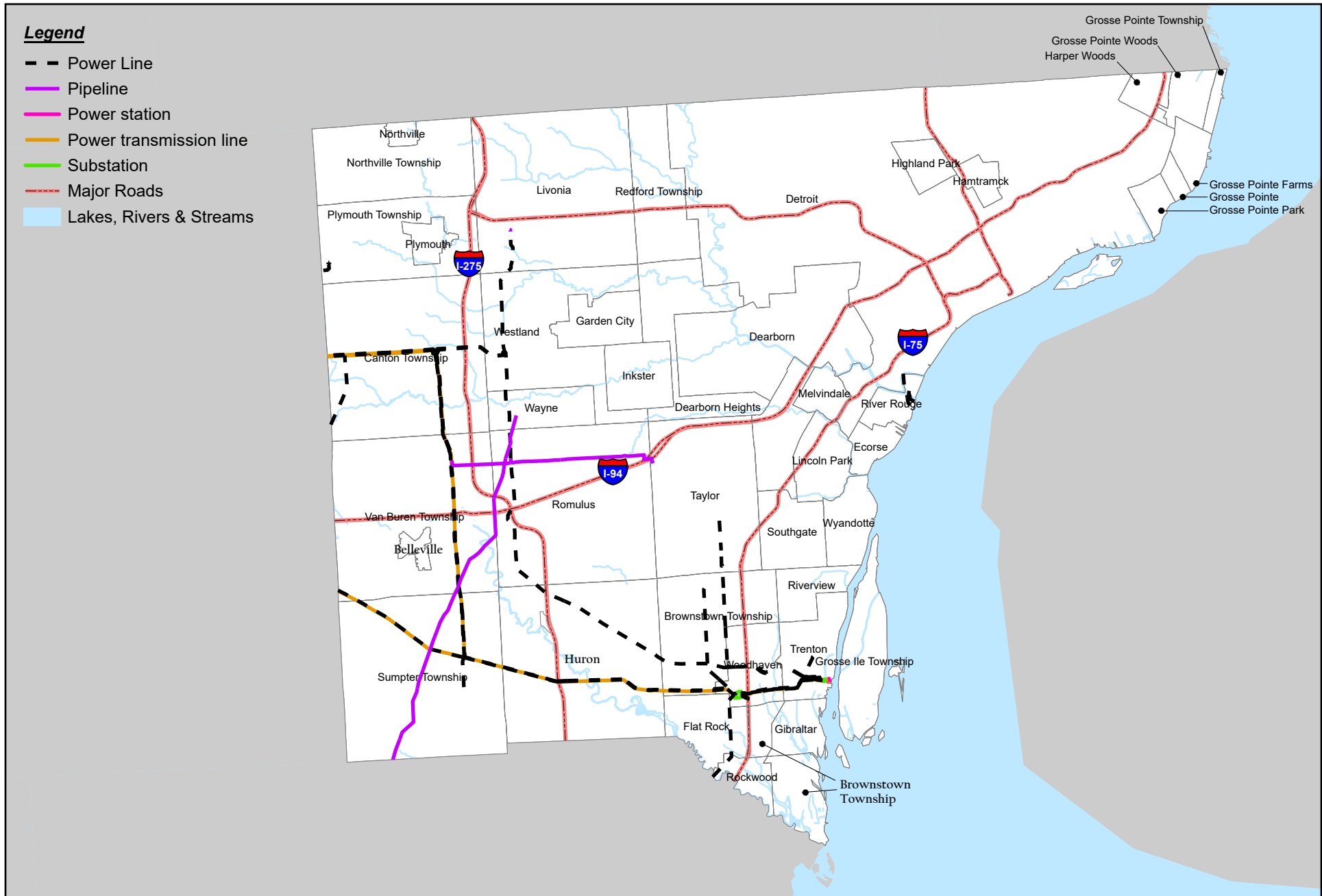
- Upgrading more than 500 miles of pipeline for our customers this year*
- Conducting more than 300,000 gas meter safety inspections annually*
- Performing routine inspections inside some pipeline sections, using a sophisticated electronic device sent through pipelines to identify internal problems*
- Continuously monitoring our natural gas system using sensors, computers and remote telemetry equipment that detect changes in pressure that might indicate a concern*
- Surveying nearly 10,000 miles of pipeline each year*

Additionally, DTE's Energy Gas Renewal Program's focus is to modernize natural gas infrastructure by renewing gas mains, service lines and upgrading natural gas meters to further improve the safety and reliability of our natural gas system. Cast iron and steel gas main service lines are being replaced with new and improved materials, reducing the risk of gas leaks."

4.13 Public Health Emergencies

Definition

A public health emergency is a widespread and/or severe epidemic, incident of contamination, or other situation that presents a danger to, or otherwise negatively impacts, the general health and wellbeing of the public.



Wayne County

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 Created by: RMH, April 23, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013))

Figure 8 - Hazard History:
 Pipelines & Electrical Utilities

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The Flint water crisis, which exposed more than 100,000 residents to elevated lead levels, began in 2014 after the city changed the source of its drinking water from Lake Huron and the Detroit River to the Flint River. The change in water and insufficient treatment resulted in lead being leached from pipes into the drinking supply,

President Obama declared in a federal emergency in January 2016, and Flint residents were instructed to use only bottled or filtered water for drinking, cooking, cleaning, and bathing. Replacing the lead pipes is expected to be completed in 2019, but as this Plan is being developed in May 2019, an estimated 2,500 lead service lines are still in place and there is still disagreement whether the water in Flint is safe to drink.¹⁶⁸ In addition to elevated lead levels, insufficient chlorination in the Flint water supply was also linked to one of the largest outbreaks of Legionnaires' disease in the past decade.¹⁶⁹

In 2008, Michigan residents were affected by a nationwide *Salmonella* outbreak involving more than 700 cases in 46 states and Canada. In Michigan, 38 cases were confirmed, including 12 hospitalizations, across the Lower Peninsula. Institutional settings such as schools, colleges, long term care facilities, and correctional centers were focal points for the outbreak.¹⁷⁰

At the time of this writing the County, and most of the world, is grappling with a pandemic form the COVID-19 virus; nearly 200,000 lives have been lost the U.S. to-date. Quarantine and/or [preventative isolation measures of various types have now been in place for approximately six months. The Wayne County Health Department has conducted an analysis of the County's initial efforts in anticipation of an increased outbreak or second wave as flu season approaches. Lessons learned from their efforts are include in Appendix E as a supplement to County Actions previously actions previously developed for this Plan.

Frequency & Probability

Public health emergencies can arise from a wide range of causes and exhibit varying levels of severity, thus making it difficult to establish a frequency of occurrence. The Michigan Hazard Analysis lists seven major public health emergencies in Michigan between 1973 and 2010, approximately one every five years.¹⁷¹

It is important to note that some of the same causes of a public health emergency (i.e. food borne illness, etc.) do occur with regularity within Wayne County. However, these cases are isolated to a few individuals with limited impact to the general public.

¹⁶⁸ The Detroit News. Flint: Water line replacement won't be done till 2019.

<https://www.detroitnews.com/story/news/michigan/flint-water-crisis/2018/12/04/state-shrugs-flint-pipe-replacement-work-ahead/2204132002/>, December 4, 2018

¹⁶⁹ Zahran, Sammy, McElmurray, Shawn P., Kilgore, Paul E., Mushinsko, David; Press, Jack; Love, Nancy G.; Sadler, Richard; Swanson, Michele S. (February 1, 2018), "Assessment of the Legionnaires' disease outbreak in Flint, Michigan." *Proceedings of the National Academy of Sciences*. 115(8): E1730-E1739.

¹⁷⁰ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 360.

¹⁷¹ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, page 354-355.

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The safety of the municipal drinking water supplies is an increasingly important public health concern. Michigan communities are finding it difficult to adequately treat groundwater and/or surface water supplies. The Cities of Flint and Ann Arbor, Oscoda Township, and 12 Michigan counties are currently faced with either changing their drinking water source(s) or improving treatment efficacy to address a host of water quality parameters including, hexavalent chromium; VOCs; trihalomethanes; 1,4 dioxane; PFAS/PFOS; arsenic, naturally occurring radioactive materials, and others.¹⁷²

It is anticipated that public health hazards will become more likely to occur in the future as the population ages and as the county population increases.

Health & Safety

Public health emergencies are an obvious threat to human health and safety. A public health emergency can take many forms and spread by various means. As a result, it is not feasible to determine a death or injury rate for this hazard. No deaths were reported in Michigan associated with the seven public health emergencies noted above, but over 400 people were injured.

Public health emergencies are of concern for populations with weakened or undeveloped immune systems.

Area Impacted

Due to the nature of public health emergencies, impacts from this event tend to be widespread rather than confined to a specific location. It is important to note that a public health emergency can originate outside of Wayne County, yet impact communities within the county.

Economic Impact

Economic impacts from this hazard can be severe if the source is infrastructure related, for example, if improvements are needed to the public water supply system. However, it is more likely that economic impacts will result through lost wages and medical expenses for impacted persons. Additional impact may result if a business is determined as the source of the emergency, (i.e. a restaurant must close). Due to the low frequency of this hazard, additional investigation of the economic impact is not recommended at this time.

Critical Facilities/Services

A major public health emergency would likely involve varying degrees of response from local, state, and possibly federal public health agencies.

¹⁷² American Society of Civil Engineers (ASCE), Michigan Section. 2018 Report Card for Michigan's Infrastructure. infrastructurereportcard.org/michigan.

4.14 Subsidence

4.14.1 Natural

Definition

A lowering or collapse of the land surface due to loss of subsurface support.

Historical Events

There have been no known natural subsidence events in Wayne County. There are no natural subsidence hazards in Wayne County according to the Geological and Survey Division of the EGLE.¹⁷³

Frequency and Probability

No known events have been recorded in Wayne County. Therefore, the frequency of events cannot be adequately determined. It can be expected to be an extremely low probability, as it is most often linked to groundwater movement through porous limestone. Cases of natural subsidence are more common in areas of Florida where the geologic conditions are favorable.

Health & Safety

In the event of a sinkhole, potential health and safety issues are dependent on the location and size of the sink hole. A sink hole occurring near or within a street or public access area could potentially cause injury. Injury could also occur if subsidence occurred beneath a building causing structural damage or collapse. Following the event, the sinkhole could pose a risk to the health and safety of people within the area if it is not probably marked and barricaded. Workers are at risk for cave-ins or confined space issues if entrance within the sinkhole is required to correct the problem.

Area Impacted

The area of impact would be the land immediately surrounding the subsidence or sinkhole and any transportation and utility networks disrupted by it.

Economic Impact

Economic impacts incurred from the occurrence of a sinkhole could include a disturbance in transportation, communication, and utilities as well as costs incurred to fill the sinkhole and repair roadways and utilities. If a sinkhole were to occur beneath a building foundation, costs to stabilize, repair, or rebuild could be substantial, dependent on the area and depth of the subsidence.

¹⁷³ Michigan Department of State Police, Emergency Management Division, Michigan Hazard Analysis, December 2001, page 183.

Critical Facilities/Services

Response agencies would primarily include localized police and fire departments, utility services, and road service agencies such as the Wayne County Road Commission or MDOT.

4.14.2 Mining

Definition

A lowering or collapse of the land surface due to loss of subsurface support in mining areas.

Historical Events

Wayne County lies over a regional salt bed. These salt deposits, laid down between 600 and 230 million years ago, are closer to the surface in the Detroit area, and have been very important to the local economy. The salt was removed in two ways. Solid mining of the salt involved sinking a shaft 1100 to 1200 feet below the surface, then carving out rooms of salt. The solid salt mine in Detroit closed in 1983, and reopened in 1998. Hundreds of miles of tunnels and excavation areas exist beneath the city. Liquid or brine extraction methods are now used for salt production and Southeastern Michigan is still a leading producer of salt. During their operation the mines in Michigan had neither a fatality nor a collapse.

Frequency and Probability

While there have been no cases of collapse or subsidence due to mining in Wayne County, it is important to realize that this doesn't preclude any future subsidence. The Retsof Salt Mine near Rochester, NY suffered a collapse due to the infiltration of groundwater into the mine. This water wore away the salt pillar supports resulting in the systematic collapse of the mine shafts and the closing of the mine. These collapses also resulted in a series of sinkholes 200- to 600-feet wide that damaged roadways and nearby structures and filled with water¹⁷⁴. The possibility of mine-related subsidence remains of concern in Wayne County.

Area Impacted

The area impacted would be the area immediately surrounding the sinkhole.

Economic Impact

Economic impacts incurred from the occurrence of subsidence could include a disturbance in transportation and costs incurred to fill the sink hole. If subsidence were to occur beneath a building foundation, potential cost to stabilize, repair, or rebuild could be substantial, dependent on the size of the sink hole.

¹⁷⁴ The Center for Land Use Institute, www.ludb.clui.org/ex/i/ny3129, Retsof Salt Mine

Critical Facilities/Services

Response agencies would primarily include localized police and fire departments, utility services, and road service agencies such as the Wayne County Road Commission or MDOT.

4.14.3 Water / Sewer

Definition

A lowering or collapse of the land surface due to loss of subsurface support over water and sewer lines.

Historical Events

Sinkholes or subsidence events appear to be fairly infrequent in Wayne County: one known sewer or waterline related subsidence event occurred in February 2000, when a leaking underground pipe formed a 15-foot wide sinkhole in Detroit that enveloped an automobile.¹⁷⁵ Sinkholes are more frequently experienced in neighboring Macomb County. A sinkhole in Fraser requiring evacuation of three homes; it occurred in the same vicinity as a 160-foot by 60-foot by 30-foot deep sinkhole in 2004 and a 19878 sinkhole caused by a break in a local sewer interceptor.^{176,177}

Frequency and Probability

The infrequency of this type of subsidence in Wayne County makes it difficult to predict the probability of future occurrences. However, it is notable that multiple subsidence events have occurred in neighboring counties. Based on the amount of underground utilities (specifically water mains) within in the county, there is a good probability that a sink hole event can occur from this non-natural source. The probably of this occurrence increases with the age of these water systems.

Health & Safety

In the event of subsidence, potential health and safety issues are dependent on the location and size of the sinkhole. A sinkhole occurring near or within a street or public access area could potentially cause injury. Injury could also occur if subsidence occurred beneath a building causing structural damage or collapse. Following the event, the sinkhole could pose a risk to the health and safety of people within the area if it is not probably marked and barricaded.

¹⁷⁵ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 180.

¹⁷⁶ WXYZ, Channel 7 ABC Detroit. April 8, 2019. Officials urge drivers to be cautious of sinkhole in Mount Clemens, <https://www.wxyz.com/getting-around-metro-detroit/officials-urge-drivers-to-be-cautious-of-sinkhole-in-mount-clemens>

¹⁷⁷ Detroit Free Press. December 24, 2016. <https://www.freep.com/story/news/local/michigan/macomb/2016/12/24/sinkholes-macomb-county/95829674/>

Area Impacted

The areas of impact would be the land immediately surrounding the subsidence or sinkhole and any transportation and utility networks disrupted by it.

Economic Impact

Economic impacts incurred from the occurrence of a sinkhole could include disturbance in transportation, communication, and utilities as well as costs incurred to fill the sinkhole and repair roadways and utilities. If a sinkhole were to occur beneath a building foundation, costs to stabilize, repair, or rebuild could be substantial, dependent on the area and depth of the subsidence.

Critical Facilities/Services

Response agencies would primarily include localized police and fire departments, utility services, and potentially road services such as the local road commission or MDOT.

4.15 Thunderstorm Hazards

Wayne County receives an average of 32 thunderstorm days per year.¹⁷⁸ Between July 2004 and June 2005, six severe thunderstorm warnings were issued in Wayne County.¹⁷⁹

4.15.1 Hail

Definition

Conditions where atmospheric water particles from thunderstorms form into rounded or irregular lumps of ice that fall to the earth.

Historical Events

In Wayne County, 12 hailstorms were recorded between 2013 and April 2019.¹⁸⁰

On November 15, 1955 4-inch hail was reported in Wayne County.¹⁸¹

On March 7, 1991, severe thunderstorms and accompanying high winds and hail caused considerable damage across a large portion of central and southern Michigan, damaging homes, businesses, farms, and some public facilities.

On June 24, 1998, two tracts of severe thunderstorms crossed the State moving east to west – one tract stretched across central Michigan, while the other moved in the

¹⁷⁸ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, April 2019, page 33.

¹⁷⁹ National Weather Service FOIA Office, Email dated September 28, 2005.

¹⁸⁰ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, May 1, 2019.

¹⁸¹ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005

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southern portion of the State. The more northerly thunderstorms produced large amounts of hail in several counties, ranging from dime-size up to baseball-size hail.¹⁸²

Frequency and Probability

Wayne County experiences a hail storm approximately twice per year: the Michigan Hazard Analysis notes 155 hail storms in 67 years for Wayne County.¹⁸³ Most storms in Michigan result in hailstones approximately ¼-inch in diameter to golf ball sized hailstones (1¾ inches), but baseball sized hailstones have been recorded in most Michigan counties. .¹⁸⁴ Hail events are highly likely to occur in the county.

Health & Safety

The human health and safety risk associated with hail is low. However, hail is often associated with tornado activity. Tornadoes are discussed in Section 4.16.

Area Impacted

Hailstorms are typically localized as they move through Michigan. The entire county could be affected; however, impacts will more likely be localized to residents directly under the center of the storm.

Economic Impact

Nationally, hail damages each year exceed \$3.1 million. Hailstorms can impact infrastructure, power lines, roads and businesses. Property damage, loss of business revenue, and response costs can result from hail events. Hail is especially damaging to crops, property, and automobiles.

Critical Facilities/Services

Response to a hail related emergency would be localized. Utilities may require repair and maintenance resulting from hail.

The National Weather Service, NOAA, and local media, through radar, weather data, and spotters, can alert the public of severe storms capable of producing large hail, severe winds, and lightning. Warning sirens can alert those not near a radio or television of approaching storms. Warning sirens are located throughout the county; those located within the 42 communities participating in this Plan are shown in Figure 9.

¹⁸² Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 31.

¹⁸³ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, April 2019, page 39

¹⁸⁴ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, April 2019, page 33.

4.15.2 Lightning

Definition

The discharge of electricity from within a thunderstorm.

Historical Events

On June 28, 1995, a man suffered first and second degree burns when lightning struck him in his kitchen in Plymouth while he was washing dishes.¹⁸⁵

On July 21, 1998, southeast Michigan was hit particularly hard by a string of thunderstorms. The storms produced over 4,300 lightning strikes, some of which caused fires that destroyed a house and an apartment building in Sterling Heights, Macomb County. Sixteen people were left homeless and the storms resulted in damages totaling \$275,000. Governor John Engler and President Clinton issued state and federal disaster declarations for Wayne and Macomb County.¹⁸⁶

On July 31, 1999, a woman in Lincoln Park was knocked unconscious by a lightning strike just outside her home.¹⁸⁷

In May 2000, lightning struck the steel superstructure of a new terminal under construction at the Detroit Metropolitan Wayne County Airport. Nine workers were injured as a result with two requiring hospitalization.¹⁸⁸

On August 8, 2003, lightning struck Trojan Cleaners on Main Street in Belleville and the building caught fire and burned to the ground.¹⁸⁹

On May 20, 2004, lightning was blamed for a blackout which left most of the City of Gibraltar and parts of Brownstown Township and the City of Flat Rock without power.¹⁹⁰

Lightning Statistics

Location of Lightning Strikes

- 40% are at unspecified locations
- 27% occur in open fields and recreation areas (not golf courses)
- 14% occur to someone under a tree (not on golf course)
- 8% are water-related (boating, fishing, swimming, etc.)
- 5% are golf-related (on golf course or under tree at golf course)
- 3% are related to heavy equipment and machinery
- 2.4% are radio, transmitter, and antenna-related

Months of Most Strikes

July - 30%
August - 22%
June - 21%

Time of Most Strikes

2:00p.m. - 6:00 p.m.

Source: National Oceanic and Atmospheric Administration (NOAA) and the National Lightning Safety Institute (NLSI) for the periods 1959-1994.

¹⁸⁵ Wayne County Executive, Special Projects Staff, September 15, 2004.

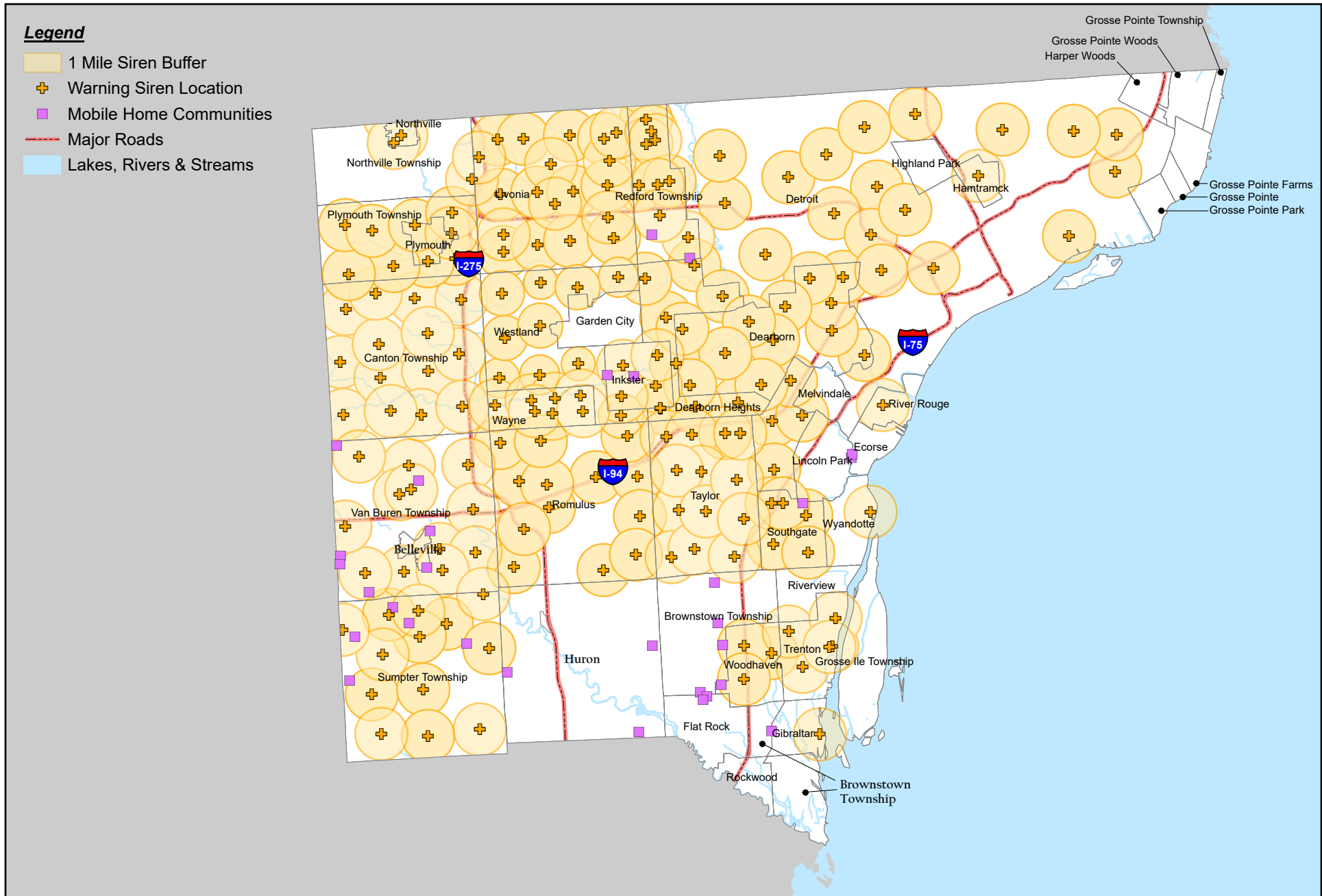
¹⁸⁶ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, April 2019, page 51.

¹⁸⁷ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 191.

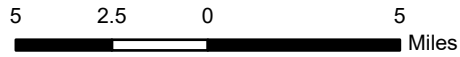
¹⁸⁸ Ibid.

¹⁸⁹ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.

¹⁹⁰ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.



Wayne County



Created for: Wayne County
 Created by: RMH, May 20, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013))

Figure 9 - Hazard History:
 Warning Siren Locations

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Frequency

Only one lightning strike (resulting in fire, injury, death, etc.) was recorded for Wayne County in NOAA's severe weather database between 2013 and April 2019; it resulted in a house fire in Canton Township causing \$300,000 in damage.¹⁹¹ However, the Michigan Hazard Analysis listed a total of 21 lightning strikes on 17 days between 1996 and 2017 resulting in \$857,000 in damages. Over 50% of lightning casualties occur in the months of June and July, and another 28% of deaths occur in May and August.¹⁹² Lightning occurrences happen every year; therefore lightning events will occur in the future within the county.

Health & Safety

Michigan averages 1.5 deaths and 10.7 injuries per year from lightning strikes.¹⁹³ Lightning deaths are usually caused by the electrical force shocking the heart into cardiac arrest or throwing the heartbeat out of rhythm. Lightning can also cause severe skin burns that can lead to death if complications from infection ensue. Ninety-one percent (91%) of lightning strikes impact a single person, and only 9% of strikes impact two or more victims.¹⁹⁴ Approximately 20% of lightning strike victims die, and 70% of survivors suffer serious long-term effects such as memory and attention deficits, sleep disturbance, fatigue, dizziness, and numbness.¹⁹⁵

Between 1959 and 2005, the National Weather Service recorded 101 lightning deaths and 711 lightning-related injuries, consistently ranking Michigan near the top in the nation in these categories. During the period 1959-1995, Michigan was ranked 2nd nationally in lightning injuries and 12th nationally in lightning deaths.¹⁹⁶

Area Impacted

The effects of lightning are very localized; however, thunderstorms can cover a large area.

Economic Impact

Property damage estimates from lightning strikes in Wayne County between January 1, 1996 and April 30, 2017 equaled \$ 857,000, an average of \$40,809 per year.¹⁹⁷

On September 19, 1997, lightning damaged an apartment building in Westland with property damage of \$5,000.¹⁹⁸

¹⁹¹ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, May 1, 2019.

¹⁹² Oakland County Michigan Emergency Management, *Hazard Study*, August 1998, page 17.

¹⁹³ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 34.

¹⁹⁴ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 34.

¹⁹⁵ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 34.

¹⁹⁶ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, April 2019, page 47.

¹⁹⁷ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.

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Nationally, property damage from lightning is estimated at several billion dollars. In Michigan, property damage was estimated at \$20.0 million since 1990.¹⁹⁹ Cost estimates for property damage vary greatly, but a conservative estimate is \$2 million per year in Michigan. Property damage from lightning is often a result of fires or electrical systems damage. Lightning strikes cause 2% of Michigan's wildfires.²⁰⁰

Because lightning-related damage information is compiled by a number of different sources, it is difficult to accurately determine collective damage figures resulting from lightning strikes.

Critical Facilities/Services

Initial response to a lightning strike would be provided by local emergency responders (fire, police, emergency medical care, etc.). Power outages as a result of a lightning strike can impede emergency response. Electric utility companies across the county estimate as much as \$1 billion per year in damaged equipment and lost revenue from lightning.²⁰¹

Communication services can be damaged and destroyed (cell and communication towers, computer systems, phone services, etc.). Utility companies (DTE Energy, Consumers Energy, SBC, AT&T, cable companies, etc.) and the services they offer are often affected by lightning strikes.

Lightning is directly associated with severe thunderstorms. The National Weather Service and local media can alert the public of the severe storms capable of producing large hail and lightning. Warning sirens can alert those not near a radio or television of an approaching storm. Warning sirens are located throughout the county. Figure 9 displays community siren locations applicable to this Plan.

4.15.3 Severe Wind

Definition

Winds greater than 58 miles per hour, not including tornadoes, are classified as windstorms, severe, or straight-line winds. Often Occurring during thunderstorms severe winds may be very damaging. Severe winds have the potential to cause injury or loss of life from breaking and falling trees, property damage, and flying debris. Although Tornadoes tend to result in more deaths than severe winds, property damage from straight line winds is often more widespread than from tornadoes, usually affecting multiple counties at a time.

¹⁹⁸ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.

¹⁹⁹ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 34.

²⁰⁰ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page iv.

²⁰¹ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 34.

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Historical Events

On April 30, 1984 a windstorm struck the entire Lower Peninsula, resulting in widely scattered damage, 1 death, and several injuries.²⁰² Wind gusts up to 90 miles per hour (mph) were measured in some areas. Damage was extensive with 6,500 buildings, 300 mobile homes, and 5,000 vehicles being damaged. Over 500,000 electrical customers lost power.

On January 18, 1996, a strong storm tracked from the central plains northeast to northern Michigan downing power lines in Wayne County.²⁰³

On April 20, 1996, downed power lines resulted in power outages for 30,000 DTE Energy customers within Macomb, Oakland, St. Clair, Washtenaw, and Wayne counties.

On July 22, 1998, a family of four attempted to leave a video store in Woodhaven and a severe gust struck an awning located above the exit. Falling bricks hit a young boy in the head, killing him. Two fatalities occurred in Woodhaven as a result of the same storm. Storm damage also occurred in Flat Rock, Gibraltar, and Trenton. On Grosse Ile, one hundred homes and two businesses suffered damages. Five people were killed in Grosse Pointe Farms.²⁰⁴ Wayne County and parts of Macomb County received both state and federal disaster declarations following this event.²⁰⁵

High winds were experienced across southeast Michigan on the afternoon of November 24, 2014. Peak winds of 68 mph were recorded at Detroit Metropolitan Wayne County Airport. Numerous downed power lines and trees were reported across the region and approximately 200,000 people were without power. The resulting damages were estimated at \$25 million.

Frequency and Probability

NOAA's Storm Events Database reports nine high wind and 37 thunderstorm wind events in Wayne County Since 2103.²⁰⁶ The Michigan Hazard Analysis reports that Wayne County experienced 351 severe wind events between 1996 and 2017, an average of approximately 17 per year.²⁰⁷ Severe winds are a high probability event for the county.

²⁰² Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 196.

²⁰³ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.

²⁰⁴ Southeast Michigan Tornado Outbreak, National Weather Service in White Lake, Michigan, July 2, 1997.

²⁰⁵ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.

²⁰⁶ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, May 1, 2019.

²⁰⁷ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 25.

Health & Safety

Since 1990, Michigan averaged approximately 2.0 deaths and 20.0 injuries per year as a result of severe winds.²⁰⁸ The public is most at risk from such things as falling trees and electrical lines, blowing debris, and collapsed buildings or roofs. Severe winds can be a direct effect of tornadoes, which are discussed in Section 4.16.

Area Impacted

Severe winds would affect entire populations, but greatest risk would be to populations housed in mobile homes. There are approximately 2,240 acres of manufactured home parks in Wayne County, excluding Detroit.²⁰⁹

Economic Impact

Between 1996 and 2017, Wayne experienced an estimated \$99,770,000 in property damage from severe wind events.²¹⁰ Property damage costs in Michigan average \$12,380,952 per year. Property damage would be greatest contributor to economic loss. Power outages resulting from high winds can also have an economic impact with costs associated to restore and repair power lines and loss of revenues from prolonged outages to businesses.

Critical Facilities/Services

The National Weather Service, NOAA, and local media, through radar, weather data, and spotters, can alert the public of severe storms capable of producing large hail, severe winds, and lightning. Warning sirens can alert those not near a radio or television of an approaching storm. Warning sirens are located throughout the county. Initial response activities due to emergencies from high winds would primarily be associated with local response from police, fire, and medical emergency services.

Utility companies are responsible for repairing lines and shutting down power or gas services that represent a threat to safety. Also, private or governmental tree removal services (urban forestry services) are essential in providing preventive measures and are often involved following severe wind incidents in clearing downed trees from power lines, roadways, and buildings. Following the initial response, regional, state, and local agencies may assist in cleanup and aid.

4.16 Tornadoes

Definition

A violently rotating column of air extending downward to the ground from a cumulonimbus cloud.

²⁰⁸ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 52.

²⁰⁹ SEMCOG, *Land Use in Southeast Michigan 1990-2000*, Specific to Wayne County, Excluding Detroit, April 2004.

²¹⁰ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, April 2019, page 77.

Historical Events

Between 1950 and 2001, approximately 4% of tornadoes in Michigan were classified as violent tornadoes (F4 or F5 intensity).²¹¹ However, these few violent tornadoes have been responsible for 88% of Michigan's tornado-related deaths.²¹² One F4 tornado was recorded in Wayne County between 1950 and July 2001.²¹³

On July 2, 1997, a series of thunderstorms went through south-central and southeast Michigan spawning 16 tornadoes, thirteen of which occurred in southeastern Michigan counties.²¹⁴ An F2 tornado was reported west of Highland Park to Hamtramck in Wayne County.

Frequency and Probability

Between 1950 and 2012, there were 28 tornadoes, ranging from F0 to F4, recorded in Wayne County, resulting in 136 injuries.²¹⁵ Four of those tornadoes were recorded between 1996 and 2017 resulting in 90 injuries and damages totaling \$91,250,000. Tornadoes in Michigan are most frequent in the spring and early summer when warm, moist air from the Gulf of Mexico collides with cold air from the Polar Regions to generate severe thunderstorms.²¹⁶ Most tornadoes in Michigan occur in the southern Lower Peninsula, which averages 17 tornadoes per year.²¹⁷

Tornadoes will continue to represent a hazard to the county and are most probable during the months of April through June.

Health & Safety

Michigan's tornadoes have resulted in more deaths than in many other tornado-prone states. Michigan ranks in the top 10 in single killer tornadoes, deaths per 10,000 square miles, and killer tornadoes as a percent of all tornadoes. Between 1950 and July 2009, 242 tornado-related deaths were reported in Michigan.²¹⁸

There are approximately 4 tornado-related deaths per year in Michigan.²¹⁹ A tornado that occurred on July 2, 1997 in Highland Park accounted for 90 injuries.²²⁰

²¹¹ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, pages 61.

²¹² Ibid.

²¹³ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001.

²¹⁴ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 65.

²¹⁵ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, April 2019, page 71.

²¹⁶ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001.

²¹⁷ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 62.

²¹⁸ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 60.

²¹⁹ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 60.

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Area Impacted

A tornado would affect the entire population in the tornado path. The most vulnerable population would be mobile home residents. According to 2000 land use data, there are approximately 2,240 acres of manufactured home park development in the county, excluding Detroit.²²¹ Van Buren and Canton Township have the highest number of manufactured home establishments, with approximately 300 acres each.

The average tornado track is 16 miles long. The longest tracks have been reported at 200 miles long.²²² The tornado path width is typically less than one-quarter mile, but can be over one mile.

Economic Impact

Property damage is the greatest contributor to economic loss. The amount of damage varies greatly with the severity of the tornado. Also, damage or destruction to utility lines (primarily overhead lines) can result in the loss of power and other utilities anywhere from a few moments to several days. Tornadoes can also destroy or damage agricultural fields, disrupt transportation services due to debris and/or downed power lines, and destroy trees and other flora.

Property damage in Michigan averages more than \$15 million per year.²²³ Between January 1, 1950 and June 30, 2005, property damage by tornadoes totaled over \$123 million in Wayne County.²²⁴

A tornado that touched down in the Highland Park area on July 2, 1997, resulted in \$90 million in property damage.²²⁵ This was one of a series of 13 tornadoes that swept through southeast Michigan that same day. These resulted in an additional 2,900 damaged or destroyed homes, 200 damaged or destroyed businesses, over \$25 million in public damage, and nearly \$30 million in private damage elsewhere. Two deaths were caused directly by tornadoes and 120 injuries were reported. Power was lost for 350,000 electrical customers.²²⁶

Critical Facilities/Services

Tornado warnings systems and agencies play a major role in limiting the amount of deaths and injuries related to tornadoes. Warning sirens are located throughout the county. (Figure 9 displays community siren locations applicable to this Plan) The

²²⁰ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.

²²¹ SEMCOG, *Land Use in Southeast Michigan 1990-2000*, Specific to Wayne County, Excluding Detroit April 2004.

²²² Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 59.

²²³ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 62.

²²⁴ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.

²²⁵ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005

²²⁶ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 65.

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National Weather Service and local media (television and radio) provide advanced warnings to communities. Community warning sirens can be heard for several miles.

Initial response activities due to tornadoes would primarily be associated with local response from fire, police, and emergency medical care.

Utility companies (Consumers Energy, DTE Energy, SBC, etc.) would be essential for repairing lines and shutting down power or gas services that represent a threat to safety. Following the initial response regional, state, and local agencies may also assist in cleanup and aid.

4.17 Transportation Accidents

Definition

A transportation accident is a crash or other accident involving an air, land or water-based passenger carrier. (Note: Transportation accidents involving hazardous materials are addressed separately in Section 4.8.2, HazMat Incidents – Transportation.)

4.17.1 Air

Historical Events

Air transportation accidents result from four major causes:

- collision between two aircraft in-air,
- crash during in-air cruising due to mechanical failure, sabotage, etc.,
- crash during takeoff or landing, or
- collision between two aircraft during taxi or staging.

The majority of air transportation accidents occur during takeoff or landing, and therefore, impacted areas are typically located near airports or runways. Response to air transportation accidents may involve fire control, survivor rescue/first aid, site security and crowd/traffic control.

The most fatal airplane accident in Wayne County history, and one of the top 10 air accidents in US history, occurred on August 16, 1987 near Detroit Metropolitan Wayne County Airport in Romulus. Flight 255 crashed just after takeoff, killing 154 of 155 people on board as well as two people on the ground.²²⁷

A plane carrying the University of Michigan men's basketball team skidded off a runway at Willow Run Airport in March 2017 when a jammed part prevented the pilots from

²²⁷ National Transportation Safety Board, www.nts.gov, Aviation Database Query, Wayne County, Michigan, report generated September 19, 2005.

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bringing the aircraft nose up during takeoff. Of the 110 passengers and six staff on board only one was injured in the crash.²²⁸

Frequency

As shown on Figure 10, there are five airports within Wayne County. The airports provide for commercial flights, industrial shipping, corporate jets and charter planes. Two of the airports are owned by Wayne County; the other three airports are privately owned and operated. The Detroit Metropolitan Wayne County Airport handles approximately 24.4 million air passengers annually; accounting for roughly 87% of the air traffic of all Michigan airports.²²⁹ Between 1990 and 2005, there were 28 air transportation incidents in Wayne County, nearly 2 incidents per year.²³⁰

Commercial passenger air transportation is available through two airports in Wayne County. Air transportation incidents in Wayne County will continue to occur and it is anticipated that the probability for this hazard will fluctuate with air traffic volume.

Health & Safety

Death and injury is limited in most aircraft accidents. Between 1990 and 2005, there have been 3 deaths from air transportation incidents in Wayne County, an average of one death every five years.²³¹ However, although rare, major crashes can be very deadly, as in the 1987 crash noted above.

Area Impacted

Due to the fact that the majority of aircraft accidents occur during landing or takeoff, the area most at risk for impact is the airport (or heliport) and immediately adjacent areas.

Economic Impact

Economic impact would result from damage to the aircraft and damage to any structures or improvements on the ground at the site of the accident. Damages to aircraft would typically be the responsibility of the private owner. Because two airports are owned by Wayne County, damages to airport infrastructure at these facilities could be the

²²⁸ Detroit Free Press. May 7, 2019. <https://www.freep.com/story/sports/college/university-michigan/wolverines/2019/03/07/michigan-basketball-plane-crash/3095406002/>

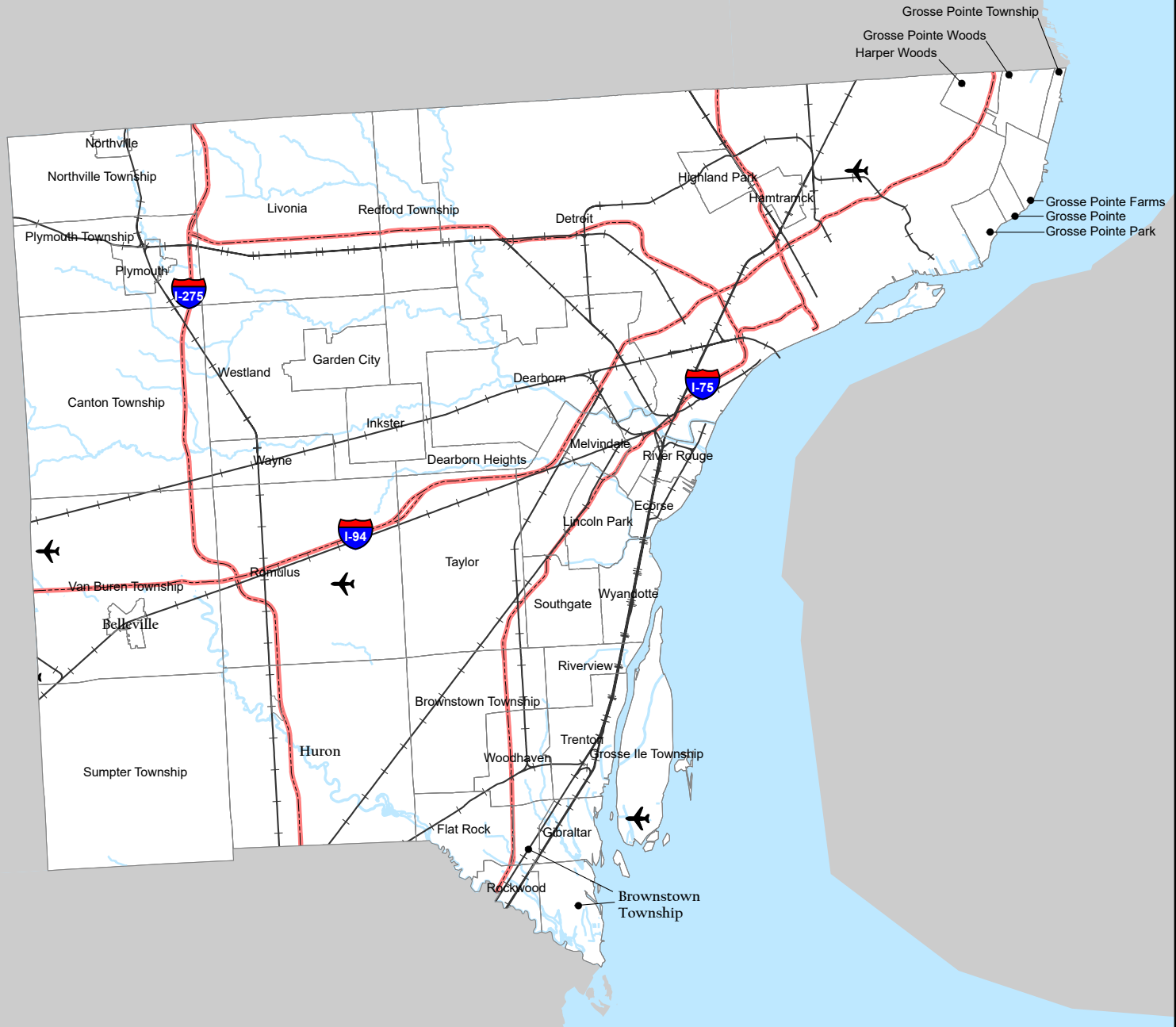
²²⁹ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, July 2012, page 305.

²³⁰ National Transportation Safety Board, www.nts.gov, Aviation Database Query, Wayne County, Michigan, report generated September 19, 2005.

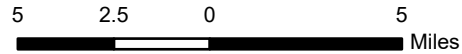
²³¹ National Transportation Safety Board, www.nts.gov, Aviation Database Query, Wayne County, Michigan, report generated September 19, 2005.

Legend

-  Airports
-  Railroad
-  Major Roads
-  Lakes, Rivers & Streams



Wayne County



Created for: Wayne County
Created by: RMH, April 23, 2020, ASTI Project 10943
Data Source: City of Dearborn (2013), Michigan CGI (2013))

Figure 10 - Hazard History:
Transportation

responsibility of the county. Additional economic impact to the county may result if an accident causes disruption of services at the airport.

Critical Facilities/Services

Response to air transportation accidents is provided by local fire and police departments. Emergency response assistance is available through mutual aid arrangements.

Airports within Wayne County are an important service provided to area businesses. A significant accident at an airport could temporarily impede the county's ability to provide this service.

4.17.2 Highway

Historical Events

Vehicle accidents are common to all communities and can happen along any roadway. Most accidents are due to driver error or inclement weather conditions. Accidents involving modes of mass public transportation are of particular concern due to the high number of passengers which could be impacted.

Frequency & Probability

Michigan vehicle travel increased more than 20 percent between 1990 and 2015 and over 10 percent from 2013 to 2016.²³² Automobile accidents occur several times daily in Wayne County. In 2016, there were 312,172 traffic accidents on Michigan roads, resulting in 1,064 fatalities; a 22 percent increase since 2009. The number of fatalities per vehicle mile traveled increased from 0.91 to 1.07 from 2009 to 2016; slightly lower than the national average.²³³ In 2003, over 18% of all traffic crashes reported in Michigan occurred in Wayne County.²³⁴

Health & Safety

The 71,227 traffic accidents in Wayne County in 2003 resulted in 222 fatalities and 22,093 injuries.

Economic Impact

The National Highway Traffic Safety Administration estimated the total economic cost of traffic crashes in Michigan at \$8,069,000,000 for the year 2000.²³⁵ This total includes all types of accidents and accounts for costs associated with lost productivity, medical

²³² American Society of Civil Engineers (ASCE), Michigan Section. 2018 Report Card for Michigan's Infrastructure. infrastructurereportcard.org/michigan.

²³³ American Society of Civil Engineers (ASCE), Michigan Section. 2018 Report Card for Michigan's Infrastructure. infrastructurereportcard.org/michigan.

²³⁴ State of Michigan, Office of Highway Safety Planning, 2003 Michigan Traffic Crash Facts, Reported Statewide Traffic Crashed By County In Michigan.

²³⁵ U.S. Department of Transportation, National Highway Traffic Safety Administration, www.nhtsa.dot.gov, *The Economic Impact of Motor Vehicle Crashes 2000*, State Costs.

costs, legal costs, emergency services costs, insurance costs, travel delays, property damage, workplace losses, and human capital losses. Assuming that 18% of these accidents were in Wayne County, and assuming 2000 costs are representative of most years, the economic cost to the county would be over \$1.45 billion per year.

Based upon the number of all traffic crashes in Michigan, the average cost of a traffic crash is \$20,391 per accident. It is anticipated that this rate of economic loss would be higher for public passenger transportation given that more passengers are present and the higher cost of a bus versus a private automobile.

Critical Facilities/Service

The highway transportation system in Wayne County plays a vital part in the county's ability to provide services to the public. Traffic crashes are notorious for causing temporary traffic delays that complicate the county's ability to maintain a well operating transportation network.

4.17.3 Rail

Historical Events

Passenger rail accidents are typically associated with derailments or collision with motor vehicles attempting to cross railroad tracks. On January 23, 2003 in Romulus, the driver of a passenger vehicle ignored the warning signals at a level grade crossing and attempted to cross the railroad tracks. An approaching freight train struck the vehicle, killing the driver, injuring the passenger, and causing the derailment of 7 tank cars. While infrequent, accidents involving cars and trains at crossings are the leading source of rail fatalities.

Frequency & Probability

As shown in Figure 10, there are 134 miles of freight rail lines and 62 miles of passenger rail lines in Wayne County. Passenger rail service is provided by Amtrak with service between Pontiac, Detroit, Dearborn, and other southeast Michigan destinations.

From 1990 through 2009, there were 1970 railroad transportation accidents in Michigan, an average of almost 13 accidents each year.²³⁶ However, rail-automobile accidents have been decreasing notably through this period; the 44 vehicle-train crashes recorded in 2009 is a 64.8% decrease over the preceding 10 year period.²³⁷ The most common reported accidents (64%) are derailments. None of the derailments reported between 1999 and 2005 resulted in injury.

²³⁶ Federal Railroad Administration, <http://safetydata.fra.dot.gov>, all reports for all railroads in Wayne County, 1999 through December 2005, reports generated on December 13, 2005.

²³⁷ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, July 2012, page 310.

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Approximately half of the public rail-road crossings in Michigan have active warning devices but accidents still occur. It is anticipated that the likelihood of occurrence for this hazard will fluctuate with the rate of rail traffic within the county.

Health & Safety

Death and injury to passengers involved in railroad accidents is rare in Wayne County. From 1999 through mid-December 2005, there have been three deaths and six injuries as a result of this hazard.²³⁸

Area Impacted

Areas adjacent to a railroad are most at risk for impact from this hazard due to the potential for derailment. As previously stated, 58 of the 90 accidents reported in Wayne County from 1999 to 2005 involved derailment of cars or locomotives. Secondary impacts may result from accidents of this type if railroad crossings are blocked resulting in traffic delays.

Economic Impact

The greatest economic loss is property damage to the train equipment and railroad tracks. This loss is the responsibility of the owner/operator of the equipment and railroad.

Critical Facilities/Services

Given the frequency of this event, it is not anticipated that county services or facilities will be greatly impacted. Impact to county services may result if an accident blocks a railroad crossing, thus causing traffic problems.

4.17.4 Marine

Historical Events

Most shipwrecks in Michigan occur in waters exhibiting treacherous weather and currents particularly areas of Lakes Superior and Huron. However, the C.K. Collins did sink in the Detroit River (Wayne County) in 1854, killing 23 people.

The number of shipwrecks occurring in the Great Lakes decreased dramatically between the 1800s and the 1930s. Marine travel has significantly changed and most boat traffic now is recreational. Additionally, weather prediction, communications, technology, ship design and construction, and emergency response have all improved over time. The

²³⁸ Federal Railroad Administration, <http://safetydata.fra.dot.gov>, all reports for all railroads in Wayne County, 1999 through December 2005, reports generated on December 13, 2005.

most recent significant accident occurred with the sinking of the Edmund Fitzgerald in 1975.²³⁹

Nineteen commercial marine passenger ferries operate from Michigan shorelines. Public marine passenger ferries are regulated and inspected by the U.S. Coast Guard to ensure public safety. To date, there has not been a significant accident involving public marine transportation in Michigan. Response to marine accidents differ significantly from air and land transportation accidents in that they can require underwater search and rescue. Typically, marine accidents involve recreational boating incidents and are often linked to individuals operating vehicles under the influence of alcohol. Like rail-automobile accidents, Michigan boating accidents are declining over time. The 131 boating accidents recorded in 2009 is a 40% decrease over the preceding 10 year period.²⁴⁰

4.18 Winter Hazards

4.18.1 Ice and Sleet Storms

Definition

Freezing rain is rain that freezes on contact with surfaces causing a coating of ice on exposed surfaces.

Historical Events

Between January 1, 1950 and June 30, 2005, seven ice storm/freezing rain events have been recorded in Wayne County.²⁴¹

On January 7, 1994, much of lower Michigan experienced a mix of freezing rain, rain, and snow.²⁴² Ice accumulations during the event were approximately 1/4- inch over the southern third of Lower Michigan. Detroit Edison reported 50,000 people affected by power outages.

Freezing rain developed across southern lower Michigan late on February 26, 1995 and continued through the morning of the 27th.²⁴³ Numerous traffic accidents were reported and most schools were closed.

On March 13, 1997, freezing rain caused 425,000 homes and businesses in the Metropolitan Detroit area to lose power.²⁴⁴ Several thousand residents were without

²³⁹ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, July 2012, page 311.

²⁴⁰ Michigan Department of State Police, Emergency Management and Homeland Security Division, *Michigan Hazard Analysis*, MSP/EMHSD Publication 103, July 2012, page 314.

²⁴¹ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 21, 2005.

²⁴² National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.

²⁴³ Ibid.

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power for as long as four days. In addition to power lines, falling trees damaged dozens of cars, houses and most schools were closed, and numerous auto accidents occurred.

On January 30, 2002, a mix of freezing rain and snow led to the collapse of the roof at Checker's Savemore Drugs in Westland. Falling branches and the weight of the ice downed hundreds of power lines and left an estimated 290 thousand residents and businesses without power, mostly in the Metro Detroit area. Several communities in the Metro Detroit area declared snow emergencies and almost all school districts in the region were closed.²⁴⁵

In April 2018, a three-day storm with heavy rain, snow, sleet, and freezing rain hit southeast Michigan, including Wayne County.. Damage to trees and power outages were experienced across the region with nearly 500,000 DTE and Consumers Power customers losing service during the storm. Strong northeast winds also caused flooding along the Lake Erie shoreline.²⁴⁶

Frequency and Probability

NOAA's Storm Events Database reports three ice storms, one winter storm, and four winter weather events including sleet and freezing rain for Wayne County since 2000. In Michigan, there were 40 major events recorded from 1970 through July 2001.²⁴⁷ Michigan averages one major event per year. The probability for ice and sleet storms to occur in Wayne County is high and is most likely to occur from December to March.

Health & Safety

Deaths and injury caused directly by ice or sleet storms are difficult to determine. Deaths and injury are usually caused by secondary effects such as auto accidents, downed power lines and heart attacks from overexertion. The majority of deaths related to ice storms are traffic related.

Area Impacted

Due to the widespread nature of ice/sleet storms the entire population could be impacted either directly or secondarily (i.e., power outages, etc.). According to 2000 Land Use Data, Wayne County, excluding Detroit, has approximately 6,816 acres of roadway, 917 acres of utility, and 1,036 acres containing electrical transmission lines.²⁴⁸

Economic Impact

Economic loss would include property damage and costs of response (clearing roadways, downed power lines or trees, etc.).

²⁴⁴ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.

²⁴⁵ Ibid.

²⁴⁶ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, May 1, 2019.

²⁴⁷ Ibid.

²⁴⁸ SEMCOG, *Land Use in Southeast Michigan 1990-2000*, Specific to Wayne County, Excluding Detroit, April 2004.

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From 1970 to June 2005 ice/sleet storms caused nearly \$30 million in property damage (nearly \$550,000 each year). Michigan has suffered \$100 million in property damage from major storms between 1976 and 2005.

Critical Facilities/Services

Response to an ice/sleet related emergency would primarily be localized. Initial response activities due to emergencies from sleet and freezing rain would primarily be associated with local response from police and medical emergency services.

Utilities may require repair and maintenance resulting from sleet and freezing rain. As in the event that occurred on April 3, 2003, regional or out-of-state services may be required to assist in cleanup and repair activities. Also, private or governmental tree removal services are often involved following severe wind incidents in order to remove trees from roadways, yards, and away from power lines.

The National Weather Service, NOAA, and local media can alert the public of severe storms capable of producing sleet and freezing rain.

4.18.2 Snow Storms

Definition

A period of rapid accumulation of snow accompanied by high winds and cold temperatures.

Historical Events

Between January 1, 1950 and June 30, 2005, 16 heavy snow events, 5 snow events, and 6 winter storms were reported in Wayne County.²⁴⁹

On January 26, 1977 a Presidential Emergency Declaration was issued for 15 counties in the southern part of the State. Many residents were isolated in rural residences or stranded in public shelters.²⁵⁰

On March 12-14, 1993 a snowstorm now called "The Storm of the Century" struck the eastern U.S. dumping 56 inches of snow in some areas and causing \$2 billion in property damage. The storm impacted 26 states and approximately 50% of the nation's population. A total of 270 deaths and over 600 injuries were attributed to the storm.²⁵¹

²⁴⁹ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, May 2019.

²⁵⁰ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 46.

²⁵¹ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2012, page 48-49.

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On March 19, 1996, snow accumulations of 5.8 inches combined with high winds resulted in power outages to 173,000 homes and businesses in southeast Michigan.²⁵²

On December 11, 2000 a powerful snow storm dumped heavy snow across southeast Michigan.²⁵³ Seven inches were reported in Grosse Pointe Farms, 8-10 inches were reported in Hamtramck, 12 inches were reported in Belleville, 8-11 inches were reported in Wayne, and 5 inches were reported in Grosse Ile with power outages in Trenton.

Frequency and Probability

NOAA's Storm Events Database reports three ice storms, one winter storm, and four winter weather events including sleet and freezing rain for Wayne County since 2000.²⁵⁴ The Michigan Hazard Analysis records 46 snow storms or blizzards impacting Wayne County between 1996 and 2017 and resulting in an estimated \$960,000 in damage and economic loss.²⁵⁵ Wayne County averages more than two major events per year. The probability for winter snowstorms to occur in Wayne County is high and is most likely to occur from December to March.

Average annual snowfall in Michigan ranges from 30 to 200 inches. Wayne County had an average season snowfall of approximately 30 inches between the 1950-51 and 1978-80 seasons.²⁵⁶ It is probable that snowstorms will occur in the future in Wayne County.

Health & Safety

Deaths caused directly from the event are difficult to determine. Deaths related to snowstorms are usually caused by secondary effects such as delays in emergency vehicle response, auto accidents, downed power lines and heart attacks from overexertion. The direct risk to human life from snowstorms is low.²⁵⁷

Area Impacted

Blizzards are the most dramatic of all snowstorms, bearing strong winds and an enormous amount of snowfall. Snowstorms can impact a large area of a community, especially if they result in heavy accumulations of snow. Due to the widespread nature of snowstorms the entire population could be impacted either directly or secondarily (i.e. power outages, etc.). Wayne County has approximately 6,816 acres of roadway.²⁵⁸

²⁵² National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.

²⁵³ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, September 6, 2005.

²⁵⁴ National Climatic Data Sponsored Website, www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm, *Standard Query for Severe Weather*, May 1, 2019.

²⁵⁵ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, April 2019, page 124.

²⁵⁶ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 235.

²⁵⁷ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 11.

²⁵⁸ SEMCOG, *Land Use in Southeast Michigan 1990-2000*, Specific to Wayne County, Excluding Detroit, April 2004.

Economic Impact

Primary costs would include property damage and snow removal. Economic losses are dependent upon the degree of storm severity. Schools and businesses may be closed if snowfall is severe enough or if a State of Emergency is declared that prohibits traffic on roadways.

Critical Facilities/Services

Response to a snow related emergency would primarily be localized. Initial response activities due to emergencies from snowstorms would primarily be associated with local response from medical emergency services, public works departments, and agencies such as the Wayne County Road Commission and MDOT. Municipalities would have increased costs in snow removal activities.

Transportation would be affected as roads and airports could see heavy delays or short-term to long-term closures. Schools and businesses may be closed for a day to several days.

The National Weather Service, NOAA, and local media are critical in alerting the public of severe storms capable of producing snowstorms and blizzard conditions.

4.19 Terrorism/Active Assailant Incidents

Definition

An intentional, unlawful use of force, violence or subversion against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political, social, or religious objectives. An Active Assailant may or may not be affiliated with a terrorist organization and may not otherwise be considered a terrorist. In the US many active assailant events have been lone shooter driven. For the purposes of this Plan they are described together despite ideological objective.

Historical Events

The most recognized forms of terrorism include assassination, bombings, and extortion. These acts are often identified with particular groups or organizations. The Middle East and portions of Europe, South America and Asia have been greatly impacted for many years by acts of terrorism and sabotage. In more recent years, the United States has been victim to acts of terrorism.

Wayne County has experienced instances of terrorism in the past several decades. In 2001, a homemade bomb left outside the St. Paschal Babylon Catholic Elementary School in Taylor, MI was inadvertently carried inside where it detonated injuring 10 people. In July of 2000, an individual pulled wiring from around 100 streetlights throughout Detroit and, in one case, attached them to a nearby fence, electrifying it. The

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city was forced to cut power to more than 600 streetlights for repairs that were estimated to cost \$26,000.²⁵⁹

Terrorism events may simply involve the threat of action or thwarted attempts. In 2018, a Detroit man pleaded guilty for threats, made in 2016, against the police. The case was declined for lack of evidence by the Wayne County Prosecutor but taken up by Michigan's Attorney General.²⁶⁰ Similarly, a local high school student was arraigned on two counts of terrorism and two counts of making bomb threats for writing the threats on the bathroom walls at Salem and Plymouth High Schools.²⁶¹ The threats came less than a month following the shooting at Marjorie Stoneman Douglas High School in Parkland, Florida.

During the writing of this plan the University of Michigan campus in Ann Arbor was placed on lockdown as local, state, and federal officials searched for a possible gunman. What students suspected were gunshots, triggering the incident, was later determined to be balloons popping. Social media was an important tool in notifying the student body and surrounding community to seek cover.

Cases such as these have occurred throughout Michigan. In 1927, a man detonated 1000 pounds of explosives underneath a local school in Bath, Michigan. The explosion killed 41 people and injured nearly 60 more and stands as the worst school related attack in U.S. history.²⁶²

Frequency & Probability

It is difficult to establish a frequency for terrorist activity in Wayne County based on historical events and how you interpret trends depends upon the data sources used and the time frame of comparison. James Alan Fox, a professor of criminology at Northeastern University, notes that there have been 16 multiple-victim school shootings in schools since 1996. Eight of these incidents have resulted in four or more deaths and, thus, have been termed mass shootings.

Mass shootings are relatively rare. Fox found that, on average, they occur 20 to 30 times per year with approximately one of those located at a school. He and his associate found that shootings involving students have been declining, with four times fewer students being killed as a result now than in the early 1990s. He points out that more kids die each year from drowning in pools or from bicycle accidents.

²⁵⁹ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, Page 162-163.

²⁶⁰ Michigan Radio. February 7, 2018. <https://www.michiganradio.org/post/detroit-man-pleads-guilty-terrorism-charge-facebook-rant-against-police>

²⁶¹ Detroit Free Press, March 8, 2018.

<https://www.freep.com/story/news/local/michigan/wayne/2018/03/08/plymouth-canton-school-bomb-threat/406759002/>

²⁶² Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, Page 166.

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This contrasts with a study reported in the *Journal of Child and Family Studies*²⁶³ that found that more people have died or been injured in mass school shootings in the United States in the past 18 years than in the entire 20th century. Despite a lack of an established frequency for this hazard, it is likely to occur in the future.

Health & Safety

Due to the nature of terrorist attacks, it is difficult to establish a death or injury rate from historical events. Not all acts of terrorism are intended to cause death or injury, as demonstrated in the 1971 bus bombings in Pontiac, MI, nor do all of those intended for harm do so, as seen with the several homemade bombs found and safely detonated throughout Wayne County. However, all of these occurrences result in a general feeling of insecurity and fear that hurts social and economic systems in the areas affected.

Area Impacted

Terrorism can take many forms and the aim of terrorist attacks can vary from destruction of property to harming people to disrupting quality of life. Depending on the type of terrorist attack, property damage can be extensive.

Further information on this matter is law enforcement sensitive and homeland security sensitive and, therefore, is not available to the general public.

Economic Impact

It is difficult to determine the economic impact of terrorist acts. Given that terrorism can take many forms and have widely different consequences, there is the potential for terrorist acts to cause great economic damage.

Critical Facilities/Services

Terrorist acts carried out on public infrastructure can directly impact the county's ability to operate essential facilities and provide services. Significant terrorist acts would require large-scale response from all levels of government.

Special Consideration

Homeland security is addressed under a County-wide threats and needs assessment. Terrorist acts, outside of active assailant events, are not considered in this Plan.

4.20 Weapons of Mass Destruction

Definition

Weapons intended to cause widespread damage and high number of casualties.

²⁶³ Antonis Katsiyannis, Denise K. Whitford, Robin Parks Ennis. Historical Examination of United States Intentional Mass School Shootings in the 20th and 21st Centuries: Implications for Students, Schools, and Society. *Journal of Child and Family Studies*, 2018; DOI: 10.1007/s10826-018-1096-2

Historical Events

Weapons of mass destruction typically fall into four categories: 1) missiles, 2) biological weapons, 3) nuclear weapons, or 4) chemical weapons. Currently, there are 33 countries known to have one or more types of weapons of mass destruction.²⁶⁴ A number of nations and organizations may also be capable of obtaining weapons of mass destruction.

Frequency & Probability

Weapons of mass destruction have never been used to carry out an attack in Wayne County. Globally, there have been 18 attacks since 1985.²⁶⁵ Although Wayne County does not have a history of attacks using weapons of mass destruction, the possibility of such an event does exist.

Health & Safety

Given the nature of weapons of mass destruction, a successful use of these weapons would cause great loss of life and injury. Death and injury rates are highly variable with each attack and the form of weapon used. The atomic bombs dropped on Hiroshima and Nagasaki during World War II killed an estimated 210,000 people initially²⁶⁶, with radiation related deaths stretching to the present. As a reference, these bombs each carried 20 kiloton yields, while conventional nuclear weapons today carry 20 megaton yields. Chemical and biological weapons are often feared as they are easier to produce and are lethal in smaller amounts. These weapons, while they have historically killed fewer people and are harder to deliver successfully can result in the death of thousands as well as the disruption of agriculture and water infrastructures.

Depending on the type of weapon used, the effects on human health can linger for years, continuing to present a hazard.

Area Impacted

Further information on this matter is law enforcement sensitive and homeland security sensitive and, therefore, is not available to the general public.

Economic Impact

It is difficult to estimate the economic impact of a successful attack using weapons of mass destruction. It is anticipated that such an event would be incredibly damaging to life, property and infrastructure, as well as the local, state, and possibly federal economy.

²⁶⁴ Federation of American Scientists, www.fas.org, Intelligence Resource Program, Countries With Weapons of Mass Destruction, January 29, 2004.

²⁶⁵ Nuclear Threat Initiative, www.nti.org, Weapons of Mass Destruction Chronology 1985 through 2003, January 30, 2004.

²⁶⁶ The Detroit Free Press, www.freep.com, *Bombings at Hiroshima, Nagasaki: 60 Years Later, Many Wonder – Were Atomic Blasts Necessary?*, August 5, 2005.

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Critical Facilities/Services

An attack using weapons of mass destruction against public infrastructure can directly impact the county's ability to operate essential facilities and provide services. Successful attacks would require large-scale response from all levels of government. As stated above, the county has identified and evaluated locations within the county which are potential targets for weapons of mass destruction.

Special Consideration

Homeland security is addressed under a separate threat and needs assessment. Therefore, weapons of mass destruction are not considered in this Plan.

Table 4. Wayne County Hazard History Summary

Hazard	Annual Frequency	Frequency Rank	Hazard Impact				Consequence	Data Source
			Probability****	Health & Safety	Area	Economic		
Transportation Accidents - Highway*	55,001	1	Very High	Medium	Local	High	Medium	MSP, NHTSA, MTCF, Detroit News
Criminal Acts - Vandalism**	13,637	2	Very High	Low	Local	Low	Low	MSP
Fire Hazards - Structural Fires	4,207	3	Very High	Medium	Local	High	Medium	NFIRS
Fire Hazards - Wildfires	1,640	4	Very High	Low	Local	Low	Low	NIFC
Criminal Acts - Arson***	917	5	Very High	Medium	Local	Low	Medium	NFIRS, MSP
Transportation Accidents - Marine	10	6	High	Low	Local	Low	Low	USCG and NSC
Thunderstorm Hazards- Severe Wind	7	7	High	Medium	County	High	Medium	NOAA
Infrastructure Failure - Water System	5	8	High	Low	Local	Medium	Medium	Wayne County
Transportation Accidents - Rail	3	9	High	Low	Local	Low	Low	USDOTFRA
Petroleum and Natural Gas Pipeline Accidents	2	10	High	Medium	Local	Medium	Medium	MSP, NRC
Thunderstorm Hazards - Hail	2	10	High	Low	County	Medium	Medium	NOAA
Winter Hazards-Snowstorms	2	10	High	Medium	County	High	Medium	NOAA
Flooding-Riverine	1.3	13	High	Low	Local	High	Medium	NOAA
Flooding-Urban	1.3	13	High	Low	Local	High	Medium	NOAA
Civil Disturbance*	1	15	High	High	Local	High	Medium	Armstrong Economics
Flooding - Dam Failure	1	15	High	Low	Local	High	Medium	State of Michigan
Infrastructure Failure - Electrical System	1	15	High	Medium	Local	High	High	Wayne County, MSP
Transportation Accidents - Air	1	15	High	Medium	Local	Low	Low	FAA
Winter Hazards- Ice and Sleet	1	15	High	Medium	County	Medium	Medium	NOAA
Flood-Great Lakes Shoreline and Erosion	0.95	20	Moderate	Low	Local	Medium	Medium	NOAA
Extreme Temperatures-Extreme Cold	0.83	21	Moderate	Medium	County	Low	Medium	NOAA
Extreme Temperatures-Extreme Heat	0.67	22	Moderate	Medium	County	Low	Medium	NOAA
HazMat Incidents - Fixed Sites	0.60	23	Moderate	Medium	Local	Very High	High	NRC
Infrastructure Failure - Storm Sewer System	0.50	24	Moderate	Low	Local	Low	Low	Wayne County
Infrastructure Failure - Communications	0.50	24	Moderate	Medium	Local	Low	Medium	Wayne County
Infrastructure Failure - Bridges, Roads, and Overpasses	0.50	24	Moderate	High	Local	High	Medium	MDOT and FHA
Thunderstorm Hazards - Lightning	0.50	24	Moderate	Medium	County	Medium	Medium	NOAA
Tornadoes	0.50	24	Moderate	High	County	High	High	Wayne County and NOAA
HazMat Incidents - Transportation	0.40	29	Low	Medium	Local	Medium	Medium	NRC
Subsidence	0.40	29	Low	Low	Local	Low	Low	State of Michigan
Criminal Acts - Mass Shooting	0.35	31	Low	High	Local	Medium	Medium	MSP
Invasive Species	0.35	31	Low	Low	County	High	Medium	State of Michigan
Public Health Emergencies - Pandemics and Epidemics	0.33	33	Low	High	County	High	High	MSP
Public Health Emergencies - Contaminated Food Supply and/or Water Supply	0.33	33	Low	High	County	High	High	MSP
Gas/Oil Shortages or Supply Disruption	0.23	35	Low	Low	County	Very High	High	State of Michigan
Terrorism and Sabotage	0.21	36	Low	High	Local to County	High	High	State of Michigan
Drought	0.21	36	Low	Low	County	Medium	Medium	Wayne Co., NOAA, & NDMC
Earthquake	0.20	38	Low	Low	County	Low	Low	USGS
Fog	0.20	38	Low	Medium	County	Medium	Medium	State of Michigan, NOAA
Oil and Gas Well Incidents	0.20	38	Low	Low	Local	Medium	Low	MSP
Catastrophic Events/National Emergencies	0.12	41	Low	Medium	County	Medium	Medium	No established frequency
Infrastructure Failure - Sanitary Sewer System	0.05	42	Low	High	Local	Medium	High	Wayne County
Fire Hazards - Scrap Tire Fires	0.04	43	Low	Low	Local	Low	Low	MSP and MDEQ
Celestial Impact	0	44	Very Low	High	County	High	High	No established frequency
Nuclear Power Plant Accidents	0	44	Very Low	Medium	County	High	Medium	No established frequency
Weapons of Mass Destruction	0	44	Very Low	Very High	County	Very High	Very High	No established frequency

* Value shown is the total number of vehicle crashes recorded in Wayne County for 2017. The five-year average for 213 through 2017 equals 50,750. Number of fatal crashes in Wayne County for 2017 equals 157.

** Vandalism = Property Crime

*** Arson figures do not include City of Detroit

**** Probability categories: Very High > 10 events per year (average), High ≥ 1 to 10 events annually, Moderate ≥ 0.5 to 0.99 events per year, Low ≥ 0 to 0.49 annual events, and Very Low = 0 events recorded.

5. Hazard Assessment

5.1 Hazard Assessment

Hazards (Table 5) were ranked according to historical risk (frequency and impact), according to committee and community survey responses, and by comments on open ended questions in the survey. These rankings formed the basis for individual evaluations and group discussions during committee meetings that resulted in a final list of hazards of particular significance to the county. Final selection of the top hazards was based on a combination of risk and impact rankings as described below.

5.1.1 Survey

The first survey was provided to 62 individuals in the Advisory Committee in electronic form, and included 40 hazards categorized as natural, technological, or human -related hazards. A total of 57 participants (92%) participated in survey number one. The results of the survey were presented to the Advisory Committee for review and evaluation at the first workshop.

This first survey asked respondents to rank the importance of 40 hazards on a scale of 1 (Not Important) to 5 (Extremely Important). Importance was defined as an evaluation of the negative consequences of the hazard on the population, economy and environment of the county. In addition, the survey included open ended questions asking respondents to list the most significant hazards in each of three major categories: natural, technological, and human. Respondents were asked to determine significance based upon the severity of the impact, probability of occurrence, and preparedness of the county to respond. These comparisons and responses were used to initially rank the relative significance of each hazard in order to consider frequency and consequence during the first workshop. Hazard rankings in the top five are highlighted in Table 5.

5.1.2 Risk Analysis Workshop

Survey results noting highly ranked hazards was then used during the Advisory Committee workshop to identify the top hazards for further evaluation. Although the top five hazards, in various rankings, are highlighted in Table 5 below, this list was not intended to be a final ranking, but was used to start discussion on the selection of hazards significant to the county. Of particular importance were those hazards ranked highly across more than one column.

Discussion by the committee removed those hazards that were historically significant because of their large frequency but were not of concern for future mitigation programs: specifically, most criminal acts, structural fires, and transportation accidents. Secondly, hazards that were beyond the scope of this program were removed: specifically, nuclear power plant accidents.

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Table 5. First 2019 Survey Hazard Ranking Results, With 2013 Workshop Ranking

	Historic Frequency Ranking	Survey Open Ended	Survey Prompted Rank	Weighted Rank (1 high, 5 low)	2013 Plan Workshop Rank
Natural Hazards					
Celestial Impact	43		38	39	
Drought	40		27	30	
Earthquake	35		37	37	
Extreme Temperatures - Extreme Hbt or Cdd	21, 20	5	7	9	1, 5
Fire - Wildfires	4		36	36	
Flooding - Riverine or Shoreline	13	3	21	6	
Fog	13		33	31	
Invasive Species	30		34	34	
Subsidence - Natural	28		39	32	
Thunderstorms - Hail, Lightning, Severe Wind	10, 23, 7	1	1	3	
Tornadoes	23	4	6	7	
Winter Hazards - Snow, Ice & Sleet	10, 15	2	2	12	
Technological Hazards					
Fire - Scrap Tire	42		35	35	
Fire - Structural	3		23	20	
Flooding - Dam Failure	15	9	28	33	
Flooding - Urban	13	4	12	16	6
Hazmat Incidents - Fixed Site	22		18	11	3
Hazmat Incidents - Transportation	28	2	9	15	
Infrastructure Failure - Bridges, Roads, Overpasses	23	1	3	8	
Infrastructure Failure - Communications	23	5	15	5	4
Infrastructure Failure - Electrical Systems	15	3	8	1	4
Infrastructure Failure - Sanitary/Storm Sewers	41, 23	6	13	2	
Infrastructure Failure - Water System	8		11	13	4
Nuclear Power Plant Accidents	43	7	14	21	
Oil and Gas Well or Pipeline Accidents	37, 10	8	25	14	
Subsidence - Mining or Infrastructure	28		29	38	
Human Hazards					
Catastrophic Events/National Emergencies	40	3	16	24	
Civil Disturbance	15	5	19	22	
Criminal Acts - Mass Shootings/Active Assailant(s)	30	4	5	19	
Criminal Acts - Vandalism and Arson	5, 2	5	20	27	
Criminal Acts - Homicide/Robbery/Carjacking	—				
Gas/Oil Shortages or Supply Disruptions	34	7	30	18	
Information Technology Intrusion	—	6	17	29	
Public Health Emergencies - Pandemics, Epidemics, Food/Water	32	1	4	23	2
Terrorism/Sabotage	35		26	17	
Transportation Accidents - Air	15	7	22	10	
Transportation Accidents - Marine	6		32	28	
Transportation Accidents - Rail	9	7	31	26	
Transportation Accidents - Surface Roads/Highways	1	2	10	4	
Weapons of Mass Destruction	43		24	25	

The Advisory Committee reviewed the hazard history of the County, the hazard ranking in the 2013 Plan, and the results of the first survey. Workshop participants discussed and both the frequency and impacts of various hazards in three categories: health and safety, area affected, and economic effects. The Committee also discussed the importance of each hazard and its impacts to population, environment, and the economy in each of 11 asset classes that exist in the county, such as residential areas, business districts, industrial sites etc.

Following discussion, the following 17 hazards were initially selected for further review and analysis:

- Catastrophic Events/National Emergencies
- Civil Disturbance

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- Criminal Acts - Mass Shootings/Active Assailant(s)
- Criminal Acts - Vandalism & Arson
- Extreme Temperatures - Extreme Hot or Cold
- Flooding - Riverine or Shoreline
- Flooding - Urban
- Hazmat Incidents - Transportation
- Infrastructure Failure – Bridges & Roads
- Infrastructure Failure – Communications
- Infrastructure Failure – Electrical Systems
- Infrastructure Failure – Water & Sewer Systems
- Public Health Emergencies - Pandemics/Epidemics, Food/Water Contamination
- Severe Weather Summer
- Severe Weather Winter
- Thunderstorms - Hail, Lightning, Severe Wind
- Tornadoes
- Transportation Accidents - Surface Roads/Highways
- Winter Hazards - Snow, Ice & Sleet

Further discussion noted that electrical and communication systems failure was often related to the underlying weather event/hazard and that the historic frequency of bridge failure was somewhat low. As a result, the list of 17 hazards was reduced to 14 deemed significant for the County and selected for further analysis. This selection was intended to focus discussion and evaluation and was not intended to eliminate any hazard from consideration.

The committee was then asked to select and weight criteria for individually evaluating the top hazards. Using a paired comparison methodology, workshop participants determined the most important criteria for evaluating hazards, and weights for each individual criterion. Participants were asked to brainstorm (individually, and then in small groups) to create a list of criteria specifically applicable to Wayne County. A total of seven criteria were originally identified. The selected four most important criteria, and their relative weights during the ranking process, are provided below.

- Ability to Recover from Disaster/Incident (weighted 7)
- Associated Infrastructure Failure (weighted 8)
- Loss of Life and Injury (weighted 15)
- Geographic Area of Impact (weighted 7)

Ranking Criteria For Hazards - Goal Setting

2019 Plan Update Meeting Results

	Ability to Recover from Disaster/Incident	Infrastructure Failure	Loss of Life and Injury	Geographic Area of Impact	Sum
Ability to Recover from Disaster/Incident	3	1	3	7	
Infrastructure Failure	3	2	3	8	
Loss of Life and Injury	5	5	5	15	
Geographic Area of Impact	3	3	1	7	

With respect to the criterion, the importance of one item to the other is:

- 5= much greater
- 4= greater than
- 3= the same as
- 2= lower than
- 1= much lower

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The impact of each hazard on each of the four criteria was then evaluated by the group. This was used to rank each hazard according to its impact and risk.

The final hazard rank from the workshop and risk rank for each hazard were then factored together to identify the most critical hazards for the county. The committee considered the most crucial hazards to be: public health emergencies, active assailant incidents, and water and sewer system infrastructure failure.

Hazard and Risk Assessment as Ranked by Advisory Committee:

Hazard Event	Workshop Rank	Hazard Risk Rank	Action Plan Needed
Extreme Temperatures - Extreme Hot or Cold	5	6	3
Flooding - Riverine or Shoreline	4	10	3
Thunderstorms - Hail, Lightnings, Severe Wind	14	12	4
Tornadoes	8	13	4
Winter Hazards - Snow, Ice & Sleet	8	2	2
Flooding - Urban	8	9	4
Hazmat Incidents - Transportation	5	8	3
Infrastructure Failure - Water & Sewer Systems	1	5	1
Catastrophic Events/National Emergencies	11	13	4
Civil Disturbance	13	11	4
Criminal Acts - Mass Shootings/Active Assailant(s)	3	2	1
Criminal Acts - Vandalism and Arson	12	1	2
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Opioid Crisis	2	4	1
Transportation Accidents - Surface Roads/Highways	7	6	4

The need for a county-wide action plan to address each of the most important hazards was evaluated based on a table that compared the workshop rank (in columns) to hazard risk rank (in rows), such as the one shown here.

Action Plan Assessment		
	Rank	
Risk	1-5	6-10
1-5	1	2
6-10	3	4

The first workshop prioritized and evaluated the top 14 hazards described above, and 11 critical assets. The assets considered include the following (in order of ranked critically):

- Residential Areas.
- Hospitals/Response Facilities
- Utility Facilities
- Roads, Railroads, Bridges
- Industrial Sites
- Open Space
- Central Business District
- Sports/Entertainment Arenas
- Public Facilities
- Schools, Churches
- Commercial Sites

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Individual assets were evaluated to determine their vulnerability to each hazard. The effect of a hazard on each asset, and for each of the three criteria, was evaluated in an interactive process. This was used to rank the most critical assets. The most important hazards identified in the first part of the workshop were then evaluated for the likelihood of impacting a specific asset, and the consequence of such an impact on that asset.

The risk to each asset was then ranked, and the criticality of the asset and asset risk rank were then factored together to identify the most vulnerable assets in the county. As indicated below, assets with a criticality and risk rank in the top half were considered most vulnerable (as indicated by an assessment ranking of 1). The committee considered the most vulnerable assets to be:

- Hospitals/Skilled Care Facilities
- Residential Areas.
- Schools/Churches
- Roads, Railroads, & Bridges
- Central Business Districts

Vulnerability Assessment of Critical Assets as Ranked by Advisory Committee:

Critical Asset	Criticality Rank	Asset Risk Rank	Vulnerability
Commercial Sites	10	6	4
Hospitals/Skilled Care Facilities	1	5	1
Industrial Sites	5	8	3
Open Space	11	11	4
Public Facilities	9	10	4
Residential Areas	2	3	1
Roads, Railroads, Bridges	6	4	2
Utility Facilities	2	7	3
Schools, Churches	4	2	1
Sports/Entertainment Arenas	6	9	4
Central Business Dist.	6	1	2

The Vulnerability Assessment was based on this table, which compares the criticality rank (in columns) to asset risk rank (in rows):

Vulnerability Assessment		
	Criticality	
Risk	1-5	6-11
1-5	1	2
6-11	3	4

5.2 Community Input

The overall goals of a community with respect to hazard mitigation are to protect the local population from natural, technological, and human health hazards that may occur, and to reduce the potential impact of these disasters on vulnerable areas or populations within the community. Representatives from each community in Wayne County were contacted to identify hazards of particular concern to that community and specific hazard vulnerabilities within the community.

A ranking of community hazards identified in the responses is provided in the table below. A value of 1 represents the highest ranking. Communities discussed on average 6 of their highest ranked hazards.

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Representatives of the 42 Wayne County communities discussed in this Plan were asked to review their section(s) of the 2013 HMP and revise their individual hazard priorities and mitigation strategies as appropriate. If comments were not received from individual communities during through the survey instruments used or during one of the workshops, community emergency managers were interviewed by phone to update community specific hazard and mitigation strategy priorities, The following sections summarize the contents of each of the community responses regarding potential hazards and the critical assets that could be affected. Descriptions of the communities' land use and population are taken from Southeast Michigan Council of Governments (SEMCOG) community profiles, Descriptions of each communities' policies and programs are taken from a review of their Codes of Ordinances, Zoning Ordinances, etc.

5.2.1 City of Allen Park

Hazard Priorities

During and after heavy thunderstorms, increased volumes of storm water in the north branch of Ecorse Creek has caused significant flooding in the City of Allen Park. In particular, the area bordered by M-39, I-94 and Outer Drive is most vulnerable. This area has a history of sewer failures resulting in basement flooding. City representatives have also voiced concern over the potential health risk to residents as a result of sewers backing up into their homes.

Tornadoes were also mentioned as a significant risk to the population of the city. Of greatest concern was the impact on residents living in the senior citizen communities located within Allen Park.

I-94 and M-39 are heavily traveled routes located in Allen Park. Both highways have a history of numerous vehicular accidents. There is a particular risk due to the large volume of trucks that carry hazardous material through the community.

Of additional concern is the potential of a hazardous material accident at one of the industrial complexes located in the city. Also mentioned was the risk of a high-pressure gas main rupture as well as the risk of an incident involving trains that transport hazardous materials through the community.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Allen Park is primarily a residential community of approximately 28,634 people (SEMCOG 2019 estimate). The City is largely built-out with only 6% vacant land and 3.6% of its land area in recreation/open space (0% agriculture). The City's largest land uses are single family residential and transportation, communication, and utility (TCU) at 34.6% and 34.2%, respectively. The City is in the frequently-flooding Ecorse Creek Watershed and 55% of the community is categorized as impervious surface.

Allen Park participates in the National Flood Insurance Program and amended their Code of Ordinances in 2012 to adopt the FEMA Firm Maps and administer Appendix G of the Michigan Construction Code, to minimize losses due to flood conditions in specific flood hazard areas.

Allen Park is a member of the Alliance for Downstream Watersheds and works in partnership with other communities to manage stormwater under a Phase II Municipal

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Separate Stormwater System (MS4) permit. In addition to including tools to regulate floodplain development, their Code of Ordinances includes protections to reduce the potential for structural or wildfires and regulate hazardous waste.

Areas for possible improvement could include regulatory mechanisms to reduce the impact of existing impervious surfaces as land is redeveloped or to protect smaller remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.).

5.2.2 City of Belleville

Hazard Priorities

Tornadoes, ice storms and thunderstorms accompanied by high winds, create a threat to the City of Belleville and to its residents. Resulting power outages and extreme temperatures could have a significant effect on the population, especially on the elderly. The citizens considered most at risk for weather-related emergencies are the residents of the city's two senior citizen facilities and those living in mobile home communities located in the northeast and southeast areas of Belleville.

According to city officials, trains and trucks transporting hazardous materials, industrial facilities, as well as a natural gas pipeline that traverses the city, create the potential of a hazmat emergency. To better respond to these and all potential emergencies in Belleville, officials suggested that there is a need for more reliable communication equipment for the police and fire departments. City officials also identified a need for a program to respond to active shooters, particularly in schools.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Belleville is primarily a residential community of approximately 4,094 people (SEMCOG 2019 estimate) on the shores of Belleville Lake, an impoundment on the Huron River. The City's largest land use is single-family residential (37.1%) and 43.2% of the community is categorized as impervious surface. The City's population appears to be aging with 200-2018 growth in most age categories over 55 and losses in age groups younger than 55; the City is projected to lose population between now and 2045.

Belleville is a member of the Huron River Watershed Council and the Alliance of Downriver Watersheds. The City lies within the Ann Arbor Urbanized Area and, as such, falls under the Phase II municipal (MS4) stormwater permit program. and works in partnership with other communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit. In addition to including tools to regulate floodplain development, their Code of Ordinances includes protections to reduce the potential for structural or wildfires and regulate hazardous waste.

Possible areas for improving regulatory mechanisms to reduce the impact of existing impervious surfaces and protect the City's remaining open lands could include incentives to install green infrastructure or regulations to protect natural features (e.g., wetland/woodland ordinances), etc.).

5.2.3 Brownstown Township

Hazard Priorities

Tornadoes, thunderstorms, and severe winter weather are considered significant threats to the residents of Brownstown Township. At greatest tornado and high-wind risk are the residents of mobile home communities and senior citizen facilities located within the township. Representatives of the township have identified a need for early warning sirens that would alert all citizens in the likelihood of an approaching tornado.

Telegraph Road and I-75 experience heavy vehicular traffic traveling through Brownstown Township. Many of these vehicles transport hazardous materials through the community. In addition, natural gas pipelines, trains carrying hazardous material, and the potential for structural fires or an accident at the Wayne County Waste Treatment Facility all present a hazmat risk to the residents of the community. The presence of a nuclear power plant in the vicinity was also noted as a potential source of risk.

Representatives of the community also mentioned concern about the potential for civil disturbance, health emergencies and criminal acts.

Existing Authorities, Policies, & Programs and Ability to Expand These

Brownstown Township is primarily a residential community of approximately 31,567 people (SEMCOG 2019 estimate). Single family residential and vacant land are comparably the largest land use/cover classifications in the Township at 29.5% and 24.4%, respectively. Unlike the two communities described previously, Brownstown Township retains a significant area of open space (41%) with 31% tree cover. The Township is at the downstream end of the Huron River Watershed and portions of the Township abut Lake Erie.

Brownstown Township participates in the National Flood Insurance Program and regulates fill within floodplain and flood hazard under Part 228 of their Code of Ordinances.

Brownstown is a member of the Alliance of Downriver Watersheds and works in partnership with other communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit. Recognizing that the Township includes unique wetlands and wildlife due to its proximity to Lake Erie and the Huron River while also wishing to protect private land rights, the Township eschews variety of environmental regulations but has created an Environmental Commission to review development proposals.

Areas for possible improvement could include commitment to recommended actions in the Lower Huron Watershed Management Plan. Many of the projects described therein, although aimed at improving water quality, do so by reducing stormwater runoff and in-stream erosion. It's recommended that the Township also continue to work with the US Army Corps of Engineers to control Lake Erie shoreline flooding and erosion.

5.2.4 Canton Township,

Hazard Priorities

Community representatives from Canton Charter Township identified convective weather, including tornados, severe winds, and lightning; as their hazards of greatest concern. Examples of flooding damage to roads, businesses, residences, and public and private open spaces includes areas along Ford Road from Canton Center to Sheldon, in Cherry Hill Village, and in areas adjacent to retention ponds. High winds have damaged areas near Sheldon and Lilley Roads between Palmer and Michigan Avenue. Concerns related to severe weather include loss of power, lack of overnight warming/cooling centers for residents, and the adequacy of evacuation and response capacity for planned sporting events, including an annual soccer tournament with over 100,000 in attendance. Power loss was noted as having negative impact on traffic circulation, communications, and business revenue.

The highest priority technological hazards in Canton Township relate primarily to infrastructure failure, including electrical systems, roads and water and electrical systems. In the 2013 HMP Canton officials noted their concern regarding structural fires, particularly fires that could affect one of the senior assisted living facilities. Residential areas that do not have hydrants require additional assistance in the event of fire.

Canton officials also identified concerns regarding active shooter(s)/active assailant(s) as a key concern for the 2019 HMP update. Previously hazards relating to health emergencies, civil disturbance, criminal acts, and traffic accidents were listed as a source of concern in the Township. Public schools in the region have experienced closures due to H1N1 virus, and public conflicts relating to cultural and religious diversity were also reported. Roadways throughout the Township have high posted speeds, and accidents on roads with posted speeds of 45 mph are usually very serious and sometimes fatal. A bike trail through the Township has experienced at least one car-related fatality.

Existing Authorities, Policies, & Programs and Ability to Expand These

Canton Township is a residential community of approximately 98,340 people (SEMCOG, 2019) that has grown exponentially since the 1950s and 60s. Its largest land uses are single family residential and TCU at 33.7% and 16.1%, respectively and 31% of the Township is impervious surfaces, but it retains significant areas of open space (43%).

Canton Township participates in the National Flood Insurance Program and conducted extensive analysis to determine the number of parcels within flood hazard areas in past HMP development. Chapter 8 of their Code of Ordinances regulates construction activities in flood prone areas.

Canton Township's Code also includes their own stormwater ordinance, which in turn has protections for wetlands and steep slopes; they even have an ordinance regulating logging and logging road construction.

Canton Township, like many Wayne County communities, still exhibits lower than ideal tree canopy and higher imperviousness than recommended. Increased tree canopy coverage has benefits for both reducing stormwater runoff and reducing extreme

temperatures. Increasing tree cover has the potential to exacerbate electrical infrastructure failure in storms if lines are above-ground and tree aren't trimmed.

Additional authorities, programs, or policies could be developed to plant trees, and install green infrastructure, reduce the potential for structural or wildfire, and regulate hazardous waste. Implementing recommendations from Wayne County Public Health from their analysis of COVID-19 preparedness is also recommended, especially in light of the Township's aging population.

5.2.5 City of Dearborn

Hazard Priorities

The most important natural hazards for the City of Dearborn include flooding and severe weather in both summer and winter, accompanied with power outages. Dearborn City buildings have been designated as cooling shelters during business hours in event of extreme summer heat, and the City has supplied dry ice to residents during power outages longer than 24 hours.

The potential for a hazmat emergency exists in the City of Dearborn. According to City representatives, there are locations within the city where hazardous chemicals are either stored or used in production. M-39 and I-94 are major highways that serve as routes for trucks, many carrying hazardous materials through the City. Trains carrying hazardous materials, especially in the eastern portion of the City, are also a concern.

City officials identified high-rise buildings including offices, apartments, senior citizen facilities and a hospital as a source of concern for structural fires, particularly in cases that may require evacuation of the elderly. Dearborn has many older factories, particularly in the eastern section of the City, and at least one instance of a factory explosion. There has also been concern about the potential for arson fires in these areas. Because a fire in some of these locations could present particular challenges to fire fighters, Dearborn officials feel that there is a need for additional personnel as well as additional fire department and EMS training. Buildings of concern for structural fires identified by individual communities are presented in Figure 11.

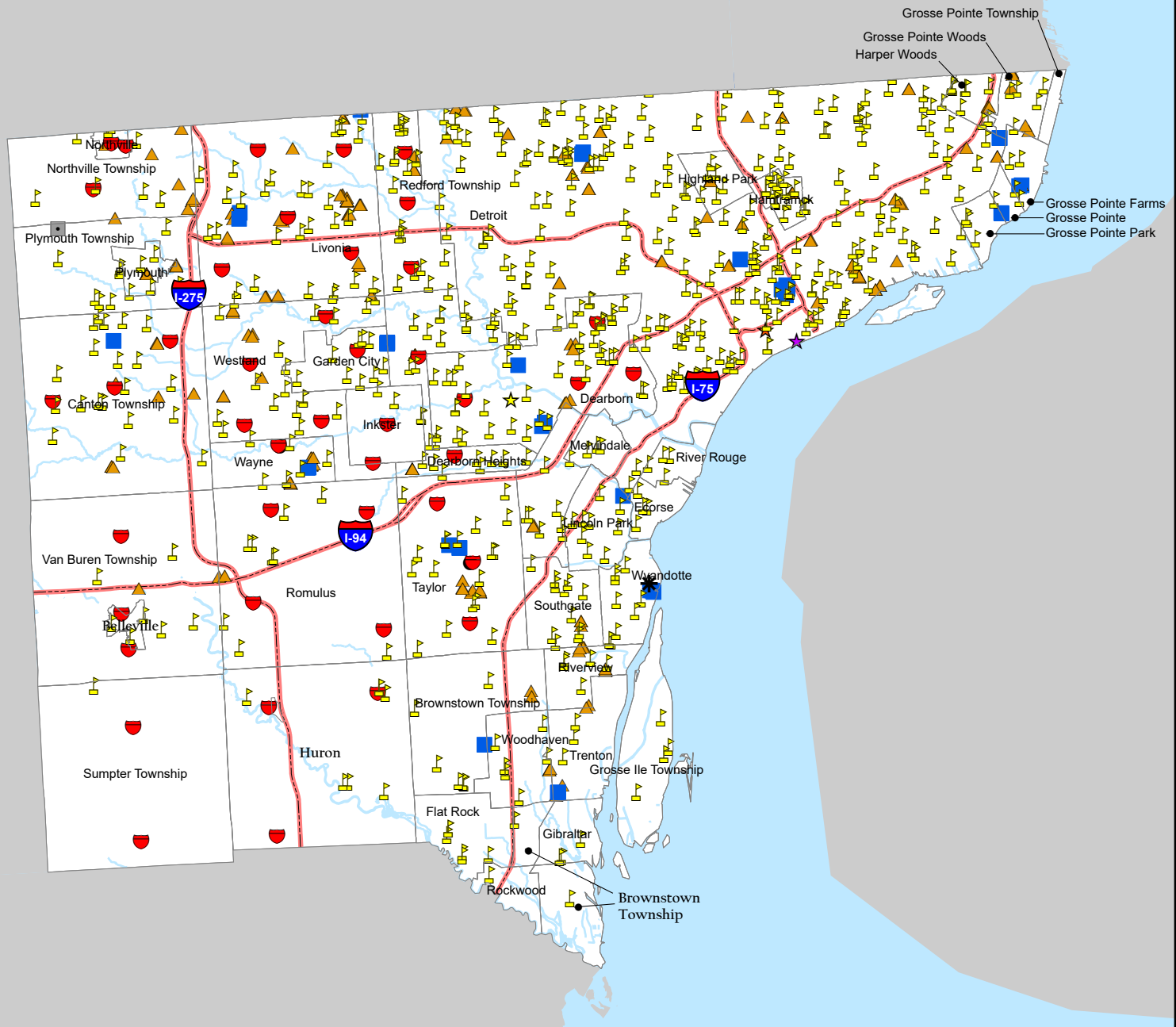
Approximately 35% of the population of Dearborn is of Middle Eastern descent. The threat of hostilities directed against this segment of the population is a concern for officials of the city. An example was provided of an annual event that has attracted out-of-state instigators of civil unrest. City officials feel that there is a need to provide the public with a better awareness of issues regarding ethnic diversity within the community.

Existing Authorities, Policies, & Programs and Ability to Expand These

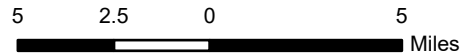
The City of Dearborn is primarily a residential community of approximately 101,636 people (SEMCOG, 2019), but it also contains significant acreage used for industry. The City's largest land uses are TCU, single-family residential, and industrial at 24.8%, 24.7%, and 14.1%, respectively. The City is both within the Rouge River Basin and the frequently-flooding Ecorse Creek Watershed. Fifty-seven percent of the community consist of impervious surfaces, while less than half of that (25%) remains in open space.

Legend

- Fire Stations
- ▲ Schools
- ★ Joe Louis
- ★ Henry Ford Museum
- ★ Comerica Park
- ✱ 27th District Court
- City Hall
- Detroit House of Correction
- H Hospital
- ▲ Nursing Home/Assisted Living
- Major Roads
- Lakes, Rivers & Streams



Wayne County



Created for: Wayne County
 Created by: RMH, April 23, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013),
 ArcGIS Online

Figure 11 - Hazard History:
 Community Structural Fires

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Dearborn participates in the National Flood Insurance Program and their website contains extensive information regarding new floodplain maps and flood insurance requirements for residents of the Ecorse Creek Watershed. Their Code of Ordinances regulates construction in floodplains, solids waste, storm and sanitary sewer systems.

The City of Dearborn does not appear to be a member of the Alliance for Downstream Watersheds or the Alliance of Rouge Communities. Participating with these groups may offer resources shared among the participants that could assist the City if further reducing flooding.

Again mechanisms to reduce the impact of existing impervious surfaces as land is redeveloped or to protect remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.) may be possible ways to expand existing authorities, programs, and policies.

5.2.6 City of Dearborn Heights

Hazard Priorities

Thunderstorms, high winds and associated power outages, and flooding, particularly along Ecorse Creek, have had impacts on the City of Dearborn Heights. When they occur, the outages are typically widespread with varying size and duration. The need for a more comprehensive public warning and information distribution system was noted by public officials.

Human hazards in the community relate primarily to criminal acts that result in personal injury and property loss.

Existing Authorities, Policies, & Programs and Ability to Expand These

Nearly half of the City of Dearborn Heights is dedicated to single-family residential land use (46.5%) and the City is home to 59,073 people. Another 24.2% of the City is dedicated to TCU. Like neighboring Dearborn, the City is both within the Rouge River and Ecorse Creek Watersheds.

Dearborn Heights participates in the National Flood Insurance Program and administers Chapter 15 of their Code of Ordinances to minimize losses due to flood conditions in flood hazard areas. Chapter 11 of their Code establishes the role and powers of the City Emergency Management Coordinator.

Dearborn Heights is a member of the Alliance for Downstream Watersheds and the Alliance of Rouge Communities, working in partnership with other communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit.

In addition to including tools to regulate floodplain development and emergency management, their Code of Ordinances includes protections to reduce the potential for structural or wildfires, regulate food waste, stormwater management, and water, sewer, electrical, and gas infrastructure.

Although the City has a number of hazard mitigation related polices already adopted and participates with regional partners to address water quality and quantity concerns, 52%

of the community is impervious surfaces at the same time that they struggle with flooding and work with area partners to remove existing structures from the floodplain of the North Branch of Ecorse Creek.

As elsewhere, areas for possible improvement could include regulatory mechanisms to reduce the impact of existing impervious surfaces or to protect remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.).

5.2.7 City of Ecorse

Hazard Priorities

Thunderstorms, winter hazards, tornados, and associated flooding and wide-spread power outages, are concerns to the representatives of the City of Ecorse. The lack of tornado sirens in this community increases their concern. Although the entire population could be affected by a tornado, residents at the two mobile home communities located in the city are at greatest risk.

Due to the large amount of industry in Ecorse, city representatives expressed concern regarding their potential for hazmat emergencies within the community. Accidents on streets, at their train tracks and rail yards, at manufacturing sites and other businesses, or involving gas pipelines, were included as being vulnerable locations for these potential emergencies. The community is also within the zone that could potentially be affected by a nuclear power plant incident.

Existing Authorities, Policies, & Programs and Ability to Expand These

Approximately 8,407 people live in the City of Ecorse: 1,100 less than at the time of the 2010 census. Industry and transportation (TCU) dominate the City's land use types, 26% and 25.2%, respectively, followed by single-family residential (21.7%). The City is in the Ecorse Creek Watershed and 51% of the community is categorized as impervious surface (25% open space).

Ecorse participates in the National Flood Insurance Program and administers Chapter 11 of their Code of Ordinances to minimize losses due to flood conditions in flood hazard areas.

Ecorse is a member of the Alliance for Downstream Watersheds and works in partnership with other communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit.

In addition to including tools to regulate floodplain development, their Code of Ordinances includes protections to reduce the potential for structural or wildfires, regulates food service and waste, and infrastructure.

Areas for possible improvement could include regulatory mechanisms to reduce the impact of existing impervious surfaces or to protect remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.).

5.2.8 City of Flat Rock

Hazard Priorities

I-75 and Telegraph Road are two heavily traveled roads where numerous vehicular accidents occur. Of particular risk to the community are accidents that involve vehicles carrying hazardous materials. The rupture of a gas pipeline, a hazmat emergency at one of the community's manufacturing facilities, or the derailment of a railcar carrying hazardous materials were all mentioned as potential hazards to the city.

Flooding of the Huron River is a concern to the City of Flat Rock. The area most susceptible to this hazard was identified as the area along Huron River Drive between Evergreen and Garden Roads.

Weather related emergencies, particularly the threat of a tornado or a severe winter storm, were also mentioned. Representatives discussed the need to re-activate the Fermi sirens already located in city. These sirens then could be used in conjunction with existing tornado sirens to provide additional protection to the citizens of Flat Rock.

Existing Authorities, Policies, & Programs and Ability to Expand These

Approximately half of the City's area is either vacant land (23.9%) or single-family residential housing (28.1%). 41% of the City remains in open space with 24.3% tree canopy cover. The City is on the banks of the Huron River and the impoundment behind the Flat Rock Dam. Thirty-one percent of the community is categorized as impervious surface.

Flat Rock participates in the National Flood Insurance Program and Chapter 46 of their Code of Ordinances regulates construction in flood areas.

The City is a member of the Alliance for Downstream Watersheds and the Huron River Watershed Council, working in partnership with other communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit. In addition to including tools to regulate floodplain development, their Code of Ordinances includes mechanisms for fire protection, limiting invasive species, and stormwater management.

Areas for possible improvement could include regulatory mechanisms to reduce the impact of existing impervious surfaces or to protect remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.). Given the City's hazard priorities tools to mitigate potential hazardous materials spills are also advisable.

5.2.9 Garden City

Hazard Priorities

Extreme weather, including extreme hot and cold temperatures, tornadoes, severe winds, and storm resulting in flooding and electrical power loss were all identified as key natural hazards concerns and resulting technological hazards. Winter hazards and the threat of tornadoes were concerns mentioned by the officials of Garden City in 2013

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along with the need for a backup electrical system for the community's shelter building and for City Hall.

Existing Authorities, Policies, & Programs and Ability to Expand These

More than $\frac{3}{4}$ of the area of Garden City is utilized for single-family housing and TCU; 57.7% and 23.4%, respectively. Very little open space or vacant acreage is left and the City is 54% impervious surface.

Garden City also participates in the National Flood Insurance Program and amended their Code of Ordinances in 2012 to adopt the FEMA Firm Maps and administer Appendix G of the Michigan Construction Code, to minimize losses due to flood conditions in specific flood hazard areas.

Garden City is a member of the Middle 3 and Lower 2 Subwatershed Advisory Groups within the Rouge River system and works in partnership with other communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit. Additionally, since the 1970s the City has been working to remove combined sewer systems and sanitary sewer overflows. These cause both public health and flooding concerns for the City.

Areas for possible improvement could include regulatory mechanisms to reduce the impact of existing impervious surfaces as land is redeveloped or to protect smaller remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.).

5.2.10 City of Gibraltar

Hazard Priorities

The City of Gibraltar has a history of flooding. The southeast section of the city is particularly vulnerable to this hazard. Of particular concern are homes that have not been elevated above potential flood levels. Berms installed along the Gibraltar waterfront combined with low Great Lakes water levels in recent years have somewhat mitigated this hazard but current near-record high lake levels make this a greater priority. City officials identified shoreline flooding, severe weather, and a possible accident at the Fermi II Nuclear Power Plant as their chief concerns. The City of Gibraltar is also within the potential zone of effect of a nuclear power plant incident.

Previously (2013) the City had identified the presence of industrial sites, an old landfill, active railroad tracks and a tanker cleaning facility as creating hazardous materials risks to the City. Hazards include not only the potential for spill accidents and surface and ground water contamination from leachate, both on-site and during transportation, but also the potential for industrial fires. The level of railroad traffic exposes the community to the risk of unknown substances and their associated hazards, and the risk is heightened by the inaccessibility of the tracks due to woodlands and wetlands.

Uncertain funding for the collection and treatment of landfill leachate increases the level of risk to surface and ground water, including the Detroit River and Great Lakes. This risk poses a public health hazard because of the inter-connectedness of waterways throughout this area.

Existing Authorities, Policies, & Programs and Ability to Expand These

Unlike communities discussed to this point, the City of Gibraltar is dominated by vacant land and open space; 42.2% and 18.6%, respectively. Single-family residential housing is the third largest land use at 13.8%.

Gibraltar participates in the National Flood Insurance Program Chapter 18 of their Code of Ordinances regulates land uses in flood hazard areas. In addition to floodplain management, their Code also includes regulatory authority and policies regarding stormwater management, emergency services & emergency management, soil erosion, marine safety, and plumbing and electrical infrastructure.

The City of Gibraltar is a member of the Lower Huron Watershed Advisory Group and the City also borders a portion of Lake Erie and the Detroit River.

Areas for possible improvement could include regulatory mechanisms to limit the amount of impervious surface to the existing 21% and protecting open space to stay ahead of a changing climate (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.).

5.2.11 Grosse Ile Township

Hazard Priorities

There are a number of industrial facilities located a short distance from Grosse Ile Township. The likelihood of a hazmat incident at one of these locations and the direction of prevailing winds create the potential for a hazmat emergency on Grosse Ile. The evacuation of residents is a concern to township officials. The adequacy of the evacuation route via the bridges between the Island and mainland is a concern to township officials.

Because there is a small airport located at the southern tip of the township, accidents involving aircraft are also of concern to officials. The Township is also within the range of possible effects from a nuclear incident and high Great Lake levels have caused flooding and shoreline erosion.

Existing Authorities, Policies, & Programs and Ability to Expand These

Grosse Ile Township is an island in the Detroit River that is home to approximately 10,404 people. Population in the Township has stayed relatively flat since 2010 and is projected to do the same between 2020 and 2045. The largest land use categories are single-family residential (40.9%) and vacant land (24.4%). Even with the large percentage of developed housing, only 20% of the Township is covered by impervious surfaces.

Grosse Ile Township participates in the National Flood Insurance Program and regulates construction with flood prone areas under Chapter 116 of their Code of Ordinances. Other regulatory authorities include regulation and cleanup of hazardous materials, outdoor burning, motor vehicle safety, stormwater management, and natural features protection. Grosse Ile Township is the only community in Wayne County with a wetland protection ordinance recorded with EGLE. They also have a local woodland protection ordinance. As noted previously, these are useful tools for local flood protection and for

minimizing extreme temperatures and increased potential for power loss in times of heavy heating or cooling demand. Their Wetland and Waterways Protection regulations also control shoreline stabilization.

Areas for possible improvement could include regulatory mechanisms to reduce the impact of existing impervious surfaces as land is redeveloped or to protect smaller remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.).

5.2.12 City of Grosse Pointe

Hazard Priorities

Power outages, as a result of high winds or ice storms, have adversely affected the residents of Grosse Pointe for years. The City has made progress on the development of an emergency power back-up system, particularly for the Department of Public Safety, but additional power back-up is needed for sewage pumps in the event of large storms and associated flooding.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Grosse Pointe is primarily a residential community of approximately 5,203 people. The City is largely built-out with only 5.3% vacant land or recreation/open space (0% agriculture). The City's largest land uses are single-family residential and TCU at 60.8% and 23.8%, respectively; 44% of the community is categorized as impervious surface.

Grosse Pointe participates in the National Flood Insurance Program and administers oversight of proposed construction in flood hazard areas under Article XIII of the City's Code of Ordinances. In addition to including tools to regulate floodplain development, their Code of Ordinances includes health and sanitation, civil emergencies, infrastructure, fire prevention, stormwater management, and shoreline protection.

Areas for possible improvement could include regulatory mechanisms to reduce the impact of existing impervious surfaces and protect remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.).

5.2.13 Grosse Pointe Farms

Hazard Priorities

Thunderstorms and the associated flooding and power outages have had negative effects in Grosse Pointe Farms. In the event of power outages, storm water pumps have failed, contributing to flooding problems.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Grosse Pointe Farms is primarily a residential community of approximately 9,546 people (SEMCOG 2019 estimate). The City's largest land uses are single-family residential and transportation, communication, and utility (TCU) at 55.8% and 18.7%,

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respectively. Open space and recreation is the third largest category at 14.3%. The amounts of impervious and open space land cover are approximately equal; 37% and 33%, respectively.

Grosse Pointe Farms participates in the National Flood Insurance Program and regulates proposed construction within floodplain areas under Section 12-06 of the Code of Ordinances. In addition to including tools to regulate floodplain development, their Code of Ordinances includes fire code regulations, infrastructure requirements, and soil erosion controls.

Areas for possible improvement could include regulatory mechanisms to maintain imperviousness at its current levels or reduce the amount of existing impervious surfaces (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.).

5.2.14 Grosse Pointe Park

Hazard Priorities

Tornadoes, ice storms, and thunderstorms accompanied by high winds, create a threat to the City of Grosse Pointe Park and its residents. Resulting damage and power outages have a significant effect on the population. The capacity of emergency power back-up systems at the Department of Public Safety and the adequacy of the tornado warning system are concerns, along with the availability of necessary equipment needed to remove fallen trees and clear roads is a concern.

Due to the community's close proximity to the City of Detroit, the issue of civil disturbances and criminal activity affecting Grosse Pointe Park is a concern. The associated drain on Public Safety resources has been an issue for the community. The City is also a coastal community at the confluence of Lake St. Clair and the Detroit River, prone to shoreline flooding.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Grosse Pointe Park is primarily a residential community of approximately 12,335 people. The City's largest land uses are single-family residential housing and transportation, communication, and utility (TCU) at 67% and 25.2%, respectively. Thirty-nine percent of the community is categorized as impervious surface.

Chapter 11 of the City's Code governs floodplain management and administration of Appendix G of the Michigan Building Code, as well as monitoring Lake St. Clair water levels and responding to imminent flooding with the construction of temporary barriers if necessary. Grosse Pointe Park participates in the National Flood Insurance Program.

In addition to including tools to regulate floodplain development, the Grosse Pointe Park Code of Ordinances includes protections against fire.

Additional policies and programs could include partnerships for addressing more of the City's hazard priorities, e.g., building safe rooms for tornado safety, providing adequate power backup, and exploring ways to reduce or reimburse costs associated with cross-border emergency response in the City of Detroit.

5.2.15 Grosse Pointe Shores

Hazard Priorities

Weather-related hazards have the potential to impact the community. The potential exists for structural fire at the Grosse Pointe Yacht Club or Ford House, which could be a drain on the resources of the community.

Existing Authorities, Policies, & Programs and Ability to Expand These

Grosse Pointe Shores is a community of 2,497 people almost entirely developed for single-family housing and transportation related uses, 71.8% and 19.1%, respectively. Although 34% of the City is impervious surfaces, existing housing must provide a good deal of greenery; SEMCOG describes the City land cover as 36% open space with 28% tree canopy cover. Approximately half of the City's population is 55 years or older (median 53.4).

Grosse Pointe Shores participates in the National Flood Insurance Program and impacts to flood areas under Article V of the City Code of Ordinances. In addition to including floodplain development regulatory policies, the City's Code of Ordinances includes provisions for law enforcement, fire protection, telecommunications and other utilities.

Areas for possible improvement could include implementing repairs of protective mitigation to protect key structures from fire or planning for the elderly residents of the community in the event of power loss or other hazards.

5.2.16 Grosse Pointe Woods

Hazard Priorities

Tornadoes, ice storms, and thunderstorms accompanied by high winds, create a threat to the City of Grosse Pointe Woods and its residents. Resulting damage and power outages have a significant effect on the population, including congestion due to traffic lights not working, and medical problems in senior housing due to food spoilage and other hazards. Officials discussed the capacity of the emergency power back-up system at the city's municipal building and at the Department of Public Works' pump station, along with the readiness of a mobile generator.

Located within the city is a Wayne County pumping station. Since chlorine is stored at this location, the possibility of a hazmat emergency affecting the safety of the citizens of Grosse Pointe Woods is a concern. In recent years, structural fires have been the main community concern, sometimes relating to downed power lines. The replacement of outdated fire gear and equipment was noted as a community need.

The close proximity to the City of Detroit and that city's potential for civil disturbance, terrorist acts, active shooter and criminal activity that could adversely affect the citizens of Grosse Pointe Woods, is a concern to City officials. The need to provide additional training to properly respond to these types of emergencies was discussed.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Grosse Pointe Woods is home to 15,682 people and the dominant land uses are single-family housing (57.8%) and transportation and utilities (TCU) (20.6%); 43% of

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the community is categorized as impervious surface. Grosse Pointe is the only one of the “Pointes” that is not on the coast.

Although the FEMA Status Book Report for the National Flood Insurance Program lists Grosse Pointe Woods as participating in the National Flood Insurance Program, we were unable to find regulatory language within the City Code or Zoning Ordinance describing the program. The City Code does include regulatory mechanisms regarding fire protection, utilities and infrastructure, waterways, and emergency services and preparedness.

Areas for policy and/or program improvements could include ensuring that Flood Insurance Program requirements are being met and programs that ensure improved preparedness for the weather related natural hazards noted above as priorities.

5.2.17 City of Hamtramck

Hazard Priorities

Tornadoes, thunderstorms accompanied by high winds, and winter snow and ice storms, are all concerns of the City of Hamtramck officials. Of particular concern to the Public Safety Department is heavy snow or ice storms that block the streets and increase traffic accidents. Adequacy of snow removal equipment and timeliness of snow removal in relation to emergency response remain a concern in this community.

Within the City of Hamtramck there are sites that stock hazardous materials. Several sites stock hazardous materials in amounts that by law mandate notification of the Hamtramck Fire Department. According to officials, the potential for a hazmat emergency at one of these locations presents a danger to the citizens and visitors to the city. In addition, hazardous material is carried by trucks on I-75 and by trains traveling through the eastern portion of the City; a gas pipeline also runs through the community. These present additional risks to the population if hazardous materials were to escape as a result of an accident.

Criminal acts including street robberies, and the associated need for sharing of information between road patrols, investigators and the public, have placed a demand on public resources.

Existing Authorities, Policies, & Programs and Ability to Expand These

The population of Hamtramck is approximately 23,228; less than half of its highest in the 1930s. Land use in the City is dominated by single-family housing and transportation (TCU), 30.6% and 28.1%, respectively, but a notable portion of the City also supports industrial uses (16.9%). Seventy percent of the community is categorized as impervious surface.

Hamtramck does not participate in the National Flood Insurance Program, but their Code of Ordinances includes regulations affecting hazard related topics such as fire protection, the fire and police departments, weapons, and sewers and other public utilities. Possible improvements could include regulatory mechanisms to reduce the impact of existing impervious surfaces or to address that storage and reporting of hazardous materials.

5.2.18 City of Harper Woods

Hazard Priorities

Thunderstorms and severe winter weather have resulted in power outages and down trees that have negatively affected the City of Harper Woods. Of particular concern is power outage to City Hall, and associated effects on public safety. The need for improvements to reduce the likelihood and limit the effects of power failure was identified by local officials.

The heavily traveled I-94 highway that runs through Harper Woods has a history of vehicular accidents. Of particular concern to City representatives are accidents involving vehicles carrying hazardous materials through the community. Based on the current level of hazmat training, hazmat equipment, and the number of public safety personnel currently employed, the ability to properly respond to an emergency of this type is a concern.

Criminal acts including auto thefts, robbery, and breaking and entering of residences in the community are of concern to officials. Public notification about threats and the hiring of additional law enforcement personnel has placed demands on the community. Limitations on Harper Woods public safety personnel's radio interoperability with their counterparts in Detroit continue to present a danger to the citizens of both communities.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City's population of 15,034 has stayed fairly flat since 2000. Harper Woods is primarily residential (52.3%) with TCU making up another 25.2%. Forty-one percent of the City is covered with impervious surfaces, whereas the City only has 19% tree canopy cover.

Harper Woods does not participate in the National Flood Insurance Program, but their Code of Ordinances includes regulations governing health and sanitation, the police department, water and sewers, fire prevention, and civil defense and emergencies.

Areas for possible improvement could include regulatory mechanisms focused on the stated local concern of hazardous materials transport and safety.

5.2.19 City of Highland Park

Hazard Priorities

City officials noted transportation related hazmat accidents, public health emergencies, and severe summer weather, including thunderstorms, high winds, hail, etc., as their priority hazard concerns for the 2019 HMP update.

In the 2013 HMP, Highland Park officials had noted that there are a large number of vacant homes and a high incidence of arson in the City of Highland Park, and that building fires were a significant hazard to the community. They also expressed the concern for potential hazmat material emergencies at any one of the many industrial facilities located within the city. According to officials, not having a sufficient number of public safety personnel to adequately respond to these emergencies increases the

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danger to the residents of the City. Representatives also discussed the need for additional fire and hazmat training for new and existing public safety personnel.

Ice and snowstorms and their effect on the streets of Highland Park were previously noted as a concern to officials. Not having sufficient resources to clear streets during and after storms restricts the ability of public safety personnel to properly respond to emergencies.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Highland Park, similarly to Hamtramck, has lost population since its height in the 30s. The current population of 11, 201 is approximately one-fifth what it was at that time. The major land uses of TCU, single-family residential, vacant, and industrial are fairly similar in overall coverage: 27.6%, 20.9%, 19.8%, and 16.3%, respectively.

Highland Park does not participate in the National Flood Insurance Program, but their Code of Ordinances includes tools to regulate building and housing, fire prevention, and sewers and utilities. Additional programs or policies could address some of the hazard concerns noted above.

5.2.20 Huron Township

Hazard Priorities

Tornadoes, ice storms, and thunderstorms accompanied by high winds, create a threat to the citizens of Huron Township. Resulting power outages have a significant effect on the population, especially on the elderly. Officials mentioned that the residents of the township's three mobile home communities were at an increased risk in the likelihood of a tornado touching down in the area. Both tornado and hail damage have been reported since development of the 2006 Plan. Tornado warning sirens have been installed near the Township's northern boundary, but Figure 9 still shows a clear gap in coverage for most of the Township.

I-275, railroads, pipelines, and industrial facilities, all located within Huron Township, present the potential for hazardous material emergencies that could affect Township residents. Because the Township lies along a flight path for Detroit Metropolitan Airport, the potential for a plane crash exists within the community. The adequacy of police and fire personnel to properly respond to these multiple hazards may be a concern.

The issue of flooding of the Huron River, particularly in the southeast section of the Township was mentioned by representatives in 2006. Dry conditions the time of the last update made this less of a concern, only to have high water conditions return recently.

Existing Authorities, Policies, & Programs and Ability to Expand These

The current population of 16,329 has been steadily increasing each decade since the 1920s. Huron Township is the first community described herein with a significant agricultural land use component. Agriculture makes up 36.9% of the Township with a notable 17.4% recreation and open space. Single-family housing is the second highest land use percentage in the Township (23.3%). Land cover is only 10% impervious and the Township exhibits a tree canopy coverage of 38%.

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Huron Township participates in the National Flood Insurance Program and administers floodplain protections under Chapter 288 of their Code of Ordinances. Other regulatory mechanisms related to hazard mitigation include dangerous buildings, open burning, water, sewer, streets, and other utilities, and fire protection.

Areas for possible improvement could include regulatory mechanisms to protect open space and/or mechanisms to protect area agricultural resources from drought, fire, or invasive species.

5.2.21 City of Inkster

Hazard Priorities

Tornadoes, structural fires, and hazmat accidents were all mentioned as potential hazards that could adversely affect the citizens of Inkster. Not having sufficient staffing in the police and fire departments increases the danger presented by these hazards.

Officials also mentioned that the inability to communicate between all city departments at times of emergencies restricts each department's ability to respond properly.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Inkster consists of approximately 1/3 single-family-residential (36.1%) but the City also includes a significant amount of open space/recreational lands, primarily along the Lower Rouge River. Forty-two percent of the City consists of impervious land cover, which likely contributes, along with stormwater from communities upstream, to the flashy nature of the Lower Rouge.

The City participates in the National Flood Insurance Program and administers their reviews of proposed floodplain development under Chapter 155: Zoning Code. In addition to floodplain management, their Code of Ordinances includes regulatory mechanisms concerning stormwater management, convalescent homes and other care establishments, and water and sewers.

Areas for possible improvement could include regulatory mechanisms to reduce the impervious surfaces, protect low lying areas from flooding, and/or addressing concerns regarding hazardous material storage and reporting, and/or communications as described above.

5.2.22 City of Lincoln Park

Hazard Priorities

Extreme temperatures have the potential to impact the residents of the City of Lincoln Park, particularly the elderly. Limitations on air conditioning and water systems during severe summer weather were noted as concerns by City officials.

The potential for a hazardous material emergency exists in relation to pipelines and transport along both railroads and I-75. The highly technical requirements for preparedness to respond to a hazardous material incident has placed demands on

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responders to stay up to date. Preparation for emergency response is complicated by the proximity of transportation corridors to residential areas.

The potential for criminal acts and civil disturbances exist in the City. A policy for responding to active killers has been developed and training for police and schools is being implemented.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Lincoln Park is home to 37,261 people and SEMCOG predicts that all age classes in the City under 65 years of age will decline from 2015 to 2045; whereas the 65-84 and the 85+ age classes will increase by 56% and 93%, respectively. As such, the concerns for elder care in extreme temperatures or other hazard conditions seem well warranted. will is primarily a residential community of approximately 28,634 people (SEMCOG 2019 estimate). Even with these increases, the overall population of Inkster is expected to decline over time. City land uses are dominated by single-family residential and transportation, communication, and utility (TCU) at 43.6% and 33.4%, respectively.

Lincoln Park participates in the National Flood Insurance Program; their flood plain protection programs are administered using a flood hazard area overlay zone under Section 1294.36 of their Code of Ordinances. Additionally, their Code include regulations regarding railroads, sanitation and health, building and housing, and fire protection.

Lincoln Park is a member of the Alliance for Downstream Watersheds and works in partnership with other communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit.

Areas for possible improvement could include policies or programs for hazardous materials safety and /or improving care for seniors in extreme weather events or under COVID-19 or other pandemics.

5.2.23 City of Livonia

Hazard Priorities

The potential for a hazardous material emergency exists in relation to transport along I-275, I-96 and railroad lines. As such, Livonia officials noted hazardous materials incidents as a chief concern.

In the 2013 HMP update, Livonia officials had noted their concern regarding winter storms due to their frequency, their effects on traffic accidents and congestion, business slow-downs, and draining of government resources. Livonia officials had also noted flooding and other infrastructure problems as a secondary effect of winter storms.

For the 2019 HMP update, Livonia officials noted similar priorities, noting electrical infrastructure failure, flooding, and hazard materials incidents as their chief hazards.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Livonia saw rapid population growth until the 1970s and has declined slightly since then. The population is currently approximately 93,856. The City is largely built-

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out and single-family housing is the dominant land use (42%), 47% of the City is characterized as impervious surfaces.

Livonia participates in the National Flood Insurance Program and administers flood protection reviews under Article XXVIII of Ordinance 543 the City's Zoning Ordinance. Other regulations are concerned with health ad safety and public services.

Areas for possible improvement could include policies, programs, and partnerships revolving around hazardous materials storage and transport and preparation for winter weather.

5.2.24 City of Melvindale

Hazard Priorities

The potential for hazmat accidents involving either trucks or trains, or at local industry and businesses, exists in Melvindale. I-75 on the eastern boarder of Melvindale is the route for many large trucks carrying hazardous materials through the city. A train derailment with the potential of a chemical spill is a risk to the neighborhoods along the tracks in the central and eastern portions of the City. A chemical accident at one of the industrial facilities within the city is a risk to all citizens of Melvindale. Officials stressed the need for additional personnel in the fire and police departments as well as additional training for hazmat emergencies.

Flooding as a result of storm sewer failures is a concern for the City of Melvindale. Officials identified the locations of the greatest frequency of flooding in the vicinities of Allen Road and Outer Drive, and Dix Road and Wabash near the railroad yard.

Existing Authorities, Policies, & Programs and Ability to Expand These

Land use in the City of Melvindale is dominated by transportation, communication, and utility (TCU) (40.2%); single-family housing is somewhat distant second at 25%. With that much transportation-related land use, the land over in the City is characterized as 58% imperviousness.

Melvindale does not participate in the National Flood Insurance Program but is a member of the Alliance for Downstream Watersheds. Their Code of Ordinances includes protections to reduce the potential for structural or wildfires, health and sanitation, fire protection, and environmental protections including toxic releases and incendiary fires.

Areas for possible improvement could include regulatory mechanisms to reduce existing impervious surfaces and protecting remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.).

5.2.25 City of Northville

Hazard Priorities

Storms and associated power outages and flooding are a threat to the citizens of the City of Northville, particularly the elderly in assisted living facilities. Power outages are

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of particular concern at City Hall, which needs to operate as a command center in the event of an emergency. The need for additional flood mitigation was noted by City officials, and a study is currently underway to improve flood mitigation capacity. Emergency radio interoperability was also highlighted as a problem that has not been fully resolved despite past efforts.

According to City officials, trains carrying hazardous materials through the eastern section of the City present the risk of a hazmat emergency in the community. Providing adequate training to all responders has placed demands on City resources.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Northville is a small community of 2,691 people. Single-family housing constitutes 33.6% of the land use; 21.4% TCU coverage is the second-most prevalent land use in the City. 45% of the community is categorized as impervious surface.

Northville participates in the National Flood Insurance Program and administers flood prone area protections under Article 23, Flood Hazard Zones, of the City's Zoning Ordinance. At present, the City also hosts a page on their website with information about floodplains and how one may read the FEMA FIRM maps. This information also describes a current study to and public comment period regarding a letter of map revision for a portion of the Walled Lake Branch of the Middle Rouge River.

The City is a member of the Alliance of Rouge Communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit. In addition to tools regulating floodplain development, their Code of Ordinances and Zoning Ordinance also include protections for trees and woodlands, emergency services provisions, and fire prevention regulations.

Additional tools could include an inventory of locations needing flood mitigation, coordination with the railroads to receive notification of train contents, and regulatory mechanisms to reduce existing impervious surfaces and protect remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, tree canopy targets, etc.).

5.2.26 Northville Township

Hazard Priorities

Severe winds, thunderstorms and tornadoes and associated power loss in Northville Township is considered a significant threat to all citizens. At particular risks are the residents of the senior citizen communities located in the Township. Areas of the Rouge River along Northville Road have a history of flooding. According to officials, the areas most susceptible to this hazard are in the vicinities of Jamestown Circle and just west of Franklin Road.

A Consumers Power station, battery plant, high pressure gas pipelines, and railroad tracks carrying trains with hazardous material cargo, all exist within Northville Township. A hazmat emergency at any of these locations presents a significant risk to the citizens of this community.

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The community has recently been focused on training to mitigate the hazard of active shooters in schools and other locations.

Existing Authorities, Policies, & Programs and Ability to Expand These

Northville Township is home to 32,164 people and its population is aging. Single-family housing constitutes 33.5% of the land use but the Township also contains significant open space/recreational lands (29.9%). Twenty-seven percent of the community is categorized as impervious surface.

Northville Township participates in the National Flood Insurance Program and administers flood prone area protections under Chapter 82 of the Township's Code of Ordinances. In addition to tools regulating floodplain development, their Code of Ordinances also includes regulations for hazardous waste cleanup, oil and gas operations, and Sewer and water infrastructure.

Additional programs and policies could be directed at the community concerns noted regarding hazardous materials and development of safe rooms for tornados and high winds.

5.2.27 City of Plymouth

Hazard Priorities

Histories of flooding problems exist in the City of Plymouth. Large storms and the associated flooding of Tonquish Creek, particularly in the vicinity of Ann Arbor Trail and Harvey Streets, and the areas immediately surrounding this location, are of greatest concern to city officials.

There are two railroad lines that run through the City of Plymouth. According to City representatives, there is the potential for a hazmat emergency that could have a devastating effect on the citizens of Plymouth. Trains have the potential to block intersections in the city, interfering with timely emergency response, particularly in the event of a derailment at a road crossing.

The presence of the 35th District Court in the City of Plymouth creates the potential for civil disturbances to affect citizens.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Plymouth is home to 9,038 people. Single-family housing constitutes 35.8% and TCU makes up 21.7% of the Township's land use. Fifty-six percent of the community is categorized as impervious surface.

Plymouth participates in the National Flood Insurance Program and administers flood prone area protections under Article XV of the City's Code of Ordinances. In addition to tools regulating floodplain development, Plymouth's Code of Ordinances also includes regulations for soil erosion control, stormwater management, fire prevention and emergency services, law enforcement, and communications and infrastructure.

Additional programs and policies could be directed at reducing the impacts of impervious surfaces and resulting flooding concerns, the community concerns regarding railroad crossings.

5.2.28 Plymouth Township

Hazard Priorities

Large storms and associated power outages and flooding present the most significant hazard to the citizens of Plymouth Township, due to their frequency. The effects include road flooding and down trees that interfere with emergency response, structural fire when energized power lines come in contact with buildings, and risks to the elderly. Evacuation from large senior complexes is a source of concern. Tornadoes have also affected the Township, causing property damage and the public burden of cleaning up many down trees. Winter storms place additional demands on emergency response due to increased traffic accidents and personal injuries from slipping on ice and snow-shoveling.

The potential for incidents relating to hazardous materials exists along the I-275 and M-14 highways and the CSX railroad, and limited resources to effectively manage a major incident has required assistance from other governmental units in the past. The at-grade railroad crossings in the Township can result in car-train accidents that require hazmat response. The high railroad traffic volume transporting hazardous substances causes this to be a significant hazard in the Township.

Existing Authorities, Policies, & Programs and Ability to Expand These

Plymouth Township is a growing community of 28,282 people. Single-family housing constitutes 37.1% and TCU makes up another 18.3% of the Township's land use;. Thirty-six percent of the community is categorized as impervious surface and 37% as open space.

The Township participates in the National Flood Insurance Program and administers flood prone area protections under Chapter XII of the City's Zoning Ordinance regulating land development.

The Township also participates as a member the Alliance of Rouge Communities. In addition to tools regulating floodplain development, their Code of Ordinances also includes protections for trees, water and sewer regulations.

Additional tools could include protections for remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, tree canopy targets, etc.) and/or means to better prepare fro winter weather and power outages.

5.2.29 Redford Township

Hazard Priorities

The potential for hazmat accidents involving trucks, trains, gas pipelines, or industrial facilities, exists within Redford Township. According to township officials, not having a

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sufficient number of public safety personnel, especially those trained in responding to hazmat emergencies, presents a significant risk to citizens.

A tornado touching down in the township would be a significant threat to all citizens. In particular, the residents of the two mobile home and two senior citizen communities located in the township are the most vulnerable.

Existing Authorities, Policies, & Programs and Ability to Expand These

Redford Township is primarily a residential community of approximately 47,064 people (SEMCOG 2019 estimate). The Township's largest land uses are single-family residential and TCU at 45.5% and 26.9%, respectively. Fifty-two percent of the community is categorized as impervious surface.

Redford Township participates in the National Flood Insurance Program administers flood protection under Chapter 46 of their Code of Ordinances.

Allen Park is a member of the Alliance of Rouge Communities and works in partnership with other communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit. In addition to including tools to regulate floodplain development, their Code of Ordinances includes protections for civil emergencies, telecommunications and other infrastructure, fire protection, and health and sanitation.

Areas for possible improvement could include programs to establish safe locations in the event of tornadoes, improved flood control, reduction of impervious surfaces, etc.

5.2.30 City of River Rouge

Hazard Priorities

Tornadoes and thunderstorms accompanied by high winds create a threat to the City of River Rouge and its residents. Resulting damage and power outages create a significant risk to all citizens, especially the senior population. Most vulnerable to these storms are the residents of the high-rise senior citizen facility located on Vigger Road. Officials expressed the need for additional training and equipment to better prepare for and respond to these hazards.

Due to the large amount of industry in River Rouge, there exists the potential for a hazmat incident where hazardous materials are either transported or stored within the community. Officials discussed the need to provide additional security to protect vulnerable locations from the possibility of a terrorist incident. They also expressed a need for additional training for public safety departments concerning homeland security. City representatives suggested that all departments of the city be required to receive emergency management training.

Existing Authorities, Policies, & Programs and Ability to Expand These

The population of River Rouge is declining and stands at an estimated 6,873. The City's dominant land uses include industrial and TCU uses at 26.1.6% and 24.3%, respectively. Forty-two percent of the community is categorized as impervious surface.

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River Rouge participates in the National Flood Insurance Program. Areas for possible improvement could include programs to ensure adequate power supply in the event of emergencies and to reduce the potential impact of hazardous materials incidents.

5.2.31 City of Riverview

Hazard Priorities

The City of Riverview has a history of flooding after large storms and snow melt. According to officials, the areas of greatest concern are the Huntington Creek Drain between Fort Street and Civic Park, King Road near Westfield, and in particular, the Frank and Poet Drain along Valley View between Williamsburg and Sibley. This drain originates at Detroit Metro Airport and has experienced significant flooding due to storm water runoff and releases upstream. The elderly population of the City is particularly vulnerable during times of flooding due to increases in emergency response times.

Due to the large amount of industry in the City of Riverview, there exists the potential for a hazardous material emergency. Railcars, tanker trucks, gas pipelines and manufacturing facilities in the eastern section of the city were mentioned as potential areas of concern for this hazard. In addition, officials discussed the need to continue the effort of protecting these vulnerable locations from terrorist activities. In the event of a major emergency, a need for a mass evacuation plan as well as improved communications within the department and with Wayne County was discussed. The importance of establishing a unified command to properly respond to these major disasters was mentioned.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Riverview has a population of 12,056. The City's largest land uses are single family residential and open space/recreation at 22.6% and 22.2%, respectively. The City is along the Detroit River and 36% of the community is categorized as impervious surface.

Riverview participates in the National Flood Insurance Program and administers flood protections under Article 10 of their Code of Ordinances.

The City of Riverview is a member of the Alliance for Downstream Watersheds and works in partnership with other communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit. In addition to including tools to regulate floodplain development, their Code of Ordinances includes standard regulations concerning new development, but has little other related to hazard mitigation.

Areas for possible improvement could include other regulatory mechanisms for programs to reduce flooding or improve preparedness for hazardous materials spills/accidents.

5.2.32 City of Rockwood

Hazard Priorities

The potential for major storms and tornadoes and associated power outages and flooding in the City of Rockwood was identified as a primary hazard to this community. Insufficient warning of a tornado was a concern to City representatives. Flooding along the Huron River, shoreline erosion, and the potential effects of a Belleville Dam failure were also mentioned as a source of concern to city officials.

Due to the proximity of the Fermi Nuclear Plant within 10 miles and the potential effect on Rockwood if there was an emergency at the plant, officials feel that there is a need for an evacuation plan for the City.

I-75 is a heavily traveled highway that runs north and south through the City of Rockwood. This highway has a history of many vehicular accidents. Of particular concern to city officials are accidents involving trucks carrying hazardous materials. The additional demands on manpower that this type of emergency response requires is a source of concern to the City. In addition, there exists the threat of hazmat emergencies involving railways, at the sewage treatment plant, or at industrial locations located within the city. The need to better notify citizens if these disasters strike, was discussed.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Rockwood is home to approximately 2,951 people (SEMCOG 2019 estimate). Single-family residential, extractive (mining), TCU, and vacant lands are the largest land uses; 22.1%, 18.8%, 17.5%, and 14.4%, respectively. The City is located along the lower Huron River; 22% of the community is categorized as impervious surface compared to 36% open space.

The City participates in the National Flood Insurance Program and administers their program under Chapter 90 of their Code of Ordinances. In addition to including tools to regulate floodplain development, their Code of Ordinances includes policies regulating emergency response expenses, hazardous materials spills, soil erosion, fire prevention, stormwater management, and water and sewer.

Rockwood is a member of the Alliance for Downstream. Areas for possible improvement could include programs to reduce the risk of hazardous materials incidents and/or traffic-related emergencies.

5.2.33 City of Romulus

Hazard Priorities

Community representatives specified severe storms and tornados and associated flooding and power outages, along with extreme temperatures in both summer and winter as the natural hazards of greatest concern. Damage could result to roads, businesses, and residences, and in areas adjacent to retention ponds. Concerns related to severe weather include loss of power, damage to water-related infrastructure, and lack of overnight warming/cooling centers for residents. Power loss was noted as having negative impact on traffic circulation, communications, and business revenue.

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Hazards relating to Detroit Metro Airport being located entirely within the City perimeter include health emergencies and terrorism. The presence of tank storage facilities near the airport, railroads, highways, pipelines and other industry create the potential for a hazardous materials emergency. The hazard extends to the local water supply in the event of a release. The community has a need for more comprehensive mutual aid agreements between communities and better accessibility to information about potential hazmat sites and their associated contingency plans.

The City has several municipal buildings, schools, and the 34th district court building that could all be the target of intrusion or civil disturbance. The need for a vulnerability assessment of these institutions was discussed by officials.

Existing Authorities, Policies, & Programs and Ability to Expand These

The population of Romulus is 23,916 people, and the City's principal land are TCU with the airport, vacant, and single-family residential at 35.6%, 22.3%, and 17.9%, respectively. 27% of the community is categorized as impervious surface.

Romulus participates in the National Flood Insurance Program and administers their floodplain protections under Article X of their Code. In addition to including tools to regulate floodplain development, their Code of Ordinances includes regulations concerning emergency preparedness, and a woodland protection ordinance that likely assists with flood reduction.

Romulus is a member of the Alliance for Downstream Watersheds and works in partnership with other communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit.

Areas for possible improvement could include regulatory mechanisms to and other programs to facilitate cooperative management of concerns stemming from the airport use and emergency response.

5.2.34 City of Southgate

Hazard Priorities

Tornadoes, thunderstorms accompanied by high winds, and snow and ice storms, create a threat to the City of Southgate and its residents. Resulting power outages have a significant effect on the population, especially senior citizens. Those who are at greatest risk from these hazards are the residents of the senior citizens facilities located within the city. People living at the mobile home community located on Dix Toledo Highway in the northern section of the city are most vulnerable to the danger of tornadoes.

I-75 is a heavily traveled highway that runs through the City of Southgate. This highway has a history of many vehicular accidents. Of particular concern to city officials are accidents involving trucks carrying hazardous materials. The potential of train accidents and gas pipeline ruptures are additional hazardous material vulnerabilities. The ability to adequately respond to these potential disasters, as well as other emergencies, is a concern to the officials of Southgate.

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The close proximity of Detroit Metro Airport and the City's location along a flight path to the airport is a concern to City officials. Not having the manpower and resources to properly respond to a plane crash was discussed.

Existing Authorities, Policies, & Programs and Ability to Expand These

Southgate's population is 29,778 and land uses are primarily single-family residential and TCU: 35.5% and 22.8%, respectively. Fifty-three percent of the community is categorized as impervious surface.

Southgate participates in the National Flood Insurance Program under Chapter 1464 of their Code of Ordinances.

Southgate is a member of the Alliance for Downstream Watersheds and works in partnership with other communities to manage stormwater under a Phase II Municipal Separate Stormwater System (MS4) permit. In addition to including tools to regulate floodplain development, their Code of Ordinances includes provisions regulating soil erosion and sedimentation, vacant properties, fire prevention, and utilities.

Areas for possible improvement could include regulatory mechanisms and programs to reduce the impact of possible gas line or hazardous materials accidents, or weather related emergencies/

5.2.35 Sumpter Township

Hazard Priorities

The occurrence of a tornado could be devastating to the people and property of Sumpter Township. At greatest risk are residents of the five mobile home communities located within the township. Thunderstorms with accompanying high winds and ice storms have caused trees and limbs to fall across electric lines resulting in power outages, some lasting several days. Officials discussed the need to remove trees and limbs from the area of power lines. Also discussed were back-up generators and funds for a structure to be used to store cots and other supplies needed by the public in certain mass emergencies.

The need for additional manpower for the public safety departments was also mentioned. Emergency response to air and tanker accidents is a potential need, due to the location of the township.

Existing Authorities, Policies, & Programs and Ability to Expand These

The population of Sumpter Township is 8,531 and agriculture (40.3%) and single-family residential housing (35.6%) are the dominant land uses. Only 5% of the community is categorized as impervious surface.

Sumpter Township participates in the National Flood Insurance Program and administers their flood reduction program under Chapter 12 of their Code of Ordinances. In addition to including tools to regulate floodplain development, their Code of Ordinances includes regulations governing emergency preparedness, soil erosion control, and infrastructure.

Sumpter Township is a member of the Alliance for Downstream Watersheds but is outside of the urbanized area so is not part of the Phase II Municipal Separate Stormwater System (MS4) permit program.

Possible additional authorities and programs could include regulatory mechanisms to maintain the low amount impervious surfaces and to protect smaller remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.) in addition to addressing the weather-related emergencies noted as community priorities.

5.2.36 City of Taylor

Hazard Priorities

Tornadoes, thunderstorms accompanied by high winds, and other severe weather including extreme temperatures in summer and winter, continue to be a chief concern to officials in the City of Taylor. Many of these storms result in trees or branches falling on power lines or blocking city roads. Resulting power failures adversely affect the community. At greatest risk from these power outages is the senior population including the residents of the senior communities located in Taylor.

Similarly, city officials noted that the potential of accidents resulting in hazardous material spills remain a high priority for the 2019 HMP update. I-75, I-94, and Telegraph Road are heavily traveled routes with a high frequency of traffic accidents. The potential for a hazardous material emergency also exists on one of the railways, at fuel storage facilities and pipelines, and at the many industrial facilities that are located in Taylor.

Because of the close proximity to Detroit Metropolitan Wayne County Airport, there exists the threat of an airplane crash in the community. The ability to properly respond to these emergencies, especially in conjunction with neighboring communities, is of concern to city officials.

Existing Authorities, Policies, & Programs and Ability to Expand These

The population of Taylor is 61,015. The City's principal land uses are single-family residential, TCU, and vacant at 30.5%, 18.9%, and 18.5%, respectively. Thirty-nine percent of the community is categorized as impervious surface.

Taylor participates in the National Flood Insurance Program, minimizing losses due to floods using an overlay zone under Article 10 of their Code of Ordinances. In addition to tools regulating floodplain development, their Code of Ordinances includes provisions regulating utilities and traffic. Other programs could address concerns with neighboring Metro Airport

5.2.37 City of Trenton

Hazard Priorities

Tornadoes and winter weather hazards, especially those resulting in prolonged power outages and flooding, were mentioned as a concern of the City of Trenton. There is a

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history of flooding in Trenton, particularly along the Frank and Poet Drain in the area surrounding Fort Street (M-85) south of Van Horn. A particular concern expressed by a representative of the City of Trenton is the potential failure of the Trenton Wastewater Treatment Facility and resulting basement flooding. This hazard also presents a significant health threat to the citizens.

Also discussed was the potential for a hazardous material emergency as a result of a train derailment within the City. The most vulnerable area is along West Jefferson and Van Horn.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Trenton is home to 26,010 people living along the Detroit River. TCU and single-family housing area the primary land uses at 32.4% and 25.6%, respectively.

Trenton participates in the National Flood Insurance Program under Chapter 46 of their Code of Ordinances, which also includes regulations concerning emergency services and emergency management, health and sanitation, law enforcement, utilities, and marine safety.

Areas for additional programs and policies could include mechanisms to develop tornado safety rooms or address shoreline erosion.

5.2.38 Van Buren Township

Hazard Priorities

Tornados, winter weather hazards, thunderstorms and accompanying high winds and ice storms that result in power outages and property loss are of the greatest concern to Township officials. The presence of dead trees around electrical lines was cited as a potential contributor to this hazard. The capacity to support displaced residents was also listed as a concern.

The presence of I-94 and associated service drives in Van Buren Township create the potential for a major highway accident to interfere with local emergency response and regular traffic circulation. Under these circumstances, the need for public safety officers to direct traffic instead of addressing other safety needs is a burden for the local community. I-275, two railroads, and a cargo-based airport additionally contribute to the risk of hazardous materials incidents.

Existing Authorities, Policies, & Programs and Ability to Expand These

The Township population 30,706. Major land uses in the Township include single-family residential, TCU, vacant, and agriculture, at 26.6%, 20.8%, 14.5% and 13.9%, respectively. Sixteen percent of the community is impervious surface.

Van Buren Township does not participate in the National Flood Insurance Program. It is a member of the Alliance for Downstream Watersheds and portions of the Township are regulated under the Phase II Municipal Separate Stormwater System (MS4) permit program.

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Their Code of Ordinances includes provisions for civil emergencies, emergency services, Boat safety, utilities, and telecommunications. Potential areas for improvement could include programs to prepare for large weather events and resulting power loss.

5.2.39 City of Wayne

Hazard Priorities

Severe weather in both summer and winter, and associated power outages, have been the major natural hazard concern in the City of Wayne. The contribution of dead tree branches around power lines, and aging infrastructure, were noted as sources of this problem.

The age of urban infrastructure and associated hazards from gas mains and structural fires were cited as the greatest technological hazards. The presence of two railroads in the City were also mentioned as having the potential for derailments, at-grade automobile crossing accidents, and hazardous materials emergencies.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Wayne has a population of approximately 16,797. Dominant land uses include single-family residential (25.2%), TCU (19.3%), and recreation/open space (13.1%). Impervious surfaces constitute 49% of the community.

Wayne participates in the National Flood Insurance Program, administering their program under Chapter 1478 of the City's Code of Ordinances. In addition to including tools to regulate floodplain development, their Code of Ordinances includes regulations governing blight, construction of fallout shelters, and fire protection.

Areas for possible improvement could include working with DTE regarding tree trimming and their programs for gas line safety. Stormwater management provisions limiting impervious surface could also help avoid exacerbation of flooding issues the community may have.

5.2.40 City of Westland

Hazard Priorities

Ice storm effects on city roads, along with any other storm generating high winds and resulting power outages were discussed by officials of the City of Westland. Ford Road in the area of I-275 is an area of numerous vehicular accidents as a result of ice on the road.

Because of the potential of hazardous material accidents in Westland and in surrounding communities along highways and railroad corridors, there exists a need to improve emergency communication between the public safety departments of those communities. It was also mentioned that there is a need for additional hazmat equipment to be distributed to all municipal employees of the City of Westland.

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Existing Authorities, Policies, & Programs and Ability to Expand These

Westland's population is 84,218 and its dominant land uses is single-family residential (37.5%). Forty-five percent of the community is categorized as impervious surface.

Westland participates in the National Flood Insurance Program and administers its program under Section 22-39 of their Code of Ordinances. Their ordinances also include provisions regulating emergency preparedness, energy conservation, fire protection, and utilities.

Potential additions to the City's policies and programs could include regulatory mechanisms to reduce the impact of existing impervious surfaces, to protect remaining areas of open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.).

5.2.41 City of Woodhaven

Hazard Priorities

Severe storms pose a significant threat to the city. According to officials, the residents of the mobile home community located south of Van Horn and east of Peters are at greatest risk from a tornado. Snow and ice storms resulting in traffic accidents, especially on I-75, were also discussed.

Due to the large amount of industry in the City of Woodhaven, city representatives expressed concern regarding the potential for hazmat emergencies within the community. Accidents on streets and highways, at the train tracks or rail yards, at manufacturing or other industrial facilities, or involving gas tank farms and pipelines, were included as being vulnerable locations for these emergencies. The need was discussed for a well-organized evacuation plan to be implemented if a hazmat or other emergency requires the relocation of citizens.

The likelihood of a pandemic resulting from the avian influenza (bird flu) and particularly, the avian Influenza A (H5N1) virus was of concern to representatives of the City of Woodhaven. Not having the necessary vaccine to immunize the population was discussed. The senior citizen population was determined to be at the greatest risk for this health hazard.

Existing Authorities, Policies, & Programs and Ability to Expand These

The population of Woodhaven is 84,218 and single-family housing is the principal land use in the community (37.5%); 45% of the community is impervious surface.

Woodhaven participates in the National Flood Insurance Program and administers their program under Chapter 50 of their Code of Ordinances. Other regulatory tools in the City's Code of Ordinances include emergency management, emergency services, fire protection, health and sanitation, law enforcement, utilities, transportation, and sewer infrastructure.

Potential additions could include regulatory mechanisms to reduce the impact of existing impervious surfaces and protect open space (e.g., incentives to install green infrastructure, remove structures from the floodplain, create a stormwater utility, etc.).

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Additionally, after-action lessons from the County's preparedness and response to COVID-19 should be implemented to better care for the City's senior population and others.

5.2.42 City of Wyandotte

Hazard Priorities

Severe storms and associated power outages and flooding are a source of concern in the City of Wyandotte. In addition, the City has a history of flooding due to sewer failures. As a result of exceeding capacity at the Wayne County Wastewater Treatment Facility, sewers have backed up and flooded numerous homes in Wyandotte. The area of highest frequency of flooding occurs in the southern portion of the city in the area between Pennsylvania and Eureka Roads, west of Biddle. Officials discussed the potential health risk to citizens as a result of sewage backing up into their homes.

Due to the large amount of industry in the City of Wyandotte, the potential for a hazmat emergency exists. Representatives discussed vulnerable locations including: railroads, chemical and other manufacturing plants, the Municipal Water and Power Plant, the Wayne County Wastewater Treatment Facility, and at high pressure pipelines. Officials expressed the need for additional public safety personnel, hazmat training and hazmat emergency equipment, to better prepare for these potential disasters.

Criminal activity has become an increasing concern due to changes in the economy and police staffing levels. School security has also become a concern.

Existing Authorities, Policies, & Programs and Ability to Expand These

The City of Wyandotte population is 23,874. Single-family residential housing is the dominant land use and 56% of the community is categorized as impervious surface.

Wyandotte is a coastal community and participates in the National Flood Insurance Program, administering their local program under Article VIII, Division 5, Subdivision III of their Code of Ordinances. Other regulatory tools in the City's Code address sewers and traffic.

Additional policies or programs could focus on the sewer backups and potential for hazardous material releases noted above.

5.3 Hazard Evaluation

Based on survey results, community input, and the results of the workshop evaluations, the top hazards to evaluate during mitigation planning were identified. In selecting the top hazards, special consideration was given to those hazards that are being evaluated and mitigated by other programs.

Specifically, terrorism and weapons of mass destruction are being evaluated under the Homeland Security Program. Due to security considerations, information from that program was not available for consideration in this Plan. Therefore these two hazards were not considered when selecting and prioritizing hazard mitigation alternatives.

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Hazards from nuclear power plant accidents have also been evaluated under other county planning initiatives, and due to security considerations, are not considered in this Plan.

5.3.1 Hazard Selection

The hazards selected for developing mitigation strategies combined the top hazards identified in the survey, the top hazards identified by the communities, and the hazard ranking conducted during the workshop. Hazard selection evaluated both potential impact and risk. The process was described previously in the discussion of the Risk Analysis Workshop.

The impact rank and risk rank for each hazard were used to identify the most critical hazards for the county. Hazards with an assessment ranking of 1 were of the greatest concern, followed by others in the top seven hazards listed below.

Hazard Event	Workshop Rank	Hazard Risk Rank	Action Plan Needed
Extreme Temperatures - Extreme Hot or Cold	5	6	3
Flooding - Riverine or Shoreline	4	10	3
Winter Hazards - Snow, Ice & Sleet	8	2	2
Hazmat Incidents - Transportation	5	8	3
Infrastructure Failure - Water & Sewer Systems	1	5	1
Criminal Acts - Mass Shootings/Active Assailant(s)	3	2	1
Criminal Acts - Vandalism and Arson	12	1	2
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Opioid Crisis	2	4	1

5.4 Vulnerability Assessment

5.4.1 Current Assessment

Civil Disturbance

A civil disturbance in Michigan occurs once every 8 to 10 years.²⁶⁷ The most likely causes for a civil disturbance in the county are a labor dispute, sporting event, or demonstration at a college, government facility, detention facility, or military facility.

Wayne County features numerous places of public gathering including major entertainment venues, festivals, national events, major league athletic facilities, places of potential political protest, and governmental facilities but most of these are located within the City of Detroit, which is not part of this Plan. The most vulnerable locations/events include the following:

- Court Houses and Federal Buildings
- Detention Facilities
- Little Caesar's Arena
- Ford Field

²⁶⁷ Listing of US Civil Unrest Incidents, Armstrong Economics: www.armstrongeconomics.com/statistics/listing-of-us-civil-unrest-incidents

- Comerica Park
- Hart Plaza
- Wayne State University

Police stations are critical assets in the event of a civil disturbance event. Figure 12 displays the locations/events listed, those locations specifically listed as concerns by communities, and the locations of police stations in the county.

Criminal Acts - Vandalism

The 2017 Michigan State Police Michigan Incident Crime Reporting (MICR) online database indicates that there were a total of 68,184 "damage against property" incidents reported in Wayne County from 2013 through 2017, resulting in an average of 13,637 vandalism offenses per year.²⁶⁸ The entire county area is susceptible to vandalism. Facilities that have the highest vulnerability to an act of vandalism are government facilities, educational institutions, and registered historic sites. Police stations are critical assets for responding to acts of vandalism.

Criminal Acts – Arson

In 2003, an arson or suspicious fire occurred every 62 minutes in Michigan.²⁶⁹ Since 2013, Wayne County has experienced 4,081 arson fires, an average of 816 per year.²⁷⁰ This is notably less than the 6,565 total and 1,094 average arson fires per year reported in Wayne County's 2013 Hazard Mitigation Plan.

Any property is a potential target for arson. However, residential areas and historic sites are most vulnerable to acts of arson. Fire departments are critical assets for responding to acts of arson. Thirty-five fire departments respond to structural fires within the Wayne County communities covered in this plan. Residential land use, indicating the highest concentrations of structures, is shown on Figure 17.

²⁶⁸ Michigan State Police, Michigan Incident Crime Reporting, Crime Statistics, Wayne County, 2013, 2014, 2015, 2016, and 2017. <http://www.micrstats.state.mi.us/MICR/Reports/Report02.aspx>

²⁶⁹ Michigan State Police, Fire Marshall Division, *2003 Michigan Fire Clock*

²⁷⁰ Michigan State Police, Michigan Incident Crime Reporting, Crime Statistics, Wayne County, 2013, 2014, 2015, 2016, and 2017. <http://www.micrstats.state.mi.us/MICR/Reports/Report02.aspx>

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Drought

At least four drought events have been recorded for Wayne County since 2000 and climate patterns continue to trend to drier, hotter summers.²⁷¹ All of the county's active agricultural lands are vulnerable to drought. Wayne County contains approximately 13,060 acres of agricultural land.

Figure 13, shows the location of active agricultural lands in Wayne County. The most vulnerable agricultural resource is cropland. Sumpter Township, Huron Township, and Van Buren Township are the top three communities for total active agriculture and cropland acreage.²⁷²

Natural resources such as lakes, rivers, streams, and other bodies of water could be affected by decreases in water levels. Water features are also shown on Figure 13. Van Buren Township, Canton Township, and Northville Township contain the most water (by surface acreage) in the county.²⁷³

Top 5 Community Land Use in Wayne County- Drought Vulnerabilities		
Active Agriculture and Cropland		
Community	Agriculture (acres)	Agriculture (%)
Sumpter Township	4,051	16.8
Huron Township	3,251	14.2
Van Buren Twp.	2,977	12.9
Canton Township	1,069	4.6
Romulus	955	4.2

Source: SEMCOG, 2008 Land Use and 2010 Leaf-off Land Cover: Wayne County, Excluding Detroit, May 2019.

Top 5 Community Land Use in Wayne County –	
Forest/Field Fire Vulnerabilities	
Forest Land	
Community	Acres
Grosse Ile Township	1,272
Northville Township	1,130
Livonia	866
Plymouth Township	806
Van Buren Twp.	719

Grassland/Shrubland	
Community	Acres
Sumpter Township	3,288
Huron Township	2,901
Canton Township	2,789
Romulus	2,744
Van Buren Township	2,466

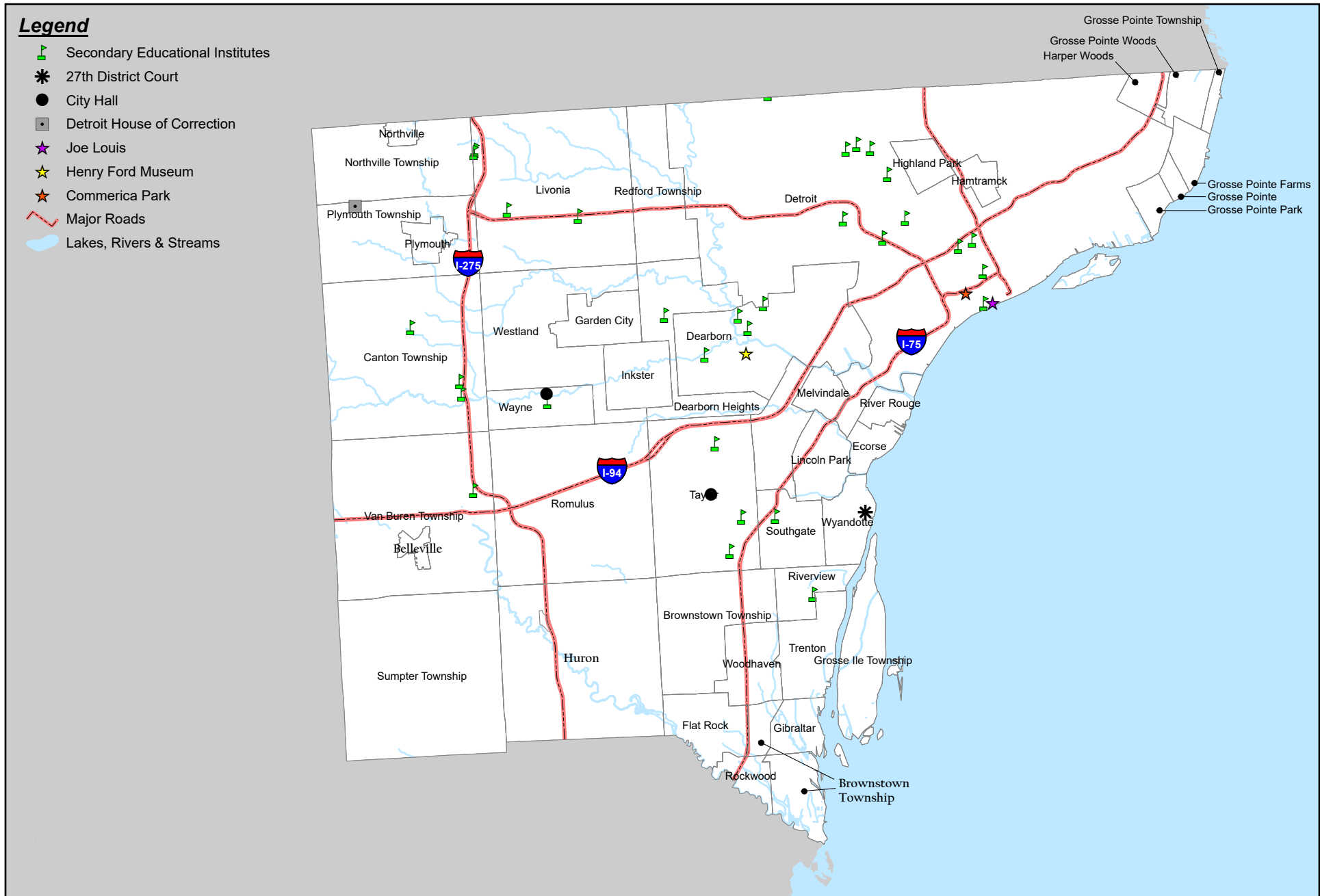
Source: SEMCOG, 2008 Land Use and 2010 Leaf-off Land Cover: Wayne County, Excluding Detroit, May 2019.

²⁷¹ NOAA National Centers for Environmental Information Storm Events database query

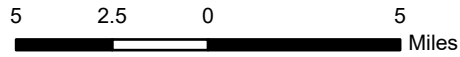
<https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=26%2CMICHIGAN>, May 14, 2019

²⁷² SEMCOG, 2008 *Land Use and 2010 Leaf-off Land Cover*: Wayne County, Excluding Detroit, May 2019.

²⁷³ SEMCOG, *Land Use in Southeast Michigan, 1990-2000*, Specific to Wayne County, Excluding Detroit, April 2004.



Wayne County



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 Data Source: City of Dearborn (2013), Michigan CGI (2013),
 HIFLD (2019)

Figure 12 - Vulnerability:
 Civil Disturbance

Earthquakes

Most earthquakes in Michigan are minor tremors that result in little damage. Several mildly damaging earthquakes have been felt since the early 1800s. The most vulnerable assets to earthquakes are the county’s water, sewer, and natural gas services, and natural gas/petroleum pipelines. The entire county has gas service available either through Consumers Energy or DTE Energy. Municipal and county operated water, storm water, and sanitary sewers are also vulnerable. Existing and planned sewers within Wayne County and pipeline locations are shown in Figures 20 and 22, respectively.

Extreme Temperatures

Extreme temperature periods occur every year in the state and impact the entire county. Underground utilities, primarily water and gas service areas, are vulnerable to extreme cold. These vulnerable areas are shown in Figure 14. The entire county has natural gas services available through Consumers Energy or DTE Energy. Trenton, River Rouge, and Romulus have the highest utility land use acreage in the county, excluding Detroit.²⁷⁴

Also vulnerable to extreme temperatures are the elderly, young, disabled, and impoverished persons. Hospitals are vulnerable due to increased cases of heat stroke, heat exhaustion, frost bite, hypothermia, and other temperature-related illnesses. Almost 21% of the Wayne County population is vulnerable to extreme temperature based on age alone.²⁷⁵ There are 44 nursing homes in Wayne County. Figure 20 displays the locations of sewer service areas and hospitals in the county.

Community	Acres
Trenton	150
River Rouge	110
Romulus	66
Dearborn Heights	63
Westland	57

Source: SEMCOG, Land Use in Southeast Michigan, 1990-2000, Specific to Wayne County, Excluding Detroit, April 2004.

Forest/Field Fire

A total of 1,669 forest/field fires occurred between 1998 and 2004 in Wayne County.²⁷⁶ Woodlands, wetlands, grassland, shrub land, and areas near railroad right-of-ways are vulnerable to forest/field fires. Wayne County contains approximately 6,904 acres of forest land.²⁷⁷ Grosse Ile Township, Northville Township, and Livonia have the highest acreage of forest in the county. Wayne County contains approximately 27,336 acres of

²⁷⁴ SEMCOG, *Land Use in Southeast Michigan, 1990-2000*, Specific to Wayne County, Excluding Detroit, April 2004.

²⁷⁵ U.S. Census Bureau, *Profile of General Demographic Characteristics: 2000*, Wayne County, Michigan

²⁷⁶ Federal Emergency Management Association Website, www.nfirs.fema.gov, NFIRS 5.0 National Reporting, October 3, 2005, Filtered for Wayne County Reporting Only.

²⁷⁷ SEMCOG, *Land Use in Southeast Michigan, 1990-2000*, Specific to Wayne County, Excluding Detroit April 2004.

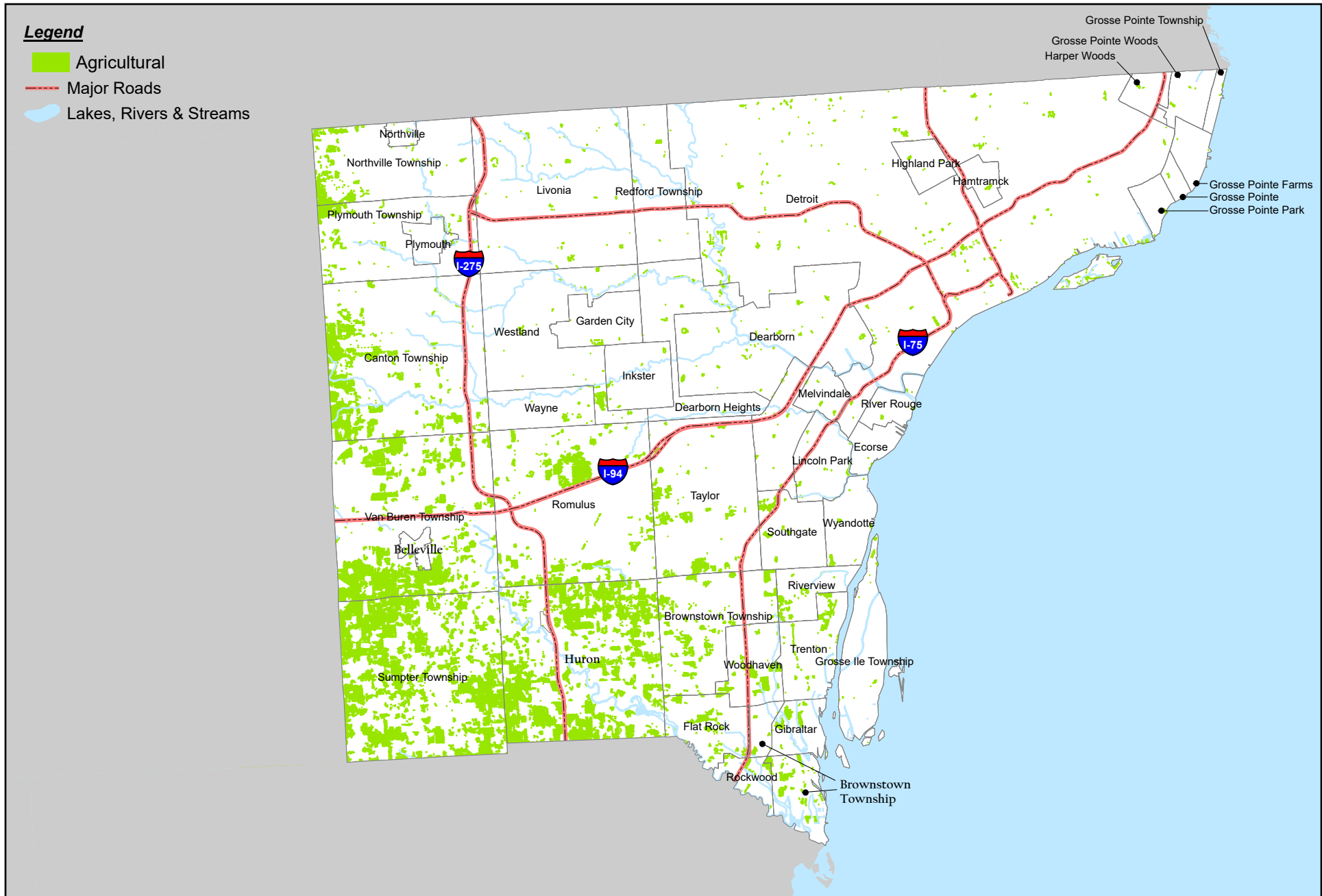
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grassland and shrub land.²⁷⁸ Sumpter Township, Huron Township, and Canton Township have the highest total acreage in the county of grassland and shrub land.

²⁷⁸ SEMCOG, *Land Use in Southeast Michigan, 1990-2000*, Specific to Wayne County, Excluding Detroit April 2004.

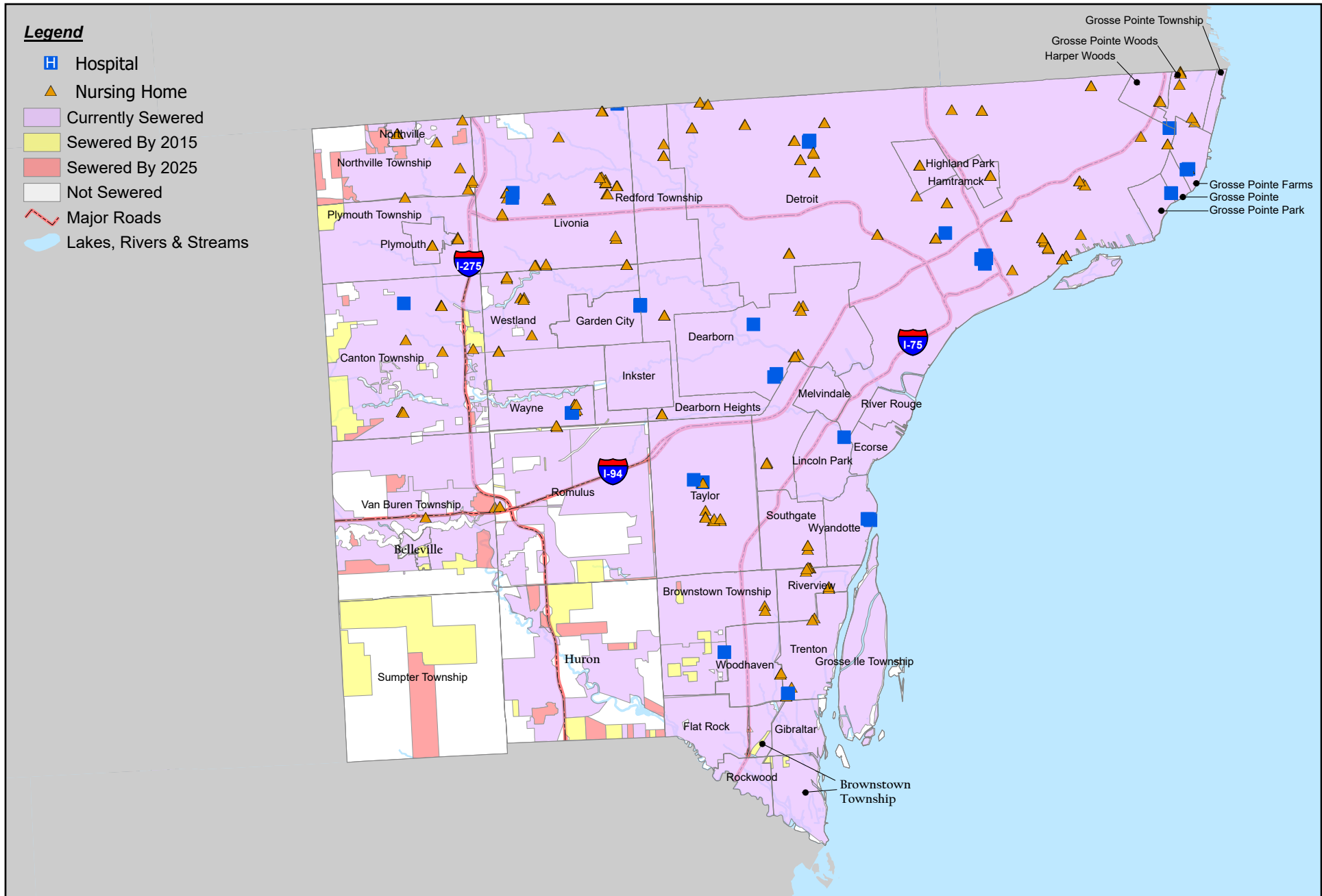


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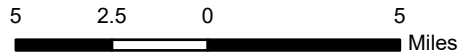
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 Data Source: City of Dearborn (2013), Michigan CGI (2013)
 NLCD (2016), SEMCOG Land Use (2015)

Figure 13 - Vulnerability:
 Drought





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 Data Source: City of Dearborn (2013), Michigan CGI (2013),
 ArcGIS Online

Figure 14 - Vulnerability Assessment:
 Extreme Temperature

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The 35 fire departments in the participating Wayne County communities are critical assets for responding to forest/field fires. Figure 15 presents the coverage of forest woodland, grassland, and shrub land, railroads (along which fires often occur), and the location of fire department headquarters in the county.

Scrap Tire Fire

Within Wayne County, there are 13 registered scrap tire facilities and approximately 107 unregistered facilities.²⁷⁹ The Michigan Department of Environmental Quality's Scrap Tire Program has identified many unregistered scrap tire facilities which are in need of remediation. A third of the unregistered sites are very small, typically storing fewer than 500 tires, the majority listed store between 500 and 2,000 tires on site, and the largest site held over 53,000 when last surveyed.²⁸⁰

Due to the toxic smoke produced by tire fires and potential environmental impact, residents living near these facilities are considered vulnerable. Figure 16 shows the location of the registered scrap tire facilities with a 1-mile radius of census block groups. Unregistered scrap tire locations store fewer tires than registered facilities. Therefore, areas adjacent to unregistered sites are considered less vulnerable than areas near registered facilities. There are approximately 11,548 people within a one-mile radius of registered tire facilities in Wayne County. Also shown on Figure 16 are the locations of fire stations and air transportation facilities in the county. Air transportation facilities are considered vulnerable as the smoke produced by a fire may interrupt flight patterns.

Structural Fire

Structural hazards are commonly known as the "universal hazard" because they can occur anywhere. From 1998 through 2004, 8,674 structural fires in Wayne County were reported to the Federal Emergency Management Agency, National Fire Incident Reporting System.²⁸¹ This equals an average of roughly 1,240 structural fires per year in Wayne County.

The 35 participating community fire departments are critical assets for responding to structural fires. Figure 17 shows the areas of multiple-family residential, industrial, and commercial development that may be susceptible to structural fires.

Flooding

Wayne County has had 2 documented dam failures.²⁸² Urban flooding and riverine flooding are dependent on seasonal weather patterns and seven flood and flash flood events have been recorded since 2013.

²⁷⁹ Michigan Department of Environmental Quality, Southeast Michigan District, Scrap Tire Program, Tire Site Database.

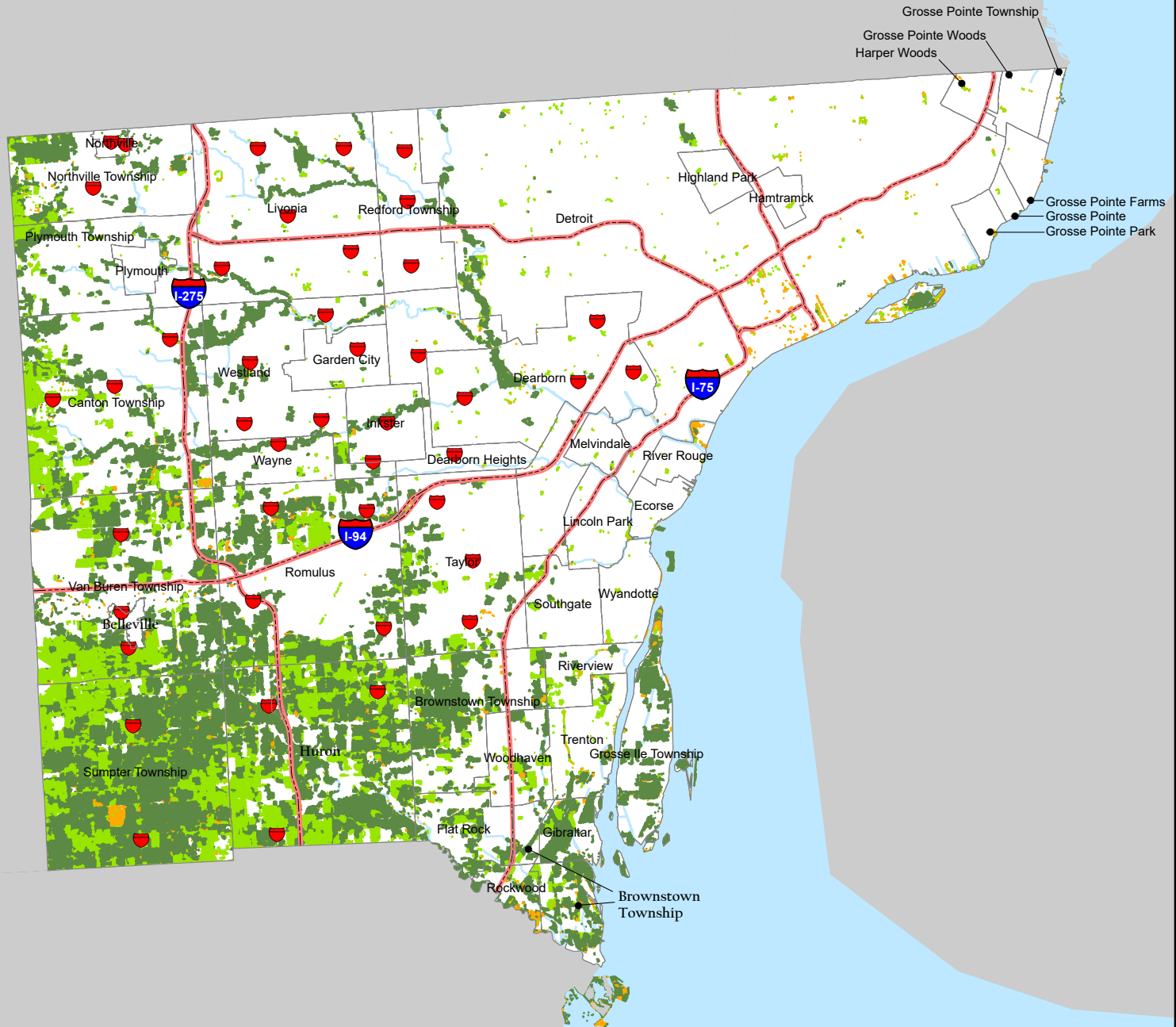
²⁸⁰ Ibid.

²⁸¹ NFIRS 5.0 National Reporting, Tally by Incident Type, January 1, 1998 through December 31, 2004, report generated on October 3, 2005, filtered for Wayne County reporting only.

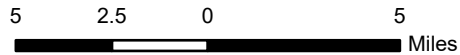
²⁸² Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 76.

Legend

-  Fire Stations
-  Active Agricultural
-  Forested Woodland & Wetland
-  Grassland & Shrub
-  Major Roads
-  Lakes, Rivers & Streams
- PROVINCE

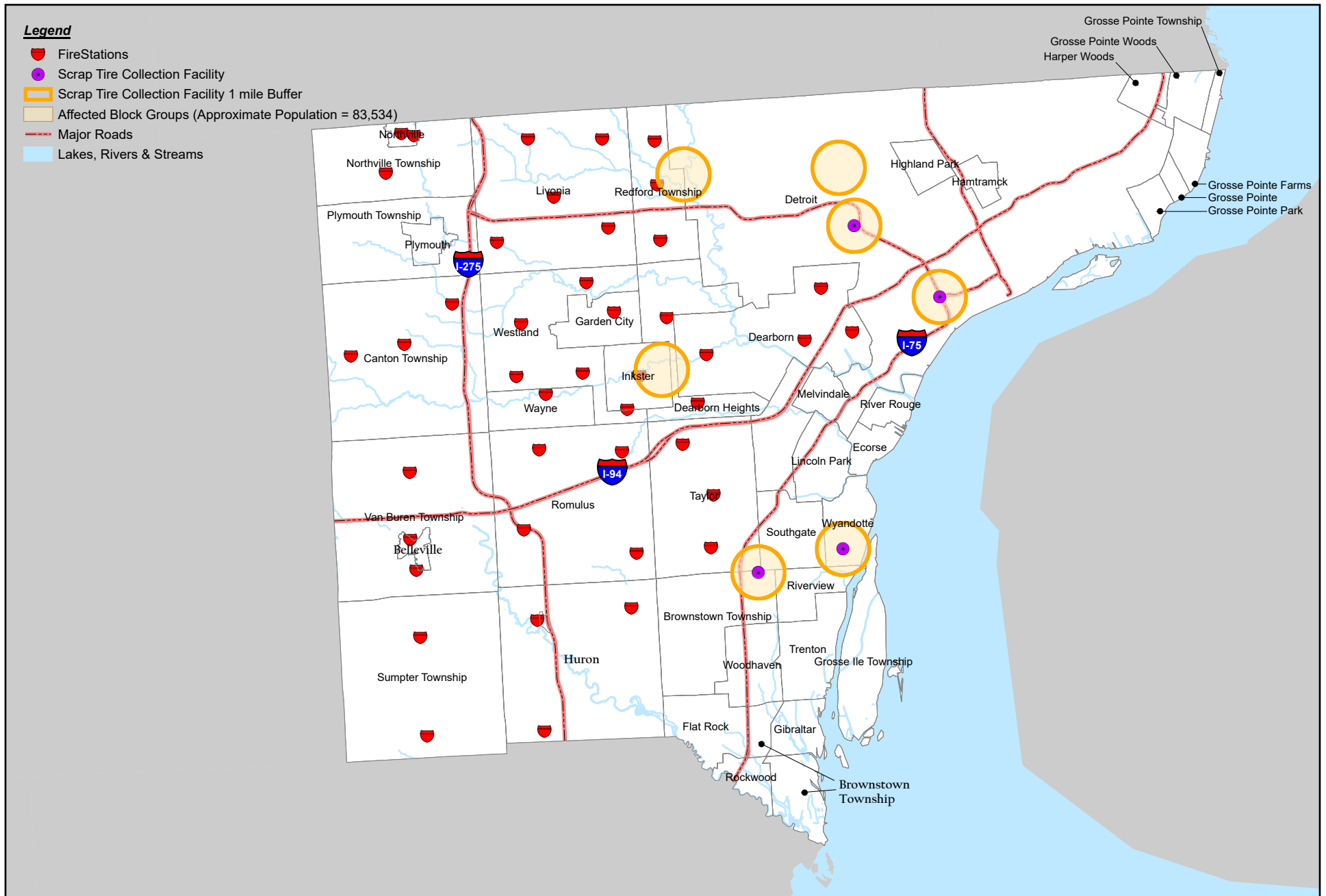


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 Data Source: City of Dearborn (2013), Michigan CGI (2013),
 SEMCOG (2015), NLCD (2016)

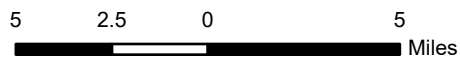
Figure 15 - Vulnerability Assessment:
 Forest/Field Fire



Legend

- Fire Stations
- Scrap Tire Collection Facility
- Scrap Tire Collection Facility 1 mile Buffer
- Affected Block Groups (Approximate Population = 83,534)
- Major Roads
- Lakes, Rivers & Streams

Wayne County



Created for: Wayne County
 Created by: RMH, April 24, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013), U.S. Census Bureau (2010)

Figure 16 - Vulnerability Assessment:
 Scrap Tire Fire

Areas vulnerable to flooding are those locations and populations within floodplains and flood prone areas. Vulnerabilities include Infrastructure (bridges and structures) and populated areas. Approximately 9,509 structures are located within the FEMA 100-year floodplain in Wayne County. Figure 5 shows the location of dams in the county and floodplains. Figure 18 also shows floodplains and specific areas in the county which have a high occurrence of flooding.

Hazmat Incidents – Fixed Site

The majority of hazmat material releases in Wayne County are releases to water, followed by those to land and air.²⁸³ Vulnerable locations are Sara Title III sites (sites that store hazardous substances) in the county and those areas within a one-mile radius of these sites. There are 153 Sara Title III sites in Wayne County, with 113 of those within the City of Detroit.²⁸⁴

Between 1990 and October 2005, Ecorse, Detroit, River Rouge, Taylor and Trenton had the highest number of releases from fixed site hazmat locations.²⁸⁵ Police and fire stations are critical assets for responding to hazmat fixed site releases. Areas with greater population are more at risk for secondary health-related incidents resulting from a fixed site hazmat release.

Hazmat Incidents – Transportation Incident

From 1990 to April 1, 2013, there were a total of 664 transportation related hazmat incidents, 420 occurring on highways and 244 in Wayne County railroads.²⁸⁶ This equals an average of approximately 29 incidents each year in the county. Between 1999 and October 2005, the highest number of releases from transportation related hazmat incidents involved the release of oil.²⁸⁷ Vulnerable locations to a transportation hazmat incident are the areas within a one-mile radius of the railroads and major roadways, particularly I-75, I-696, I-96, I-94 and I-275. Areas of greater population are more vulnerable to these incidents. Police and fire stations are critical assets for responding to hazmat fixed site releases, providing evacuation and cleanup assistance. The locations of the railroads, major highways, and police and fire station locations are included on Figure 19.

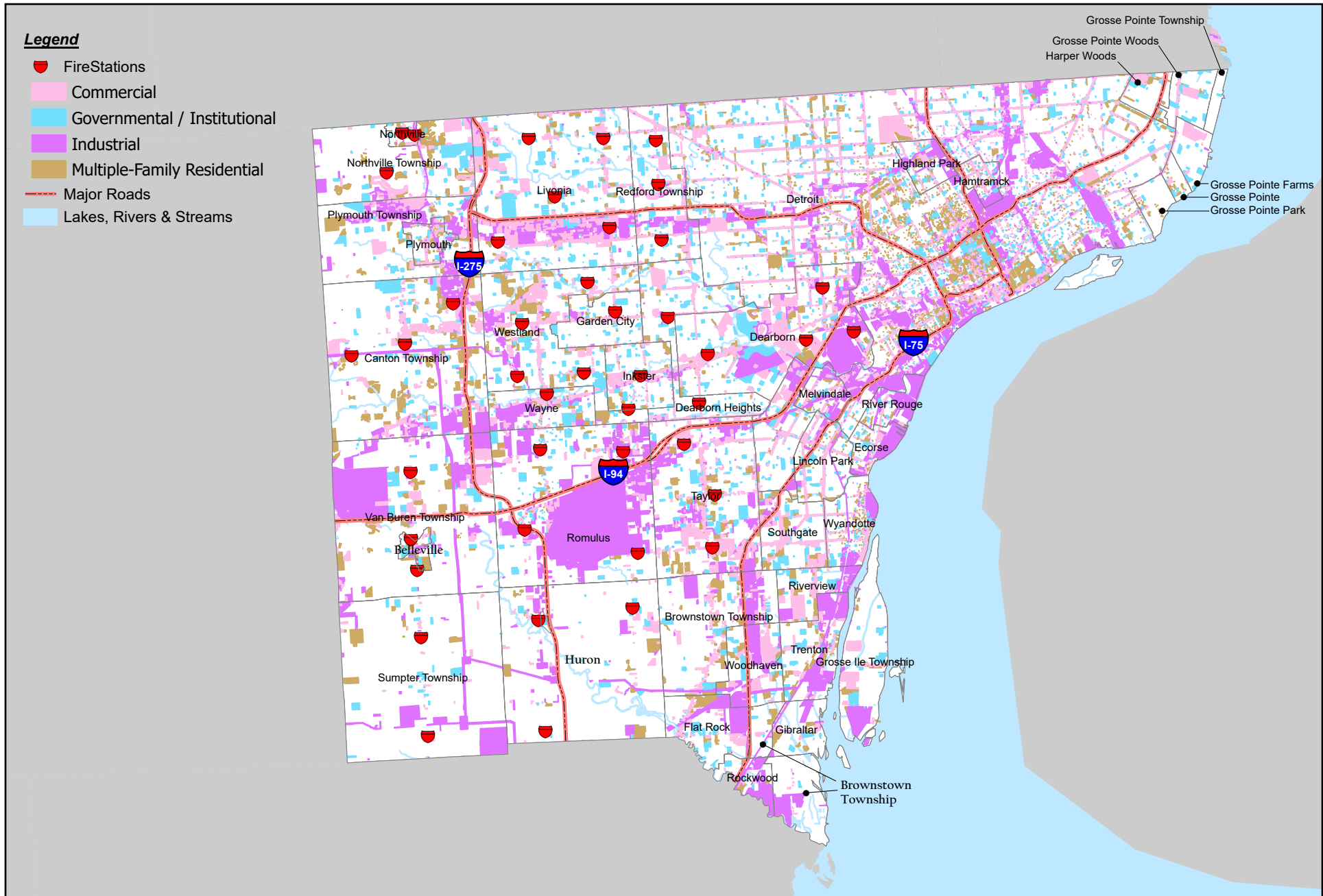
²⁸³ U.S. Coast Guard National Response Center Website, www.nrc.uscg.mil/foia.html, Standard Query Report for Wayne County, Fixed Incidents, October 2005.

²⁸⁴ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, April 2012, page 234.

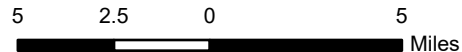
²⁸⁵ U.S. Coast Guard National Response Center Website, www.nrc.uscg.mil/foia.html, Standard Query Report for Wayne County, Fixed Incidents, October 2005.

²⁸⁶ U.S. Coast Guard National Response Center Website, www.nrc.uscg.mil/foia.html, Standard Query Report for Wayne County, Transportation, April 2013.

²⁸⁷ Ibid

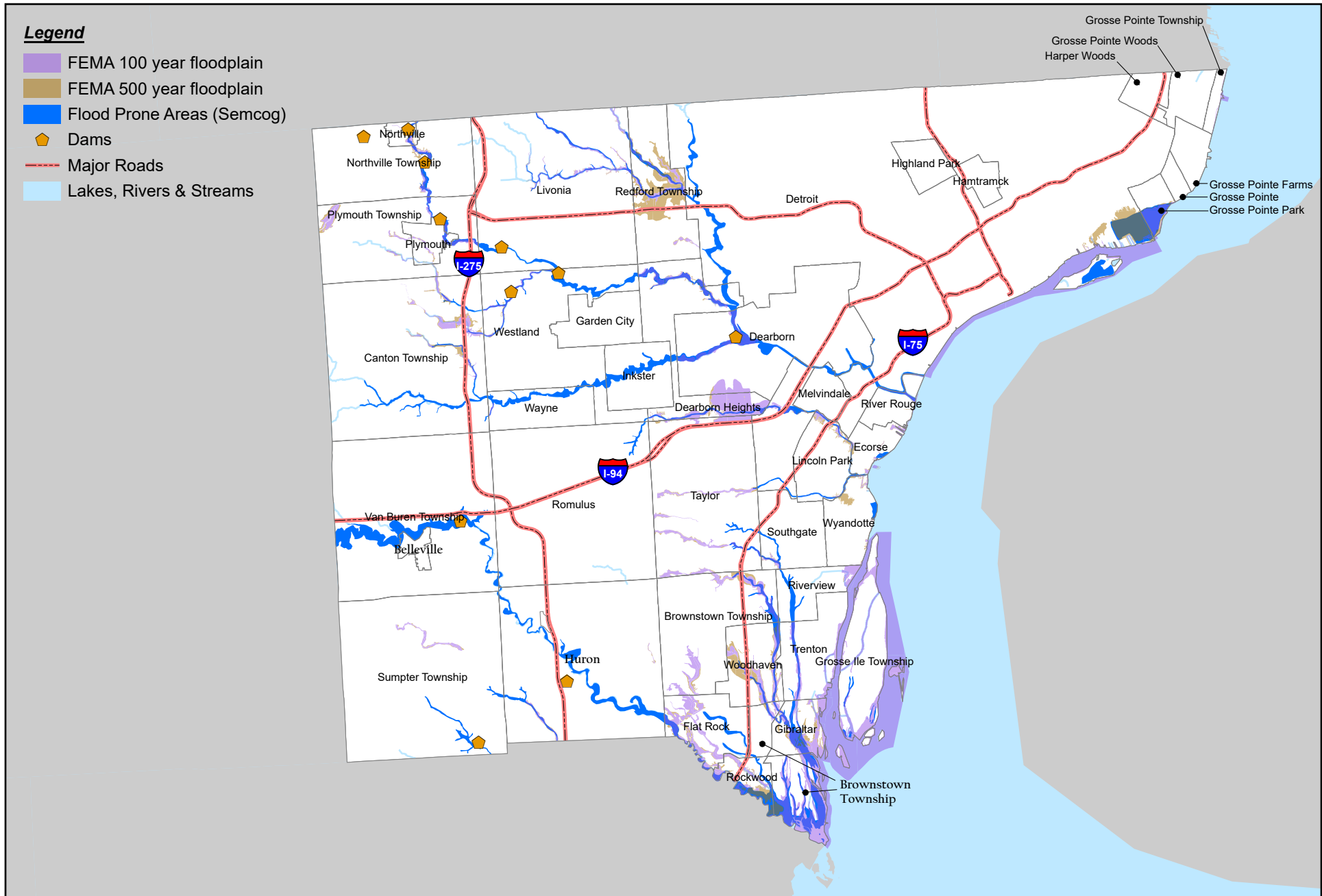


Wayne County

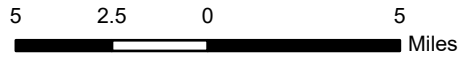


Created for: Wayne County
 Created by: RMH, April 24, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013),
 SEMCOG Land Use (2015)

Figure 17 - Vulnerability Assessment:
 Structural Fire



Wayne County



Created for: Wayne County
 Created by: RMH, April 24, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013), USDA (2010), SEMCOG (2008 & 2012), National Inventory of Dams (2013)

Figure 18 - Vulnerability Assessment: Flooding

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Infrastructure Failures – Water System, Sanitary & Storm Sewers, Electrical, Communications

The Wayne County Department of Public Works along with the Detroit Water and Sewer Department operate and maintain county storm drains throughout the county (Figure 20) as well as other water, wastewater, and storm sewer infrastructure. Minor problems with the sanitary and storm sewers are common with major rain or snowmelt events. Interruptions in the water system are localized and intermittent, and typically only follow power outages and extreme temperatures. The primary consequence of this hazard is potential public health impacts. As a result, schools, hospitals and elderly care facilities have been identified as the most vulnerable. The downriver communities have been identified as having the greatest occurrence of problems with infrastructure failures involving the sanitary sewer system. Therefore, schools, hospitals, and elderly care facilities in these communities are at increased vulnerability.

Electrical service is provided to Wayne County residents by Consumers Energy and DTE Energy (Figure 21). Private communication services are provided by a number of companies with AT&T serving the most customers. Wayne County also operates a 911 Call Center and public safety radios. Failures of the electrical and communications systems are more likely to occur during severe storms. Populations in schools, hospitals and elderly care facilities have been identified as being at increased vulnerability to this hazard.

Wayne County and its local units of government participate in the State 800 MHz emergency communication system that provides communication services between various response facilities and groups during an emergency situation, and which can also aid in the distribution of information to the public.

Nuclear Power Plant Accidents

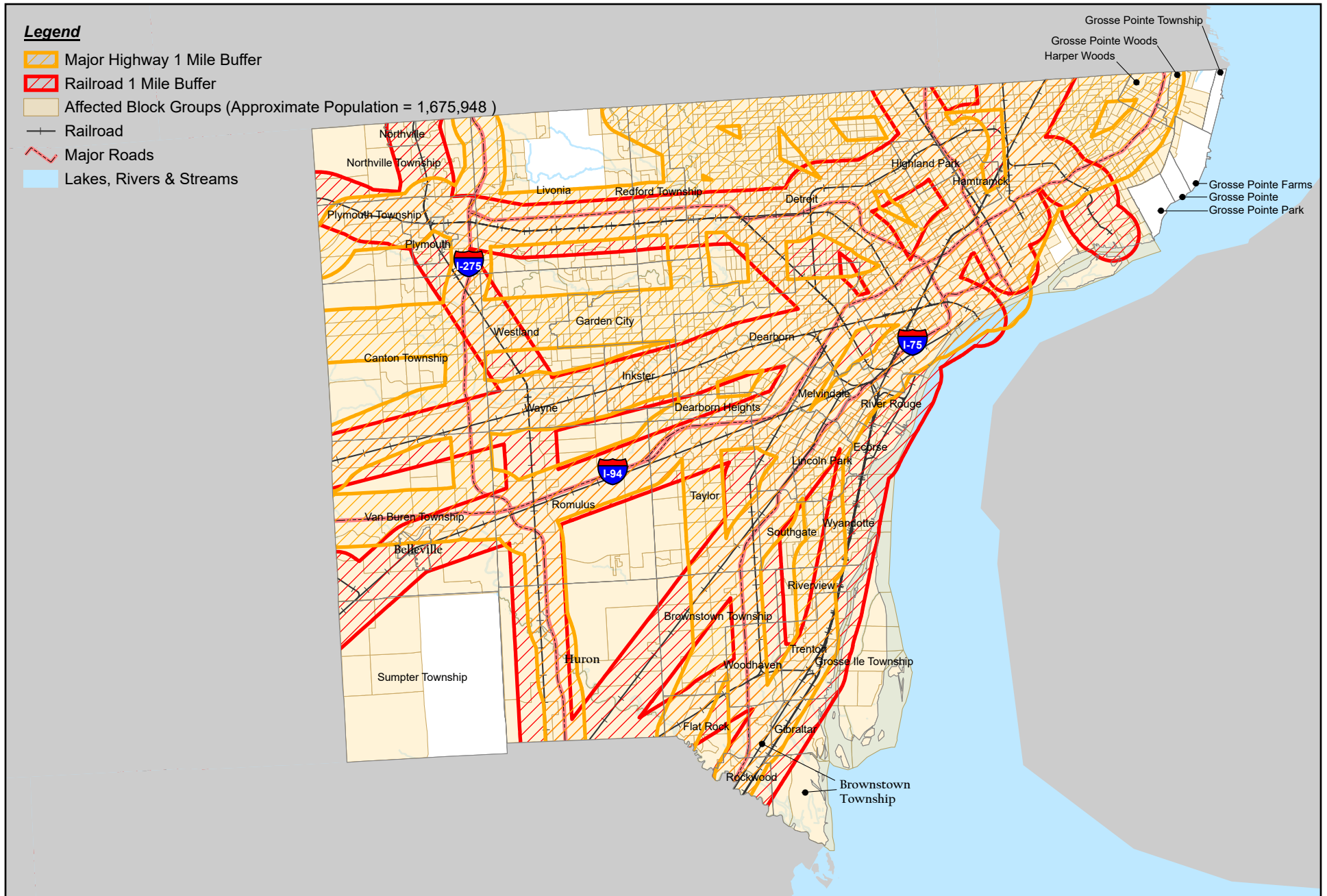
There are three nuclear power plants in Michigan. The closest active plant, Enrico Fermi-2 was opened in Monroe County in 1998. A portion of Brownstown Township, and the Cities of Flat Rock, Gibraltar, and Rockwood are within Protection Action Order Areas 4 of the Enrico Fermi-2 Nuclear Power Plant (Figure 6). The primary vulnerability to a nuclear power plant incident is radiological contamination of food sources. Agricultural lands, restaurants, and grocery stores are most vulnerable.

Oil and Gas Well Accidents / Petroleum and Natural Gas Pipeline Accidents











There have been no oil or gas well related incidents in Wayne County in the past 5 years.²⁸⁸ Although there have never been any significant incidents in Wayne County, the presence of active and producing wells within the county makes it possible for this hazard to occur. Between 1973 and 2001, there was an oil or gas well incident in Michigan every 3-4 years.²⁸⁹

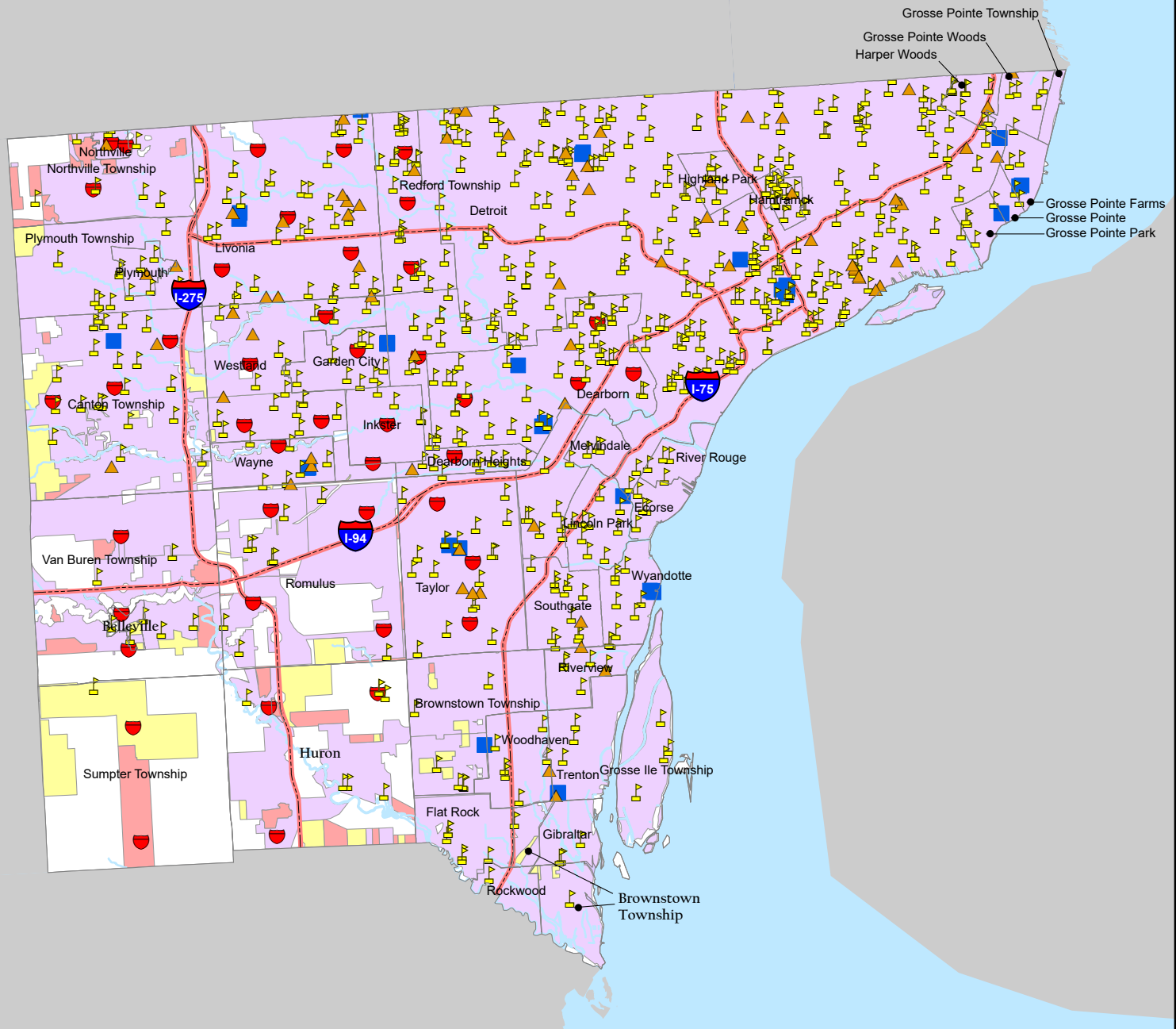
²⁸⁸ Michigan Department of Environmental Quality, Southeast Michigan District, Geological and Land Management Division, staff telephone interview July 7, 2004.

²⁸⁹ Source: Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 9.

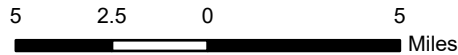


Legend

-  Nursing Home
-  Fire Stations
-  Hospital
-  Major Roads
-  Currently Sewered
-  Sewered By 2015
-  Sewered By 2025
-  Not Sewered
-  Lakes, Rivers & Streams
-  Schools



Wayne County



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 Data Source: City of Dearborn (2013), Michigan CGI (2013),
 ArcGIS Online

Figure 20 - Vulnerability Assessment:
 Infrastructure Water/Sanitary Sewer System

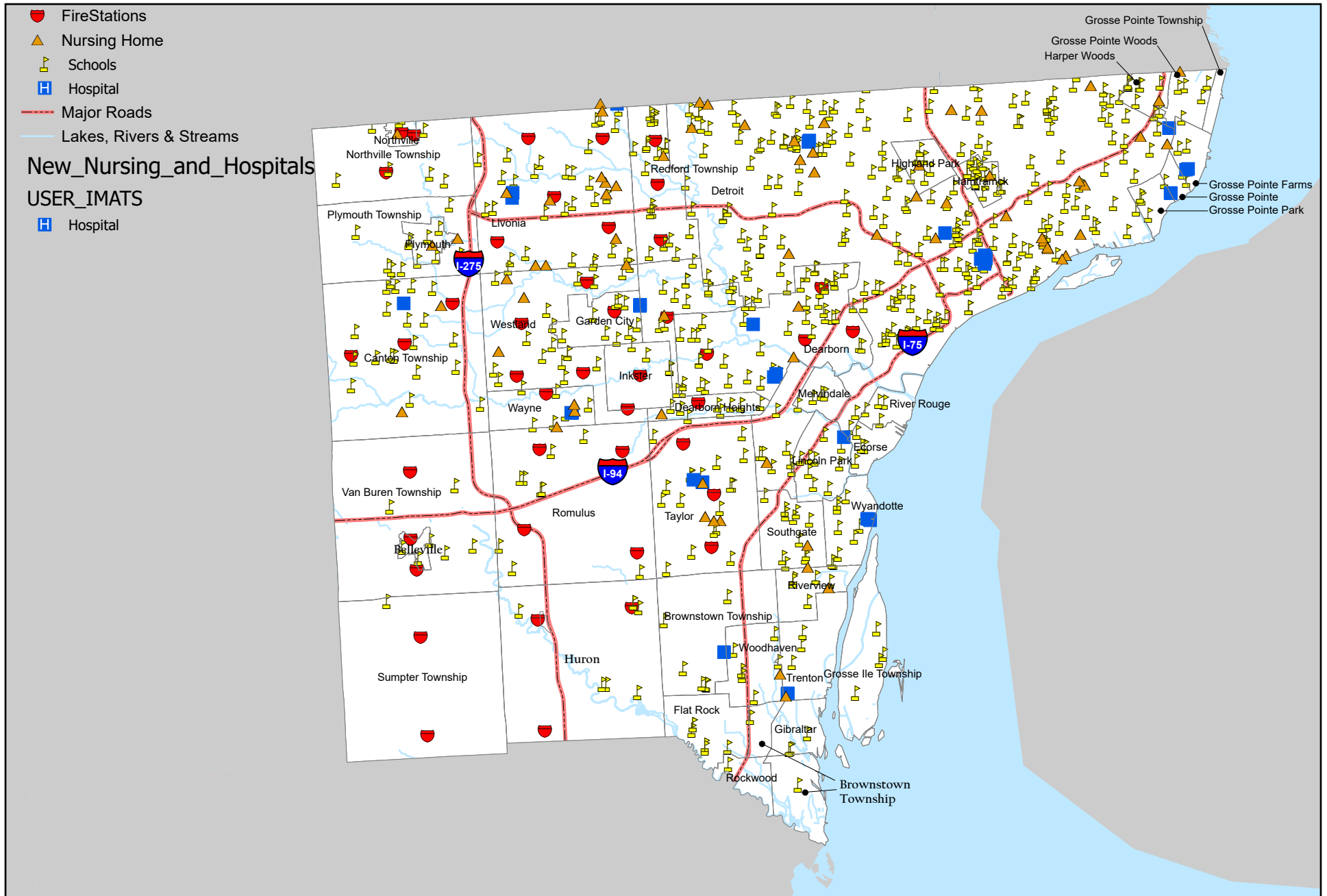
Legend

- FireStations
- ▲ Nursing Home
- ▼ Schools
- Hospital
- Major Roads
- Lakes, Rivers & Streams

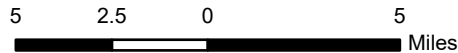
New_Nursing_and_Hospitals

USER_IMATS

- Hospital



Wayne County



Created for: Wayne County
 Created by: RMH, April 24, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013),
 ArcGIS Online

**Figure 21 - Vulnerability Assessment:
 Infrastructure Water/Sanitary Sewer System**

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Pipelines can pose a significant threat to the public due to the threat of fires, explosions, and ruptures. Most vulnerable are heavily populated residential areas, schools, churches, and hospitals. Local fire and police departments would respond to a pipeline incident. Gas leaks are a frequent call for service for Emergency Response Teams. Populations located within a 1-mile radius of a well or pipeline are most vulnerable and urbanized areas are more vulnerable than rural areas, based solely on population densities. The locations of natural gas distribution pipelines, natural gas transmission lines, petroleum gas pipelines, oil/gas bottom wells, and oil/gas surface wells are shown in Figure 22. There are approximately 120 miles of natural gas distribution pipelines, 363 miles of natural gas transmission lines, and 107 miles of petroleum gas pipelines in Wayne County. Census block groups within a 1-mile radius of the pipelines and wells are included on Figure 22. Approximately 1,028,514 people are located within the census blocks identified. Figure 22 also presents the locations of schools, hospitals, police stations, and fire stations in the county.

Public Health Emergencies

Public Health Emergencies can arise from a wide range of causes and can result in varying levels of severity. Persons most susceptible are those with weakened or undeveloped immune systems. Therefore, adult care and day care facilities and schools are the most vulnerable. The locations of public safety facilities, adult care facilities, day care facilities, and schools are shown in Figure 23.

Vulnerable assets involved with public health emergencies are medical service facilities and include the county's health departments, clinics, and hospitals. The Wayne County Division of Health operates two locations within the county. The county's health departments and hospitals are also shown in Figure 23.

Subsidence

The most likely occurrence of subsidence in the county would be due to sink holes caused by water main and storm water utility breaks. The probability of this occurrence increases as infrastructure ages. Figure 20 presents Wayne County sewer services areas.

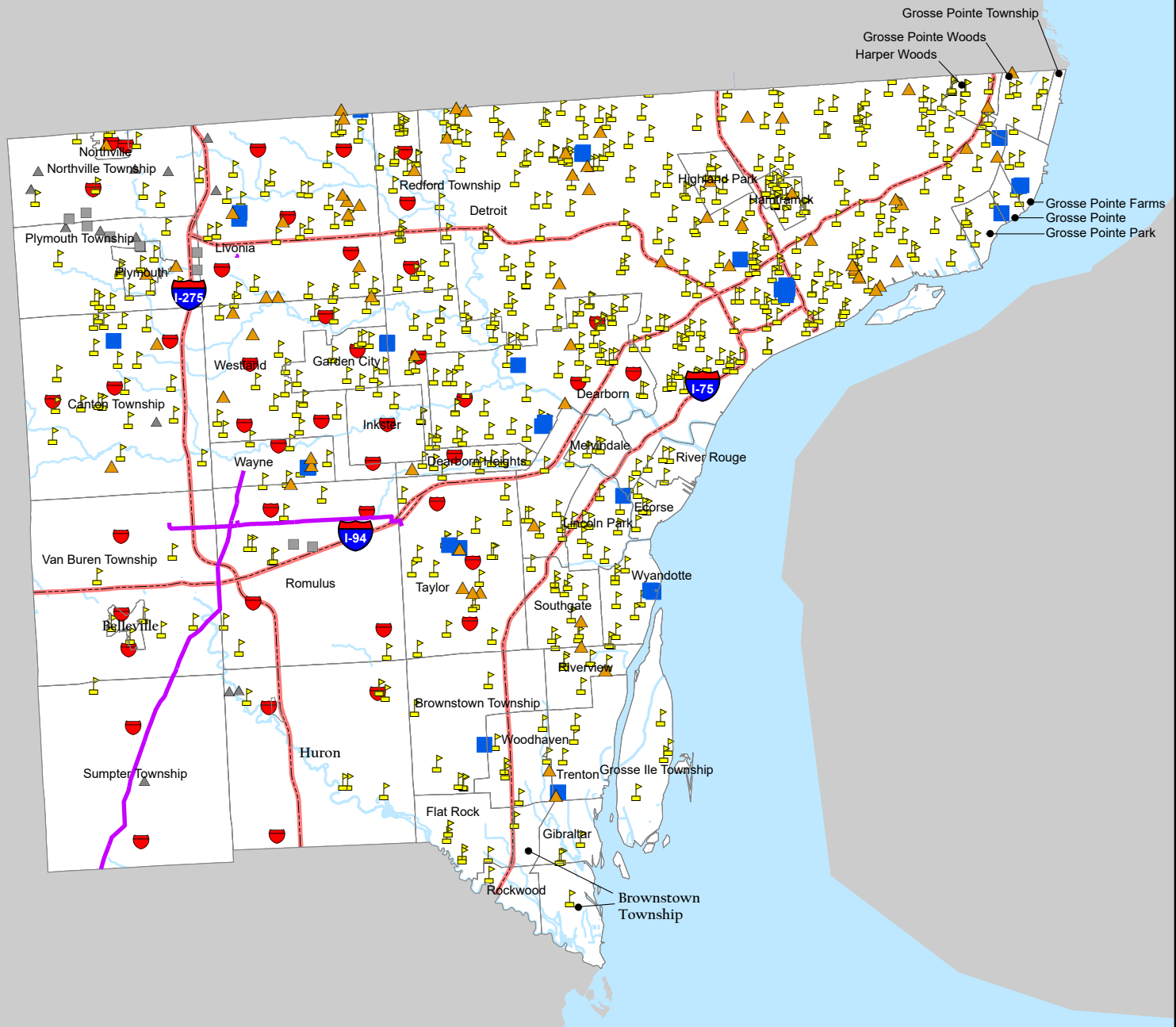
Thunderstorm Hazards and Tornadoes

Wayne County receives 40-60 thunderstorm days per year.²⁹⁰ Vulnerable and critical assets associated with thunderstorms (hail, lightning, and severe wind) and tornadoes are the warning siren systems, communications/ electrical infrastructure, police and fire facilities, and manufactured home sites. Private urban tree removal services and municipal forestry departments are also critical to responding to wind hazards.

²⁹⁰ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, December 2001, page 184.

Legend

- ▲ Oil Well
- Gas Well
- ▲ Nursing Home
- Pipeline
- Hospital
- ▼ Schools
- Fire Stations
- Major Roads
- Lakes, Rivers & Streams










Wayne County

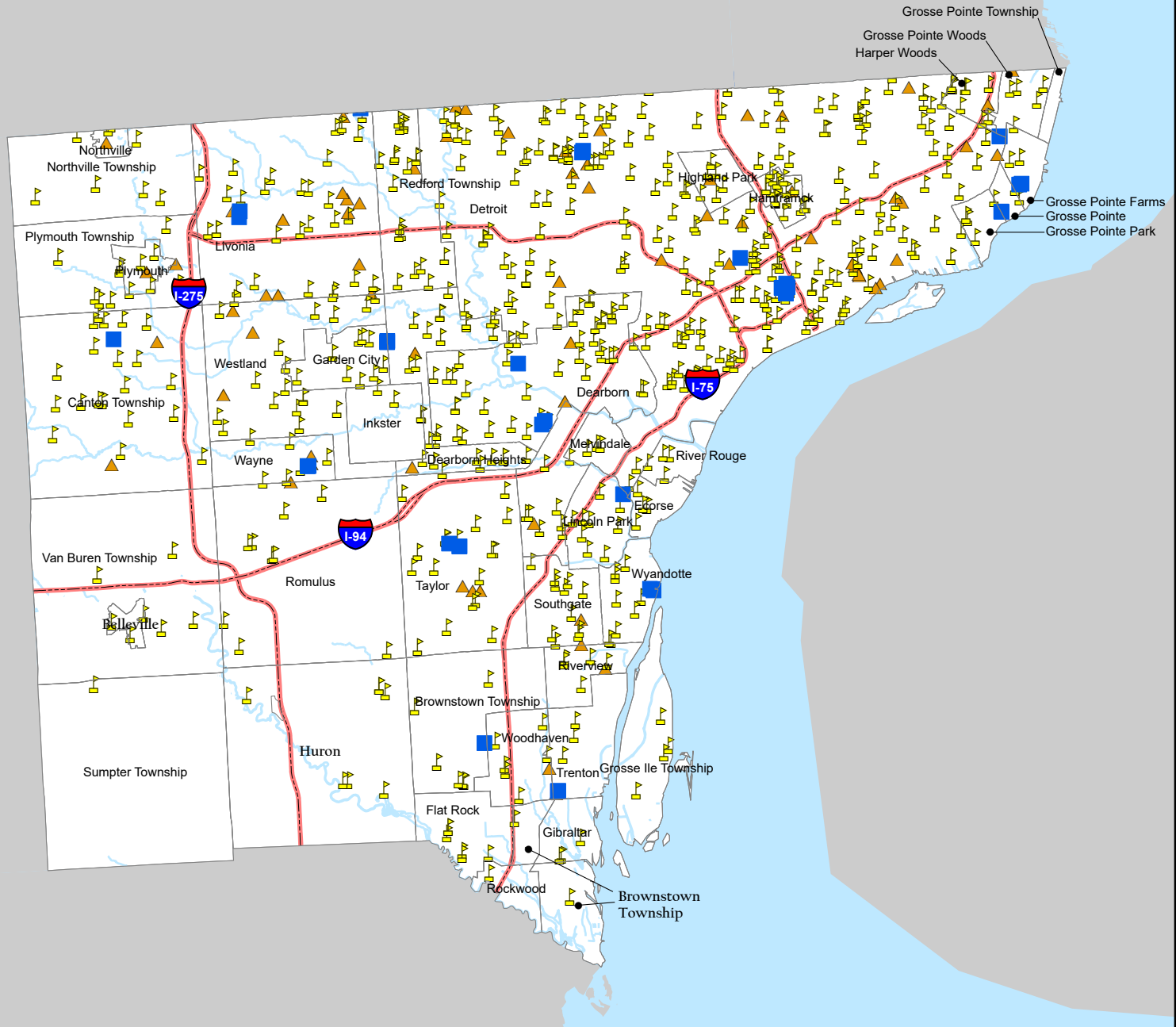


Created for: Wayne County
 Created by: RMH, April 24, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013),
 ArcGIS Online

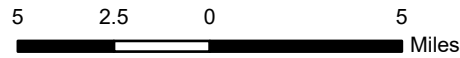
Figure 22 - Vulnerability Assessment:
 Accidents- Wells & Pipelines

Legend

-  Nursing Home
-  Hospital
-  Schools
-  Major Roads
-  Lakes, Rivers & Streams
-  river_163v4b
-  minor_civ

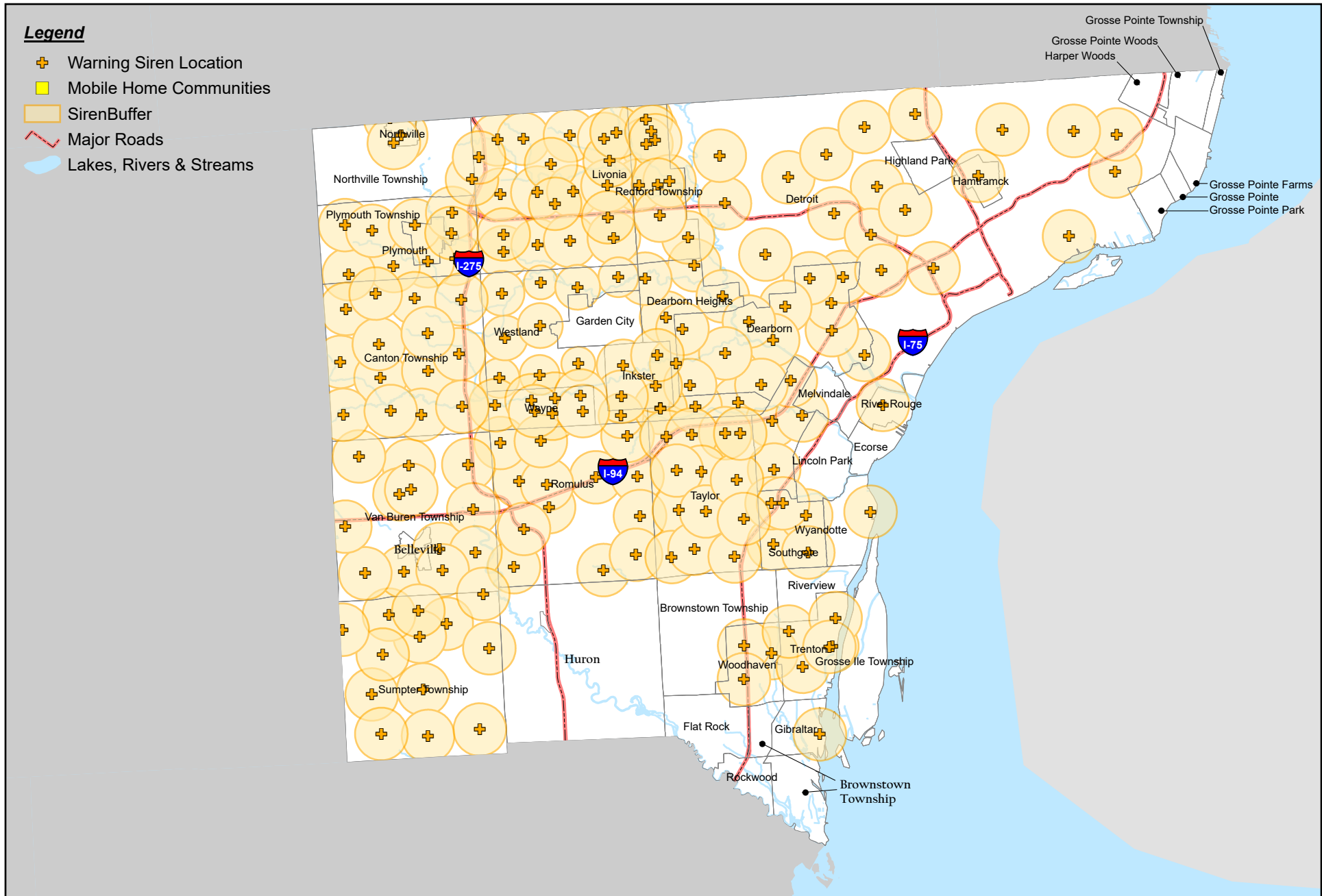


Wayne County



Created for: Wayne County
 Created by: RMH, April 24, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013),
 ArcGIS Online

Figure 23 - Vulnerability Assessment:
 Public Health Emergencies



Wayne County

Created for: Wayne County
 Created by: RMH, May 20, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013))

Figure 24 - Vulnerability Assessment:
 Warning Siren Locations



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Wayne County, excluding Detroit, has approximately 188 acres and 916 acres devoted to land uses associated with communication and utilities, respectively. There are also over 2,240 acres of manufactured home parks in the county. Canton Township, Van Buren Township, and Sumpter Township are most vulnerable to communication, utility, and electrical transmission line failure based on total acreage, respectively. Van Buren Township has the highest acreage for manufactured home park land use. Mobile home communities (for applicable communities only) are shown on Figure 24, which also includes the locations of the county's warning sirens and fire department headquarters (within participating communities).

Communication and electrical companies within the county include DTE Energy, Consumers Energy, Verizon, AT&T, Charter Communications, Comcast, local television networks, local radio networks, communication towers, local emergency services, and cell phone service providers.

Transportation Accidents – Air, Highway, and Rail

There are five airports within Wayne County. Between 1990 and 2005, there were 28 air transportation incidents in Wayne County, nearly two incidents per year.²⁹¹ From 1987 to present (2019) five accidents occurred at or in the vicinity of the Detroit Metropolitan Wayne County Airport. The majority of transportation accidents occur during takeoff or landing, and therefore, impacted areas are typically those area located near the airports or runways. The locations of the airports within the county are provided on Figure 25, along with census blocks within a five-mile radius of the airports. There are over 300,000 people located within five miles of at least one airport in the county.

Top 5 Community Land Use In Tornado Vulnerabilities	
Communications	
Community	Acres
Riverview	40
Romulus	31.5
Taylor	29
Gibraltar	29
Lincoln Park	21
Electrical Transmission Lines	
Community	Acres
Canton Township	243
Sumpter Township	210
Van Buren Township	191
Huron Township	95
Trenton	85
Manufactured Home Park	
Community	Acres
Van Buren Township	297
Canton Township	293
Huron Township	253
Sumpter Township	251
Romulus	159

Source: SEMCOG, Land Use in Southeast Michigan, 1990-2000, Specific to Wayne County, Excluding Detroit, April 2004

²⁹¹ National Transportation Safety Board, www.ntsb.gov, Aviation Database Query, Wayne County, Michigan, report generated September 19, 2005.

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Automobile accidents occur several times daily in the county and can occur anywhere in the county. Wayne County averaged 54,042 traffic accidents in 2016-2017; of these an average of 164 each year involved fatalities.²⁹² The impact to the public from private automobile accidents is primarily limited to the individuals and families of those involved in the accident. However, the secondary impacts, whether permanent or transient, to traffic systems and roadway structures can affect a much greater number of people.

On average there are 13 recorded railroad accidents each year in Wayne County.²⁹³ The majority of these recorded incidents involve minor derailments, most often on private property, and resulting in only mechanical damage to the train or its cars. Two accidents involved collisions between trains and passenger vehicles at level grade crossings. Areas adjacent to railroads are most vulnerable to a railroad accident. The locations of railroads, police stations, fire stations, and critical vulnerable assets in the county are included in Figure 25.

Winter Hazards

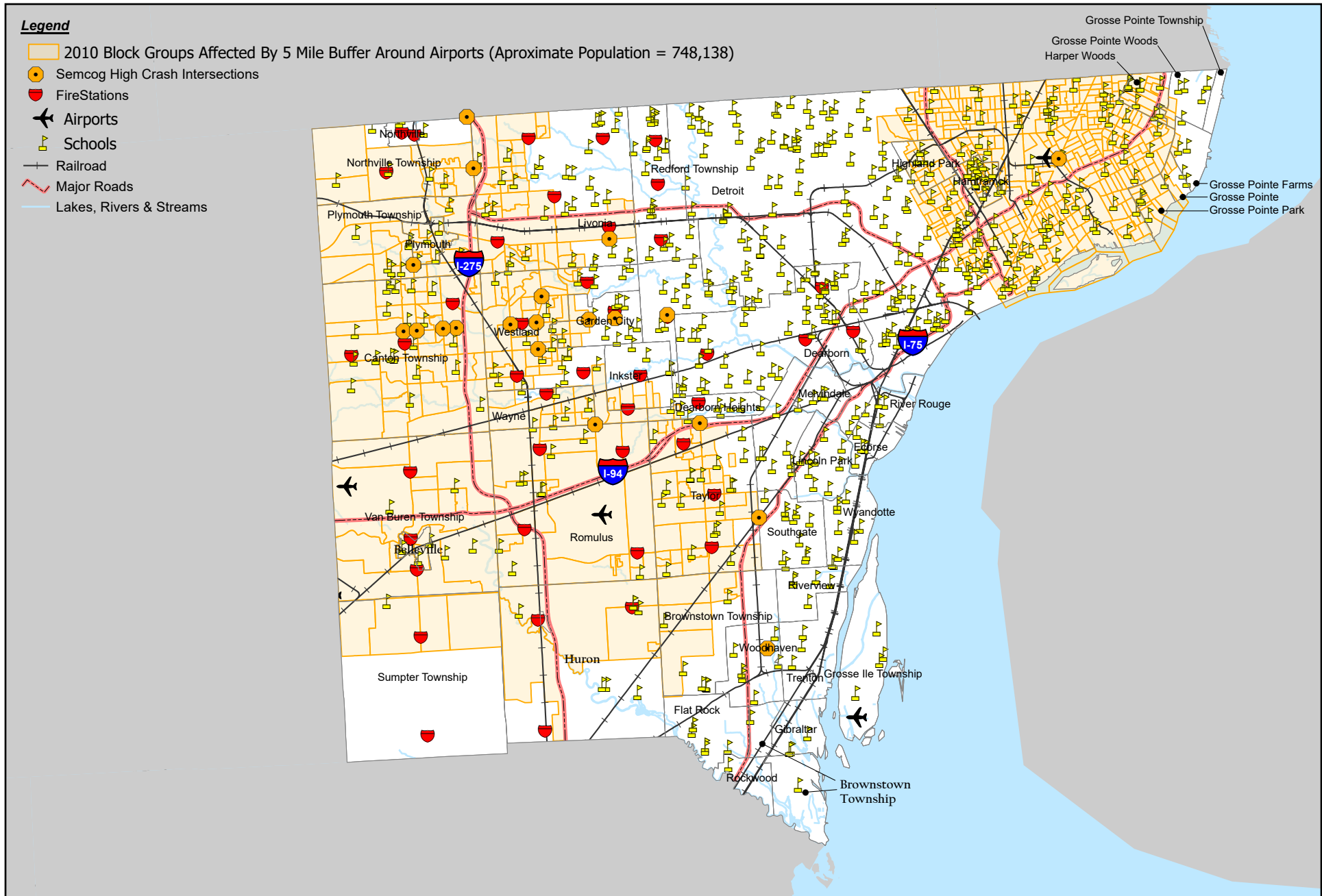
Michigan averages one major snow or winter storms every other year and one major ice and sleet storm event annually.²⁹⁴ Communications and utilities are vulnerable to winter hazard events and would include such companies as DTE Energy, Consumers Energy, AT&T, Charter Communications, Comcast, local television networks, local radio networks, and communication towers – local emergency services and cell phone service providers.) Bridges and major roadways are vulnerable in that most incidents related to winter hazards are secondary effects such as auto accidents. Public facilities such as road yards (road commission and MDOT) are vulnerable assets in snow removal and road salt services.

Top 5 Community Land Use In Wayne County, Excluding Detroit – Winter Hazard Vulnerabilities	
Communications	
Community	Acres
Riverview	40
Romulus	31.5
Taylor	29
Gibraltar	29
Lincoln Park	21
Electrical Transmission Lines	
Community	Acres
Canton Township	243
Sumpter Township	210
Van Buren Township	191
Huron Township	95
Trenton	85
Utilities	
Community	Acres
Trenton	150
River Rouge	110
Romulus	66
Dearborn Heights	63
Westland	57
<i>Source: SEMCOG, Land Use in Southeast Michigan, 1990-2000, Specific to Wayne County, Excluding Detroit, April 2004</i>	

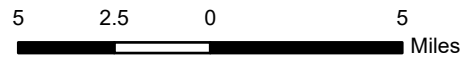
²⁹² MLive Public Records Search, May 1, 2019.

²⁹³ Federal Railroad Administration, <http://safetydata.fra.dot.gov>, all reports for all railroads in Wayne County, 1999 through December 2005, reports generated on December 13, 2005.

²⁹⁴ Michigan Department of State Police, Emergency Management Division, *Michigan Hazard Analysis*, April 2012.



Wayne County



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 Data Source: City of Dearborn (2013), Michigan CGI (2013),
 ArcGIS Online

Figure 25- Vulnerabilities:
 Transportation Arteries

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During major events, schools are likely to close and hospitals are likely to see an increase in patients with ailments such as heart attacks from overexertion and auto accident injuries. Police and fire stations are vulnerable to emergency response activities related to winter hazard incidents. Private or governmental tree removal services are also vulnerable to winter hazards. The locations of major highways, schools, hospitals, and fire department headquarters are included on Figure 26, along with utility land use locations.

5.4.2 Specific Local Vulnerabilities

A draft version of this Plan was submitted to FEMA for review in early 2020. FEMA responded that additional information was required for the following hazards: Urban Flooding, Erosion, Subsidence, Dam Failure Extreme Cold / Heat, and Drought.

To improve the presentation of information concerning these specific hazards and the vulnerability of each community to these and other hazards, a third survey was provided to community representatives. The results of that survey, identifying community assets or locations specifically vulnerable to these hazards and the reasons for their vulnerability are presented in Table 6.

For the most part, all Wayne County communities are vulnerable to the same natural, technological, and human-caused hazards. There are some differences however based upon infrastructure, land cover, proximity to the Great Lakes and Detroit River and hazard history. Specifically, hazards for which particular communities are at greater risk include, drought, wildfire, lakeshore flooding and erosion, flooding due to dam failure, and subsidence/sinkholes. Additional information regarding which communities are at-risk from each of the individual hazards reviewed is provided in Table 7.

5.4.3 Future Assessment

The majority of this Hazard Mitigation Plan focuses upon current hazards, and the locations and populations within Wayne County vulnerable to those hazards. Anticipated changes in population and land use within the county, however, allow some prediction of how these hazards and vulnerabilities may also change over time. Review of growth trends and predictions for Wayne County and southeast Michigan identify the following four hazard categories as particular concerns to be considered by Wayne County officials. These are discussed in order of the hazard and risk rankings determined by the Advisory Committee.

Extreme Temperatures

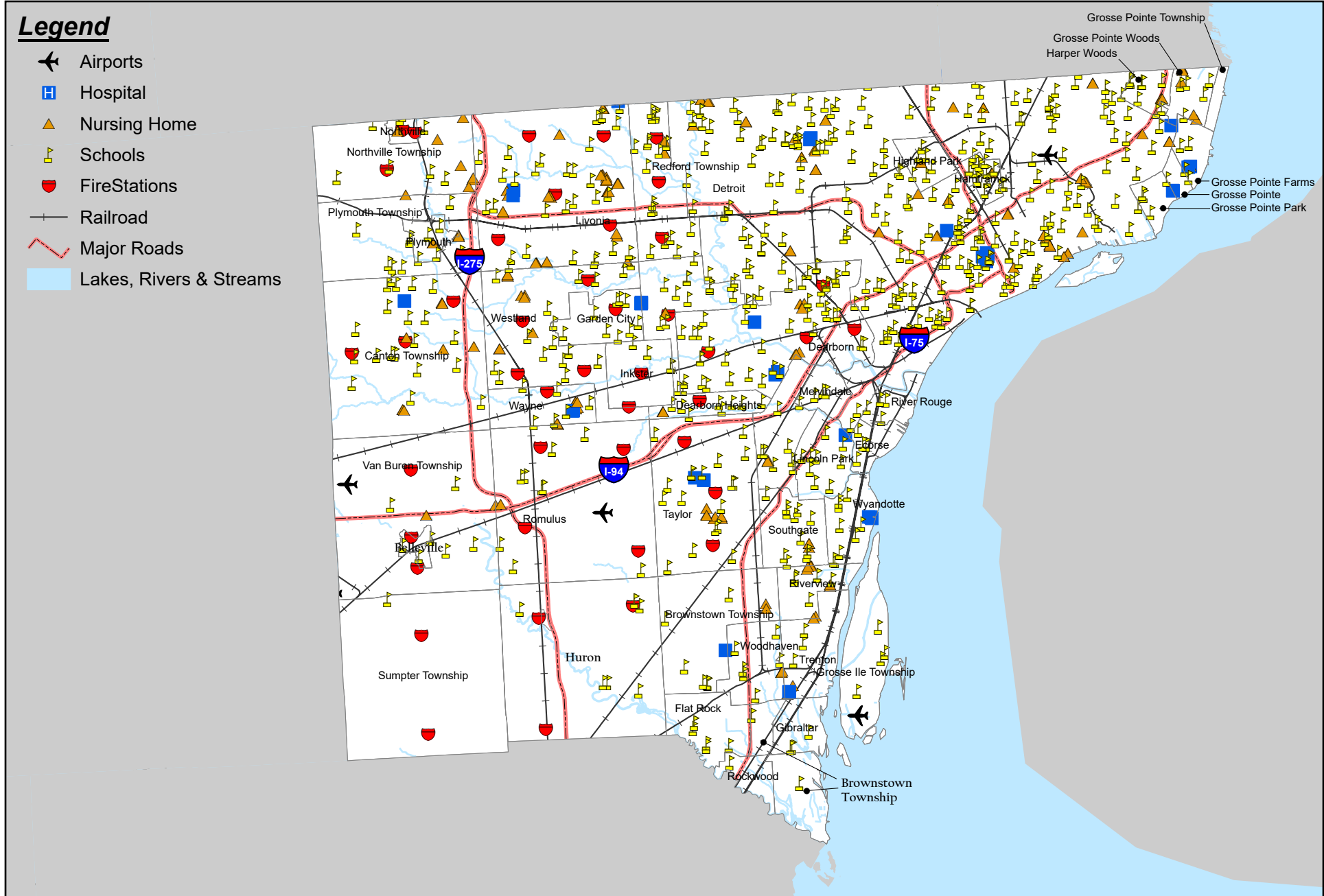
The population of Wayne County and much of southeast Michigan is aging. Between 2015 and 2045, the percentage change in people 65 to 84 years of age and those older than 84 are estimated at 37.9 and 65.4 percent, respectively, whereas most younger cohorts are expected to shrink. Over 231,245 people, will be of retirement age; an

Table 6. Community Identified Problem Areas and Assets at Risk of Urban Flooding, Erosion, Subsidence, Extreme Temperatures, and Pandemic

Urban Flooding			
Municipality	Name of Facility/Location	Address	Reason(s) for Vulnerability to this Hazard
City of Allen Park	Northwest Allen Park	Area of Southfield Freeway (M39) and Outer Drive	Ecorse Creek regularly overflows its banks, flooding homes and businesses
Canton Township	Haggerty Road	Haggerty Road North and South of Cherry Hill Road	Past occurrences, undersized/blocked drains
	Sheldon Road	Sheldon Road North of Ford Road	Past occurrences, Storm infrastructure requires maintenance
	Wayside Drive	41569 Wayside Drive and surrounding properties	Past occurrences, Storm infrastructure requires maintenance
	Lotz Road	Lotz Road at Finley	Past occurrences, overgrown drain requires maintenance
City of Dearborn Heights	Dept of Public Works Building	24600 Van Born Road	The building location is in a close proximity to the Ecorse Creek that floods after with large amounts of rainfall.
	Richard A Young Recreation Building	5400 McKinley	The building location is in a close proximity to the Ecorse Creek that floods after with large amounts of rainfall.
	Eton Senior Citizen Building	4900 Pardee	The building location is in a close proximity to the Ecorse Creek that floods after with large amounts of rainfall.
	Rouge Valley Sewage Disposal System, Lift Station 1A	21100 Ford Road (Hines Drive)	Flood Plain - Aging Infrastructure
	Dearborn Heights CSO Retention Treatment Basin	23800 Edward Hines Drive	Flood Plain - Aging Infrastructure
	LeBlanc Pumping Station (#1 Sanitary Arm)	5600 Jackson Street	Aging Infrastructure
	Banner Ave. Pumping Station (Lateral #94)	24312 Amherst	Aging Infrastructure
City of Ecorse	Jefferson Corridor	W Jefferson from the south city limit to Outer Drive	High Detroit River levels are threatening this commercial/recreation area. Areas are at risk due to location and elevation.
	Residential Areas	Along Ecorse Creek from Detroit River confluence through the City	High Detroit River levels impact flooding of Ecorse Creek. Large residential areas in City within the 100-year floodplain. At risk due to location and elevation
City of Flat Rock	Huroc Park & Huroc Park Dam	Atwater and Huron River Drive, 1 block west of Telegraph Road	Seasonal runoff can raise water levels up to 10 feet
City of Grosse Pointe	Norbert Neff Memorial Park	17350 Jefferson Avenue	Shoreline of Lake, St. Clair
City of Grosse Pointe Park	Edgemont Park Road	This street has catch basins draining to Lake St. Clair	With the high lake levels this street will flood. We are in the process of getting Duckbill valve and pump back to lake
City of Inkster	Inkster CSO Retention Treatment Basin	2001 Inkster Road	Flood Plain - Aging Infrastructure
City of Livonia	42-inch Diam. Elevated Sanitary Sewer	Section #13: 16575 Harrison Road	Tarabusi Creek Crossover - Location
	10-inch Diam. Elevated Sanitary Sewer	Section #16: 15990 Alpine	Bell Creek Crossover - Location
	Iyil Wyld Golf Course	35780 5 Mile Road	Adjacent to Bell Creek (sections may flood due to heavy rainfall) - past occurrence
	Rouge Valley Sewage Disposal System, Livonia Retention Basin	14577 Inkster Road	Aging Infrastructure
City of Plymouth	One Under Bar & Grill	35550 5 Mile Road	Adjacent to Bell Creek (portion of lower parking lot floods on heavy rainfall) - past occurrence
	Tonquish Creek Nature Walk	354 S. Harvey	Past occurrence
	Lions Club Park	575 Burroughs	Past occurrence
	Sheldon Road Rail Road Underpass	Sheldon Road, between Goldsmith and Plymouth Oaks	Past occurrence
Redford Township	Redford CSO Retention Treatment Basin	16100 Lotz Drive	Flood Plain - Aging Infrastructure
City of River Rouge	River Rouge CSO Retention Treatment Basin	10120 W Jefferson	Aging Infrastructure
City of Southgate	Southgate Wyandotte Drain District	Over 8,000 addresses in Southgate (see Wayne County records)	Aging infrastructure and location relative to the Downriver Plan
City of Taylor	Monroe Street Storm Lateral	6875 Monroe Boulevard	Aging Infrastructure
	E.C.P.A.D. #3 Storm Pond	6691 Cherokee	Aging Infrastructure
	E.C. Storm Relief Basin (Goddard Basin)	20590 Goddard Road	Aging Infrastructure
	E.C. Sanitary Retention Basin (Taylor Basin)	20195 Trolley Industrial Road	Aging Infrastructure
City of Trenton	Beaumont Hospital - Trenton	5450 Fort Street	Near low point of Frank and Poet Drain in Trenton
City of Wyandotte	Southgate-Wyandotte Relief Drains Drainage District, CSO Retention Treatment Facility	767 Central	Aging Infrastructure; Detroit River high water levels
	Southgate-Wyandotte Relief Drains Drainage District, Pump Station No. 5	767 Central	Aging infrastructure; Detroit River high water levels
	Southgate-Wyandotte Relief Drains Drainage District, Pine St. Pump Station	61 Pine	Aging infrastructure; Detroit River high water levels
Erosion			
Municipality	Name of Facility	Address	Reason(s) for Vulnerability to this Hazard
Canton Charter Township	River Rouge (Canton Township)	Rouge River, Denton Road to Hannan Road	Multiple locations of eroded banks and bridges
City of Ecorse	City of Ecorse Row Club	4603 W Jefferson Ave.	Aging/failing seawall structure. This property is along the Detroit River
	City of Ecorse Boat Launch	W Jefferson Avenue (parcel 34-013-99-0019-000)	Aging/failing riprap revetment. This property is along the Detroit River
	City of Ecorse Dingell Park	4459 W Jefferson Avenue	Aging/failing seawall structure near pavilion. This property is along the Detroit River
	Ecorse Creek	Throughout City	Streambank failures throughout the city
City of Grosse Pointe Park	Windmill Pointe Park (GP Park)	14920 Windmill Pointe Drive	Catch basins are attached to a 12" line that goes out to the Cana
	Patterson Park	16002 Essex Avenue	This property runs along Lake St. Clair. Erosion is quite extensive to the Board Walk. Exposed Electrical Conduit is showing where the water is eroding. All concrete is eroding to a point that 10" lumber supports and the lights' concrete footings are exposed.
City of Livonia	Sanitary Sewer Main Infrastructure (Livonia)	North of Intersection at Sunnyside / Inkster Road	Bell Creek floods and make have trees fall, creating issue with existing sanitary sewer main and infrastructure
City of Plymouth	Tonquish Creek Nature Walk	354 S Harvey	Past occurrence
	Lions Club Park	575 Burroughs	Past occurrence
City of River Rouge	Zug Island (River Rouge)	1300 Zug Island Road	Located on Detroit River. Great Lakes steel is closing. Island remains idle for now
	Belanger Park	1 Belanger Drive	Located on the Detroit River. Possible with high water in future
Subsidence/Sinkholes			
Municipality	Name of Facility	Address	Reason(s) for Vulnerability to this Hazard
Canton Charter Township	Fellows Creek	2936 S Lotz Road	Sink hole east of Lotz Road due to failure of storm drain from the parking lot
Dam Failure			
Municipality	Name of Facility	Address	Reason(s) for Vulnerability to this Hazard
City of Flat Rock	Huroc Park & Huroc Park Dam	Corner of Atwater & Huron River Drive, 1 block west of Telegraph Road	Old structure & seasonal congregations of people
	French Landing Dam & Powerhouse	Van Buren	Loss of power at the dam could result in flooding of southern 1/3 of the city of Flat Rock
City of Livonia	Newburgh Road over Rouge River Bridge (Livonia)	Newburgh Road, South of Plymouth of Road	Structure ID: 823994, 3100100B01. Concern with erosion exposing riprap at wingwalls
City of Plymouth	Sanitary Sewer Interceptor	Parallel to Hines Drive	Location in Rouge Valley downstream of Wilcox Lake Dam
	Sanitary Sewer Conn. At Plymouth Rd	Hines Drive and Plymouth Road	Location in Rouge Valley downstream of Wilcox Lake Dam
	Sanitary Sewer Conn. At Park Dr	Hines Drive and Park Drive	Location in Rouge Valley downstream of Wilcox Lake Dam
	Sanitary Sewer Conn. At Riverside D	Hines Drive and Riverside Drive	Location in Rouge Valley downstream of Wilcox Lake Dam
	Sanitary Sewer Conn. At Industrial Dr	Hines Drive and Industrial Drive	Location in Rouge Valley downstream of Wilcox Lake Dam
Extreme Temperatures			
Municipality	Name of Facility	Address	Reason(s) for Vulnerability to this Hazard
Brownstown Township	Elmcroft of Downriver	19697 Allen	Past occurrence of power outage and lack of air conditioning/heat
	Brownstown Forest View Assisted Living	19341 Allen	Past occurrence of power outage and lack of air conditioning/heat
Canton Charter Township	Canton Club 55+	46000 Summit Parkway	Senior Center
	Canton Place	144505 Ford Road	Senior Housing
	Wallowood	42500 and 42600 Cherry Hill Road	Senior Housing/Memory Care/Assisted Living
	Walton Wood Carriage Park	2000 Canton Center	Assisted Living
	Walton Wood Carriage Park	2250 Canton Center	Senior Housing
	Canton Crossings Assisted Living	1474 N Sheldon Road	Assisted Living
	Glen Abbey Assisted Living	445 N Lotz Road	Assisted Living
	Crystal Creek Assisted Living	8121 N Lilly Road	Assisted Living
	Embrace Group home	6934 N Canton Center Road	Assisted Living
	Serenity Manor of Canton	48410 Gyle Road	Assisted Living
	Regency Nursing	45900 Geddes	Nursing facility
	Heartland Healthcare	7025 N Lilley	Nursing facility
	Beaumont Canton	7300 Canton Center	Urgent Care/Emergency Department
	St. Joseph Canton	1600 Canton Center	Urgent Care/Emergency Department
City of Dearborn Heights	Heartland Healthcare Facility	26001 Ford Road	Nursing Care Facility
	Imperial Health Care Center	26505 Powers	Nursing Care Facility
	American House-Deaorbom Heights	26600 Ann Arbor Trail	Assisted Living Facility
City of Ecorse	The Ecorse Manor	4500 9th Street	Aged
	Miles Senior High Rise	307 Salliette	Aged
	Senior Center	4072 W. Jefferson Avenue	Aged
City of Flat Rock	Flat Rock Towers	28794 Telegraph Road	96 units (6 stories) for elderly w/ limited additional apts for younger physically disable persons
City of Garden City	Garden Towers	6120 Middlebelt	Senior high-rise building, aged residents
City of Gibraltar	Gibraltar Manor	14486 Middle Gibraltar Road	Senior Apartments, Elderly vulnerable population
	Group Home	30443 W. Jefferson Avenue	Mentally & Physically Handicapped Resident
	Group Home	14466 Middle Gibraltar Road	Mentally & Physically Handicapped Resident
City of Grosse Pointe Woods	Sunrise	21260 Mack Avenue	Elderly population-Assisted Living
	Sunrise	1850 Vernier Road	Elderly population-Assisted Living
	The Rivers	900 Cook Road	Elderly population-Assisted Living
	Van Elslander Cancer Center	19229 Mack Avenue	Cancer patients undergoing treatments
City of Harper Woods	Advantage Living Center	19840 Harper Avenue	Age of population/Compromised health status
	Park Place Towers of Harper Woods		Age of population/Compromised health status
City of Livonia	McNamara Towers	19300 Purlingbrook	Aged population
	William W. Brashear Towers	17841 N. Laurel Drive	Aged population
	Ziegler Place	30001 St. Martins Street	Aged population
City of Plymouth	Tonquish Creek Manor	1160 Sheridan Street	Aged population
	Medlodge of Plymouth	395 W Ann Arbor Trail	Nursing Home/Aged population
	Plymouth Inn	205 Haggerty Road	Nursing Home/Aged population
	SKLD Plymouth	105 Haggerty Road	Nursing Home/Aged population
Plymouth Township	Independence Village	14707 Northville Road	Large population of the elderly

Redford Township	Bradbury Park Homes	40185 Newport Road	Large population of the elderly	
	Minock Meadows	26600 Schoolcraft Road	Senior citizen residential community	
	Coventry Place	24200 Cathedral Street	Senior citizen residential community	
	Village of Redford (PVM)	25300 Six Mile Road	Senior citizen residential community/rehab center	
City of River Rouge	Redford Community Center	12121 Hemingway Street	Senior Center programs/activities	
	RENO Building	10593 W. Jefferson	Aged population	
City of Riverview	Sumbly Senior Center	240 Visger	Aged population	
	Belle Fountain Nursing Home	18591 Quarry Road	Aged and Vulnerable Population & Rehabilitation Facility	
	Arias Health Care	13840 King Road	Aged and Vulnerable Population	
	Rivergate Convalescent	14041 Pennsylvania	Aged and Vulnerable Population	
	Rivergate Terrace	14141 Pennsylvania	Past occurrence and aged, and vulnerable population	
	American House	20300 Fort Street	Rehabilitation Facility/Aged/Vulnerable Population	
	King Haven Manor	14800 King Road	Aged and Vulnerable Population	
	Carolyns Corner	17890 Parkridge	Aged and Vulnerable Population	
	Forest Estate Senior Residence	20487 Coachwood	Aged and Vulnerable Population	
	Michigan House Senior Living	18533 Quarry	Aged and Vulnerable Population	
	Mulberry Senior Residence	17928 Mulberry	Aged and Vulnerable Population	
	Rosetta Bella Casa	18213 Yorkshire	Aged and Vulnerable Population	
	Samaritan Group Homes	17090 Ray	Aged and Vulnerable Population	
	Coachwood Group Home	20287 Coachwood	Aged and Vulnerable Population	
	AHS Community SCS	19333 Coventry	Aged and Vulnerable Population	
	Bella/Generations HC	12621 Hale	Aged and Vulnerable Population	
	Ray Street Group Home	18787 Ray	Aged and Vulnerable Population	
	Stratford Street Group Home	13944 Stratford	Aged and Vulnerable Population	
	City of Taylor	Regency	12575 Telegraph Road	Nursing Home
Lodges of Taylor		22950 Northline Road	Nursing Home	
Medlodge		23600 Northline Road	Nursing Home	
American House		25250 Eureka Road	Elderly Assisted Living	
City of Trenton	The Commons	26121 Eureka Road	Elderly Assisted Living	
	Numerous groups homes in the city		Physically and Mentally Challenged and/or Elderly Population	
City of Wayne	Trenton Towers Co-op Apartments	2645 Riverside Drive	205 units with senior living apartment	
City of Wyandotte	Wayne Towers	35200 Sims Road	Aged population	
	Newberry Square	35340 W. Michigan Avenue	Aged population / past occurrences of HVAC failure	
	Advantage Living	4427 Venoy	Nursing Home	
	Beaumont Wayne	33155 Annapolis	Hospital	
	Maple Manor	3999 Venoy	Nursing Home	
	Pine Creek Manor	34330 Van Born Road	Nursing Home	
	Westchester Towers	35700 & 35800 W. Michigan Avenue	Large Apartment Complex	
	Wyandotte Co-op	2455 Biddle Avenue	Elderly population. 10 story building	
	Bishop Co-op	2651 Biddle Avenue	Elderly population. 8 story building	
	Downriver Waste Water Treatment Facility	797 Central	Water treatment facility serving Detroit Downriver community	
City of Wyandotte	City of Wyandotte Water/Power Plant	2555 Van Alstyne	Central Power Plant	
	Wyandotte Early Childhood Development	2609 10th Street	Development Center for early child care, ages 6mos.-6 year	
	Jo Brighton Skills Center	4460 18th Street	Special needs students, juvenile to adult age	
Lincoln Center	891 Goddard Road	Special needs students, juvenile to adult age		
Pandemic Municipality	Name of Facility	Address	Reason(s) for Vulnerability to this Hazard	
City of Allen Park	Heartland Healthcare	9150 Allen Road	Nursing Home, patients in poor health housed in close quarters	
	Maple Heights	4600 Allen Road	Assisted Living, residents in poor health housed in close quarters	
	Palush Senior Housing	17000 Champaign	Senior Housing, residents in poor health housed in close quarters	
Browntown Township	Henry Ford Hospital Brownstown	23050 West Road	Insufficient PPE equipment and other resources such as testing kits needed to treat vulnerable population	
	Elmcraft of Downriver	19697 Allen	Insufficient PPE for vulnerable population and protection of first responder	
	Brownstown Forest View Assisted Living	19341 Allen Road	Insufficient PPE for vulnerable population and protection of first responder	
	Brownstown Fire Department	24150 Stibley	Insufficient PPE for vulnerable population and protection of first responder	
	Brownstown Police Department	23125 King Road	Insufficient PPE for vulnerable population and protection of first responder	
	Kroger	23849 West Road	Critical facility providing necessary goods to sustain public, subject to contamination and civil disorder from lack of stock	
Canton Charter Township	Kroger	20645 Gibraltar	Critical facility providing necessary goods to sustain public, subject to contamination and civil disorder from lack of stock	
	Canton Club 55+	46000 Summit Parkway	Senior Center	
	Canton Place	44505 Ford Road	Senior Housing	
	Waltonwood	42500 and 42600 Cherry Hill Road	Senior Housing/Memory Care/Assisted Living	
	Walton Wood Carriage Park	2000 Canton Center	Assisted Living	
	Walton Wood Carriage Park	2250 Canton Center	Senior Housing	
	Canton Crossings Assisted Living	1474 N Sheldon Road	Assisted Living	
	Glen Abbey Assisted Living	445 N Lotz Road	Assisted Living	
	Crystal Creek Assisted Living	8121 N Lilly Road	Assisted Living	
	Embrace Group home	6934 N Canton Center Road	Assisted Living	
City of Ecorse	Serenity Manor of Canton	48410 Gyde Road	Assisted Living	
	Regency Nursing	45900 Geddes Road	Nursing facility	
	Heartland Healthcare	7025 N Lilly Road	Nursing facility	
	Beaumont Canton	7300 Canton Center Road	Urgent Care/Emergency Department	
	St. Joseph Canton	1600 Canton Center Road	Urgent Care/Emergency Department	
	The Ecorse Manor	4560 9th Street	Aged, vulnerable populations	
	Miles Senior High Rise	307 Sallotte	Aged, vulnerable populations	
	Senior Center	4072 W. Jefferson Avenue	Aged, vulnerable populations	
	City of Flat Rock	Flat Rock Towers	28794 Telegraph Road in Flat Rock	96 units (6 stories) for elderly w/ limited additional apts for younger physically disable persons
	City of Garden City	Garden Towers	6120 Middlebelt	Senior high-rise building, aged residents
City of Gibraltar	Gibraltar Manor	14486 Middle Gibraltar Road	Senior Apartments, Elderly vulnerable population	
	Group Home	30443 W. Jefferson Avenue	Mentally & Physically Handicapped Residents	
	Group Home	14466 Middle Gibraltar Road	Mentally & Physically Handicapped Residents	
	Carlson High School	30550 West Jefferson Avenue	High Density Population	
	Shumate Middle School	30551 West Jefferson Avenue	High Density Population	
	Parsons Elementary	14473 Middle Gibraltar Road	High Density Population	
	City of Grosse Pointe	Beaumont Hospital	Cadieux Road	High Density Population
City of Grosse Pointe Park	Beaumont Health Center (GP Park)	15200 Kercheval Avenue	Not open at this time	
City of Grosse Pointe Woods	Sunrise	Mack Avenue	Elderly-assisted living	
	Sunrise	Vernier Road	Elderly-assisted living	
	The Rivers	900 Cook Road	Elderly-assisted living	
	Van Elslander Cancer Center	19229 Mack Avenue	Cancer patients undergoing treatments	
	City of Harper Woods	Advantage Living Center	19840 Harper Avenue	Age/Compromised Health
City of Livonia	Park Place Towers of Harper Woods	19460 Park Drive	Age/Compromised Health	
City of Livonia	St. Mary Mercy Livonia	36475 Five Mile Road	Treating patients with the COVID 19	
	Marycrest Manor	15475 Middlebelt Road	Elderly Population	
	Marcrest Heights Apartments	15495 Middlebelt Road	Elderly Population	
	Marywood	36975 Five Mile Road	Elderly Population	
	Angel Gardens	38910 Six Mile Road	Elderly Population	
	Angela Hospice	14100 Newburgh Road,	Elderly Population	
	Arden Courts of Livonia	32500 Seven Mile Road	Elderly Population	
	Aspen Assisted Living	32406 Seven Mile Road	Elderly Population	
	Fountain Bleu	28910 Plymouth Road	Elderly Population	
	Felician Sisters	36800 Schoolcraft Road	Elderly Population	
	Heartland Health Care Center	28550 Five Mile Road	Elderly Population	
	Manoogian Manor	15775 Middlebelt Road	Elderly Population	
	Oakmont Livonia	14265 Middlebelt Road	Elderly Population	
	SKLD Livonia	29270 Morlock	Elderly Population	
	St. Jude	34350 Ann Arbor Trail	Elderly Population	
	Tranquil Place	34150 Hathaway	Elderly Population	
	Villa Marie	15131 Newburgh Road	Elderly Population	
	American House Livonia	11525 Farmington Road	Elderly Population	
	Woodhaven Retirement Community	29667 Wentworth Street	Elderly Population	
	Woodpointe Independent Senior Apts.	29667 Wentworth Street	Elderly Population	
	Livonia Woods Nursing & Rehab	33600 Luther Lane, Livonia	Elderly Population	
	Wellspring Lutheran Services	28910 Plymouth Road	Elderly Population	
	Aspen Assisted Living	32406 W. Seven Mile Road	Elderly Population	
	Michigan Assisted Living Association	15441 Middlebelt Road	Elderly Population	
	Regency Assisted Living	14900 Middlebelt Road	Elderly Population	
	Parkside of Livonia Indep. Senior Apts	28815 Jamison Street	Elderly Population	
	Trinity Park Senior Apartments	14666 Middlebelt Road	Elderly Population	
	Aletha B. Phipps Senior Apartments	14931 Farmington Road	Elderly Population	
	McNamara Towers	19300 Purlingbrook	Elderly Population	
	William W. Brashear Towers	17841 N. Laurel Drive	Elderly Population	
	Ziegler Place	30001 St. Martins Street	Elderly Population	
	Newburgh Village	11999 Newburgh Road	Elderly Population	
Silver Village	33780 Lyndon, Livonia	Elderly Population		
DaVita Dialysis	37240 Five Mile Road	Dialysis Center		
Fresenius Kidney Care Livonia	32424 Schoolcraft	Dialysis Center		

	Saint Mary Dialysis	14555 Levan Road	Dialysis Center
	Fresenius Kidney Center Botsford Park	28425 Eight Mile Road	Dialysis Center
City of Northville	Allen Terrace (City of Northville)	401 High Street	Aging/Vulnerable Population
	Star Manor	520 W. Main Street	Aging/Vulnerable Population
City of Plymouth	Tonquish Creek Manor (City of Plymouth)	1160 Sheridan Street	Aged population
	Medlodge of Plymouth	395 W Ann Arbor Trail	Nursing Home/Aged population
	Plymouth Inn	205 Haggerty Road	Nursing Home/Aged population
	SKLD Plymouth	105 Haggerty Road	Nursing Home/Aged population
	St. Joseph Mercy Arbor Health	990 W Ann Arbor Trail	Lab patient service center and multiple medical offices/clinic
Plymouth Township	Independence Village (Plymouth Twp)	14707 Northville Road	Large population of the elderly
	Bradbury Park Homes	40185 Newport Road	Large population of the elderly
Redford Township	Redford Town Hall (Redford Twp)	15145 Beech Daly Road	Government/Municipal facility
	Redford 17th District Court	15111 Beech Daly Road	Government/Municipal facility
	Redford Police Department	25833 Elsinore Street	Government/Municipal facility
	Redford Public Service Building	12200 Beech Daly Road	Government/Municipal facility
	Redford Ice Arena	12400 Beech Daly Road	Government/Municipal facility
	Redford District Library	25320 Six Mile Road	Government/Municipal facility
	Redford Community Center	12121 Hemingway Street	Government/Municipal facility
	Redford Fire Department	24251 Acacia Street	North Station & South Station facilities
	Detroit Diesel Corporation	13400 W. Outer Drive	Manufacturing facility
	Redford Union School District	17715 Brady Street	Educational facilities (multiple locations - 7 buildings)
	South Redford School District	26141 Schoolcraft	Educational facilities (multiple locations - 7 buildings)
	Minock Meadows Senior Housing	26600 Schoolcraft Road	Senior citizen residential community
	Coventry Place Apartments	24200 Cathedral Street	Senior citizen residential community
	Village of Redford (PVM)	25330 Six Mile Road	Senior citizen residential community/rehab center
City of Riverview	Belle Fountain Nursing Home (Riverview)	18591 Quarry Road	Aged and Vulnerable Population & Rehabilitation Facility
	Arias Health Care	13840 King Road	Aged and Vulnerable Population
	Rivergate Convalescent	14041 Pennsylvania	Aged and Vulnerable Population
	Rivergate Terrace	14141 Pennsylvania	Past occurrence and aged, and vulnerable population
	American House	20300 Fort	Rehabilitation facility/Aged/Vulnerable Population
	King Haven Manor	14800 King	Aged and Vulnerable Population
	Carolyns Corner	17890 Parkridge	Aged and Vulnerable Population
	Forest Estate Senior Residence	20487 Coachwood	Aged and Vulnerable Population
	Michigan House Senior Living	18533 Quarry	Aged and Vulnerable Population
	Mulberry Senior Residence	17928 Mulberry	Aged and Vulnerable Population
	Rosetta Bella Casa	18213 Yorkshire	Aged and Vulnerable Population
	Samaritan Group Homes	17090 Ray	Aged and Vulnerable Population
	Coachwood Group Home	20287 Coachwood	Aged and Vulnerable Population
	AHS Community SCS	19333 Coventry	Aged and Vulnerable Population
	BellaIr/Generations HC	12621 Hale	Aged and Vulnerable Population
	Ray Street Group Home	18787 Ray	Aged and Vulnerable Population
	Stratford Street Group Home	13944 Stratford	Aged and Vulnerable Population
City of Rockwood	Ervin Brewer Apartments	22065 Huron River Drive	Aged - Senior Citizens Apartments
City of Southgate	Advantage Living Center	15400 Trenton	Aged or otherwise vulnerable populations
	American House	16333 Allen Road	Aged or otherwise vulnerable populations
	Meadows of Southgate	16201 Allen Road	Aged or otherwise vulnerable populations
	Southgate Co-Op	11255 Allen Road	Aged or otherwise vulnerable populations
	Deaconess Tower	16400 Dix-Toledo	Aged or otherwise vulnerable populations
City of Taylor	Regency	12575 Telegraph	Nursing Home
	Lodges of Taylor	22950 Northline	Nursing Home
	Medlodge	23600 Northline	Nursing Home
	American House	25250 Eureka	elderly assisted living
	The Commons	26121 Eureka	elderly assisted living
	Numerous groups homes in the city		physically and mentally challenged and numerous elder
City of Trenton	Beaumont Hospital - Trenton	5450 Fort Street	Hospital
	Trenton Towers Co-op Apartments	2645 Riverside Drive	205 units with senior living apartment
	Westfield Activities Center	2700 Westfield	Key Parks & Recreation Center capacity over 600
	Kennedy Recreation Center	3101 West Road	3 Ice Rinks capacity 4,000, outdoor Pool capacity over 800
	Trenton Public Schools: 1 High School 1 Middle School 2 Elementary Schools	various	At least 600 persons each on a school day
City of Wayne	Wayne Towers	35200 Sims	Aged population
	Advantage Living	4427 Venoy	Nursing Home
	Beaumont Wayne	33155 Annapolis	Hospital
	Maple Manor	3999 Venoy	Nursing Home
	Pine Creek Manor	34330 Vanborn	Nursing Home
	Westchester Towers	35700 & 35800 W. Michigan Avenue	Large Apartment Complex
	Newberry Square	35240 W. Michigan Avenue	Aged population
	Wayne Police Department	33701 E. Michigan Avenue	Police department / daily contact with public
	Wayne Fire Department	3300 S. Wayne Road	Fire department / daily contact with public, including sick people
City of Westland	American House	1660 S. Venoy	Vulnerable population
	American House	39201 Joy Rd	Vulnerable population
	American House	35700 Hunter	Vulnerable population
	Ashford Court	37501 Joy	Vulnerable population
	Our Savior's Manor	39495 Annapolis	Vulnerable population
	Villages of Westland	32001 Cherry Hill Rd.	Vulnerable population
	Thomas Taylor Tower	36500 Marquette	Vulnerable population
	Westgate Tower	34567 Elmwood	Vulnerable population
	Westhaven Manor	34601 Elmwood	Vulnerable population
	Four Chaplins Nursing	28349 Joy	Vulnerable population
	Four Seasons Nursing	8365 N. Newburgh	Vulnerable population
	Hope Convalescent	38410 Cherry Hill	Vulnerable population
	Westland Convalescent	36137 Warren	Vulnerable population
	Regency at Westland	2209 N. Newburgh	Vulnerable population
	Marquette House	36000 Campus Drive	Vulnerable population
	Villages of Westland-Rose Cottage	32111 Cherry Hill	Vulnerable population
	Villages of Westland-Ivy Cottage	32151 Cherry Hill	Vulnerable population
City of Wyandotte	Henry Ford Hospital-Wyandotte	2333 Biddle Avenue	Level 2 Trauma Hospital of the Henry Ford Health System
	Wyandotte Co-op	2455 Biddle Avenue	Elderly population. 10 story building
	Bishop Co-op	2651 Biddle Avenue	Elderly population. 8 story building
	Wyandotte Early Childhood Development	2609 10th Street	Development Center for early child care, ages 6mos.-6 year
	Theodore Roosevelt High School	540 Eureka Road	Public High School
	Woodrow Wilson Middle School	1275 15th Street	Public Junior High School
	Jefferson Elementary School	1515 15th Street	Kindergarten/Elementary children, age 5-11
	Washington Elementary School	1440 Superior Boulevard	Kindergarten/Elementary children, age 5-12
	Garfield Elementary School	340 Superior Boulevard	Kindergarten/Elementary children, age 5-12
	Monroe Elementary School	1501 Grove	Kindergarten/Elementary children, age 5-14
	Wyandotte Early Childhood Development	2609 10th Street	Development Center for early child care, ages 6mos.-6 year
	Jo Brighton Skills Center	4460 18th Street	Special needs students, juvenile to adult age
	Lincoln Center	891 Goddard Road	Special needs students, juvenile to adult age
	ChristNet Homeless Shelter	3051 4th Street	Temporary 24-hour shelter for homeless, serving 30 to 90 individual:



Wayne County

Created for: Wayne County
 Created by: RMH, April 24, 2020, ASTI Project 10943
 Data Source: City of Dearborn (2013), Michigan CGI (2013),
 ArcGIS Online

Figure 26 - Vulnerability Assessment:
 Winter Hazards

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increase of 55% since the 2010 census.²⁹⁶ Wayne County will need to prepare for the needs of a substantially older population.

Among the hazards considered in this planning process, extreme temperatures may be those with the greatest implications for the elderly. Specific vulnerabilities include heating and cooling shelters where older individuals without access to air conditioning or sufficient heating may be brought for care. The County's aging population may have additional planning implications for emergency response agencies in cases of structural fires and other hazards requiring evacuation.

Flooding

Non-tropical, billion-dollar, inland flood events have increased in the United States, including four separate billion-dollar inland flood events in 2016. This doubled the previous annual record, as no more than two of these events had occurred in a year since 1980. In 2019, the U.S. has again been impacted by two large-scale, inland flood events across several Midwestern and Southern Plains states. The scale of the damage is still being assessed but may be comparable to the historic 1993 Midwestern flood.

Also in 2017, Hurricane Harvey caused unprecedented amounts of rainfall (up to 60 inches) over Houston - one of America's largest cities. More than 30 inches of rainfall fell on 6.9 million people, while 1.25 million experienced over 45 inches and 11,000 had over 50 inches, based on 7-day rainfall totals ending August 31.

This perhaps should be expected, as heavy rainfall events and their ensuing flood risks are increasing because warmer temperatures are "loading" the atmosphere with more water vapor. Over time, this increases the potential for extreme rainfall events. And, where we build and how we build determines our resilience to the increasing risk of flood events.

Analysis conducted by the First Street Foundation to identify land parcels at risk of flooding was described in Section 4.7.2. Whether their models are better or worse than FEMA analysis is not the subject of this report; however, they have developed a tool that may be of use for Wayne County municipalities. It is an interactive map noting the numbers of at-risk parcels in 2020 vs projected numbers in 2050. Data are provided by zip code.²⁹⁷ Changes over time for different communities/zip codes differ due to the amount of area left in various communities that have not yet been built-out.

Infrastructure Failure

Although the Michigan legislature authorized new investment in our roads and bridges in 2015, the funds allocated are insufficient to fully address the needs within the system. Approximately 1,234 (11%) of the state's 11,156 bridges are deemed structurally

²⁹⁶ SEMCOG, *2045 Regional Development Forecast (RDF) Forecasted Population Change*, May 2019, <https://semcog.org/community-profiles#People>

²⁹⁷ Detroit Free Press, June 29, 2020. *First Street Foundation's flood assessment method finds 70% more parcels at flood risk nationwide than are noted by FEMA.* <https://www.freep.com/in-depth/news/local/michigan/2020/06/29/flood-risk-michigan-homes-map-first-street-foundation/3258043001/>

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deficient and the number of state-maintained bridges in poor condition is expected to increase by 50% between 2016 and 2033.²⁹⁸ A 2016 assessment of our roads indicates that 39% of Michigan's 120,000 miles of paved roadways are in poor condition. Transportation funds for road and bridge maintenance and improvements, and for maintaining existing transit services, are expected to fall \$17 billion short of projected needs over the next 30 years.²⁹⁹ Monies available for maintaining and improving sewers are, likewise, expected to fall \$14 to \$26 billion short of infrastructure needs.³⁰⁰ Wayne County communities may be especially hard hit by this lack of public funding as decreasing population and the loss of jobs within portions of Wayne County will result in few tax dollars with which to fund improvements.³⁰¹ Many of the same communities exhibiting these demographic trends of decreasing population and a loss of local jobs are the same as those that have some of the oldest existing infrastructure.

Transportation Accidents and Transportation Related Hazmat Incidents

Road congestion and traffic accidents are, and will continue to be, a particular concern in Wayne County. Within southeast Michigan, Wayne County is second only to Oakland County in the number and percentage of congested road miles. The Southeast Michigan Council of Governments (SEMCOG) has determined that 184.8 miles of road in Wayne County are congested. That equals 9% of the County's roadways, but over ¼ (26%) of the congested roads in the region.³⁰² There are more commuters driving Wayne County roads than in any of the other counties in southeast Michigan, with over 1 million people commuting within, into, or out of the County to get to work each day. Additionally, the Detroit-Windsor border crossing is the busiest truck crossing of either the Canadian or Mexican-U.S. borders.

As a result of the number of congested road miles and the number of vehicles, Wayne County has more traffic accidents than any other in southeast Michigan. Over forty-one percent (41%) of the crashes in southeast Michigan, and forty-four percent (44%) of the fatal crashes, occur in Wayne County.³⁰³ These statistics have implications for both the number of transportation accidents and the number of transportation related hazmat incidents in the County. Likewise, future trends (e.g., an aging population, population shifts to outlying communities/areas, continued growth in truck traffic across the Detroit-Windsor border, etc.) for the County may have implications for the potential future increased risk for these hazards.

As mentioned previously, by the year 2030 more than twenty percent (20%) of the population in the cities of Northville, Plymouth, Livonia, Redford, Westland, Garden City,

²⁹⁸ American Society of Civil Engineers (ASCE), Michigan Section. 2018 Report Card for Michigan's Infrastructure. infrastructurereportcard.org/michigan.

²⁹⁹ SEMCOG, *Land use Change in Southeast Michigan: Causes and Consequences*, March 2003, <http://www.semco.org/products/pdfs/LandUseChange.pdf>

³⁰⁰ Ibid

³⁰¹ SEMCOG, 2020 Regional Development Forecast: Population, Households and Employment for Cities, Villages, Townships and Detroit Subcommunities, April 1996, <http://www.semco.org/products/pdfs/rdf2020.pdf>

³⁰² SEMCOG, *Commuting in Southeast Michigan, 2000*, June 2003, <http://www.semco.org/products/pdfs/CommutingSEMI.pdf>

³⁰³ SEMCOG, *Traffic Crash Profiles for Southeast Michigan and Wayne County, 2004*. http://www.semco.org/website/transdata/reports/crash_profile.cfm

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Dearborn, Wayne, Taylor, Allen Park, Melvindale, Lincoln Park, Ecorse, Southgate, Riverview, Trenton, Flat Rock, Rockwood, Highland Park, Harper Woods, Grosse Pointe Woods, Grosse Pointe Shores, Grosse Pointe Shores, Grosse Pointe, and Gross Pointe Park, and Plymouth Township will be over the age of 65.³⁰⁴ Elderly drivers have the lowest crash rate per licensed driver. However, when comparing rates per mile driven, elderly drivers are approximately twice as likely to be involved in a crash and, due to increased fatality, about three times as likely to experience a fatal crash as non-elderly drivers.³⁰⁵

The amount of traffic experiencing congested conditions in southeast Michigan is expected to increase from twenty-three (23) percent, in 2000, to thirty-three (33) percent by the year 2025. Over the same time period truck traffic across the Detroit-Windsor border is estimated to increase by 158%.

The confluence of increasing road congestion, an aging population, and increased truck traffic presumably exacerbates the potential for transportation accidents, including accidents involving the transport of hazardous materials. As County officials review and plan improvements for those areas currently identified as problem intersections and roads, hazard mitigation should be included in the planning process.

Flooding – Urban/Riverine

Although many communities in Wayne County are older and more densely developed than other areas of southeast Michigan, and despite the fact that Detroit and inner core communities are experiencing reductions in population, households, and jobs, Wayne County saw a net increase of 13,400 acres of developed land between 1990 and the year 2000.³⁰⁶ During the same period, Wayne County lost forty-three percent (43%) of its remaining farm land.

Housing development trends for most of the region show a shift toward less dense development patterns. New subdivisions in St. Clair County, for example, use more than two acres of land, on average, for a single new housing unit. SEMCOG reports that the region as a whole grew by five (5) percent from 1990 to 2000. During the same period, developed land in southeast Michigan increased by seventeen (17) percent. SEMCOG's data shows that land in much of the region is being developed at a rate greater than three times that of population growth.³⁰⁷

New housing in Wayne County, by contrast, continues to maintain higher densities of three housing units to the acre on average. Continued higher density development within Wayne County, more sprawling development and higher population growth in neighboring, upstream communities, and the loss of agricultural land and other open space have the potential to increase and exacerbate flooding within Wayne County.

³⁰⁴ SEMCOG, *2030 Regional Development Forecast (RDF) Population by Age by Community*, September 2002, <http://www.semcog.org/products/pdfs/2030RDFAgeByCommunity.pdf>

³⁰⁵ ACTS Older Driver Toolkit. <http://townsafety.com/ACTSweb/ODT/Overview.htm>

³⁰⁶ SEMCOG, *Land use Change in Southeast Michigan: Causes and Consequences*, March 2003, <http://www.semcog.org/products/pdfs/LandUseChange.pdf>

³⁰⁷ Ibid

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SEMCOG predicts that the area covered by impervious surfaces (i.e. roads, parking lots, driveways, and rooftops) in the region will increase from fourteen (14) percent (2000) to twenty-four (24) percent in the future as communities build-out according to existing master plans. Exacerbating this increase in imperviousness is the corresponding loss of the existing “natural infrastructure” of woodlands and wetlands, farmland, and other open space, which serve to intercept, store, and return storm water to the atmosphere. Studies compiled from across the country demonstrate that increased imperviousness results in imbalances in hydrology and degradation of water quality and stream integrity.³⁰⁸

In an undeveloped landscape, most of the water falling as rain or snow is intercepted by the forest canopy, or other vegetation. This water is returned to the atmosphere through the processes of evaporation and transpiration without ever reaching the ground surface. Water that does reach the ground is able to percolate through the soil surface. Some of this water is utilized by plants and some continues to flow downward through the soil until it reaches the water table and recharges local groundwater supplies.

As the landscape is developed, the protective layer of trees, shrubs, and grasses are stripped away and replaced by hardened surfaces. When it rains, much more water reaches the ground surface than previously and this water is then unable to infiltrate through the soil surface. Instead it runs off of roofs and roads, often carried more quickly through piped drainage systems, to local stream, rivers, and lakes. The result is an expected increase in both the frequency and the magnitude of area flooding.

Studies show that the magnitude of peak-stream flow increases by a factor of two (2) to three (3) with low-level suburban development (10-20% impervious area). In highly urbanized areas, not only are the major peak flows amplified, but smaller storms, which previously produced no runoff under pre-development conditions, also generate substantial stream flows. Under these conditions, moderate to large storms result in storm discharge lasting 30 to 100 times longer than under pre-development conditions.³⁰⁹ Hydrologic modeling of these changes also shows that the frequency of flood producing storms increases, with the five-year (20% probability of occurring in any one year) flood peak increasing in frequency from nine- (9) to twenty-nine (29)- fold, so that the “five-year” storm becomes much more commonplace, occurring from 2 to 6 times per year.³¹⁰ The loss of forest cover in a watershed exacerbates these changes so that even low-density development, with minor increases in impervious cover, result in altered stream hydrology.³¹¹

Continued climate change will further exacerbate flooding. Scientists predict an increase in the number of extreme rainfall and storm events, leading to more flooding throughout

³⁰⁸ Schueler, T.R., 1994. The Importance of Imperviousness. *Watershed Protection Techniques* 1(3):100-111.

³⁰⁹ Booth, D.B. 1990. Stream-Channel Incision Following Drainage-Basin Urbanization. *Water Resources Bulletin* 26(3): 407-417.

³¹⁰ Ibid

³¹¹ Booth, D.B., Hartley, D., and R. Jackson. 2002. Forest Cover, Impervious Surface Area, and the Mitigation of Stormwater Impacts. *J. Am. Water Res. Assoc.* 38(3): 835-845.

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the Midwest and costing taxpayers as much as \$480 million annually just to adapt stormwater systems to handle the increased runoff.³¹²

Approximately forty-nine percent (49%) of Wayne County's population lives within the Rouge River Watershed. The Ecorse Creek and Combined Downriver Watersheds and areas draining directly to Lake St. Clair are home to an additional thirty-four percent (34%) of Wayne County residents. These areas, particularly portions of the Rouge and the North Branch of Ecorse Creek, already experience severe flooding. Studies and storm water management initiatives to reduce flooding for these areas are underway; however, existing land use patterns and future land development make these efforts and uphill battle. Additional flooding will likely occur not only in areas currently identified as problem flood zones but, because population growth is expected to be concentrated in outlying headwater areas, it may also be expected to occur in areas that currently exhibit no problem flooding.^{313,314}

³¹² USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018

³¹³ SEMCOG, *Comparing 2000 Census and 2030 Regional Development Forecast by Watershed*, July 2002, <http://www.semcog.org/products/pdfs/watershedreport.pdf>

³¹⁴ SEMCOG, *Land use Change in Southeast Michigan: Causes and Consequences*, March 2003, <http://www.semcog.org/products/pdfs/LandUseChange.pdf>

6. Hazard Mitigation

6.1 Goals and Objectives

The following five goals were selected by the Advisory Committee in 2013 and were confirmed as goals to focus mitigation activities under this (2019) Plan:

1. Protect and preserve human health and well being
2. Maintain and fortify critical assets, structures and infrastructure to preserve the quality of life.
3. Insure Interagency cooperation and coordination for preparedness
4. Enhance emergency response capabilities (including and especially communications)
5. Review and improve county-wide contingency plans for maintaining quality of life

6.1.1 *Mitigation Selection Criteria*

The Advisory Committee developed the evaluation criteria used for the selection of mitigation strategies. The 2013 evaluation criteria were reviewed and additional potential evaluation criteria were identified and discussed during the second workshop in 2019. The Advisory Committee voted selected the top five criteria listed below; weighting them using the method of paired alternatives to provide the weighting factor listed below.

Criteria (Weighting in parentheses):

- Ability to accomplish (22)
- Technical Feasibility (20)
- Cost Effectiveness (19)
- Availability of Funding (18)
- Effectiveness of strategy (including downside of risk) (14)

6.2 Survey Results

The second survey presented 201 mitigation alternatives organized by the hazard addressed by each strategy, as discussed in Section 2. Responses to open-ended survey questions generated an additional 50 strategies for a total of 251 mitigation strategies for discussion by the Advisory Committee during the Second Workshop. The results of the survey were ranked based on the number of respondents that indicated a strategy was important or very important. The ranking was used by participants to prioritize the strategies during the workshop.

The top-ranked strategies for consideration received an average rating of 3.8 (16 strategies). All strategies were presented with their associated ranking for consideration by the Advisory Committee. Discussion during the workshop resulted in sixteen survey strategies for Action Plan consideration. These strategies are listed in Section 6.4.

6.3 Community Input

Each community identified potential mitigation strategies to address hazards within the community. Mitigation strategies outlined by each community are summarized in the discussion that follows.

6.3.1 Community Identified Mitigation Strategies

Each community discussed mitigation in different terms to address specific local needs.

The following describes the individual mitigation strategies identified by each community, along with the hazard addressed with that strategy. Strategies are listed in the order they were presented in the survey materials. These priorities and suggested mitigation strategies reflect local municipal concerns. Their inclusion within this County Plan does not necessarily imply County funding will be provided for these activities.

6.3.1.1 City of Allen Park

2013 Mitigation Strategies: 1) Provide additional funding for the replacement or relining of older sewer lines that back up and cause flooding within the city. Remove diseased or dead ash trees to prevent them from falling into Ecorse Creek and exacerbating flooding and sewer backups (Hazard Addressed: Urban Flooding, Riverine Flooding).

Progress since last update: Ongoing: Sewer lines being replaced or relined in priority order by contractor.

2) Provide funding for additional training of public safety personnel in responding to hazardous material emergencies (Hazard Addressed: Hazmat Incidents – Fixed Site and Transportation).

Progress since last update: Ongoing: All fire personnel trained in hazmat response and two staff persons have specialty training and are part of the regional HazMat Response Team.

3) Allocate funds to equip the city's community center so the facility can serve as an emergency shelter in case of a disaster that requires evacuation or relocation of citizens. Specifically, the need for back-up generator was mentioned (Hazard Addressed: Tornadoes/Severe Weather, Hazmat Incidents).

Progress since last update: Ongoing: New roof installed on community center, which serves as both morgue and shelter in event of disaster/emergency.

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2019 Mitigation Strategies: 1, 2, & 3 above) Allen Park Fire Department personnel indicate that progress has been made on all three of these actions but that they remain priorities until completed.

Person/Agency Responsible: Allen Park Fire Department

Known/Potential Funding: Engineering/Fire Dept general funds

Anticipated Completion Timeline: 2025

How action will be prioritized: Council budget process: Dept. budget process

6.3.1.2 City of Belleville

2013 Mitigation Strategies: 1) Provide back-up generators to be used during power failures especially at senior citizen facilities and the emergency shelter (Hazard Addressed: Severe Weather/Tornadoes).

Progress since last update: The City has succeeded in funding some backup generators but the need for more remains.

2) Upgrade or replace the current communication equipment; used by the public safety departments (Hazard Addressed: All). Progress since last update: Implementation of 800 MHz communication systems throughout the County has improved communications between communities.

2019 Mitigation Strategies: 1) Continue to provide back-up generator power in where lacking at senior citizen facilities (Hazard Addressed: Severe Weather/Tornadoes).

2) Continue improvements in communication systems and agreements between communities (Hazard Addressed: All).

Person/Agency Responsible: Belleville Police/Fire

Known/Potential Funding: General fund/grants

Anticipated Completion Timeline: 2023

How action will be prioritized: Council budget process

6.3.1.3 Brownstown Township

2013 Mitigation Strategies: 1) Provide funding for installation of new warning sirens and the repair and activation of existing sirens in the township (Hazard Addressed: Tornadoes/Severe Weather). Progress since last

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update: Completed. The Township now has 13 tornado sirens and also utilizes local radio stations and Nixle for emergency notifications.

2) Provide resources for continuous hazmat training (Hazard Addressed: Hazmat Incidents). Progress since last update: Staff have received ONGOING training, but this remains a goal moving forward.

3) Allocate funds to hire and/or train additional public safety personnel, especially for addressing mass emergencies such as tornadoes and hazmat accidents (Hazard Addressed: Tornadoes/Severe Weather). Progress: ONGOING

4) Activate Wayne County's resources at lower level of emergency in the township; responding to emergencies that require outside assistance (Hazards Addressed: All). Progress: ONGOING

2019 Mitigation Strategies:

Mitigation strategies 2, 3, and 4 above remain ongoing concerns The Township will continue these strategies as listed above.

5) Additionally, Brownstown Township will work with Wayne County, FEMA, the U.S. Army Corps of Engineers and others to address coastal flooding and erosion.

Person/Agency Responsible: Township & Wayne County

Known/Potential Funding: Grants

Anticipated Completion Timeline: 2025

How action will be prioritized: Council/County budget processes

6.3.1.4 Canton Township

2013 Mitigation Strategies:

1) Use comprehensive land use and transportation plans to establish policies regarding the placement and design of critical facilities and infrastructure. Assure that future development does not impede existing hazard mitigation and response activities (Hazards Addressed: All).

Progress since last update: The Township has constructed a third fire station since the 2013 HMP update and is considering adding a fourth. Additionally, The Township is redeveloping the Ford Road corridor to make sure that this heavily traveled roadway remains open and accessible for emergency vehicles.

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2) Plan for access to a back-up water supply to be used for public health and extended fire-fighting needs in the case of a drought or water system failure (Hazards Addressed: Fires, Severe weather – summer and winter, Health Emergencies, Infrastructure Failure).

Progress since last update: The Township has constructed a secondary supply tank for additional water storage. This task is considered completed.

3) Arrange for a method of “rolling blackouts” in electrical systems that are at risk of overloading (Hazards Addressed: Infrastructure Failure, Criminal Acts).

Progress since last update: The Township has been meeting with DTE to develop a Local Energy Assurance Plan (LEAP). It has not yet been adopted, but this is anticipated in 2020.

4) Review the feasibility of constructing concrete “safe rooms” in shelter areas in mobile home parks, fairgrounds, parks, shopping malls and other vulnerable areas (Hazards Addressed: Tornadoes/Severe Weather).

Progress since last update: The Township reports that there has been no progress on this initiative due to lack of funding and changes in priorities. It is not likely to remain a priority in the 2019 HMP update.

5) Pre-plan for debris removal after a hazard response event, including staging, storage and disposal (Hazards Addressed: All).

Progress since last update: The Canton Township Fire and Public Works Departments have been working together to conduct a damage assessment based upon past experiences and are beginning to develop the plan for debris removal and disposal.

6) Establish maintenance and improvement standards requiring that roads, bridges and driveways are sufficient for and are accessible to emergency vehicles and fire equipment (Hazards Addressed: All).

Progress since last update: This mitigation strategy was focused on a few narrower, private roads in the Township. A combination of tree trimming and use of smaller tankers, rather than hook and ladder trucks, have provided a solution to the problem. This strategy is considered completed.

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7) Create and revise public information materials on each hazard and warning system as it applies to the Township (Hazards Addressed: All).

Progress since last update: The Township continually works to improve their outdoor warning systems and communications. They now contract with Nixle and Everbridge to provide public and internal emergency notifications.

8) Facilitate and encourage the creation of escape plans and disaster supply kits for residents and businesses (Hazards Addressed: All).

Progress since last update: The Township's Emergency Manager and Fire Inspector work together to visit businesses throughout the Township, working with them to create and implement emergency preparedness plans. They have conducted these exercises with assisted living, other nursing/health care facilities, and churches, and now are reaching out to other businesses.

2019 Mitigation Strategies:

1) Township officials indicated that the hazard priorities and mitigated strategies listed above, with the exception of Numbers 2 and 6 which are considered complete, remain priorities for the 2019 HMP update. The other mitigation strategies are considered ONGOING. Additionally, Canton Township is working toward National Weather Service StormReady designation.

Person/Agency Responsible: Emergency Mgt/Fire Dept.

Known/Potential Funding: General fund & grants

Anticipated Completion Timeline: 2024

How action will be prioritized: Council budget process/grant availability

6.3.1.5 City of Dearborn

2013 Mitigation Strategies:

1) Provide public officials and citizens with better awareness regarding issues facing ethnic diversity within the community (Hazard Addressed: All).

Progress since last update: City officials, particularly Police Department personnel work with the Arab Community Center for Economic and Social Services (ACCESS) and local imams to conduct outreach and training concerning local emergency planning

2) Hire additional fire fighters and EMS personnel and provide funds for training those individuals as well as

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current public safety (Hazard Addressed: Fire/ Hazmat Incidents).

Progress since last update: The City has hired additional emergency preparedness and response personnel and further increased capacity by merging with the City of Melvindale Fire Department. Additionally, the City runs its own training academy. Additional staffing and training have been possible with the help of FEMA's Assistance to Fire Fighters Grants Program. This task is considered completed.

3) Provide funds to address the flooding issues in Dearborn (Hazard Addressed: Infrastructure Failure/Riverine and Urban Flooding).

Progress since last update: The City applied for and received FEMA Hazard Mitigation Grant funding in 2014, including installation of two shut-off gates in the West Dearborn Sewage District and construction of an overflow structure. This allowed the City to address combined sewer overflow problems that previously caused flooding of Oakwood Hospital and other key locations. Although flooding can still be a problem, the City largely avoided flooding earlier in 2019 that impacted other communities in the region. This is now considered a lower priority.

4) Address the issue of public safety personnel's inability to establish radio contact with their counterparts in the City of Detroit likelihood of an emergency involving both communities (Hazard Addressed: Hazmat Incidents).

Progress since last update: Dearborn was one of the last communities in the County to implement 800 MHz cellular communications systems. They are now in the process of identifying local blank spots and developing MOUs with neighboring municipalities for shared channel use.

2019 Mitigation Strategies:

1) Continue to address impediments to establishing and maintaining radio communications with surrounding communities, including the City of Detroit (Hazard Addressed: ALL).

2) The City describes their Community Emergency Response Team (CERT) program as one of the most active in the State of Michigan. They wish to continue educating volunteers regarding disaster preparedness and basic response skills; to develop a city-wide collaborative emergency management team of public and private stakeholders (e.g., local government officials, public safety personnel, hospital officials, schools, and major industry

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representatives. They will continue to offer tabletop exercises regarding preparedness for and response to armed person and/or active shooter scenarios, severe weather, and other hazards (Hazards Addressed: All).

Person/Agency Responsible: Emergency Management

Known/Potential Funding: General fund & grants

Anticipated Completion Timeline: Ongoing

How action will be prioritized: Budget process, grant availability

6.3.1.6 City of Dearborn Heights

2013 Mitigation Strategies:

1) Continue to coordinate with Wayne County, the State of Michigan and U.S. Army Corps of Engineers to find solutions to Ecorse Creek flooding issues (Hazards Addressed: Flooding).

Progress since last update: The city was awarded FEMA Hazard Mitigation Grants in 2016 and 2018 to purchase and remove a total of 27 homes from the Ecorse Creek floodplain; returning these areas to green space. Although flooding remains an issue along the creek this has significantly reduced the potential loss of life and property due to riverine flooding.

City officials are also evaluating construction of a retention basin near Annapolis Street that would alleviate flooding.

2) Develop a more comprehensive public warning and information systems (Hazards Addressed: All).

Progress since last update: Nixle now provides alerts throughout Dearborn Heights for a variety of hazards and events, improving the emergency notification capabilities of the community.

Although progress has been made, the City of Dearborn Heights will continue to implement these same strategies under the 2019 HMP update.

Person/Agency Responsible: City Emergency Mgt/County Homeland Security

Known/Potential Funding: General fund & grants

Anticipated Completion Timeline: 2024

How action will be prioritized: Department budget processes

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6.3.1.7 City of Ecorse

2013 Mitigation Strategies:

1) Provide funding for hazmat training, so there is sufficient level of preparedness to respond to hazmat emergencies (Hazard Addressed: Hazmat Incidents). Progress since last update: Funding continues to be an issue for priority programs in the City of Ecorse.

2) Install tornado siren (Hazard Addressed: Tornadoes/Severe Weather). Progress since last update: Additional emergency alerts sirens are still needed for coverage within the City.

3) Provide funding to hire additional manpower for the public safety departments; to be able to properly respond to transportation accidents and criminal activities, as well as conducting necessary fire inspections and investigation. (Hazard Addressed: Criminal Acts, Transportation Accidents, Fire). Progress since last update: Additional staff have been hired and trained since the last HMP update, but means of providing ongoing training and equipment are still needed.

2019 Mitigation Strategies:

1, 2 and 3) The same mitigation strategies listed above remain priorities for the 2019 HMP update.

4) The City of Ecorse will also work with Wayne County, FEMA, the U.S. Army Corps of Engineers and others to address coastal flooding and erosion.

Person/Agency Responsible: City Manager/County Coordinator

Known/Potential Funding: Grants

Anticipated Completion Timeline: 2022

How action will be prioritized: City budgeting, grant availability

6.3.1.8 City of Flat Rock

2013 Mitigation Strategies:

1) Address flooding (Hazards Addressed: Flooding).

2019 Mitigation Strategies:

1) In July 2019 the City of Flat Rock experienced some of its worst flooding since the late 1970s due to heavy rain. This continues to be a priority for local officials and will remain in the 2019 HMP update.

Person/Agency Responsible: City Manager/County Coordinator

Known/Potential Funding: General fund/grants

Anticipated Completion Timeline: Ongoing

How action will be prioritized: City budget process

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6.3.1.9 Garden City

202013 Mitigation Strategies: 1) Provide funds to purchase generators; to be used in case of power outages at community shelters and City Hall (Hazard Addressed: Infrastructure Failure – Electrical, Severe Weather). Progress since last update: The City issued a Request for Bids in July 2019 for installation of a new generator.

2019 Mitigation Strategies: 1) Funding for other backup generators and locations remains a priority.

Person/Agency Responsible: City Manager/Emergency Mgr

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: 2023

How action will be prioritized: Department budget process

6.3.1.10 City of Gibraltar

2013 Mitigation Strategies: 1) Provide funding to be used to elevate homes located in flood areas of the city (Hazard Addressed: Riverine and Urban Flooding). Progress since last update: Riverine flooding remains a priority for the City of Gibraltar, which was hit by heavy flooding earlier in 2019. High water levels in the Detroit River and Lake Erie have also created flooding in coastal areas.

2019 Mitigation Strategies: 1) Develop a railway incident hazardous material response plan that is specific to Gibraltar and surrounding downriver communities (Hazards Addressed: Hazmat Incidents)

2) Address problems of contaminated landfill leachate (Hazards Addressed: Public Health Emergencies, Hazmat Incidents)

3) Update and maintain consistency in evacuation and emergency response plans, particularly related to Fermi II and hazardous materials (Hazards Addressed: Hazmat Incidents, Public Health Emergencies).

4) Continue to develop strategies for reducing stormwater related- and coastal flooding and erosion.

Person/Agency Responsible: City Manager/Engineering

Known/Potential Funding: General Funds & grants

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Anticipated Completion Timeline: Ongoing

How action will be prioritized: City budget process

6.3.1.11 Grosse Ile Township

2013 Mitigation Strategies: 1) Provide funding to improve or replace the county bridge linking Grosse Ile with the mainland. (Hazard Addressed: Hazmat Incidents).

Progress since last update: The County ("Free") bridge has been studied and found to require repair. It has had a few temporary closures in 2019 and will likely be closed for longer periods in 2020 for more extensive construction.

2019 Mitigation Strategies: 1) As noted above, work on the county bridge is ONGOING and will continue in 2020.

2) Grosse Isle Township will also work with Wayne County, FEMA, the U.S. Army Corps of Engineers and others to address coastal flooding and erosion.

Person/Agency Responsible: Township Board/Manager

Known/Potential Funding: General funds & grants

Anticipated Completion Timeline: Ongoing

How action will be prioritized: Township budgeting

6.3.1.12 Grosse Pointe

2006 Mitigation Strategies: 1) Provide a solution to the problem of not being able to establish radio contact with the City of Detroit when faced with public safety emergencies (Hazard Addressed: All). Progress: COMPLETE

2) Provide funding for emergency power back-up systems in the event of outages (Hazard Addressed: Tornadoes/Severe Weather). Progress: COMPLETE

2019 Mitigation Strategies: 1) A recent structural fire within the City of Grosse Pointe resulted in the deaths of two boys. As a result, preventing death and injury and property loss and damage from structural fires has been identified as a key hazard priority for Grosse Pointe and surrounding cities. The strategy proposed to address this is described under Grosse Pointe Woods, below:

2) The City of Grosse Pointe will also work with Wayne

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County, FEMA, the U.S. Army Corps of Engineers and others to address coastal flooding and erosion.

Person/Agency Responsible: City Manager/County Coordinator

Known/Potential Funding: Grants

Anticipated Completion Timeline: Ongoing

How action will be prioritized: Council budget, grant availability

6.3.1.13 Grosse Pointe Farms

2006 Mitigation Strategies:

1) Provide funding to replace the water filtration system with a system that utilizes hydro liquid chloride (Hazard Addressed: Hazmat Incidents – Fixed Site). Progress since 2006: COMPLETE

2) Provide a solution to the problem of not being able to establish radio contact with the City of Detroit when faced with public safety emergencies (Hazard Addressed: All). Progress: COMPLETE

2019 Mitigation Strategies:

1) Structural Fire is a key priority for collective action all of the "Pointes". The strategy to address this is described under Grosse Pointe Woods, below:

2) Grosse Pointe Farms will work with Wayne County, FEMA, the U.S. Army Corps of Engineers and others to address coastal flooding and erosion.

Person/Agency Responsible: Fire Chief

Known/Potential Funding: Dept budget & grants

Anticipated Completion Timeline: Ongoing

How action will be prioritized: Dept. budgeting & grant availability

6.3.1.14 Grosse Pointe Park

2013 Mitigation Strategies:

1) Provide a solution to the problem of not being able to establish radio contact with the City of Detroit (Hazard Addressed: All).

Progress since last update: Implementation of broader 800 MHz communications systems has improved communications between neighboring communities and Grosse Pointe Park will continue to improve inter-governmental emergency communications.

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2) Provide funding for generators to be used in cases of power outages. Determine the availability of necessary equipment to be used to clear streets that are blocked as a result of storms. Install a tornado siren within the community. Enhance the community's ability to properly prepare and respond to the needs of the community in the event of weather related emergencies (Hazard Addressed: Tornadoes/Severe Weather).

Progress since last update: This remains a priority issues for inclusion in the 2019 HMP update.

2019 Mitigation Strategies:

1) Preventing deaths, injuries, and property damage from structural fires has been identified as a key regional hazard priority. The strategy proposed to address this is described under Grosse Pointe Woods, below:

2) Continue to seek funding for installation of backup power generation and emergency notification systems.

3) Grosse Pointe Park will work with Wayne County, FEMA, the U.S. Army Corps of Engineers and others to address coastal flooding and erosion.

Person/Agency Responsible: Fire Chief

Known/Potential Funding: Fire Department budget & grants

Anticipated Completion Timeline: Ongoing to complete by 2025

How action will be prioritized: Department budgeting/grant availability

6.3.1.15 Grosse Pointe Shores

2013 Mitigation Strategies:

1) The officials of Grosse Point Shores indicated in 2013 that they were sufficiently prepared to deal with emergencies within their community.

2019 Mitigation Strategies:

1) Recent events have identified structural fire as a key hazard priority for collective action in all of the "Pointes". The strategy to address this is described under Grosse Pointe Woods, below:

2) Grosse Pointe Shores will work with Wayne County, FEMA, the U.S. Army Corps of Engineers and others to address coastal flooding and erosion.

The coastal erosion of the area between Woodland Shore Road and the 788 Lake Shore Road (Grosse Pointe Yacht Club) is our greatest threat at this time. We are in danger of the lake levels and high winds washing out our sanitary

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sewers and storm sewer outfall. In addition, the erosion has in many areas washed out the greenbelt between the lake and the northbound lanes of the Wayne County Road (Lake Shore Road). This erosion over time will create a collapse and a sink hole in the road endangering vehicle and pedestrian traffic. Elected officials in Grosse Pointe Shores have been in discussion with Wayne County and a study of the deteriorated seawall has been authorized.

Person/Agency Responsible: Fire Chief

Known/Potential Funding: Fire Department budget & grants

Anticipated Completion Timeline: Ongoing to complete by 2025

How action will be prioritized: Department budgeting/grant availability

6.3.1.16 Grosse Pointe Woods

2013 Mitigation Strategies:

1) Provide necessary funds to be used to increase the capacities of the back-up power system located at the Municipal Building and at the Department of Public Works Pump Station. Provide a mobile generator that can be transported to emergencies at various locations within the community. (Hazard Addressed: Tornadoes/Severe Weather, Infrastructure Failure).

Progress since last update: The Public Safety Building does have a generator that allows continued dispatch service during power outages. However, the generator is approximately 30 years old and is in need of replacement. The City has identified a need of approximately \$148,000 to replace the generator. This continues to be a priority.

2) Provide funding for additional training for the Department of Public Safety. Provide funding to be used for coordinated regional training (Hazard Addressed: All).

Progress since last update: The City anticipates shared Fire Department personnel training programs with the City of Detroit using Grosse Pointe Woods' share of fireworks funds. This may still require additional funding for overtime and/or equipment, so funding remains an ONGOING need.

Additionally, the City Fire Department has implemented a plan to replace five set of gear each year and has one set left to replace (Hazards Addressed: All).

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2019 Mitigation Strategies:

1) Emergency management directors in the Grosse Pointe communities met recently to discuss creating joint, mandatory, K-4th grade education programs related to fire safety. They seek to update or replace their existing fire prevention mobile smokehouse for open houses and elementary school programs beginning in fall of 2020.

Person/Agency Responsible: Fire Chief

Known/Potential Funding: Fire Department budget & grants

Anticipated Completion Timeline: Ongoing to complete by 2025

How action will be prioritized: Department budgeting/grant availability

6.3.1.17 City of Hamtramck

2013 Mitigation Strategies:

1) Coordinate and plan for snow removal to increase street accessibility to emergency crews and residents (Hazard Addressed: Severe Weather – Winter)

2) Collect and maintain information about Hazmat sites, including on-site inspections and computerized record-keeping (Hazard Addressed: Hazmat Incidents)

2019 Mitigation Strategies:

1) The City will continue the ONGOING strategies it has listed above.

Person/Agency Responsible: Emergency Manager

Known/Potential Funding: General fund

Anticipated Completion Timeline: Ongoing

How action will be prioritized: City budget review

6.3.1.18 City of Harper Woods

2013 Mitigation Strategies:

1) Provide funds to hire additional personnel for the city's public safety departments. Provide additional hazmat equipment and training for these departments (Hazard Addressed: Hazmat Incidents – Transportation). Progress: ONGOING

2) Hire additional police officers to assist in combating civil disturbances and criminal activities within the community (Hazard Addressed: Criminal Acts). Progress: ONGOING

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3) Provide a solution to the problem of not being able to establish radio contact with the City of Detroit when faced with public safety emergencies (Hazard Addressed: All).

Progress since last update: Use of Nixle as an alert system has improved communications with both residents and neighboring communities. This remains an ONGOING priority. Harper Woods seeks to enter into MOUs with other communities for shared communications and response.

4) Monitor and remove trees that could be a hazard to power lines and improve problem areas in the power grid to reduce the number of power failure incidents (Hazard Addressed: All).

Progress since last update: Some tree trimming has been conducted but this will remain an ongoing project.

2019 Mitigation Strategies:

- 1) The City will continue with the ONGOING strategies it has listed above.

Person/Agency Responsible: City Police/Fire

Known/Potential Funding: Department budget/Millage if needed

Anticipated Completion Timeline: Ongoing

How action will be prioritized: City budget process

6.3.1.19 City of Highland Park

2013 Mitigation Strategies:

1) Hire additional manpower so that there is a sufficient level of preparedness to respond to major emergencies. Provide funding for training in hazmat response and arson investigations (Hazard Addressed: Hazmat Incidents/Arson). Progress: ONGOING need.

2) Provide resources needed to clear streets during and after winter storms (Hazard Addressed: Severe Weather/Winter Hazards). Progress: BEING EVALUATED

2019 Mitigation Strategies:

- 1) The mitigation strategies identified in 2013 will continue as priorities the 2019 update.

Person/Agency Responsible: City Police/Fire

Known/Potential Funding: Department budget/Millage if needed

Anticipated Completion Timeline: Ongoing

How action will be prioritized: City budget process

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6.3.1.20 Huron Township

2013 Mitigation Strategies:

1) Install additional tornado sirens (Hazard Addressed: Tornadoes/Severe Weather). Progress since last update: Seven emergency alert sirens were installed and activated in 2016. Township officials will utilize the sirens to notify residents of severe weather, including high winds, hail, and tornadoes, but also for hazardous material spills, wildfires, or other similar incidents. This task is considered completed

2) Require electrical companies to clear limbs and dead trees away from power lines (Hazard Addressed: Severe Weather/Severe Wind/Winter Hazards).

Progress since last update: Maintenance to trim trees in priority areas has been conducted but this remains an ongoing priority.

2019 Mitigation Strategies:

2 above) The Township will continue with the ONGOING strategy for clearing power lines to reduce the frequency and severity of electrical power outages as described above.

Person/Agency Responsible: City Police/Fire, City Manager

Known/Potential Funding: General fund, grants, private companies

Anticipated Completion Timeline: 2025

How action will be prioritized: City budget process

6.3.1.21 The City of Inkster

2013 Mitigation Strategies:

1) Hire additional manpower so that there is a sufficient level of preparedness to respond to all major emergencies. (Hazard Addressed: Severe Weather/Tornadoes, Structural Fire, Hazmat Incidents, All).

Progress since last update: Inkster received a SAFER (Staffing for Adequate Fire & Emergency Response) grant award of \$1,682,760 for the 2016 award year, which allowed improved staffing.

The City has also installed four sirens able to send variable-tone signals to address multiple hazards

2019 Mitigation Strategies:

1) The City will continue to prioritize adequate emergency preparedness and response personnel in their police and fire departments.

2) Inkster will explore projects and policies that reduce riverine and stormwater runoff-related flooding along the

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Lower Rouge River and elsewhere in the City.

Person/Agency Responsible: City Police/Fire

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: 2025

How action will be prioritized: City budget review, grant availability

6.3.1.22 City of Lincoln Park

2013 & 2019 Mitigation Strategies: 1) Update emergency response plan for traffic and railroad accidents, particularly for hazardous material incidents adjacent to residential areas (Hazard Addressed: Hazmat Incident).

2) Development and implementation of training for police and schools on emergency response to an active killer incident (Hazard Addressed: Criminal Acts).

Person/Agency Responsible: Emergency Manager

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: Annually

How action will be prioritized: Department budget process

6.3.1.23 City of Livonia

2013 Mitigation Strategies: 1) Establish easements for stream access to clear log jams (Hazards Addressed: Flooding, Public Health). Progress: ONGOING

2) Create detention basins as proposed in the Storm Water Management Plan (Hazards Addressed: Flooding, Infrastructure failure). Progress: ONGOING

3) Educate vulnerable populations about how to care for themselves or obtain help during emergencies (Hazards Addressed: All). Progress: ONGOING

4) Distribute printed materials about preparing a family disaster preparedness kit (Hazards Addressed: All). Progress: ONGOING

5) Provide portable pumps, dump tanks, and suction hoses to supply a secondary water supply for firefighting during times of drought and power outages (Hazards Addressed: Fire, Infrastructure Failure, Severe Weather, Drought). Progress: ONGOING

2019 Mitigation Strategies: 1 through 5) The City will continue with the ONGOING strategies it has listed above.

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Person/Agency Responsible: Emergency Manager

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: 2025

How action will be prioritized: Annual budget process

6.3.1.24 City of Melvindale

2013 Mitigation Strategies:

1) Hire and train additional police and fire personnel to help in protecting the population and natural resources from adverse effects of hazardous material incidents and other emergencies (Hazard Addressed: Hazmat Incidents – Fixed Site and Transportation).

Progress since last update: Melvindale and Dearborn have merged their Fire Departments, which has helped both cities level out their staffing and training needs.

2) Lessen the impact that flooding has on the people, property and environment of the City of Melvindale (Hazard Addressed: Infrastructure Failure, Riverine and Urban Flooding).

Progress since last update: In 2017, the U.S. ACOE completed the North Branch Ecorse Creek Flood Risk Management General Reevaluation Report; an analysis of alternatives to reduce flooding of Ecorse Creek. Alternative number 6, construction of a 250-acre feet detention basin at the intersection of Powers Avenue and Inkster Road in Dearborn Heights, improvements to multiple road crossings, and a greenway was found to maximize the cost-benefit ratio.

2019 Mitigation Strategies:

2 above) The City will continue to work with eth Army Corps of Engineers, FEMA, and neighboring communities to develop agreements and contracts and provide funding for implementation of flooding solutions for the North Branch of Ecorse Creek.

Person/Agency Responsible: Emergency Manager/Agencies

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: Ongoing

How action will be prioritized: Budget review, grant availability

6.3.1.25 City of Northville

2013 Mitigation Strategies:

1) Replace emergency generator at City Hall and Fire Station to provide a reliable command center in the

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event of an emergency (Hazard Addressed: All).

Progress since last update: Remains a priority

2) Improve interoperability of 800 Mhz communication system between municipalities (Hazard Addressed: All).

Progress since last update: The 800 MHz communications systems have improved across the county with more communities now participating. Northville is now using the Nixle service for community bulletins and emergency alerts as well.

3) Evaluate and implement measures to mitigate flooding (Hazard Addressed: Flooding).

Progress since last update: Flooded roadways were still a problem following intense rainfall in May 2019

4) Establish a policy and place for evacuation of elderly residents from senior housing and rehabilitation centers (Hazard Addressed: Severe Weather – Summer and Winter, Tornadoes).

Progress since last update: The City and local nonprofit organizations maintain lists of shelters and food resources for homeless populations, but the identification of particular locations for emergency /hazard situations remains and ongoing need.

2019 Mitigation Strategies:

1 through 4) Continue to implement the mitigation measures noted above.

Person/Agency Responsible: Fire Chief

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: 2022

How action will be prioritized: Budget review, grant availability

6.3.1.26 Northville Township

2013 Mitigation Strategies:

1) Install tornado sirens in the community (Hazard Addressed: Tornadoes). Progress: BEING EVALUATED

2) Provide an engineering study to lessen the impact that floods have on people, property, and the environment (Hazard Addressed: Flooding, Severe Weather). Progress: BEING EVALUATED

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3) Provide necessary training and equipment to first responders (Hazard Addressed: All). Progress: ONGOING

4) Development and implementation of training for police and schools on emergency response to an active shooter incident (Hazard Addressed: Criminal Acts). Progress: ONGOING

2019 Mitigation Strategies:

1 through 4 above) The Township will continue to pursue implementation of the ONGOING strategies listed above.

Person/Agency Responsible: Emergency Manager

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: Ongoing

How action will be prioritized: Budget review, grant availability

6.3.1.27 City of Plymouth

2013 Mitigation Strategies:

1) Request financial assistance from the railroad companies for the purchase of hazmat equipment. In addition, provide for advanced technology which will route emergency vehicles around congested railroad crossing when responding to emergencies (Hazard Addressed: Hazmat Incidents – Transportation). Progress: ONGOING

2) Provide an engineering study to lessen the impact that floods have on people, property, and the environment (Hazard Addressed: Flooding). Progress: The City posted information regarding pre-disaster hazard mitigation grant funding on their website following the federal disaster declaration from 2014 flooding throughout southeast Michigan. This remains a priority hazard for the City.

3) Train emergency responders regarding hazardous material response (Hazard Addressed: Hazmat Incidents - Transportation) Progress: ONGOING

4) Train police in civil disturbance response together with Western Wayne Mobile Field Force (Hazard Addressed: Civil Disturbance). Progress: ONGOING

2019 Mitigation Strategies:

1) The City will continue with the ONGOING strategies it has listed above.

Person/Agency Responsible: Emergency Mgr/City Manager

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Known/Potential Funding: General fund, grants, railroad funds

Anticipated Completion Timeline: Ongoing

How action will be prioritized: Budget review, grant & investment availability

6.3.1.28 Plymouth Township

2019 Mitigation Strategies:

1) Mitigation strategies are currently being reviewed for appropriateness.

Person/Agency Responsible: Emergency Manager

Known/Potential Funding: TBD

Anticipated Completion Timeline: TBD

How action will be prioritized: Township budget process

6.3.1.29 Redford Township

2013 Mitigation Strategies:

1) Install additional tornado sirens (Hazard Addressed: Tornadoes/Severe Weather). Progress: BEING EVALUATED

2) Provide funding needed to establish a technical response unit to deal with all types of hazardous material accidents (Hazard Addressed: Hazmat Incidents – Fixed Site and Transportation). Progress: BEING EVALUATED

3) Township officials have also suggested that their ice arena could serve as a cooling center for elderly residents within the Township (Hazard Addressed: Severe Weather/Extreme Heat). Progress: The City maintains lists of shelters and food resources for homeless populations and domestic abuse victims, but the identification of particular locations for emergency /hazard shelters remains and ongoing need.

2019 Mitigation Strategies:

1 through 3 above) The Township will continue to pursue implementation of the ONGOING strategies listed above

Person/Agency Responsible: Emergency Mgr/City Manager

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: Ongoing

How action will be prioritized: Budget review, grant availability

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6.3.1.30 City of River Rouge

2013 Mitigation Strategies:

1) Provide necessary training and equipment for public safety departments to better prepare their personnel in responding to weather related emergencies (Hazard Addressed: Severe Weather/Winter Hazards/Tornadoes). Progress: ONGOING

2) Provide funding to be used for training all departments in the area of homeland security. Provide additional protection against potential terrorist activities targeted at one of the community's vulnerable locations (Hazard Addressed: Terrorist). Progress: ONGOING

2019 Mitigation Strategies:

1 and 2) The mitigation strategies listed above remain priorities for the City.

2) The City of River Rouge will work with Wayne County, FEMA, the U.S. Army Corps of Engineers and others to address coastal flooding and erosion.

Person/Agency Responsible: Emergency Mgr/County Coordinator

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: 2025

How action will be prioritized: Budget review, grant availability

6.3.1.31 City of Riverview

2013 Mitigation Strategies:

1) Lessen the impact that floods have on people, property, and the environment. Insist that the community is notified when the floodgates are to be opened at Detroit Metro Airport. Reduce flooding in the City of Riverview, especially flooding of the Frank and Poet Drain (Hazard Addressed: Riverine and Urban Flooding).

Progress since last update: The City experienced flooding along the Frank and Poet Drain again in 2019 and it remains a priority concern.

2) In cases of major emergencies, provide additional personnel to assist with evacuations. Address the need for better communication with the county for responding to the needs of the city during an emergency. Provide stockpiles of fuel, food and water to be used in cases of emergency (Hazard Addressed: Hazmat Incidents – Fixed Site and Transportation, Terrorism).

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Progress since last update: Some chemical manufacturers and/or companies using and storing significant quantities of hazardous materials have closed or moved since the HMP was updated in 2013; however, spills and/or fires at remaining facilities along railroad lines in the City remains a concern.

2019 Mitigation Strategies:

1) & 2) The City finds that the two mitigation strategies listed above are still significant issues and should be carried forward in the updated plan.

Person/Agency Responsible: Emergency Manager/City Manager/Federal Agencies

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: Ongoing

How action will be prioritized: Budget review, grant availability

6.3.1.32 City of Rockwood

2013 Mitigation Strategies:

1) Install tornado sirens in the City of Rockwood (Hazard Addressed: Tornadoes). Progress: BEING EVALUATED

2) Provide resources to develop an efficient system of evacuation during emergencies within the city or in neighboring communities. Allocate funds to be used to purchase 911 warning system to alert citizens or potential emergencies (Hazard Addressed: Severe weather, Hazmat Incidents – Fixed Site and Transportation). Progress: BEING EVALUATED

3) Install shoreline restoration along the Huron River (Hazard Addressed: Shoreline Erosion). Progress: BEING EVALUATED

4) Establish oversight of Belleville Dam operations (Hazard Addressed: Flooding). Progress: BEING EVALUATED

2019 Mitigation Strategies:

1) Continue to evaluate and implement 20103 mitigation strategies.

Person/Agency Responsible: Emergency Manager

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: 2025

How action will be prioritized: Budget review, grant availability

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6.3.1.33 City of Romulus

2013 Mitigation Strategies:

1) Encourage family disaster planning (Hazard Addressed: All). Progress: ONGOING

2) Update GIS Database for infrastructure analysis (Hazard Addressed: Infrastructure Failure). Progress: ONGOING

3) Establish regional retention/detention ponds and upgrade sewer mains (Hazard Addressed: Flooding, Infrastructure Failure). Progress: ONGOING

4) Enforce requirement to loop water mains as per building codes (Hazard Addressed: Infrastructure Failure, Public Health). Progress: ONGOING

5) Expand early warning system and perform testing and monitoring (Hazard Addressed: Tornadoes). Progress: ONGOING

6) Inspect and maintain record of hazardous material facilities (Hazard Addressed: Hazmat Incidents). Progress: ONGOING

7) Coordinate with railway owners/operators for at-grade crossing separation, and to improve transportation planning (Hazard Addressed: Hazmat Incidents, Transportation Accidents). Progress: ONGOING

8) Develop traffic control options during power outage or signal damage (Hazard Addressed: Transportation Accidents). Progress: ONGOING

9) Establish and update shelter agreements within City and school buildings (Hazard Addressed: All). Progress: ONGOING

Person/Agency Responsible: Emergency Manager

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: Ongoing/2025

How action will be prioritized: Budget review, grant availability

6.3.1.34 City of Southgate

2013 Mitigation Strategies:

1) Provide additional back-up generators to be used during power outages. Establish emergency shelters to be used

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in instances of power outage and other emergencies requiring the relocation of the population, especially the elderly. Provide training in snow plowing and the removal of downed trees and branches (Hazard Addressed: Tornadoes/Severe Weather/Winter Hazards, Infrastructure Failure).

Progress since last update: The City still needs additional back-up power generators, but has utilized their senior center as a emergency shelter during a recent fire that impacted a high rise senior-living center.

2) Hire and train additional manpower so the city will be better prepared to respond to hazmat and all other types of emergencies. Provide funds for improved communication equipment so the public safety personnel can properly communicate between their departments and neighboring communities. (Hazard Addressed: Hazmat Incidents – Transportation, Multiple).

Progress since last update: Although the hiring of replacement staff is an ongoing activity, the City has increased staffing levels in the Fire Department to the point where they have returned to desired levels.

2019 Mitigation Strategies:

1 and 2) The City will continue to pursue the mitigation strategies listed above.

3) Additionally, Southgate is developing solutions to relieve overflows from sewers that cause residential basement flooding on the City's east side.

Person/Agency Responsible: Police/Fire

Known/Potential Funding: General fund, grants, millage

Anticipated Completion Timeline: 2025

How action will be prioritized: Budget review, grant availability

6.3.1.35 Sumpter Township

2013 Mitigation Strategies:

1) Require the utility companies to remove trees and limbs that could fall on power lines. Provide funds to construct a storage building for emergency supplies (Hazard Addressed: Infrastructure Failure, Severe Weather). Progress: BEING EVALUATED

2019 Mitigation Strategies:

1) Mitigation strategies are currently being reviewed for appropriateness.

Person/Agency Responsible: Township Manager

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Known/Potential Funding: TBD

Anticipated Completion Timeline: TBD

How action will be prioritized: TBD

6.3.1.36 City of Taylor

2013 Mitigation Strategies:

1) Develop a procedure between the City of Taylor, the surrounding communities, and Wayne County, for responding to hazmat and other emergencies within the various communities. Install a communication system that can be accessed by all communities without regard to the community they represent. Determine a better system of authority and control regarding who should respond to these emergencies (Hazard Addressed: Hazmat Incidents – Fixed Site and Transportation, Transportation Accidents). Progress: BEING EVALUATED

2) Provide funding to hire additional personnel and to purchase generators and heavy equipment to be used to clear streets of storm debris (Hazard Addressed: Severe Weather/Tornadoes). Progress: BEING EVALUATED

3) Provide a solution to the flooding that occurs at I-75 and Pelham Road (Hazard Addressed: Flooding). Progress: ONGOING

4) Continue outreach to schools and other members of the public about school and home safety and adopt the program “do1thing.com” to promote emergency preparedness (Hazard Addressed: All).

5) Monthly testing of emergency alert system (Hazard Addressed: Tornadoes).

6) Coordinate with Public Safety and Health Departments to ensure that facilities that host special events and international visitors are meeting communicable disease prevention standards (Hazard Addressed: Public Health).

2013 Mitigation Strategies:

1) The City will continue with the ONGOING strategies it has listed above.

Person/Agency Responsible: Police Department

Known/Potential Funding: Department budget, grants

Anticipated Completion Timeline: Ongoing/2025

How action will be prioritized: Budget review, grant availability

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6.3.1.37 City of Trenton

2013 Mitigation Strategies:

1) Provide closer cooperation between health officials and health organizations, school district management, and the City of Trenton Emergency Management Department, to reduce contagious diseases (Hazard Addressed: Public Health Emergencies). Progress since last update: The City continues to work with area schools and hospitals to develop and implement emergency preparedness and response drills. This is an ONGOING priority.

2019 Mitigation Strategies:

1) The City will continue with the ONGOING emergency preparedness education noted above.

2) Additionally, Trenton has identified riverine flooding as an important priority along the 2 miles of residential Detroit River frontage in the City and the additional 2 miles of commercial properties abutting the river. The City has been in planning discussions with the U.S. Coast Guard, FEMA, and the Michigan State Police regarding how this shoreline may be protected from flood waters with sandbags. The City realizes that this a cyclical problem in times of high Great Lakes water levels³) Trenton will also work with Wayne County, FEMA, the U.S. Army Corps of Engineers and others to address coastal flooding and erosion.

Person/Agency Responsible: Paul L. Haley, Emergency Mgr.

Known/Potential Funding: None

Anticipated Completion Timeline: Ongoing

How action will be prioritized: Council budget process

6.3.1.38 Van Buren Township

2013 Mitigation Strategies:

1) Install tornado sirens and implement an education program that increases the public's awareness of the vulnerability to tornadoes (Hazard Addressed: Tornadoes). Progress since the last update: ONGOING

2019 Mitigation Strategies:

1) The City will continue with the ONGOING strategy it has listed above.

Person/Agency Responsible: City Manager

Known/Potential Funding: Department budget, grants

Anticipated Completion Timeline: Ongoing/2025

How action will be prioritized: Budget review, grant availability

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6.3.1.39 City of Wayne

2019 Mitigation Strategies:

- 1) Mitigation strategies are currently being reviewed for appropriateness.

Person/Agency Responsible: City Manager

Known/Potential Funding: TBD

Anticipated Completion Timeline: TBD

How action will be prioritized: TBD

6.3.1.40 City of Westland

2013 Mitigation Strategies:

- 1) Provide funding for the installation of an electronic sign that can be activated to warn drivers of icy conditions on Ford Road at I-275. Purchase generators to provide electrical back-up during power outages. (Hazard Addressed: Severe Weather/Winter Hazards). Progress: BEING EVALUATED

- 2) Provide protective equipment to all municipal employees so they can be of assistance in hazmat emergencies. Upgrade radio equipment so it can be utilized to communicate with other communities (Hazard Addressed: Hazmat Incidents). Progress: BEING EVALUATED

2019 Mitigation Strategies:

- 1) Mitigation strategies are currently being reviewed for appropriateness.

Person/Agency Responsible: City Manager

Known/Potential Funding: TBD

Anticipated Completion Timeline: TBD

How action will be prioritized: TBD

6.3.1.41 City of Woodhaven

2013 Mitigation Strategies:

- 1) Increases the city's preparedness for the Avian Flu Virus. Distribute information and initiate surveillance to detect human cases (Hazard Addressed: Public Health Emergencies). Progress: NOT STARTED

- 2) Provide funding for additional hazmat equipment. Develop a well-organized evacuation plan to be used in the likelihood of a hazmat or other emergency that requires the transfer or citizens (Hazard Addressed:

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Hazmat Incidents, Multiple). Progress: NOT STARTED

2019 Mitigation Strategies:

- 1) Mitigation strategies are currently being reviewed for appropriateness.

Person/Agency Responsible: City Emergency Manager

Known/Potential Funding: TBD

Anticipated Completion Timeline: TBD

How action will be prioritized: TBD

6.3.1.42 City of Wyandotte

2013 Mitigation Strategies:

- 1) Provide funding to hire additional manpower, purchase additional hazmat emergency equipment, and make available additional training for responding to hazmat emergencies (Hazard Addressed: Hazmat Incidents – Fixed Site). Progress: NOT STARTED

- 2) Provide a solution to sewer back-ups and basement flooding stemming from failures at the Wayne County Wastewater Treatment Facility (Hazard Addressed: Urban Flooding/ Infrastructure Failure). Progress: NOT STARTED

- 3) Develop a security plan and hazard mitigation procedures for all the schools in the City (Hazard Addressed: Criminal Acts).

2019 Mitigation Strategies:

- 1) Wyandotte will also work with Wayne County, FEMA, the U.S. Army Corps of Engineers and others to address coastal flooding and erosion.

- 2) Other mitigation strategies are currently being reviewed for appropriateness.

Person/Agency Responsible: Emergency Manager/County Coordinator

Known/Potential Funding: General fund, grants

Anticipated Completion Timeline: 2025

How action will be prioritized: City budget process, grant availability

6.4 Alternatives Selected

The Advisory Committee reviewed over 240 mitigation strategies and identified 18 high-priority mitigation strategies for further consideration, based on input from the mitigation survey and workshop discussions. These strategies addressed the six highest priority hazards, and the top-ranked survey strategies, as well as additional strategies from the survey that were highlighted by committee members during the workshop.

Each of these mitigation strategies were rated according to the five evaluation criteria described in Sections 2 and 6 above. The results of the evaluation are provided in Table 8, along with the hazards that each strategy addresses. From this evaluation, the following nine strategies were selected for development of Action Plans.

Criminal Acts: Mass Shooting(s)/Active Assailant(s)

1. Continue training in most current protocols and develop a process for requesting assistance from local and state law enforcement.

Infrastructure Failure

2. Identify, prioritize, and replace or renovate aging structures and equipment. Establish procedures to protect IT systems.

Public Health Emergencies

3. Stockpile vaccines and antidotes; train & equip volunteers to staff open/closed points of dispensing (PODs)
4. Develop and use mass media notification systems for public health emergencies (establish Wayne County geo-targeting/geo-fencing methods for notifications using Facebook, Nixle, Twitter, etc.)

Extreme Temperatures

5. Establish and build awareness of accessible heating/cooling centers in the community. Utilize all means available, including webs sites, social media, smart phone apps, mailers, etc. to inform public of impending weather threats and resources available, including heating & cooling shelters.
6. Educate the public regarding safe use of office and home space heaters, generators, smoke detectors & carbon monoxide detectors.
7. Catalog & map areas of vulnerable and other residents (unlicensed facilities, empty/vacant buildings, etc.). Provide outreach and transportation to vulnerable and normally hard-to-reach populations during extreme temperature events.

HazMat Incidents – Transportation

8. Utilize public warning systems and networks for public awareness and instructions in the event of hazardous materials incidents.

Flooding – River/Shoreline

9. Identify and map, or update existing maps of, floodplains and flood prone areas. Leverage new ArcGIS online application with MI CIMS sponsored by Michigan State Police. Provide training for local jurisdiction use and access.

Table 8. Selected Mitigation Strategies and Associated Hazards

			Top Hazards Addressed					
#	Mitigation Strategy	Rank	Infrastructure Failure - Water, Stormwater, Communications	Public Health Emergencies	Criminal Acts - Mass Shootings/Active Assailant(s)	Extreme Temperatures	Flooding - Urban/Riverine/Shoreline	Hazmat Incidents - Transportation
33	Replace or renovate aging structures and equipment. Establish procedures to protect IT systems.	6	✓				✓	
52	Increase public awareness of the causes, symptoms, and protective actions for disease outbreaks and other potential public health emergencies	7		✓				
57	Stockpile vaccines and antidotes in case of epidemic, chemical emergency, or biological or chemical weapons attack	7		✓				
61	Use mass notification, emerging alerting systems, and social media, for public health emergencies	1	✓	✓	✓	✓	✓	✓
71	Develop a process for requesting assistance from local and state law enforcement in the event of Active Assailant	1			✓			
73	Continue training in most current protocol(s) [Active Assailant]	15			✓			
77	Identify and map, or update existing maps of, floodplains and flood prone areas using County's ArcGIS system. Provide training for local jurisdictions in use of and access to system.	11					✓	
79	Work with USACE, or other appropriate authorities to develop engineering plans to address flood prone areas	11	✓				✓	
161	Establish and build awareness of accessible heating/cooling centers in the community Utilize all means available, incl webs sites, social media, smart phone apps, mailers to educate of impending weather threats, resources available, including heating & cooling shelters	1				✓		
167	Provide outreach to vulnerable populations during extreme temperature events Catalog & map areas of vulnerable residents (unlicensed facilities, empty/vacant buildings, etc.)	11				✓		
169	Educate the public regarding safe use of office and home space heaters, generators, smoke detectors & carbon monoxide detectors	1		✓		✓		
176	Provide transportation to shelters for elderly, disabled, otherwise unreachable	11	✓	✓		✓	✓	
184	Assure training, planning, and preparedness for hazardous material incidents along vulnerable, high risk roads and railways	16						✓
185	Utilize public warning systems and networks for awareness and instructions	1	✓	✓	✓	✓	✓	✓
Added in Workshop	Train & equip volunteers to staff open and closed PODs (Points of Dispensing) within the County	1		✓				

7. County Action Items

7.1 Recommended Mitigation Actions

Wayne County's 2006 Hazard Mitigation Plan (HMP) included the following seven Action Items:

1. Establish an adequate number of warming and cooling centers throughout the county and develop minimum criteria for their operation. Provide relief and support to individuals and reduce risk of temperature-related illness during times of extreme temperatures.
2. Improve floodplain management and minimize potential effects of flooding. Encourage and promote regional watershed cooperation.
3. Distribute family emergency preparedness information.
4. Create evacuation plans and community awareness of them.
5. Improve emergency communication(s) between all county communities, including City of Detroit (not otherwise included in this Hazard Mitigation Plan).
6. Train and equip public health, hospital and responder personnel (Police/Fire/EMS, citizen corps, etc.) for readiness.
7. Review and evaluate Hazard Mitigation Plan (HMP) priorities and progress on an annual basis.
8. Develop an inspection plan and strategy to identify and abate all vacant, abandoned, and blighted structures near sensitive populations throughout the county, including SARA Title III sites.

Significant progress has been made on most of these action items between 2013 and 2019, including the following.

1. Wayne County has compiled a database of warming and cooling centers throughout the County and developed mechanisms for informing county residents regarding the dangers and likelihood of extreme temperatures, and regarding where to go for shelter during severe weather.
2. Wayne County mobilized a variety of resources in response to severe urban and riverine flooding in August 2014, and the resulting failure of stormwater and other infrastructure, which resulted in both state and federal major disaster declarations. During the writing of this report, Wayne County again faced incidents of urban, riverine, and coastal flooding. The County has also recently (2019) requested assistance from the US Army Corps of Engineers for Lake Erie coastal communities in response to high water levels in the Great Lakes.

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3. Family emergency preparedness information is now routinely distributed to county residents in all seasons and, as such, this Action Item is being removed for the 2019 HMP Update.
4. Wayne County continues to assist municipalities by directing evacuation and practice evacuation testing from its Emergency Operations Center (EOC), based on individual municipality evacuation plans.
5. Wayne County works with all Wayne County municipalities to ensure open lines of communications with first responders. Wayne County HS & EM has sent correspondence to all county communities and actively programs municipality radios so that all entities are able to communicate on an updated 800 Mega M.P.S.C.S. Radio system during emergencies. The County began a radio project in 2014/2015 and now provides radios to municipal first response agencies annually. As such, this Action Item is being removed for the 2019 HMP update.
6. Wayne County DHSEM polled fire chiefs in Wayne County concerning Action Item 8 from the 2013 HMP and we found that local communities are currently identifying and inspecting vacant, abandoned and blighted structures near sensitive populations and SARA Title III sites. The inspections are being done by fire marshals and building/ordinance personnel. This action item has been addressed by local communities as part of their everyday operations and, hence, is being removed from the 2019 HMP update.

The Wayne County Department of Homeland Security and Emergency Management continues to address weather related hazard threats (flooding, extreme temperatures, etc.) while also focusing attention and programs on new and emerging concerns such as cyber security and preparedness for active assailant incidents. Completed Action Plans from the 2013 Hazard Mitigation Plan have been replaced with new Actions and programs from 2013 addressing ongoing concerns have been incorporated into Action Plans developed in 2019.

The final Action Items developed to guide implementation of the selected mitigation strategies are presented below. Each Action Item includes a short description of the relevant hazard(s) and the strategy aimed to mitigate its impact. The agencies responsible for implementation, the general form of costs associated with each strategy, and the benefits are also listed for each Action Item.

The Action Items below have been selected and developed based upon the prioritization exercises and Advisory Committee discussions described previously. Implementation of each will be guided by an analysis of the benefits expected relative to program costs. Implementation will be determined, in part, based upon the availability of grant or shared funding; how well each Action Item fits within established programs, goals, and initiatives of the responsible agencies; and program needs identified through ongoing feedback from Wayne County municipal officials, emergency response staff and the Wayne County LEPC. Completion of all Action Items, unless otherwise noted, is anticipated within the first four years of the 5-year cycle for reviewing and updating the HMP. The order presented for the Action Items does not denote importance or priority.

Wayne County Hazard Mitigation Plan

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County Action Items

Action Item 1. Continue training in most current protocols for preventing and responding to Active Assailant incidents; develop a process for requesting assistance from local and state law enforcement.

Specific Hazard(s) Addressed: Criminal Acts - Mass Shootings/Active Assailant(s)

Specific Vulnerability(ies): Sites of concentrated, vulnerable populations; and emergency responders

Communities Affected/Benefited: All

Primary Responsibility: Wayne County Department of Homeland Security & Emergency Management, local emergency managers

Initiatives Needed: County and local emergency managers must develop a plan to proactively engage first responders (police/fire/EMS/emergency managers, etc.) and actively participate in ongoing tabletop, drills and live scenarios. Further, local officials must identify current mutual aid agreements and ensure interoperability between all units. Communities must also develop a protocol within those respective mutual aid groups should resources be depleted and additional assistance be needed. Assistance through Wayne County Department of Homeland Security & Emergency Management will be provided to activate additional resources.

Implementation Tasks: The County will survey agencies to determine training needs and find funding to acquire instruction to fill the training gaps. This may best be accomplished by assembling an advisory training committee to identify best practices to plan, review and reach out to communities to address training gaps. The committee should then analyze current mutual aid agreements and identify additional resources or agencies that can provide assistance. The committee may also meet with mutual aid managers to establish a protocol to request assistance that falls within the scope of existing plans.

Cost(s): Staff time to assemble and analyze mutual aid agreements, and to attend meetings, training, distribution of printing, mailing and electronic media.

Benefits: Greater involvement by the Wayne County Department of Homeland Security & Emergency Management and those agencies that are covered by the Emergency Operations Plan, resulting in improved familiarization with preparedness procedures and, ultimately, if called upon for such a hazard, to reduce injuries and loss of life.

Anticipated Funding Sources: Most initiatives could be absorbed by the individual municipalities based on their training needs through general budgets, Homeland Security Grants (UASI) and private industry.

Action Item 2. Identify, prioritize, and replace or renovate aging infrastructure and equipment including water,

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stormwater, and communications systems.
Establish procedures to protect IT systems.

<i>Specific Hazard(s) Addressed:</i>	<u>Infrastructure Failure - Water & Sewer Systems, Communications, Cyber Security.</u>
<i>Specific Vulnerability(ies):</i>	Important interceptors, lift stations, and key nodes in the systems
<i>Communities Affected/Benefited:</i>	All
<i>Primary Responsibility:</i>	Wayne County Department of Homeland Security & Emergency Management, Wayne County Department of Public Works, local emergency managers & public works departments

Initiatives Needed: County and local public works officials will review locations of recent systems failures, systems exceeding their design lives, and those serving vulnerable populations. Using this information, key agencies will develop a list of priority systems and locations to be repaired, upgraded, or replaced. Associated budgets and schedules should be developed to facilitate systematic progress. Identify where the use of green infrastructure or conservation practices may yield storm water source reductions or otherwise reduce the overall strain on existing systems.

Implementation Tasks: The County will survey their own systems and local public works agencies to determine needs and priorities. Review of third party (e.g., SEMCOG, et al.) studies will aid in establishing sufficient budgets for immediate and long term needs.

Cost(s): Staff time to develop the necessary priority lists and to meet with other agencies to coordinate implementation.

Benefits: Reduced costs by addressing infrastructure needs before emergency situations arise. Long term gains in system efficiencies and reduced damages

Anticipated Funding Sources: Planning and prioritization may be absorbed within existing budgets of departmental managers and planners. Implementation costs may be provided through bonds, Michigan Drain Code (Chapters 8 & 20), Federal Homeland Security Hazard Mitigation funds, Army Corps of Engineers, Clean Michigan Initiative Grants, Clean Water State Revolving Loan Funds (may require state intervention), Community Development Block Grants, Strategic Water Quality Initiative, Great Lakes Program, Non-point Source Implementation Grants (319 program), Other MDEQ/EPA grants if available, Voter-approved millage, Court-ordered judgment levies, federal Flood Mitigation Assistance Program, Pre-Disaster Mitigation Program grants.

Action Item 3. Stockpile vaccines and antidotes for possible public health emergencies; Train and equip volunteers to staff open/closed points of dispensing (POD).

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Specific Hazard(s) Addressed: Public Health Emergencies - Mass inoculation of communicable diseases and/or biological agents.

Specific Vulnerability(ies): Areas where vulnerable populations (particularly children and the elderly) may congregate.

Communities Affected/Benefited: All

Primary Responsibility: Wayne County Public health Division

Initiatives Needed: Partner with service organizations (e.g., American Red Cross, American Heart Association, etc.) to design and provide mass training exercises. Conduct a single Point of Dispensing (POD) drill followed by one or more county-wide drills. Develop and use mass media notification systems for public health emergencies (establish Wayne County geo-targeting/geo-fencing methods for notifications using Facebook, Nixle, Twitter, etc.).

Implementation Tasks: Provide training for POD volunteers (by August 2020). Conduct an all-county drill to determine effectiveness and points of failure (by May 2021)

Cost(s): Training materials and up-to-date printed materials with each POD updated at least annually. Staff and other costs to provide training and drills.

Benefits: Trained and ready core of volunteers for emergencies. Evaluate program and ability to dispense timely and effectively.

Anticipated Funding Sources: Grant monies from FEMA and/or the Department of Homeland Security.

Action Item 4. Continue to build awareness of available/accessible warming and cooling centers in the community. Provide relief and support to individuals and reduce risk of temperature-related illness during times of extreme temperatures.

Specific Hazard(s) Addressed: Extreme temperatures (summer and winter)
Also valuable for infrastructure failure (communications, electric, water), flooding, and associated human health and safety incidents.

Specific Vulnerability(ies): Vulnerable, transient, and otherwise hard-to-reach populations that may not have access to normal means of communications.

Communities Affected/Benefited: All

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Primary Responsibility:

Wayne County Health and Human Services and Department of Homeland Security & Emergency Management, in coordination with local Police, Fire, EMS, Housing, Public Health, and Human Services.

The governing body of each municipality will assign an Office of Primary Responsibility to reduce the threats and/or impacts of extreme temperatures on public health, safety and infrastructure. Depending upon conditions, suggested OPRs could include Police Chiefs, Fire Chiefs, or Public Service/Works Directors.

Initiatives Needed: Establish or improve communication capabilities, including websites, social media, in house apps (e.g. Nixle, others). Mail with utility bills, etc. Identify vulnerable populations: group homes, unlicensed facilities, 'squatters' in vacant buildings, others. Establish and build awareness of accessible heating/cooling centers in the community. Require a vacant building registration.

Implementation Tasks: Train responders to locate (and transport?) vulnerable populations. Utilize all means available, including webs sites, social media, smart phone apps, mailers, etc. to inform public of impending weather threats and resources available, including heating & cooling shelters. Other Tasks: educate the public regarding safe use of office and home space heaters, generators, smoke detectors & carbon monoxide detectors; catalog & map areas of vulnerable and other residents (unlicensed facilities, empty/vacant buildings, etc.). Provide outreach and transportation to vulnerable and normally hard-to-reach populations during extreme temperature events.

Cost(s): Websites already funded. Warming/cooling shelters and provisions. Staff time and materials to train responders.

Benefits: Simple, accepted, flexible. Programmatic cost savings as rescues are less costly than recoveries and more valuable to the community. Volunteers are force multipliers.

Anticipated Funding Sources: Most infrastructure concerns are basic housekeeping, an anticipated expense. Websites, as a communication medium, are expected and should be a general fund item. Basic Nixle is free, more advanced options have a modest fee. Community (in-house) smart phone apps slightly more expensive but very useful.

Action Item 5.

Utilize public warning systems and networks for public awareness and instructions in the event of hazardous materials incidents. Provide additional Hazmat and other emergency training and equipment to first responders (including, but not limited to, fire, police & civilian responders).

Specific Hazard(s) Addressed:

Haz Mat Incidents - Transportation

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Specific Vulnerability(ies) High accident intersections and highways and others identified in Plan

Primary Responsibility: City, Township, and Village first responders, and Wayne County Homeland Security

Initiatives Needed: Develop strategy to utilize public warning systems and/or other communication channels including websites, social media, in house apps (e.g. Nixle, others) to notify the public of hazardous material incidents. Additionally, Wayne County Homeland Security and Emergency Management should continue facilitating hazmat and hazard/emergency response training programs for uniformed personnel. Training will include Incident Command System (ICS) procedures, hazmat response, and other emergency procedures/information required in disaster events. Wayne County HS & EM will continue to assess current training programs, identify additional training needs, establish a steering committee(s) to oversee implementation, and develop a charter (giving approval and support, announcement, definition of work, project activities).

Implementation Tasks: Specific tasks include: conducting a survey to assess current training programs and identify training needs, developing a plan of action and providing for training (either internal or through other venues), and informing local leaders and interested parties publicizing available training programs. Additional tasks include: identifying emergency messages needed and the method(s) required to deliver them to the public, and identifying National Incident Management System (NIMS) and ICS requirements, and providing these as needed.

Cost(s): Staff time; printing and postage costs; mileage for meetings; cost for contractors/instructors; overtime for students/backfill; and purchase of training materials and supplies.

Benefit(s): Protection of lives and the environment through enhanced response capabilities. All responders will have the same basic knowledge of the Incident Command System and how to work within this system to assure a smooth operation.

Anticipated Funding Source(s): County general fund, state and federal grants, and municipal assistance.

Action Item 6.

9. Identify and map, or update existing maps of, floodplains and flood prone areas. Leverage new ArcGIS online application with MI CIMS sponsored by Michigan State Police and FEMA Risk MAP incorporating the Great Lakes Coastal Flood Study. Provide training for local jurisdiction use and access. Improve floodplain management and minimize potential effects of flooding and encourage and promote regional watershed cooperation.

Specific Hazard(s) Addressed: Flooding – Riverine/Shoreline (Great Lakes)/Urban

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Specific Vulnerability(ies): All communities with floodplain areas, such as Ecorse Creek (e.g., the Cities of Allen Park, Dearborn Heights, Ecorse, Inkster, Lincoln Park, Melvindale, Romulus, Southgate, Taylor, Westland, and Wyandotte). Coastal communities (i.e., Grosse Pointe Shores, Grosse Pointe Farms, Grosse Pointe, Grosse Pointe Park, Grosse Ile, Riverview, River Rouge, Ecorse, Wyandotte, Trenton, Gibraltar & Brownstown Township). Residential areas, roads and other infrastructure in repetitive loss flood zones.

Communities Affected/Benefited: All

Primary Responsibility: Wayne County Homeland Security and Emergency Management, coastal and riparian communities, US Army Corps of Engineers, Wayne County Department of Public Services

Initiatives Needed: Direct each community to identify, train and prepare to use the new MI CIMS ArcGIS online application for damage assessment. Manage a database of community point(s) of contact that have completed training on ArcGIS to lead damage assessment in their community or as part of county task force.

Implementation Tasks: Identify Wayne County HSEMD a county-wide point of contact or point of contact to within each community to be trained in MI CIMS and ArcGIS. Wayne County in partnership with MSP – EMHSD will provide annual training on ArcGIS and MI CIMS; points of contact will lead damage assessment in their community or as part of county task force. Work with FEMA and the U.S. Army Corps of Engineers to develop flood control solutions for Detroit River, Lake St. Clair, and Lake Erie coastal communities.

Cost(s): Community costs include staff time for training (estimated 1/2-day for initial training and 2 additional hours annually). County costs include staff time for an initial 24 hours to build database and schedule initial class, manage a database of community point(s) of contact that have completed training on ArcGIS to lead damage assessment in their community or as part of county task force (estimated at 8 hrs per 6 months). Consultant costs for plan updates and green infrastructure design. Land may need to be purchased for infrastructure and road retrofitting, potentially requiring resident and business relocation. Purchase of emergency generators and emergency flood relief pumps.

Benefits: Conduct Damage Assessment in MI CIMS. Support emergency requests for assistance. Better information about community assets along creeks, streams, rivers, lakes, and flood plains in county. More effective use of MI CIMS by all communities, not just Act 390 communities.

Anticipated Funding Sources: Existing staffing budgets, Michigan Drain Code (Chapters 8 & 20), Federal Homeland Security Hazard Mitigation funds, Army Corps of Engineers, Clean Michigan Initiative Grants, Clean Water State Revolving Loan Funds (may require

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state intervention), Community Development Block Grants, Strategic Water Quality Initiative, Great Lakes Program, Non-point Source Implementation Grants (319 program), Other MDEQ/EPA grants if available, Voter-approved millage, Court-ordered judgment levies, federal Flood Mitigation Assistance Program, Pre-Disaster Mitigation Program grants.

7.2 Plan Monitoring and Revision

As noted previously, the Wayne County Hazard Mitigation Plan Advisory Committee (HMPAC) includes representatives the Wayne County Department of Homeland Security & Emergency Management, representatives from all 42 of the Wayne County municipalities covered by the Plan, and other regional stakeholders. This group meets regularly with Wayne County Homeland Security. The overall responsibility for ongoing evaluation and maintenance of the Plan is the responsibility of the County Emergency Management Coordinator but will be done in conjunction with municipal and regional organization representatives on the HMPAC.

The Plan will be reviewed by the HMPAC annually for progress on Action Items, changes in hazard history, and any known changes in vulnerability. Every two years, following review by the HMPAC, a description of Plan progress and any changes in circumstances or trends that may require revision to the Plan will be presented to the Wayne County Board of Commissioners. Meetings of the County Board of Commissioners to review and revise the HMP will be advertised to the public following Wayne County's normal public notice practices.

The Plan will be reviewed, updated, and revised, as necessary every five (5) years to maintain consistency with the changing community and hazard histories, as well as the goals and objectives of the County. As in past updates, review and updating of the HMP will be conducted in a series of dedicated workshops involving the HMPAC and other neighboring and regional stakeholders. In that process, each municipality is tasked with reviewing their individual hazard priorities, any changes in community vulnerability, and selected mitigation strategies, noting progress or lack of progress since the last update. Each community is also asked to adopt their particular sections of the HMP, or the HMP as a whole, every five years following these updates.

The public is also invited to participate in this process through the HMP update website, a link on the County's website, and through one or more publicly advertised public meetings presenting the draft revisions. Residents/members of the public may also participate in the process in public meetings as each community reviews their sections or the whole Plan for local adoption.

7.2.1 Coordination with Other Plans and Programs

A Hazard Mitigation Plan is only a part of the emergency planning, mitigation, preparedness, response, and recovery process. Future coordination of this Plan with other activities in the County will be conducted by the Hazard Mitigation Plan Advisory Committee (HMPAC). Individual members of the HMPAC are to identify opportunities, within their respective departments or organizations, to incorporate this Plan into other County plans, programs, and in the County's annual budgeting process. Any

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opportunities that are identified will be referred back to the HMPAC as a whole, for consideration. By including representatives from many jurisdictions and inter-jurisdictional agencies who are each well-connected throughout the County, opportunities for coordination with other plans will be enhanced. Incorporating this Plan into other plans and programs will ultimately be at the discretion of the County department or organization which administers these plans or programs.

The Action Items listed above do not directly limit future development in hazard prone areas. Wayne County has limited powers related to land use and land use planning. Action Item #2, which focuses on reducing flood related damages, will likely need to include the purchase of repetitive loss structures within floodplains and subsequent land use controls for those properties. The Wayne County Department of Homeland Security & Emergency Management will work with the County Drain Commissioner and the Department of Environment to plan and implement floodplain management actions consistent with this Plan and to incorporate the findings and recommendations of specific on-going flood mitigation planning into future revisions of this HMP.

Enabling legislation in Michigan has established a system of "Home Rule," wherein land use planning and zoning power is given to local cities, villages, and townships. These municipalities will be encouraged to incorporate the findings and recommendations in this HMP into their individual land use master plans and zoning practices. Regional planning initiatives such as flood mitigation plans for Ecorse Creek and the Combined Downriver Watersheds, and the periodic review and revision of watershed plans for the Rouge River, Ecorse Creek, the Combined Downriver Watersheds, and the Lower Huron River also offer opportunities for incorporating the mitigation strategies and Action Items included here. By promoting the benefits of a coordinated planning process, and utilizing digital resources to foster connections whenever possible, the HMPAC will continue to play a vital role in creating opportunities for plan coordination.

Wayne County Hazard Mitigation Plan


Revision Number/Date: 0/June 2019

Publication Date: June 17, 2019


Appendix A. Public Meeting and Outreach Materials

Public Meeting Wayne County Hazard Mitigation Plan Update

Hazard Mitigation Plan Update





Public Meeting
April 23, 2019



Overview

Introduction
The Function of a Hazard Mitigation Plan
The 2013 Wayne County Plan
2019 Wayne County Plan Update
First workshop
Survey Results
Second workshop
Survey Results

Introduction



Team

Project Team
Wayne County Homeland Security
ASTI Environmental
Advisory Committee
Public

The Wayne County Plan
www.waynecountyhmp.com


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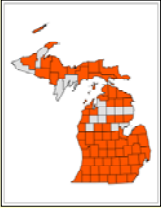
ASTI Environmental

Established in 1985
Over 90% Repeat/Referral
Over 7,000 projects in the United States
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Project Locations



Public Meeting

Wayne County Hazard Mitigation Plan Update

Advisory Committee

- Local Communities
- County LEPC
- Schools
- Industry/Businesses
- Adjacent Communities



The Wayne County Plan
www.waynecountyhmp.com

Community Reps/Stakeholders

- 42 Communities
 - Emergency Management Coordinators
 - Local Leaders
- Adjacent Communities
- Industry and Business
- Non-Government Organizations
- Interested Individuals

The Wayne County Plan
www.waynecountyhmp.com

Hazard Mitigation Plans

What is a HMP?

A Hazard Mitigation Plan (HMP) will...

- identify hazards in the community,
- evaluate and highlight those hazards,
- provide mitigation alternatives

Hazard Mitigation Plans

What is a HMP?

The objectives of a Plan are to;

- reduce risks from natural, human, and technological hazards by focusing on those hazards,
- provide guidance when committing resources that will reduce the effects of hazards, and
- **provide a basis for technical assistance and funding**

Hazard Mitigation Plans

What is a HMP?

The Plan must comply with:

- the Disaster Mitigation Act of 2000,
- the Emergency Management Act,
- FEMA and Michigan Department of State Police guidance documents,
- and all applicable federal, state, and local regulations.

Hazard Mitigation Plans

Public Meeting

Wayne County Hazard Mitigation Plan Update

What is a HMP?

The Plan is only a part of the emergency planning, mitigation, preparedness, response, and recovery process. Must coordinate with:

- All existing plans and programs
- **Existing Plans can be included in the Final HMP by reference**

Hazard Mitigation Plans

Why Prepare A Plan?

- To save lives and protect property
- To preserve and protect an area's environment and economy
- To preserve and maintain an area's essential services and quality of life

Hazard Mitigation Plans

Why Prepare A Plan?

To provide information to citizens, businesses, and officials (including future emergency managers), for

- Planning
- Economic development
- Project development decisions
- Emergency Management

Hazard Mitigation Plans

Why Prepare A Plan?

To support hazard mitigation project implementation and **funding.**

- Identifies specific hazards
- Identifies specific vulnerabilities
- Documents mitigation options
- Demonstrates community involvement and support
- Part of an effective overall plan

Hazard Mitigation Plans

Considerations - Hazards

2006 Emphasis	2013 Emphasis	2019 Emphasis??
Terrorism	Flooding	Flooding
Weapons of Mass Destruction	Earthquakes	Infrastruct./Subsidence
	Pipeline Ruptures	Changing Climate
	Nuclear Accidents	Cyber Attacks
		Catastrophic Events
		Active Assailant(s)

Hazard Mitigation Plans

Considerations - Hazards

- Natural – 12 Total
- Technological – 14 Total
- Human Related – 14 Total

Hazard Mitigation Plans

Public Meeting

Wayne County Hazard Mitigation Plan Update

Considerations – Natural Hazards

- Celestial Impact
- Drought
- Earthquakes
- Erosion
- Extreme Temperature
- Fog
- Flooding
- Fire Hazards
- Invasive Species
- Subsidence
- Thunderstorms – Hail, Lightning, Severe Winds
- Tornadoes
- Winter Hazards – Ice, Sleet, Snowstorms

Hazard Mitigation Plans

Considerations – Technological Hazards

- Fires – Structural or Tires
- Flooding – Dam Failure/Urban
- Hazmat Incidents – Transportation or Fixed
- Infrastructure Failure –
 - Water/Sewer/Electric/Communications/Roads
- Nuclear Power Plants
- Oil, Petroleum & Natural Gas Accidents
- Subsidence – Mining or Infrastructure

Hazard Mitigation Plans

Considerations – Human Hazards

- Catastrophic Events/National Emergencies
- Civil Disturbance
- Criminal Acts – Active Assailant(s)
- Criminal Acts – Arson & Vandalism
- Gas/Oil Shortages or Supply Disruptions
- Information Technology Intrusion
- Public Health Emergencies
- Terrorism & Sabotage
- Transportation Accidents – Air/Road/Marine/Rail
- Weapons of Mass Destruction


Hazard Mitigation Plans

Considerations - Critical Assets


- Commercial Sites
- Hospitals/Response Facilities
- Industrial Sites
- Open Space
- Public Facilities
- Residential Areas
- Roads, Railroads, Bridges
- Utility Facilities
- Schools, Churches
- Sports/Entertainment Arenas
- Central Business Districts

Hazard Mitigation Plans

The Current Wayne County Plan



Circa 2013



Workshop Hazard Impact Ranking

Hazard Event	Workshop Rank	Hazard Risk Rank	Action Plan
Thunderstorms - Severe Wind	4	1	1
Infrastructure Failure	1	2	1
Extreme Temperatures: Hot and Cold	3	3	1
Tornadoes	2	4	1
Hazmat Incidents - Transportation and Fixed	7	5	2
Winter Hazards - Ice and Sleet	4	7	3
Public Health Emergencies	6	6	4
Flooding - Urban	9	8	4
Flooding - Riverine	9	9	4
Transportation Acc. - Highway	8	10	4

Action Plan Assessment		
Risk	1-5	6-10
1-5	1	2
6-10	3	4

- Flooding (Non Dam)
- Hazmat Incidences—Transportation
- Infrastructure Failure
- Public Health Emergencies
- Tornadoes


Hazard Identification
Advisory Committee Meeting of October 12, 2005

Public Meeting

Wayne County Hazard Mitigation Plan Update


Action Plans

- Establish an adequate number of warming and cooling centers throughout the county and develop minimum criteria for their operation (capacity, oxygen, generators)
- Improve floodplain management by planning acceptable uses, involving drain commissioners, performing hydrologic studies, and including analyses in decisions

 Hazard Identification
Advisory Committee Meeting of January 30, 2013


Action Plans

- Distribute family emergency preparedness information
- Create evacuation plans and community awareness of those plans Improve emergency communication between communities, including the City of Detroit



 Hazard Identification
Advisory Committee Meeting of January 30, 2013

Action Plans

- Train and equip public health, hospital, and responder personnel (police/fire and citizen corps) for readiness
- Annual review and evaluation of HMP
- Develop an investigation program for all high hazard structures in the county (Large industrial and SARA Title III sites), particularly near sensitive populations
- Communication and Outreach

 Hazard Identification
Advisory Committee Meeting of January 30, 2013

The Wayne County Plan Update

The Process

- Prepare hazard history and community profile
- Identify significant hazards and risks
- Identify specific vulnerabilities

Hazard Mitigation Plans

The Process

- Identify hazard mitigation goals and objectives
- Suggest strategies to achieve mitigation goals and objectives
- Evaluate strategies using locally chosen criteria
- Select feasible strategies based on evaluation criteria

Hazard Mitigation Plans

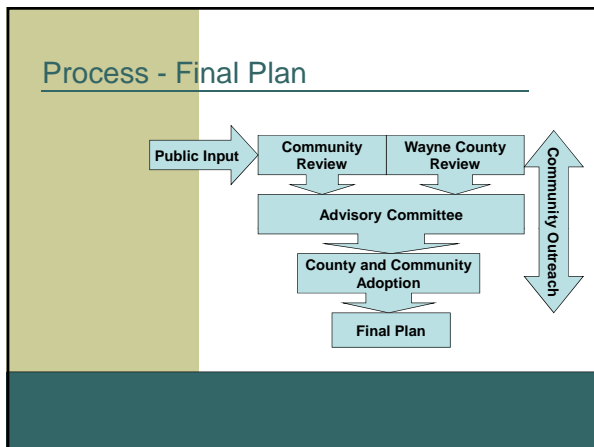
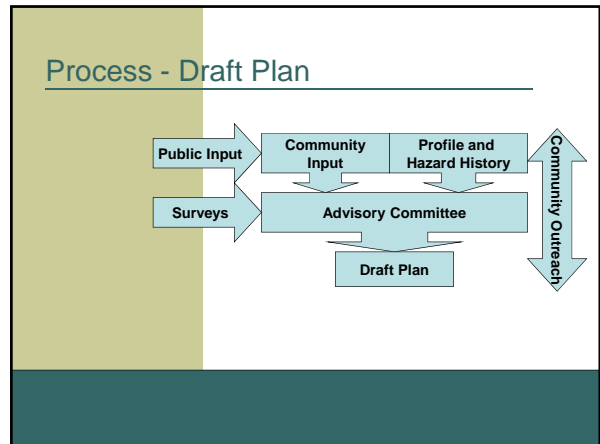
Public Meeting

Wayne County Hazard Mitigation Plan Update

The Process

- Propose specific action steps that will achieve desired objectives
- Prepare the plan
- Adopt the plan
- Implement the plan
- Monitor and update the plan

Hazard Mitigation Plans



Process - Outreach

Public

- Public meeting
- Community announcements
- Web page
 - Comment Form
 - General Information
 - Plan updates and Draft Plan
- Phone and email contact information

Process - Outreach

Stakeholders

- Web page
 - Meeting agendas and summaries
- Draft Plan Available

Process - Outreach

Advisory Committee

- Two Workshops
- Three Surveys
- Web page
 - Draft Plan
- Action Plan Review
- Draft Plan Review

Public Meeting

Wayne County Hazard Mitigation Plan Update

Hazard Ranking Criteria

Criteria	Weighting
Loss of life and Injury	15
Infrastructure Failure	8
Geographic Area of impact	7
Ability to Recover	7

Hazard Identification
Advisory Committee Meeting of March 14, 2019

Assets at Risk From Hazards

2019 Plan Update Survey Results (Average Value)

Based on Asset Class Characteristics estimate the effects of a hazard event to the listed criteria

Asset to Consider	Asset Criticality				Rank
	Ability to Recover from Disaster/Incident	Infrastructure Failure	Loss of Life and Injury	Geographic Area of Impact	
Commercial Sites	1.00	1.00	2.50	1.00	54
Hospital/Child Care Facilities	5.00	5.00	5.00	5.00	1
Industrial Sites	2.50	2.50	2.50	2.50	10
Open Space	1.00	1.00	1.00	1.00	36
Public Facilities	2.50	2.50	2.50	2.50	15
Residential Areas	5.00	5.00	5.00	5.00	2
Roads, Railroads, Bridges	5.00	5.00	1.00	5.00	6
Utility Facilities	5.00	5.00	5.00	5.00	2
Schools, Churches	2.50	2.50	5.00	2.50	4
Sports/Entertainment Areas	1.00	1.00	5.00	1.00	6
General Business Dist.	1.00	1.00	5.00	1.00	6

For Ranking 1-5:
 High Criticality >50
 Med. Criticality Between 25-50
 Low Criticality <25

Hazard Identification
Advisory Committee Meeting of March 14, 2019

Hazard History – Top 12

Hazard	Annual Frequency	Frequency Rank
Transportation Accidents - Highway*	55,001	1
Criminal Acts - Vandalism*	52,500	2
Fire Hazards - Structural Fires	4,207	3
Fire Hazards - Wildfires	1,640	4
Criminal Acts - Arson*	917	5
Transportation Accidents - Marine	10	6
Thunderstorm Hazards - Severe Wind	7	7
Infrastructure Failure - Water System	5	8
Transportation Accidents - Rail	3	9
Petroleum and Natural Gas Pipeline Accidents	2	10
Thunderstorm Hazards - Hail	2	10
Winter Hazards - Snowstorms	2	10

Hazard Identification

Survey Results - Top 14

2019 Plan Update Meeting Results

Concern About Impacts of Hazardous Events

Hazard Event to Consider	Avg Rank (Overall)	Ability to Recover from Disaster/Incident	Infrastructure Failure	Loss of Life and Injury	Area of Impact	Hazard Rank	Workshop Rank
Domestic Terrorism - Explosive Hit or CBRN	25	3	2	2	3	21	5
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	5	1	1	1	1	1	1
Public Health Emergencies - Radiation, Epidemics, Food/Water, Chemical	5	1	1	1	1	1	1
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	5	1	1	1	1	1	1
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	5	1	1	1	1	1	1
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	5	1	1	1	1	1	1
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	5	1	1	1	1	1	1
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	5	1	1	1	1	1	1
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	5	1	1	1	1	1	1
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	5	1	1	1	1	1	1
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Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	5	1	1	1	1	1	1
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	5	1	1	1	1	1	1

Enter the Cell Value:
 High 3
 Medium 2
 Low 1

Notes: additional and new assets
 Critical: those directly in line of Public Health Emergencies
 Combined water, storm, and sanitary sewer infrastructure
 Priority: those determined using matrix optimization method

High Impact >24.0
 Med. Impact Between 12.0-24.0
 Low Impact <12.0

Hazard Identification
Advisory Committee Meeting of March 14, 2019

Workshop Hazard Impact Ranking

Hazard Event	Workshop Rank	Hazard Risk Rank	Action Plan Needed
Infrastructure Failure - Water & Sewer Systems	1	5	1
Criminal Acts - Mass Shootings/Active Assailants	3	2	1
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	2	4	3
Winter Hazards - Snow, Ice & Sleet	8	2	2
Criminal Acts - Vandalism and Arson	12	1	2
Extreme Temperatures - Extreme Hot or Cold	5	6	3
Flooding - Riverine/Stream	4	10	3
Internal Incidents - Transportation	5	8	3
Thunderstorms - Hail, Lightning, Severe Wind	14	12	4
Roads	8	13	4
Roads	8	9	4
Roads	8	9	4
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Chemical	11	13	4
Oil Spill/Leakage	13	11	4
Transportation Accidents - Surface Road/Highways	7	6	4

Action Plan Assessment:
 Rank: 1-5 (1-6-11)
 1-5 (1-2)
 6-11 (3-4)

Active Assailant(s)
 Infrastructure Failure
 Public Health Emergencies
 Extreme Temperatures
 HazMat Incidents - Transportation
 Flooding

Hazard Identification
Advisory Committee Meeting of March 28, 2019

Workshop Hazard Impact Ranking

Critical Asset	Criticality Rank	Asset Risk Rank	Vulnerability Rank
Hospital/Child Care Facilities	1	5	1
Residential Areas	2	3	1
Schools, Churches	4	2	1
Roads, Railroads, Bridges	6	4	2
General Business Dist.	6	1	2
Industrial Sites	5	6	3
Utility Facilities	2	7	3
Commercial Sites	10	6	4
Open Space	11	11	4
Public Facilities	9	10	4
Sports/Entertainment Areas	6	9	4

Vulnerability Assessment:
 Rank: 1-5 (1-6-11)
 1-5 (1-2)
 6-11 (3-4)

Hazard Identification
Advisory Committee Meeting of March 28, 2019

Public Meeting

Wayne County Hazard Mitigation Plan Update

Mitigation Goals

- Protect and preserve human health and well being
- Maintain and fortify critical assets, structures and infrastructure to preserve the quality of life.
- Ensure Interagency cooperation and coordination for preparedness
- Enhance emergency response capabilities (including and especially communications)
- Review and improve county-wide contingency plans for maintaining quality of life



Hazard Identification
Advisory Committee Meeting of March 14, 2019


Action Plans

Criminal Acts: Mass Shooting(s)/Active Assailant(s)
Continue training in most current protocols and develop a process for requesting assistance from local and state law enforcement.

Infrastructure Failure
Identify, prioritize, and replace or renovate aging structures and equipment. Establish procedures to protect IT systems.

Public Health Emergencies
Stockpile vaccines and antidotes; train & equip volunteers to staff open/closed points of dispensing (PODs)

Develop and use mass media notification systems for public health emergencies (establish Wayne County geo-targeting/geo-fencing methods for notifications using Facebook, Nixle, Twitter, etc.)




Hazard Identification
Advisory Committee Meeting of March 28, 2019

Action Plans

Flooding – River/Shoreline
Identify and map, or update existing maps of, floodplains and flood prone areas. Leverage new ArcGIS online application with MI CIMS sponsored by Michigan State Police. Provide training for local jurisdiction use and access.

HazMat Incidents – Transportation
Utilize public warning systems and networks for public awareness and instructions in the event of hazardous materials incidents.




Hazard Identification
Advisory Committee Meeting of March 28, 2019

Action Plans



Extreme Temperatures
Establish and build awareness of accessible heating/cooling centers in the community. Utilize all means available, including webs sites, social media, smart phone apps, mailers, etc. to inform public of impending weather threats and resources available, including heating & cooling shelters.

Educate the public regarding safe use of office and home space heaters, generators, smoke detectors & carbon monoxide detectors. Catalog & map areas of vulnerable and other residents (unlicensed facilities, empty/vacant buildings, etc.). Provide outreach and transportation to vulnerable and normally hard-to-reach populations during extreme temperature events.





Hazard Identification
Advisory Committee Meeting of March 28, 2019

Public Input

Contact Information

Paul Rentschler
prentschler@asti-env.com
www.waynecountyhmp.com
 1.800.395.ASTI

For more information contact: Paul Rentschler (810) 225-2800

FOR IMMEDIATE RELEASE

WAYNE COUNTY HAZARD MITIGATION PLAN PUBLIC MEETING

BRIGHTON, MI, (April 4, 2019) — A public meeting to present an overview of the Hazard Mitigation Plan being updated for Wayne County, and for residents to provide input, will be held April 23, 2019 at 5:30 p.m. in Rooms 1 & 2 of the Heinz C. Prechter Educational & Performing Arts Center (EPAC), at the Wayne County Community College Downriver Campus, 21000 Northline Road, Taylor, Michigan. Additional information about the Plan is available at: <https://waynecountyhmp.com/> or by contacting Paul Rentschler, Project Manager, 800.395.ASTI or prentschler@asti-env.com.

This plan will provide a basis for identifying and managing hazards among the communities in the county, while complying with the requirements of the Disaster Mitigation Act of 2000, the Emergency Management Act, the Federal Emergency Management Agency (FEMA) and applicable federal, state, and local regulations.

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About ASTI ENVIRONMENTAL

Since 1985, ASTI ENVIRONMENTAL has been an expert in Michigan's regulatory and physical environment. ASTI provides investigation, remediation, compliance and restoration services. As one of Michigan's most respected environmental consulting firms, ASTI delivers practical solutions to environmental challenges.

Healthcare-Dental

Assertive Community Treatment Specialist, RN Only, 2 Positions - Assertive Community Treatment Program. Salary Range: \$49,806 - \$67,416 annually, plus benefits. **Application Deadline: until filled.** General Statement of Duties: under the direction of the ACTP Supervisor; performs responsible tasks in providing comprehensive, intensive, off-site clinical services to Genesee Health System clients, assigned to the ACT Program; responsible for significant liaison and consultation work with ancillary agencies, courts, hospitals, the police and families, as well as direct intervention to clients assigned to the program; will not be assigned individual clients, as clients will be assigned to the team as a whole, thus, a good deal of sharing of information, feedback and teamwork is required; this is a 7-day-a-week, 24-hour coverage program and as such, persons will be required to have "on-call" time, where they may have to perform emergency interventions in person or otherwise, at odd hours; most client contacts will be off-site, either in clients' homes or mutually agreed upon sites; persons must be able to work effectively with minimal supervision; persons will need to facilitate the exchange of information between various programs, hospitals and interested parties; performs related work as required. For additional details on job duties and requirements, please log on to www.genhs.org. You can apply directly online or fax resume and transcripts to (810) 257-3755.

Emergency Department Director

Live and work where others vacation!! In Gaylord our emphasis is on outdoor recreation and quality of life. We enjoy a healthful climate, which is ideal for year-round sporting activities including golf, camping, boating, tennis, cross-country and downhill skiing, hunting, fishing, and more. Gaylord boasts a strong business community and award-winning schools.

Munson Healthcare Otsego Memorial Hospital is seeking candidates for an Emergency Department Director to join our dynamic team! This position is accountable for clinical and operational functions of the Emergency Department, including management of the trauma program and regional Medical Control Authority. The ideal candidate will be a Master's prepared Michigan licensed RN with 2-3 year's experience in an ED setting, enjoy working in a team-oriented environment, have strong interpersonal and communication skills and deliver exceptional customer service. MHC OMH offers an excellent benefit package including health, dental, vision, life and disability insurance; continuing education assistance; retirement and generous paid time off.

Applications, position details and additional career opportunities can be found on our website at: www.munsonhealthcare.org/omh Phone: 989-731-2493 Fax: 989-731-7792



Pharmacy Manager (Bronson, MI) - Maintain the pharmacy department according to professional standards & state/federal regs. Supervise prescription dispensing process, including maintaining & taking inventory & keeping accurate records. Review drug utilization of patients. Ensure high quality patient care & customer satisfaction & address any customer complaints or concerns. Interview, hire, & train pharmacy personnel. Oversee payroll, expense control & revenues from prescription sales. Send resume to: Bimal Patel, Bronson City Pharmacy LLC, 625 E. Chicago Street, Bronson, MI 49028.

Senior Manager, Heart Lung Platform; Terumo Cardiovascular Systems Corporation, Ann Arbor, MI. Plan, direct and coordinate engineering activities for development of new Class 2 heart-lung machine products within identified schedule, personnel, and budget constraints. Lead and manage cross-functional Product Development teams in design and development of new products and changes to existing heart-lung machine products. Create and manage overall budget for heart-lung platform engineering activities. Mail CV to R. Lockerman (ATTN: Sr. Mgr. HLP), Terumo Cardiovascular Systems Corporation, 6200 Jackson Rd., Ann Arbor, MI 48103.

Professional

Metalsa Structural Products, Inc. has an opening for a Business Development Specialist Asia - Body & Chassis SBU at its Novi, MI office responsible for planning, quoting, developing & writing business winning proposals of new & profitable business for Metalsa in order to position company within the panel of providers for Metalsa Asia automotive clients. Requires Bachelor's degree & exp. Must be able to read, write & speak Mandarin Chinese fluently. Send resume to Metalsa Structural Products, ATTN: HR Specialist #1, 29575 Hudson Dr., Novi, MI 48377. No phone calls please.

Product Director (Labgoo US, Inc., Bloomfield Hills, MI) Guide Product Line Contribution Team as a business unit; responsible for increase of profitability of existing products. Reqs: Master's deg or foreign equiv in Business Admin, Mktg, or Mgmt + 2 yrs exp. Exp to incl analyzing & solving cyber security technology product issues. Mail resumes to 333 W San Carlos St, Ste 600, San Jose, CA 95110.

Senior Business Intelligence Analyst in Ann Arbor, MI: Responsible for designing and building analytics-based tools which are technically sophisticated yet easy to understand and use by business teams, in support of strategic initiatives and ongoing business processes for the company. Requires: (1) Masters + 3 yrs exp. OR (2) Bachelors + 5 yrs. exp. Please mail resume with cover letter to: XPO Enterprise Services, Inc., 13777 Ballantyne Corporate Pl., 4th Floor, Charlotte, NC 28277, Attn: Recruiting, Refer to job code 10449.

Strategic Staffing Solutions, L.C. seeks a **Product Manager** in Detroit, MI to manage relationships with customers, vendors, and other third parties as necessary. Reqs BS+5yrs exp.; Reports to company headquarters in Detroit, MI. Roving employee that will work at various unknown client sites throughout the US for up to 100% of the time. Must be willing to travel anywhere in the US and may be assigned to work at client sites across the US. For complete reas. & to apply, visit: <http://www.strategicstaff.com/get-a-job/> Job ID: 147226.

Sales-Marketing

Sales & Program Manager w/ ITT Motion Technologies America, LLC in Novi, Michigan. Responsible for dylng the brake pads bus w/ our customers. Spearhead product dvlpmnt projects from start to finish, incl the hot press process, thermal treatment oven, grinding of the pads, painting, & finishing & the rel. commercial activities & negotiations. Reas: Bach deg (U.S. or foreign equiv) in Engg, Industrial Engg, Production Engg or a rel field. 8 yrs of exp in Automotive Original Equipment Mfg or Car Mfg. Prior work exp must incl 4 yrs: Utilizing understanding of brake pads & relevant production techniques; Commercial & tech negotiation w/ car manufacturers; Utilizing understanding of tech reas pertaining to friction material & rel price positioning in the mkt; & exp w/ the mgmt of OEM & Car mfg sales accounts. Travel req for mng customer relationships for major & strategic accounts. **QUALIFIED APPLICANTS:** Please email resume to ITT_IP.Jobs@itt.com & ref requisition # 9223BR

Trades

Mold Shop Manager
Must be experienced with all aspects of machining, benching and assembly of foam molds, dunnage molds and blow molds. Benefits: Medical, Dental, Life Insurance, 401K and Paid Vacation. Please forward resume to: smlcare@regression.com or fax to: 248-477-0128

Assorted Items

all kinds of things...

Appliances

Commercial washer & dryer (equip only) Maytag washers/ 6 of 50lbs, 6 of 35lbs, 7 of 25lbs, 12 top loaders. Dryers/ 14, 2 stackers (28 total), 3 stack 50 lb (6 total) call Rocky for more details 586-604-9597 from 9am-7p

Sporting Goods
NFT bamboo fly rod, 3 piece with case, mint condition \$200, call 313-492-8217

Wanted to Buy

BUYING — Coin, sport cards & Stamp Collections. Call 248-471-4451 TOP \$\$\$

General Auctions

THE FOLLOWING STORAGE LOTS have been placed under a warehouseman's lien and will be sold at a public auction. The auction will be held at Grasse Pointe Storage Co., 11850 E. Jefferson, Detroit, MI on May 4, 2019 at 10:00 am. 313-822-4400. Preview at 9:00am.
HOUSEHOLD GOODS, OFFICE AND ESTATE ITEMS.
2851 Latasia Banks
3005 Howard Blood
1540 Paul Creasey
2505 Deborah Culler
1150 Hansen Hunter
3010 Rose Marchese
2838 Linda Marino
2795 Marina Gage
2878 Tasha Marshall
2789 Brian Masck
2993 Ronnie Mitchell
2868 Jacqueline Richards
2895 Tony Squirewell
2980 David Stefan
3120 Daniel Tappert
2567 Rodney Watts
2566 Sally/Requelle Wynn

Services

Personals
dating, entertainment...

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American Beauties
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Adult Entertainment

FIND YOUR SOUL MATE!
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WHERE REAL SINGLES MEET TO CHAT AND HAVE FUN! BROWSE AND REPLY FOR FREE 18+ GAY: 313-481-9303 STRAIGHT: 313-481-9304

Your Source

Legals
for the latest...

Legal Notices

NOTICE OF PUBLIC HEARING
Notice is hereby given that the Suburban Mobility Authority for Regional Transportation (SMART) has prepared the FY 2020 Annual Operating and Capital Budgets. The total estimated budgets include the following programs: 5307 Formula (\$27,232,949), 5307 LETC Governor's Apportionment (\$1,269,009), 5339 Formula (\$3,560,270), 5339 LETC Governor's Apportionment (\$107,996), CMAQ (\$877,891), 5310 SMART (\$4,509,095), 5310 Monroe and NOTA (\$277,925), 5311 Nonurban JARC (\$381,254), SDNT (\$325,000), Act 51 Operating (\$38,201,000), 5311 LETC Operating (\$220,300), and Other State Subsidized Services (Operating) (\$804,219). SMART ensures that the level and quality of transportation service is provided without regard to race, color, or national origin in accordance with the Title VI of the Civil Rights Act of 1964. For more information regarding our Title VI obligations or to file a complaint, please contact us at the below address. The proposed Capital and Operating budgets are on file at SMART, Buhl Building, 6th floor Receptionist, 535 Griswold Street, Detroit, MI 48226 and may be reviewed from Monday, April 22, 2019, through Wednesday, May 22, 2019, between the hours of 9:00 a.m. and 4:00 p.m. Written comments or written requests for a public hearing regarding the budgets must be received by Wednesday, May 22, 2019. If a hearing is requested, notice of the scheduled date, time and location will be provided at least 10 days in advance. Submittals should be mailed to the attention of Manager of Capital and Grant Programs, SMART, at the above address. Barring any changes made in response to the written comments, this document will become final. DET3512494 04/21/2019

Public Meeting on the Wayne County Hazard Mitigation Plan

When: 5:30 pm, April 23, 2019
Where: Rooms 3 & 2, Educational and Performing Arts Center, WCC Downriver Campus, 21000 Northline Road, Taylor, MI
Additional information: waynecountyhmp.com or 800.395.ASTI
Public Comment accepted through May 7, 2019
DET3513193 04/21/2019

State of Michigan }
County of Livingston } SS

Affidavit of Publication
IN
Michigan.com
The Detroit News & Free Press

ASTI Environmental
10448 Citation Dr., Suite 100
Brighton, MI 48116

RE: Public Meeting on the Wayne County Hazard Mitigation Plan
When: 5:30 pm, April 23, 2019

See attached.

Public Meeting on the Wayne County Hazard Mitigation Plan
When: 5:30 pm, April 23, 2019
Where: Rooms 1 & 2, Educational and Performing Arts Center, WCC Downriver Campus, 2100 Northline Road, Taylor, MI
Additional information:
www.waynecountymip.com or 800.295.ASTI
Public Comment accepted through May 7, 2019
DET3513193 04/21/2019

Amy Schmidt (Amy Schmidt), being duly sworn, deposes and says that the above advertisement(s) appeared in Michigan.com - The Detroit News and Free Press on April 21, 2019. Invoice 3513193 and as an authorized employee of Michigan.com, he/she knows well the facts stated herein.

Dated: April 24, 2019

Notarized By:

Gina Anne Huff

Acting in the County of Livingston

GINA ANNE HUFF
NOTARY PUBLIC - STATE OF MICHIGAN
COUNTY OF LIVINGSTON
My Commission Expires March 9, 2023

School of Continuing Education

Presents

Wayne County Homeland Security Emergency Management Hazmat Mitigation Meeting

APRIL 23, 2019

EPAC: 1&2

5:30 PM to 8:30 PM

Downriver Campus – 21000 Northline Road, Taylor, MI 48180



<p>Please Print: Name: <u>Mike Cleavel</u> Student ID: <u>NO</u> Address: <u>31000 N Line</u> City: <u>TAYLOR</u> State: <u>MI</u> Zip: <u>48180</u> Email Address: <u>N/A</u> WCCCD Alumni: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Phone Number: _____ Wayne County Resident? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Please Print: Name: <u>PAUL RENTSCHLER</u> Student ID: _____ Address: <u>ASTI ENVIRONMENTAL 10448 CITATION DR.</u> City: <u>BRIGHTON</u> State: <u>MI</u> Zip: <u>48116</u> Email Address: <u>prentscher@asti-env.com</u> WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/> Phone Number: _____ Wayne County Resident? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>
<p>Please Print: Name: <u>Danielle Elzayat</u> Student ID: _____ Address: <u>32030 Van Buren</u> City: <u>Wayne</u> State: <u>MI</u> Zip: <u>48184</u> Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/> Phone Number: _____ Wayne County Resident? Yes <input type="checkbox"/> No <input type="checkbox"/></p>	<p>Please Print: Name: <u>Anthony Chicks</u> Student ID: _____ Address: <u>23575 Goddard</u> City: <u>Taylor</u> State: <u>MI</u> Zip: <u>48180</u> Email Address: <u>achicks@C.taylor.mi.us</u> WCCCD Alumni: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Phone Number: _____ Wayne County Resident? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
<p>Please Print: Name: <u>PAUL L HALEY</u> Student ID: _____ Address: <u>2800 THIRD ST</u> City: <u>TRENTON</u> State: <u>MI</u> Zip: <u>48183</u> Email Address: <u>phaley@trenton-mi.com</u> WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/> Phone Number: _____ Wayne County Resident? Yes <input type="checkbox"/> No <input type="checkbox"/></p>	<p>Please Print: Name: <u>Voncl Parke</u> Student ID: _____ Address: <u>33030 Van Buren Road</u> City: <u>Wayne</u> State: <u>MI</u> Zip: <u>48184</u> Email Address: <u>gppkew@waynemi.com</u> WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/> Phone Number: _____ Wayne County Resident? Yes <input type="checkbox"/> No <input type="checkbox"/></p>

School of Continuing Education



Presents
Wayne County Homeland Security Emergency Management Hazmat Mitigation Meeting

APRIL 23, 2019

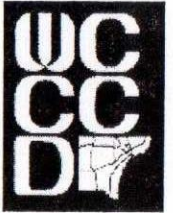
EPAC: 1&2

5:30 PM to 8:30 PM

Downriver Campus – 21000 Northline Road, Taylor, MI 48180

<p>Please Print:</p> <p>Name: <u>DEREK LAFFRIERE</u> Student ID: _____</p> <p>Address: <u>6000 Middlebelt</u></p> <p>City: <u>GARDEN CITY</u> State: <u>MI</u> Zip: <u>48133</u></p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes ___ No ___</p>	<p>Please Print:</p> <p>Name: <u>TADALIA STURDIVANT</u> Student ID: _____</p> <p>Address: <u>33030 Van Born Rd</u></p> <p>City: <u>WAYNE</u> State: <u>MI</u> Zip: <u>48181</u></p> <p>Email Address: <u>sturdiant@waynecc.edu</u> WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes ___ No ___</p>
<p>Please Print:</p> <p>Name: <u>Karen Siedlik</u> Student ID: _____</p> <p>Address: <u>7602 Trafalgar</u></p> <p>City: <u>Taylor</u> State: <u>mi</u> Zip: <u>48180</u></p> <p>Email Address: <u>N/A</u> WCCCD Alumni: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p> <p>Phone Number: <u>313-291-8047</u> Wayne County Resident? Yes <input checked="" type="checkbox"/> No ___</p>	<p>Please Print:</p> <p>Name: <u>LEE GAVIN</u> Student ID: _____</p> <p>Address: <u>6045 FENTON</u></p> <p>City: <u>Don Hags</u> State: <u>MI</u> Zip: <u>48127</u></p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes ___ No ___</p>
<p>Please Print:</p> <p>Name: <u>James Williams</u> Student ID: _____</p> <p>Address: <u>6839 Troy</u></p> <p>City: <u>Taylor</u> State: <u>mi</u> Zip: <u>48180</u></p> <p>Email Address: <u>NA</u> WCCCD Alumni: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p> <p>Phone Number: <u>313 522-9662</u> Wayne County Resident? Yes <input checked="" type="checkbox"/> No ___</p>	<p>Please Print:</p> <p>Name: _____ Student ID: _____</p> <p>Address: _____</p> <p>City: _____ State: _____ Zip: _____</p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes ___ No ___</p>

School of Continuing Education



Presents
Wayne County Homeland Security Emergency Management Hazmat Mitigation Meeting

APRIL 23, 2019

EPAC: 1&2

5:30 PM to 8:30 PM

Downriver Campus – 21000 Northline Road, Taylor, MI 48180

<p>Please Print:</p> <p>Name: <u>Thaddens G. Zmuda</u> Student ID: _____</p> <p>Address: <u>35367 Tilford RD.</u></p> <p>City: <u>Browns town</u> State: <u>M</u> Zip: <u>48173</u></p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: <u>1-734-379-0576</u> Wayne County Resident? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Please Print:</p> <p>Name: <u>Danny Dotson</u> Student ID: _____</p> <p>Address: <u>10600 W. Jefferson Ave</u></p> <p>City: <u>River Rouge</u> State: <u>MI</u> Zip: <u>48229</u></p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>Please Print:</p> <p>Name: <u>SHANON HERRON</u> Student ID: _____</p> <p>Address: <u>33030 Vanborn Rd</u></p> <p>City: GARBEN CITY <u>Wayne</u> State: <u>MI</u> Zip: <u>48184</u></p> <p>Email Address: <u>SHERRON@WAYNECOUNTYMI.COM</u> WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Please Print:</p> <p>Name: _____ Student ID: _____</p> <p>Address: _____</p> <p>City: _____ State: _____ Zip: _____</p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>Please Print:</p> <p>Name: <u>SAMER JAAFAR</u> Student ID: _____</p> <p>Address: <u>33030 Vanborn Rd</u></p> <p>City: <u>Wayne</u> State: <u>MI</u> Zip: <u>48184</u></p> <p>Email Address: <u>SJaafar@waynecounty.com</u> WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: <u>734-728-3711</u> Wayne County Resident? Yes <input type="checkbox"/> No <input type="checkbox"/></p>	<p>Please Print:</p> <p>Name: _____ Student ID: _____</p> <p>Address: _____</p> <p>City: _____ State: _____ Zip: _____</p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes <input type="checkbox"/> No <input type="checkbox"/></p>

School of Continuing Education



Presents
Wayne County Homeland Security Emergency Management Hazmat Mitigation Meeting

APRIL 23, 2019

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5:30 PM to 8:30 PM

Downriver Campus – 21000 Northline Road, Taylor, MI 48180

<p>Please Print:</p> <p>Name: <u>BRIAN LOFTUS</u> Student ID: _____</p> <p>Address: <u>9601 GROSSE</u></p> <p>City: <u>GROSSE ILE</u> State: _____ Zip: <u>48138</u></p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes ___ No ___</p>	<p>Please Print:</p> <p>Name: _____ Student ID: _____</p> <p>Address: _____</p> <p>City: _____ State: _____ Zip: _____</p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes ___ No ___</p>
<p>Please Print:</p> <p>Name: <u>Don Baner</u> Student ID: _____</p> <p>Address: <u>6003 Middlebelt</u></p> <p>City: <u>Garden city</u> State: <u>MI</u> Zip: <u>48135</u></p> <p>Email Address: <u>#</u> WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes ___ No ___</p>	<p>Please Print:</p> <p>Name: _____ Student ID: _____</p> <p>Address: _____</p> <p>City: _____ State: _____ Zip: _____</p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes ___ No ___</p>
<p>Please Print:</p> <p>Name: _____ Student ID: _____</p> <p>Address: _____</p> <p>City: _____ State: _____ Zip: _____</p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes ___ No ___</p>	<p>Please Print:</p> <p>Name: _____ Student ID: _____</p> <p>Address: _____</p> <p>City: _____ State: _____ Zip: _____</p> <p>Email Address: _____ WCCCD Alumni: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Phone Number: _____ Wayne County Resident? Yes ___ No ___</p>

Wayne County Hazard Mitigation Plan

Revision Number/Date: 0/June 2019

Publication Date: June 17, 2019

Appendix B. Public Comment and Input

Wayne County Hazard Mitigation Plan Update Survey #1

***1. Email Address**

Wayne County Hazard Mitigation Plan Update Survey #1

*2. What is the most significant natural hazard facing Wayne County?

- Drought
- Earthquake
- Extreme Temperatures - Extreme Hot or Cold
- Fire - Wildfires
- Flooding - Riverline or Shoreline
- Fog
- Invasive Species
- Subsidence - Natural
- Thunderstorms - Hail, Lightning, Severe Wind
- Tornadoes
- Winter Hazards - Snow, Ice & Sleet

Other (please specify)

Wayne County Hazard Mitigation Plan Update Survey #1

*3. What is the most significant technological hazard facing Wayne County?

- Fire - Scrap Tire
- Fire - Structural
- Flooding - Dam Failure
- Flooding - Urban
- Hazmat Incidents - Fixed Site
- Hazmat Incidents - Transportation
- Infrastructure Failure - Bridges, Roads, Overpasses, Structures
- Infrastructure Failure - Communications
- Infrastructure Failure - Electrical Systems
- Infrastructure Failure - Sanitary/Storm Sewers
- Infrastructure Failure - Water System
- Nuclear Power Plant Accidents
- Oil and Gas Well or Pipeline Accidents
- Subsidence - Mining

Other (please specify)

Wayne County Hazard Mitigation Plan Update Survey #1

*4. What is the most significant human hazard facing Wayne County?

- Civil Disturbance
- Criminal Acts - Vandalism and Arson
- Criminal Acts - Mass Shootings
- Information Technology Intrusion
- Gas/Oil Shortages or Supply Disruptions
- Public Health Emergencies - Pandemics, Epidemics, Contaminated Food/Water
- Terrorism/Sabotage
- Transportation Accidents - Air
- Transportation Accidents - Surface Roads/Highways
- Transportation Accidents - Marine
- Transportation Accidents - Rail
- Weapons of Mass Destruction

Other (please specify)

Wayne County Hazard Mitigation Plan Update Survey #1

***5. Please select the top 5 hazards from the list below (1 being most significant, 5 being least significant):**

	1	2	3	4	5
Drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Earthquake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Extreme Temperatures - Extreme Hot or Cold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fire - Wildfires	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flooding - Riverline or Shoreline	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fog	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Invasive Species	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Subsidence - Natural	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thunderstorms - Hail, Lightning, Severe Wind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tornadoes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Winter Hazards - Snow, Ice & Sleet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fire - Scrap Tire	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fire - Structural	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flooding - Dam Failure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flooding - Urban	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hazmat Incidents - Fixed Site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hazmat Incidents - Transportation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infrastructure Failure - Bridges, Roads, Overpasses, Structures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infrastructure Failure - Communications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infrastructure Failure - Electrical Systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infrastructure Failure - Sanitary/Storm Sewers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infrastructure Failure - Water System	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nuclear Power Plant Accidents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oil and Gas Well or Pipeline Accidents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Subsidence – Mining	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wayne County Hazard Mitigation Plan Update Survey #1

Civil Disturbance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Criminal Acts - Vandalism and Arson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Criminal Acts - Mass Shootings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information Technology Intrusion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gas/Oil Shortages or Supply Disruptions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public Health Emergencies - Pandemics, Epidemics, Contaminated Food/Water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Terrorism/Sabotage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transportation Accidents - Air	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transportation Accidents - Surface Roads/Highways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transportation Accidents - Marine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transportation Accidents - Rail	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weapons of Mass Destruction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wayne County Hazard Mitigation Plan Update Survey #1

***6. Based on the size of the population impacted by a hazard event, indicate the top five assets that are most vulnerable by placing the numbers 1 (most important overall) to 5 (least important of the top five).**

	1	2	3	4	5
Commercial Sites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hospitals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Industrial Sites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Open Spaces	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public Facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Residential Areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Roads, Bridges, Railroads	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Utility Facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schools and Churches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sports/Entertainment Arenas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Central Business District	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wayne County Hazard Mitigation Plan Update Survey #1

***7. Based on the impact to the environment caused by a hazard event, indicate the top five assets that are most vulnerable by placing the numbers 1 (most important overall) to 5 (least important of the top five).**

	1	2	3	4	5
Commercial Sites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hospitals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Industrial Sites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Open Spaces	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public Facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Residential Areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Roads, Bridges, Railroads	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Utility Facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schools and Churches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sports/Entertainment Arenas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Central Business District	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wayne County Hazard Mitigation Plan Update Survey #1

***8. Based on the impact to economic activity caused by a hazard event, indicate the top five assets that are most vulnerable by placing the numbers 1 (most important overall) to 5 (least important of the top five).**

	1	2	3	4	5
Commercial Sites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hospitals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Industrial Sites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Open Spaces	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public Facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Residential Areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Roads, Bridges, Railroads	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Utility Facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schools and Churches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sports/Entertainment Arenas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Central Business District	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

WCHMP 2nd Survey: County-Wide Hazard Mitigation Strategies

1. Name

2. Email Address

3. Hazard mitigation is defined as “any action taken to reduce or eliminate the long-term risk to human life and property from natural, technological, or human-related hazards.” Hazard events will occur, and at their worst result in injuries, death and/or destruction of property and infrastructure. The work done to minimize the impact of hazard events to life and property is called Hazard Mitigation. Often, these events occur in the same locations over time (i.e. flooding along rivers), and cause repeated damage. Because of this, Hazard Mitigation is often focused on reducing repetitive loss, thereby breaking the disaster cycle.

The following list of hazards was taken from priorities identified by Wayne community representatives in the March 14 workshop. Please note any specific mitigation strategies you feel County agencies should implement for any of these hazards, please use the text boxes below each hazard to describe those strategies.

Extreme Temperatures (Extreme Hot or Cold)

Flooding - Urban (stormwater

Flooding - Riverine or Shoreline

HazMat Incidents - Transportation

Infrastructure Failure - Water & Sewer Systems

Public Health Emergencies - Pandemics, Epidemics, Food/Water Contamination

Catastrophic Events/National Emergencies

Civil Disturbance

Thunderstorms- Hail, Lightning, Severe Win

Criminal Acts - Mass Shootings/Active Assailant(s)

Criminal Acts - Vandalism, Arson

Transportation Accidents - Roads/Highway

Tornadoes

Winter Hazards - Snow, Ice, Sleet

OTHER

4. The following Hazard Mitigation Strategies were selected as County Action Plans in the 2013 Wayne County HMP.

Please rate each of the following mitigation strategies for **county-wide** adoption: (Rating scale = Cannot Assess, No Longer Relevant/Not Important, Neutral, Important, Very Important)

	Cannot Assess	No Longer Relevant/ Not Important	Neutral	Important	Very Important
Develop a list of facilities in each jurisdiction that are available to serve as warming or cooling centers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improve floodplain management and minimize potential effects of flooding; encourage and promote regional watershed cooperation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distribute family emergency preparedness information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Create evacuation plans and community awareness of those plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improve emergency communication between all County communities, including the City of Detroit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Train and equip public health, hospital, and responder personnel (police/fire/EMS, etc.) for readiness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Review and evaluate Hazard Mitigation Plan (HMP) priorities and progress on an annual basis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop an inspection plan and strategy to identify and abate all vacant, abandoned, and blighted structures near sensitive populations throughout the county, including Sara Title III sites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. The following mitigation strategies have been taken from the Michigan Hazard Mitigation Plan, have been used by other Michigan communities, or have been suggested by Wayne County community representatives. Possible mitigation strategies are identified as general strategies, applicable to multiple hazards, or are listed under a specific hazard. Please note that some strategies may be applicable to multiple hazards, but we have attempted to avoid duplication to reduce the time it takes for the survey.

GENERAL MITIGATION STRATEGIES:

Please indicate all of the following mitigation strategies that you would rate as high or very high priority. Please leave blank those you cannot assess or those that you feel are less important or unimportant:

- | | |
|---|---|
| <input type="checkbox"/> Obtain communication boosters for deficient areas in county-wide communication network | <input type="checkbox"/> Keep roads and driveways accessible to vehicles and fire equipment - bridges should be able to support emergency vehicles, roads should be adequate for vehicles to turn and cross both ways |
| <input type="checkbox"/> Improve communications between municipalities, state, and regional agencies in case of mass event | <input type="checkbox"/> Establish emergency routing procedures for emergency vehicles to avoid road or bridge closures due to construction or emergency |
| <input type="checkbox"/> Identify transportation bottlenecks to ensure emergency vehicle access and access to region's hospitals | <input type="checkbox"/> Include safety strategies for severe weather events in driver education classes and materials |
| <input type="checkbox"/> Coordinate mutual aid assistance for failures in utility and communications systems (including 911) | <input type="checkbox"/> Create public/private cooperation plans for emergency response |
| <input type="checkbox"/> Encourage communities to acquire generators for backup power at critical facilities | <input type="checkbox"/> Erect signage for the AM station along roadways (complete with a flashing notification light set on a remote transmitter – when light is flashing tune to the radio station) directing the traveling public to tune into the station |
| <input type="checkbox"/> Encourage residents to develop family escape plan and disaster plans and supply kits | <input type="checkbox"/> Implement the Emergency Alert System (EAS) in Wayne County |
| <input type="checkbox"/> Ensure readiness at critical facilities (e.g., warming/cooling centers, water and wastewater treatment facilities, etc.) by obtaining adequate emergency power generators and requiring facilities to perform regular maintenance and equipment checks, pre-plan for fuel needs of existing and backup power sources | <input type="checkbox"/> Purchase and install a reverse 911 system for the county after researching the type of systems offered |
| <input type="checkbox"/> Develop mutual aid agreements for incident response | <input type="checkbox"/> Facilitate full NIMS compliance throughout Wayne County |
| <input type="checkbox"/> Improve agency coordination in response and planning activities | <input type="checkbox"/> Develop site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums and recreation areas, and other appropriate sites |
| <input type="checkbox"/> Disseminate public education materials (newsletters, pamphlets, articles, programs, web links, contact information) to explain key hazards, self and property protection measures warning and response systems currently in place | <input type="checkbox"/> Pre-plan for storm debris removal and management and implement system to provide heavy equipment for storm debris cleanup |

Other (please include your suggestions)

6. INFRASTRUCTURE FAILURE

Please indicate all of the following mitigation strategies that you would rate as high or very high priority. Please leave blank those you cannot assess or those that you feel are less important or unimportant:

- | | |
|--|--|
| <input type="checkbox"/> Coordinate mutual aid agreements with water hauling companies to have emergency supplies hauled into Wayne County | <input type="checkbox"/> Obtain equipment to detect hydrogen sulfide |
| <input type="checkbox"/> Utilize alternative 911 access through radio operators whose homes are specially marked for identification | <input type="checkbox"/> Obtain adequate supply of backup generators for emergency temporary power |
| <input type="checkbox"/> Develop programs/networks for contacting elderly or homebound persons during periods of infrastructure failure | <input type="checkbox"/> Utilize buried/protected power and utility lines |
| <input type="checkbox"/> Separate and/or expand sewer systems to handle anticipated stormwater volumes | <input type="checkbox"/> Install surge protectors on critical electronic equipment |
| <input type="checkbox"/> Create "rolling blackouts" in electrical systems that would otherwise fail due to overloads | <input type="checkbox"/> Detect and prevent/discourage illegal discharges into storm sewers from home footing drains, downspouts, and sump pumps |
| <input type="checkbox"/> Replace or renovate aging infrastructure and equipment | <input type="checkbox"/> Properly locate, design, and maintain water and sewer systems to insulate critical components from freezing |
| <input type="checkbox"/> Establish tree trimming program(s) to minimize power loss due to falling branches | <input type="checkbox"/> Use surge protectors on critical electrical equipment |
| <input type="checkbox"/> Establish procedures to protect cable/broadband internet systems | <input type="checkbox"/> Develop redundancy in utility and communication systems, especially "lifeline" systems |
| <input type="checkbox"/> Create and/or identify relief and response centers for impacted residents | <input type="checkbox"/> Increase public awareness and use of "MISS DIG" |

Other (please include your suggestions)

7. PUBLIC HEALTH EMERGENCIES

Please indicate all of the following mitigation strategies that you would rate as high or very high priority. Please leave blank those you cannot assess or those that you feel are less important or unimportant:

- | | |
|---|---|
| <input type="checkbox"/> Encourage residents to receive immunizations against communicable diseases | <input type="checkbox"/> Prevent public contact with contaminated sites or waters (including floodwaters) |
| <input type="checkbox"/> Improve ventilation in areas/facilities prone to crowding or that may involve exposure to contagions or noxious atmospheres | <input type="checkbox"/> Require pollution control, enforcement, and cleanup; proper disposal of chemicals & scrap materials |
| <input type="checkbox"/> Increase public awareness of radon dangers and what can be done to reduce radon concentrations in homes and buildings | <input type="checkbox"/> Educate residents regarding, and enforce, proper location, installation, cleaning, monitoring, and maintenance of septic tanks |
| <input type="checkbox"/> Develop stricter health codes regulating food storage in local restaurants | <input type="checkbox"/> Stockpile vaccines and antidotes in case of epidemic, chemical emergency, or biological or chemical weapons attack |
| <input type="checkbox"/> Demolish and clear vacant/condemned structures to prevent rodent infestations | <input type="checkbox"/> Utilize quarantines where applicable |
| <input type="checkbox"/> Maintain community public health system with sufficient disease monitoring and surveillance capabilities to adequately protect the population from large-scale outbreaks | <input type="checkbox"/> Create inter-hospital mutual aid pacts to assure communication and service delivery in the event of quarantine or outbreak |
| <input type="checkbox"/> Undertake brownfield and urban blight cleanup | <input type="checkbox"/> Continue to fund adequate food and sanitation inspections |
| <input type="checkbox"/> Increase public awareness of the causes, symptoms, and protective actions for disease outbreaks and other potential public health emergencies | <input type="checkbox"/> Use public warning systems for public health communications |
| <input type="checkbox"/> Encourage community support of free and reduced-expense clinics and school health services | <input type="checkbox"/> Establish a program to identify and properly close abandoned water wells |

Other (please include your suggestions)

8. CRIMINAL ACTS-- MASS SHOOTINGS/ ACTIVE ASSAILANT(S)

Please indicate all of the following mitigation strategies that you would rate as high or very high priority. Please leave blank those you cannot assess or those that you feel are less important or unimportant:

- | | |
|--|---|
| <input type="checkbox"/> Work with public and private location managers to post signage for emergency entry and exist points, first aid stations, and shelter locations | <input type="checkbox"/> Devise credential systems indicating areas of access and purpose of activity on premises |
| <input type="checkbox"/> Define perimeters and areas that require access control, identify particularly sensitive or critical areas that require special access controls | <input type="checkbox"/> Develop response plans for key locations and conduct training exercises |
| <input type="checkbox"/> Conduct periodic background checks on all staff assigned to critical or sensitive areas | <input type="checkbox"/> Develop/employ text or Amber-Alert-like communication systems to notify public when an incident occurs or is suspected |
| <input type="checkbox"/> Review terminated employees' personnel files to determine if they pose a security risk; ensure they are removed from access systems | <input type="checkbox"/> Develop and disseminate education programs so that public learns warning signs, knows how to report suspicious behavior, and knows how to respond in the event of an active assailant incident |

Other (please include your suggestions)

9. FLOODING

Please indicate all of the following mitigation strategies that you would rate as high or very high priority. Please leave blank those you cannot assess or those that you feel are less important or unimportant:

- | | |
|--|--|
| <input type="checkbox"/> Identify and map, or update existing maps of, floodplains and flood prone areas | <input type="checkbox"/> Require anchoring manufactured homes to a permanent foundation (but with an option to move structures if necessary) |
| <input type="checkbox"/> Develop a layer to the county's mapping showing the areas downstream of dams to complement any structural inventory mapping that has been done. As such, county mappers can easily sum the potential losses in a single dam's susceptibility area | <input type="checkbox"/> Increase public awareness of the need for permits for building in floodplains |
| <input type="checkbox"/> Develop engineering plans to address flood prone areas | <input type="checkbox"/> Require detention/retention in new development |
| <input type="checkbox"/> Develop county-wide maps/lists of undersized culverts and pipe systems | <input type="checkbox"/> Establish plan to eliminate repetitive loss properties |
| <input type="checkbox"/> Remove woody debris from flood prone areas | <input type="checkbox"/> Assure new building sites are above base flood elevation |
| <input type="checkbox"/> Stockpile sandbags at strategic locations throughout the county | <input type="checkbox"/> Maintain all roadways no more than 1 foot below the base flood elevation |
| <input type="checkbox"/> Establish mutual aid agreements or contracts with sand suppliers to facilitate rapid filling of sandbags during flooding events. | <input type="checkbox"/> Establish standards to prevent erosion, including the use of native vegetation |
| <input type="checkbox"/> Dry flood-proof structures within known flood areas (strengthen walls, seal openings, use waterproof compounds/plastic sheeting on walls) | <input type="checkbox"/> Zone flood prone areas for open space and recreation |
| | <input type="checkbox"/> Implement road improvements to prevent washouts |
| | <input type="checkbox"/> Disseminate public education materials explaining wetland protection measures and benefits |
| | <input type="checkbox"/> Enforce stream and wetland dumping/fill regulations |

- | | |
|---|---|
| <input type="checkbox"/> Wet flood-proof structures within know flood areas (controlled flooding of structures to balance water forces and reduce structural collapse during floods) | <input type="checkbox"/> Identify community roads that area susceptible to flooding during times of heavy rainfall |
| <input type="checkbox"/> Provide supplies (e.g. ATVs, medical supplies, etc.) to local officials/residents to provide access to isolated areas in the county to supplement first responder capabilities. | <input type="checkbox"/> Encourage acceptable land use densities, coverage, and planning for particular soil types and capacities based upon runoff and absorption capabilities |
| <input type="checkbox"/> Provide assistance to the Federal Emergency Management Agency (FEMA), as requested, for the ongoing flood map modernization project | <input type="checkbox"/> Acquire, relocate, or condemn structures within floodplain or floodway areas |
| <input type="checkbox"/> Purchase the necessary software to run new digital FEMA flood maps once the flood map modernization project is complete | <input type="checkbox"/> Require/encourage communities to join the National Flood Insurance Program (NFIP) |
| <input type="checkbox"/> Provide training to local officials on the software purchased to run maps developed by the flood map modernization project | <input type="checkbox"/> Require/encourage communities to participate in the Community Rating System (CRS) |
| <input type="checkbox"/> Elevate flood prone structures above the 100-year base flood elevation | <input type="checkbox"/> Develop drainage easements for planned and regulated public use of private land for temporary water detention and drainage |
| <input type="checkbox"/> Maintain and/or strengthen dam structures. | <input type="checkbox"/> Provide backup generators and other measures (e.g., alarms, meters, etc.) for pump and lift stations in sanitary sewer systems, to ensure that drainage infrastructure is not impeded |
| <input type="checkbox"/> Construct, or elevate existing, roads or plan alternative roads that are unaffected by flooding. Make roads more flood resistant through better drainage and/or stabilization/armoring of vulnerable shoulders and embankments | <input type="checkbox"/> Establish a "green infrastructure" plan/program to link, manage, and expand existing parks, preserves, greenways, etc. |
| <input type="checkbox"/> Include discussion of safety strategies for flood areas in driver education classes and materials | <input type="checkbox"/> Develop an open space acquisition and/or land bank program for preserving flood hazard areas |
| <input type="checkbox"/> Stabilize eroding shorelines to minimize losses of infrastructure, danger to citizens | <input type="checkbox"/> Establish watershed-based planning initiatives to address flood hazards with neighboring communities |
| <input type="checkbox"/> Dredge and clear sediment and debris from drainage channels or harbors and from support bracing under bridges | <input type="checkbox"/> Limited allowable impervious surface within new development |
| <input type="checkbox"/> Raise low-lying bridges | <input type="checkbox"/> Develop a stream buffer ordinance to protect water resources and limit flood hazards |
| <input type="checkbox"/> Enforce basic building code requirements related to flood mitigation | <input type="checkbox"/> Link flood hazard mitigation objectives with U.S. EPA/MDEQ MS4 stormwater Initiatives |
| <input type="checkbox"/> Strengthen existing watershed councils | <input type="checkbox"/> Encourage the use of Low Impact Development (LID) techniques |
| <input type="checkbox"/> Participate in structural projects to channel water away from people and property | <input type="checkbox"/> Encourage the use of porous/permeable paving materials to reduce stormwater runoff and increase groundwater recharge |
| <input type="checkbox"/> Establish higher engineering standards for drain and sewer capacity | <input type="checkbox"/> Conduct cumulative impact analyses for multiple development projects within the same watershed/subwatershed |
| <input type="checkbox"/> Install/re-route /increase storm drain system capacity, including the separation of storm and sanitary systems | <input type="checkbox"/> Verify FEMA's repetitive loss inventory and develop a tracking database |
| <input type="checkbox"/> Preserve farmland and open space | <input type="checkbox"/> Develop a dam failure study and emergency action plan |
| <input type="checkbox"/> Elevate mechanical and utility devices above expected flood levels | <input type="checkbox"/> Inspect and repair dams on a regular basis |
| | <input type="checkbox"/> Develop real estate disclosure laws that identify homes located within the hydraulic shadows of dams |

- | | |
|---|---|
| <input type="checkbox"/> Develop emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums and recreation areas, and other appropriate sites | <input type="checkbox"/> Regulate development within the hydraulic shadows of dams |
| <input type="checkbox"/> Protect, and/or restore, wetlands and natural water retention areas | <input type="checkbox"/> Automate/install pumps and floodgates at dam sites |
| <input type="checkbox"/> Provide public education and flood warning systems | <input type="checkbox"/> Conduct NFIP community workshops to provide information and incentives for property owners to purchase flood insurance |
| <input type="checkbox"/> Monitor water levels with stream gauges and trained monitors | <input type="checkbox"/> Establish impact fees to help fund public projects mitigating impacts of land development |
| <input type="checkbox"/> Train local officials in flood control, flood plan management, flood proofing, etc. | <input type="checkbox"/> Install, reroute, or increase the capacity of storm drainage and/or flood storage systems |
| <input type="checkbox"/> Provide for traffic control and road closures in flooded areas | <input type="checkbox"/> Build earthen dikes around flood threatened critical facilities |
| <input type="checkbox"/> Maintain trained, equipped, and well-prepared search and rescue teams | <input type="checkbox"/> Ask residents to keep storm drains free of debris during storms (to reduce burden on Public Works crews) |
| <input type="checkbox"/> Control and secure loose materials, yard items, and stored objects in floodplains that otherwise be swept away, damaged or pose a hazard when flooding occurs | |
| <input type="checkbox"/> Require standard tie-downs for propane tanks | |
| <input type="checkbox"/> Purchase or transfer development rights to discourage development in floodplains | |
| <input type="checkbox"/> Use check valves, sump pumps, and backflow prevention in homes and buildings | |
| <input type="checkbox"/> Participate in regional/watershed cooperation | |
| <input type="checkbox"/> Other (please include your suggestions) | |

10. EXTREME TEMPERATURES

Please indicate all of the following mitigation strategies that you would rate as high or very high priority. Please leave blank those you cannot assess or those that you feel are less important or unimportant:

- | | |
|--|---|
| <input type="checkbox"/> Establish and build awareness of accessible heating/cooling centers in the community | <input type="checkbox"/> Utilize state and federal programs that assist low income families in home improvements that protect from extreme temperatures and increase efficiency |
| <input type="checkbox"/> Ensure adequate backup power generators for warming and cooling centers | <input type="checkbox"/> Minimize temperature impacts on utilities and infrastructure (including substations) |
| <input type="checkbox"/> Provide public information before extreme temperatures occur (i.e., spring & fall) | <input type="checkbox"/> Evaluate existing pipes for brittleness and replace as necessary and prudent |
| <input type="checkbox"/> Increase coverage and use of NOAA weather radios (public notification) | <input type="checkbox"/> Perform study to ensure redundancies in water systems |
| <input type="checkbox"/> Enforce heating and cooling requirements for landlords, especially those serving vulnerable populations | <input type="checkbox"/> Plan for excess capacity at area shelters |
| <input type="checkbox"/> Work with utility companies to allow special arrangements for those unable to pay heating bills | <input type="checkbox"/> Establish a program to address pavement buckling due to extreme temperatures |
| <input type="checkbox"/> Provide outreach to vulnerable populations during extreme temperature events | <input type="checkbox"/> Provide transportation to shelters for elderly or disabled |
| <input type="checkbox"/> Create insulation standards to protect from extreme temperatures and increase efficiency (especially in buildings housing vulnerable populations) | <input type="checkbox"/> Reduce urban heat island effects by planting trees around buildings, to shade parking lots, and along public rights-of-way |
| <input type="checkbox"/> Educate the public regarding safe use of office and home space heaters | |

Other (please include your suggestions)

11. HAZMAT INCIDENTS

Please indicate all of the following mitigation strategies that you would rate as high or very high priority. Please leave blank those you cannot assess or those that you feel are less important or unimportant:

- | | |
|--|---|
| <input type="checkbox"/> Improve driver education, traffic law enforcement, and transportation planning to balance the needs of hazardous material transporters with public safety | <input type="checkbox"/> Utilize public warning systems and networks |
| <input type="checkbox"/> Improve design, routing, and traffic control on problem roadways/areas | <input type="checkbox"/> Use ITS/IHS (Intelligent Highway Systems) technology |
| <input type="checkbox"/> Inspect and improve design at problem railway/roadway intersections | <input type="checkbox"/> Comply with and enforce USDOT/MDOT regulations regarding hazardous materials transport |
| <input type="checkbox"/> Enforce truck traffic weight and travel restrictions | <input type="checkbox"/> Ensure road closures and traffic control in accident areas |
| <input type="checkbox"/> Conduct a commodity flow study on the major roadways and railways of the county to determine what materials are flowing through the county | <input type="checkbox"/> Locate schools, nursing homes, and other special facilities away from major hazardous material transportation routes |
| <input type="checkbox"/> Assure training, planning, and preparedness for hazardous material incidents along roads and railways | <input type="checkbox"/> Create emergency response system to provide bus transportation away from sites of hazmat incidents |
| <input type="checkbox"/> Other (please include your suggestions) | |

12. The following strategies for **TRANSPORTATION ACCIDENTS** have been taken from the Michigan Hazard Mitigation Plan, have been used by other Michigan communities, or have been suggested by Wayne County community representatives. Possible mitigation strategies are identified as general strategies, applicable to multiple hazards, or are listed under a specific hazard. Please note that some strategies may be applicable to multiple hazards, but we have attempted to avoid duplication to reduce the time it takes for the survey.

Please indicate all of the following mitigation strategies that you would rate as high or very high priority. Please leave blank those you cannot assess or those that you feel are less important or unimportant:

- | | |
|---|---|
| <input type="checkbox"/> Address locations where trains block emergency routes for extend | <input type="checkbox"/> Enforce weight and travel restrictions |
| <input type="checkbox"/> Evaluate purchase of mass casualty trailer to assist in multiple vehicle accidents | <input type="checkbox"/> Use ITS/IHS (intelligent highway systems) technology |
| <input type="checkbox"/> Provide funding for additional traffic barricades | <input type="checkbox"/> Establish airport maintenance, security, and safety programs |
| <input type="checkbox"/> Provide additional training and equipment for responding to plane crashes | <input type="checkbox"/> Provide commercial operator training and skill enhancement programs |
| <input type="checkbox"/> Provide funding and training for water rescue | <input type="checkbox"/> Train, plan, and prepare for mass-casualty incidents involving all modes of transportation |
| <input type="checkbox"/> Perform railroad inspections and improve designs at problem railway/roadway intersections | <input type="checkbox"/> Maintain trained, equipped, and prepared search and rescue teams |
| <input type="checkbox"/> Conduct long-term planning that provides more connector roads for reduced congestion of arterial roads | |

Other (please include your suggestions)

13. **SEVERE WIND/ TORNADOES**

Please indicate all of the following mitigation strategies that you would rate as high or very high priority. Please leave blank those you cannot assess or those that you feel are less important or unimportant:

- | | |
|--|---|
| <input type="checkbox"/> Provide public education regarding the dangers of thunderstorms | <input type="checkbox"/> Provide weather monitors (not just NOAA weather radios) to schools and nursing homes and mobile home parks for severe wind warnings |
| <input type="checkbox"/> Increase training and use of weather spotters | <input type="checkbox"/> Conduct a shelter assessment for the purpose of identifying shelter facilities that could be used during or after severe wind events and/or severe winter storm conditions |
| <input type="checkbox"/> Utilize public early warning systems and networks | <input type="checkbox"/> Use structural bracing, window shutters, laminated glass in window panes, and hail-resistant shingles to minimize damage to private and public structures |
| <input type="checkbox"/> Perform tree trimming and maintenance to prevent limb breakage and to safeguard utility lines | <input type="checkbox"/> Identify facilities in need of tornado shelters |
| <input type="checkbox"/> Utilize buried/protected power and utility lines | |

Other (please include your suggestions)

14. SEVERE WEATHER -- WINTER

Please indicate all of the following mitigation strategies that you would rate as high or very high priority. Please leave blank those you cannot assess or those that you feel are less important or unimportant:

- | | |
|--|--|
| <input type="checkbox"/> Evaluate existing pipes for "brittleness" and replace as necessary and prudent | <input type="checkbox"/> Use snow fences or "living snow fences" to limit blowing and drifting snow over critical road segments |
| <input type="checkbox"/> Provide public education regarding severe winter weather hazards | <input type="checkbox"/> Conduct public building maintenance and educate homeowners regarding prevention of ice dam damage |
| <input type="checkbox"/> Require proper building/site design and code enforcement relating to snow loads, roof slope, snow removal and storage, etc. | <input type="checkbox"/> Conduct a shelter assessment for the purpose of identifying shelter facilities that could be used during or after severe wind events and/or severe winter storm conditions |
| <input type="checkbox"/> Facilitate farmer preparedness to address livestock needs/problems | <input type="checkbox"/> Educate residents on dangers of alternative heat sources (space heaters) when power is lost - to reduce risk of fire and carbon monoxide |
| <input type="checkbox"/> Pre-arrange shelters for stranded motorists/travelers, and others | <input type="checkbox"/> Educate homeowners and builders on how to protect their pipes, including letting faucets drip during extreme cold weather and locating water pipes on the inside of building insulation or keeping them out of attics, crawl spaces, and vulnerable outside walls |
| <input type="checkbox"/> Maintain adequate road and debris clearing capabilities | |

Other (please include your suggestions)

15. SEVERE WEATHER -- SUMMER

Please indicate all of the following mitigation strategies that you would rate as high or very high priority. Please leave blank those you cannot assess or those that you feel are less important or unimportant:

- | | |
|--|--|
| <input type="checkbox"/> Increase coverage and use of NOAA Weather radio (detection and public notification) | <input type="checkbox"/> Encourage or require construction of concrete safe rooms for new construction of single and multi-family homes and shelter areas in mobile home parks, fairgrounds, shopping malls, and other vulnerable public areas |
| <input type="checkbox"/> Train, and increase the use of, weather spotters | |
| <input type="checkbox"/> Utilize public early warning systems and networks | <input type="checkbox"/> Enlist MSU Extension to recommend protective vegetation |
| <input type="checkbox"/> Include safety strategies for severe weather events in driver education classes and materials | <input type="checkbox"/> Install additional tornado sirens in community |
| <input type="checkbox"/> Use structural bracing, window shutters, laminated window glass, and hail resistant roof shingles to minimize damage to public and private structures | <input type="checkbox"/> Provide additional manpower to assist during and following storms |
| <input type="checkbox"/> Develop public education materials to explain property protection measures and insurance options | <input type="checkbox"/> Provide additional medical and confined space entry equipment |
| <input type="checkbox"/> Require proper anchoring of manufactured homes and exterior structures such as carports and porches | <input type="checkbox"/> Implement rapid damage assessment |
| <input type="checkbox"/> Secure loose materials, yard and patio items so that they cannot be blown about in high winds | <input type="checkbox"/> Install lightning protection devices in communities' communication infrastructure |
| | <input type="checkbox"/> Create a database to track those individuals at high risk of death, such as the elderly, homeless, etc. |

Other (please include your suggestions)

16. Please use the space below to ***suggest any other hazard mitigation strategies and/or to suggest specific locations in your community or Wayne County where mitigation is needed.***

In each case, please identify the hazard applicable to the mitigation strategy or location. A list of hazards is provided for your reference:

Natural Hazards:

Drought, Earthquake, Extreme Temperatures - Extreme Cold, Extreme Temperatures - Extreme Heat, Fire - Wildfires, Flooding - Riverine, Flooding - Shoreline & Erosion, Fog, Invasive Species, Subsidence - Natural, Thunderstorms - Hail, Thunderstorms - Lightning, Thunderstorms - Severe Wind, Tornadoes, Winter Hazards - Ice and Sleet, Winter Hazards - Snowstorms, Unpredictable Weather

Technological Hazards

Fire - Scrap Tire, Fire - Structural, Flooding - Dam Failure, Flooding - Urban, Hazmat Incidents - Fixed Site, Hazmat Incidents - Transportation, Infrastructure Failure - Bridges, Roads, Overpasses, Infrastructure Failure - Communications, Infrastructure Failure - Electrical Systems, Infrastructure Failure - Sanitary Sewer System, Infrastructure Failure - Storm Sewer System, Infrastructure Failure - Structural Collapse, Infrastructure Failure - Water System, Nuclear Power Plant Accidents, Oil and Gas Well Accidents, Petroleum and Natural Gas Pipeline Accidents, Subsidence - Mining

Human Hazards:

Civil Disturbance, Criminal Acts - Vandalism and Arson, Criminal Acts - Due to Economic Collapse, Criminal Acts - Mass Shootings, Centralized Planning in Lansing & Washington, DC, Unemployment and Underemployment, Information Technology Intrusion, Gas/Oil Shortages or Supply Disruptions, Public Health Emergencies - Pandemics and Epidemics, Public Health Emergencies - Contaminated Food/Water, Electromagnetic Pulse, Transportation Accidents - Air, Transportation Accidents - Highway, Transportation Accidents - Marine, Transportation Accidents - Rail, Transportation Accidents - Rail/Highway Crossings, Transportation Accidents - Surface Roads, Weapons of Mass Destruction

Survey #3 - Prioritizing Final Action Plans

1. Please rate the following italicized strategy for mitigating **Public Health Emergencies** according to how well it satisfies the five criteria listed below:

"Stockpile vaccines and antidotes in case of epidemic, chemical emergency, or biological or chemical weapons attack"

	High	Medium	Low		
Technical Feasibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cost Effectiveness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ability to Accomplish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effectiveness of Strategy (including downside risk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Availability of Funding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Please rate the following italicized strategy for mitigating **Public Health Emergencies** according to how well it satisfies the five criteria listed below:

"Train & equip volunteers to staff open and closed PODs (Points of Dispensing) within the county"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Please rate the following italicized strategy for mitigating **Public Health Emergencies** according to how well it satisfies the five criteria listed below:

"Increase public awareness of the causes, symptoms, and protective actions for disease outbreaks and other potential public health emergencies"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Please rate the following italicized strategy for mitigating **Public Health Emergencies** according to how well it satisfies the five criteria listed below:

"Use mass notification, emergency alerting systems, and social media, for public health emergencies"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Please rate the following italicized strategy for mitigating **Public Health Emergencies** according to how well it satisfies the five criteria listed below:

"Improve communication & cooperation between county and municipalities and area hospitals/health facilities"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Please rate the following italicized strategy for mitigating **Public Health Emergencies** according to how well it satisfies the five criteria listed below:

"Equip, train, & re-institute amateur radios/radio operators in hospitals"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Please rate the following italicized strategy for mitigating the impact of **Infrastructure Failure** according to how well it satisfies the five criteria listed below:

"Replace or renovate aging structures and equipment. Establish procedures to protect IT systems."

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Please rate the following italicized strategy for mitigating the impact of **Mass Shootings/Active Assailants** according to how well it satisfies the five criteria listed below:

"Continue training in most current protocol(s)"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Please rate the following italicized strategy for mitigating the impact of **Mass Shootings/Active Assailants** according to how well it satisfies the five criteria listed below:

"Develop a process for requesting assistance from local and state law enforcement"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Please rate the following italicized strategy for mitigating the impact of **Riverine/Shoreline Flooding** according to how well it satisfies the five criteria listed below:

"Identify and map, or update existing maps of, floodplains and flood prone areas using the County's ArcGIS system. Provide training for local jurisdictions in use of and access to system."

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Please rate the following italicized strategy for mitigating the impact of **Riverine/Shoreline Flooding** according to how well it satisfies the five criteria listed below:

"Work with US Army Corps of Engineers or other appropriate authorities to develop engineering plans addressing flood prone areas"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Please rate the following italicized strategy for mitigating the impact of **Extreme Hot or Cold Temperatures** according to how well it satisfies the five criteria listed below:

"Establish and build awareness of accessible heating/cooling centers in the community. Utilize all means available, including websites, social media, smart phone apps, mailers, etc. to educate of impending weather threats and available resources, including heating & cooling shelters."

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Please rate the following italicized strategy for mitigating the impact of Extreme Hot or Cold Temperatures according to how well it satisfies the five criteria listed below:

"Provide outreach to vulnerable populations during extreme temperature events. Catalog & map areas of vulnerable and otherwise difficult to locate residents (unlicensed facilities, empty/vacant buildings, etc.)"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Please rate the following italicized strategy for mitigating the impact of Extreme Hot or Cold Temperatures according to how well it satisfies the five criteria listed below:

"Educate the public regarding safe use of office and home space heaters, generators, smoke & carbon monoxide detectors"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Please rate the following italicized strategy for mitigating the impact of **Extreme Hot or Cold Temperatures** according to how well it satisfies the five criteria listed below:

"Provide transportation to shelters for the elderly, disabled, and otherwise hard to reach populations"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Please rate the following italicized strategy for mitigating the impacts of **Transportation Related HazMat Incidents** according to how well it satisfies the five criteria listed below:

"Assure training, planning, and preparedness for hazardous material incidents along vulnerable, high risk roads and railways"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. Please rate the following italicized strategy for mitigating the impacts of **Transportation Related HazMat Incidents** according to how well it satisfies the five criteria listed below:

"Utilize public warning systems and networks for awareness and instructions"

	High	Medium	Low		
Technical Feasibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to Accomplish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness of Strategy (including downside risk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

April 30, 2020

Wayne County Leadership,

Risks posing the greatest threat to DTE's electrical system are storm-related downed wires and outages, and substation-related forced outages. DTE continuously evaluates its system and has developed programs to mitigate said risks. The following helps to highlight some of those programs in place today.

Storm-Related Downed Wires and Customer Outages

When widespread storm-related downed wires and customer outages occur, DTE follows a disciplined restoration plan:

1. DTE prepares ahead of the incoming weather. This includes engaging and readying resources to support their storm assignments.
2. For everyone's safety, DTE prioritizes potentially hazardous situations first (e.g. downed power lines).
3. DTE also prioritizes the repair of power lines and equipment serving critical health and safety facilities like hospitals, police stations and pumping stations.
4. As part of our storm restoration process, our goal is to get the most customers restored as quickly as possible. We begin by repairing substation equipment, which delivers power to entire communities.
5. We then move on to distribution lines that serve large subdivisions and businesses.
6. Finally, we repair DTE equipment that powers individual homes.

DTE's goal is to reduce wire down response times. To that end, we've implemented certain actions to help improve our wire down response time which include, but are not limited to, the following:

- Increased number of employees and contractors to respond to downed wires
- Leveraged technology to proactively stage and deploy resources
- Developed wire down audit process to maximize field workmanship
- Tracking causes and locations of wire downs to help guide the preventive maintenance program

Customer outage response has also improved over time:

- Accelerated tree trimming program to improve system integrity and reliability
- Leveraged technology to better identify potential fault locations
- Developed an Incident Command System (ICS) organizational structure to optimize strategies and communications

Additionally, DTE has greatly increased communications with local Firefighters and county level Emergency Managers. Monthly collaborative sessions with leaders of local fire departments help drive process improvements. The State Fire Marshal participates in these monthly sessions. One key example of continuous improvement is the development of an emergency process allowing fire departments to escalate immediate concerns directly to DTE Electric dispatch. This improvement provides transparency and clarity during emergency conditions.

Substation-Related Outages

A Substation Event Operation Plan (EOP) was developed to provide a consistent framework for responding to a large substation event requiring the response of DTE personnel.

The purpose of the Significant Event Operation Plan is to ensure public safety, minimize impact, and ensure timely resolution and recovery from a large substation event.

The Substation EOP is used to respond to extended customer outages. The EOP is applicable to DTE personnel, departments, and facilities that have a response role during a substation event or play a support role during such a response. The objective for each significant event is to remedy any potential defects while minimizing customer interruptions.

Rotational teams have been developed to respond to these events. Furthermore, a Mobile Command Center was purchased in order to help facilitate strategic decision making and tactical planning at the point of activity.

Path Forward / Recommendations

It is DTE's recommendation to continue to work collaboratively with the Wayne County Emergency Managers (EMs). DTE will seek feedback from the EMs around how communications can be improved. DTE is also looking to establish a regular cadence of meetings with the EMs across the DTE Service Area to further their relationships with DTE's Regional Relations team.

Wayne County Hazard Mitigation Plan

Revision Number/Date: 0/June 2019

Publication Date: June 17, 2019

Appendix C. Workshop Materials

Agenda

Date: March 14, 2019

RE: Public Meeting
Wayne County Hazard Mitigation Plan Update (ASTI File No. 10943)

Meeting Objectives: Review HMP Purpose and Process, Hazard Identification & Prioritization

1. **Introductions**
2. **The Function of a Hazard Mitigation Plan**
3. **Overview of the Planning Process**
4. **Overview of 2013-2014 Plan**
5. **Confirm Goals**
6. **Update the Plan - Review & Rank Hazardous Events**
7. **Review & Rank Critical Assets** (time allowing)
8. **Next Survey - Due End of Day Monday, March 25**
9. **Next Workshop - March 28**

Summary of Current Plan – Hazard Ranking Comparison 2013 Plan
 Wayne County Hazard Mitigation Plan Update
 Workshop of March 14, 2019

	Hazard	2006 Historic Rank	2013 Survey		In 2006	
			Open Ended Question Rank	Ranking No. Times Listed		Ranking Average Score
Natural Hazards	Drought			25	28	
	Earthquakes			30	30	
	Erosion - Shoreline					
	Extreme Temperatures: Extreme Cold	12	23	4	12	
	Extreme Temperatures: Extreme Heat		23	4	12	
	Fires - Wildfires	14		30	30	
	Flooding - Riverine		10	9	7	
	Flooding - Shoreline	14	10	9	7	
	Fog			30	30	
	Invasive Species			30	30	
	Subsidence - Natural			30	30	
	Thunderstorms - Hail	2	1	1	6	
	Thunderstorms - Lightning	2	1	1	6	
	Thunderstorms - Severe Wind	2	1	1	6	
	Tornadoes	19	3	2	8	
Winter Hazards - Ice and Sleet	19	2	3	9		
Winter Hazards - Snowstorms		2	3	9		
Technological Hazards	Fires - Scrap Tire	25		30	30	
	Fires - Structural	1	20	23	2	
	Flooding - Dam Failure	25		30	30	
	Flooding - Urban	14		6	19	
	Hazmat Incidents - Transportation	7	4	9	10	
	Hazmat Incidents -Fixed	19	9	12	5	
	Infrastructure Failure - Bridges, Roads, Overpass		13	8	11	
	Infrastructure Failure - All					
	Infrastructure Failure - Communications		16	25	1	
	Infrastructure Failure - Electrical System	11	6	12	23	
	Infrastructure Failure - Sanitary Sewer System	7	13	12	15	
	Infrastructure Failure - Storm Sewer System	7	13	12	15	
	Infrastructure Failure - Water System	3	16	12	12	
	Nuclear Power Plants	28	13	18	16	
	Oil and Gas Well Accidents	28	23	19	18	
Petroleum and Natural Gas Pipeline Accidents	14		30	18		
Subsidence - Mining	28		30	30		
Subsidence - Technical						
Human Related Hazards	Civil Disturbance	13	3	23	2	
	Criminal Acts (Vandalism and Arson)	3	6	9	22	
	Criminal Acts (Mass Shootings)		10	16	20	
	Information Technology Intrusion		16	25	28	
	Gas/Oil Shortages or Supply Disruptions			25	23	
	Public Health Emergencies	28	6	6	17	
	Pandemics and Epidemics					
	Contaminated Food/Water					
	Terrorism and Sabotage		20	19	12	
	Transportation Acc. - Highway	5	4	4	21	
	Transportation Acc. - Rail	19	20	16	21	
	Transportation Acc. -Air	7	10	19	23	
	Transportation - Surface Roads			4	21	
	Transportation - Marine			25	23	
	Transportation Accidents - Rail/Highway Crossing					
Weapons of Mass Destruction			19	27		

Summary of Hazard Evaluation – First Survey Results for 2019 Update
 Wayne County Hazard Mitigation Plan Update
 Workshop of March 14, 2019

First Survey Results Open Question (N=57)

Natural Hazards

Response	Count	%
Thunderstorms - Hail, Lightning, Severe Winds	21	36.8
Winter Hazards - Snow, Ice, Sleet	14	24.6
Flooding - Riverine or Shoreline	11	19.3
Tornadoes	7	12.3
Extreme Temperatures - Hot or Cold	3	5.3
Other - Severe Weather	1	1.8
	57	100.0

Technological Hazards

Response	Count	%
Infrastructure Failure - Bridges/Roads	19	33.3
HazMat Incidents - Transportation	11	19.3
Infrastructure Failure - Electrical	9	15.8
Flooding - Urban (stormwater)	5	8.8
Infrastructure Failure - Communications	4	7.0
Infrastructure Failure - Sanitary/Storm Sewers	3	5.3
Nuclear Power Plant Accidents	2	3.5
Oil, Petroleum, Natural Gas Well or Pipeline Accidents	2	3.5
Flooding - Dam Failure	1	1.8
HazMat Incidents - Fixed Sites	1	1.8
	57	100.0

Human Hazards

Response	Count	%
Public Health Emergencies - Pandemics/Epidemics/Contaminated Food/Water	14	24.6
Transportation Accidents - Roads	11	19.3
Catastrophic Events/National Emergencies	10	17.5
Criminal Acts - Mass Shooting/Active Assailant(s)	10	17.5
Civil Disturbance	3	5.3
Criminal Acts - Arson & Vandalism	3	5.3
Information Technology Intrusion	2	3.5
Gas/Oil Shortages or Supply Disruptions	1	1.8
Transportation Accidents - Air	1	1.8
Transportation Accidents - Rail	1	1.75
Other: Criminal Acts - Homicide/Robbery/Carjacking	1	1.75
	57	100.0

Summary of Hazard Evaluation – First Survey Results for Update
Wayne County Hazard Mitigation Plan Update
Workshop of March 14, 2019

First Survey Results Hazards Ranked (N=57)

Hazard	2019 Survey			2013
	Open Ended Question Rank	Ranking No. Times Listed	Ranking Average Score	
Celestial Impact		38	39	
Drought		27	30	
Earthquake		37	37	
Extreme Temperatures - Extreme Hot or Cold	5	7	9	1, 5
Fire - Wildfires		36	36	
Flooding - Riverine or Shoreline	3	21	6	
Fog		33	31	
Invasive Species		34	34	
Subsidence - Natural		39	32	
Thunderstorms - Hail, Lightning, Severe Wind	1	1	3	
Tornadoes	4	6	7	
Winter Hazards - Snow, Ice & Sleet	2	2	12	
Fire - Scrap Tire		35	35	
Fire - Structural		23	20	
Flooding - Dam Failure	9	28	33	
Flooding - Urban	4	12	16	6
Hazmat Incidents - Fixed Site		18	11	3
Hazmat Incidents - Transportation	2	9	15	
Infrastructure Failure - Bridges, Roads	1	3	8	
Infrastructure Failure - Communications	5	15	5	4
Infrastructure Failure - Electrical Systems	3	8	1	4
Infrastructure Failure - Sanitary/Storm Sewers	6	13	2	
Infrastructure Failure - Water System		11	13	4
Nuclear Power Plant Accidents	7	14	21	
Oil and Gas Well or Pipeline Accidents	8	25	14	
Subsidence - Mining or Infrastructure		29	38	
Catastrophic Events/National Emergencies	3	16	24	
Civil Disturbance	5	19	22	
Criminal Acts - Mass Shootings/Active Assailant(s)	4	5	19	
Criminal Acts - Vandalism and Arson	5	20	27	
Criminal Acts - Homicide/Robbery/Carjacking				
Gas/Oil Shortages or Supply Disruptions	7	30	18	
Information Technology Intrusion	6	17	29	
Public Health Emergencies - Pandemics, Epidemics, Food/Water	1	4	23	2
Terrorism/Sabotage		26	17	
Transportation Accidents - Air	7	22	10	
Transportation Accidents - Marine		32	28	
Transportation Accidents - Rail	7	31	26	
Transportation Accidents - Surface Roads/Highways	2	10	4	
Weapons of Mass Destruction		24	25	

Summary of Hazard Evaluation – First Survey Results for Update
 Wayne County Hazard Mitigation Plan Update
 Workshop of March 14, 2019

First Survey Results Hazards Ranked (N=44)

Population Impact	Count	Rank	Average	Rank
Central Business District	22	8	3.6	10
Commercial Sites	18	9	3.4	9
Hospitals	48	1	2.6	2
Industrial Sites	11	10	3.3	7
Open Spaces	8	11	4.4	11
Public Facilities	30	3	3.4	8
Residential Areas	26	5	2.4	1
Roads, Bridges, Railroads	25	6	2.9	5
Schools and Churches	41	2	2.9	4
Sports/Entertainment Arenas	24	7	2.7	3
Utility Facilities	28	4	3.0	6

Environmental Impact	Count	Rank	Average	Rank
Central Business District	13	10	4.08	10
Commercial Sites	19	8	3.95	9
Hospitals	39	1	2.49	2
Industrial Sites	25	7	2.12	1
Open Spaces	17	9	3.35	8
Public Facilities	35	2	3.17	6
Residential Areas	33	4	2.73	3
Roads, Bridges, Railroads	28	6	2.75	4
Schools and Churches	31	5	3.35	7
Sports/Entertainment Arenas	10	11	4.1	11
Utility Facilities	35	3	2.77	5

Economic Impact	Count	Rank	Average	Rank
Central Business District	38	2	2.66	2
Commercial Sites	43	1	2.72	3
Hospitals	23	8	2.96	5
Industrial Sites	37	3	3.03	6
Open Spaces	2	11	4.5	11
Public Facilities	24	7	3.46	8
Residential Areas	15	10	3.2	7
Roads, Bridges, Railroads	29	4	2.38	1
Schools and Churches	16	9	3.5	9
Sports/Entertainment Arenas	25	6	3.68	10
Utility Facilities	27	5	2.96	4

Hazard Impact Goals Worksheet Number 1
 Wayne County Hazard Mitigation Plan Update
 Workshop of March 14, 2019

Objective: To identify the top three criteria for evaluating hazard event impacts in Wayne County.

Thought Questions: What are the top priorities for the community when considering hazard impacts? What do the community leaders represent as important? What are the top priorities for emergency response agencies when considering hazard impacts? What are the top challenges facing the County when a hazard occurs?

Individual Worksheet

1	
2	
3	
4	
5	

Group Worksheet

1	
2	
3	

Example Criteria

Population Impacted
 Area Impacted
 Economic Cost for Recovery
 Loss of Life
 Loss of Property
 Damage to Infrastructure
 Time to Recover to Pre-Incident Levels
 Ecological Impact

Impact to Critical Response Facilities
 Business Interruption
 Infrastructure Failure
 Transportation Disruption
 Ability to Provide Health Care
 Economic Impact

Hazard Impact Goals Worksheet Number 3
 Wayne County Hazard Mitigation Plan Update
 Workshop of March 14, 2019

Objective: To evaluate if the survey ranking makes sense.

Thought Questions: Look not only at the individual ranking, but also look across rows and down columns. Do the absolute values reflect reality? Do the relative values reflect reality?

Ranking

- 3 = High
- 2 = Medium
- 1 = Low

	Asset Criticality		
	Based on Asset Class Characteristics estimate the effects of a hazard event to the listed criteria		
Asset to Consider			
Commercial Sites			
Hospitals/Response Facilities			
Industrial Sites			
Open Space			
Public Facilities			
Residential Areas			
Roads, Railroads, Bridges			
Utility Facilities			
Schools, Churches			
Sports/Entertainment Arenas			
Central Business Dist.			

Hazard Impact Goals Worksheet Number 5
 Wayne County Hazard Mitigation Plan Update
 Workshop of March 14, 2019

Objective: To determine the overall consequence of a hazard event for each asset.

Ranking

- 3 = High
- 2 = Medium
- 1 = Low

Hazard	Consequences of Hazardous Event at the Asset				
	Comm. Sites	Hospitals/Response Facilities	Indust. Sites	Open Space	Public Fac.

Hazard	Consequences of Hazardous Event at the Asset					
	Resid. Sites	Roads, RR, Bridges	Utility Fac.	Schools, Churches	Sports/Ent. Arenas	Central Bus. Dist.

Hazard Definitions

Wayne County Hazard Mitigation Plan Update

Civil Disturbance

A public gathering or prison uprising which disrupts essential functions and results in unlawful behavior such as rioting or arson. This event involves a large number of people and requires a significant response effort by law enforcement and/or emergency responders.

Criminal Acts - Arson

The willful or malicious burning or attempt to burn, with or without intent to defraud, a dwelling, public building, motor vehicle, or personal property of another.

Criminal Acts - Vandalism

The willful or malicious destruction, injury, disfigurement, or defacement of any public or private property, real or personal, without consent of the owner or person having control.

Drought

An extended period of time with significantly low precipitation levels that usually occurs during planting and growing seasons.

Earthquake

The sudden movement or motion in the earth caused by an abrupt release of slowly accumulating strain, which results in ground shaking, surface faulting, or ground failures.

Extreme Cold

A prolonged period of extreme low temperatures, usually accompanied by snowstorms, sleet and ice storms or hail.

Extreme Heat

A prolonged period of extreme high temperatures, often accompanied by conditions such as high humidity, high winds and lack of rain.

Fire Hazards - Forest/Field Fire

A fire within an open space, forested area, brush or grassed area, or wild land. Does not include prescribed fires.

Fire Hazards - Scrap Tire Fires

Fires which occur at a location where scrap tires are being stored for processing, recycling, or re-use.

Fire Hazards - Structural Fires

A fire of any origin which ignites one or more structures, often results in loss of life and/or property.

Flooding – Dam Failure

The failure of an impoundment located in a river, stream, lake or other waterway resulting in downstream flooding.

Flooding - Riverine

The periodic occurrence of overbank flows of rivers and streams resulting in partial or complete inundation of the adjacent floodplain.

Flooding - Shoreline

Shoreline erosion hazards typically involve the loss of property as sand or soil is removed by water action and is carried away over time.

Flooding – Urban

The overflow of storm sewer systems, usually caused by inadequate drainage following heavy rainfall or rapid snowmelt.

HazMat Incidents – Fixed Site

An uncontrolled release of a hazardous material originating from a building, structure, or fixed equipment which is capable of posing a risk to life, health, safety, property or the environment.

HazMat Incidents - Transportation

An uncontrolled release of a hazardous material during transport which is capable of posing a risk to life, health, safety, property or the environment.

Infrastructure Failure

(Includes Water, Sanitary Sewer, Storm Sewer, Electrical and Emergency Communications)

The failure of a critical public or private utility infrastructure which results in a short-term loss of service.

Nuclear Power Plant Accidents

An actual or potential release of radioactive material at a nuclear facility in a quantity sufficient to constitute a threat to the health and safety of offsite populations.

Oil and Gas Well Incidents

An oil or gas well incident could involve an uncontrolled release of oil or natural gas, or a release of hydrogen sulfide gas, a by-product of production wells.

Petroleum and Natural Gas Pipeline Accidents

An uncontrolled release of petroleum or natural gas from transmission or distribution pipelines.

Public Health Emergencies

A widespread and/or severe epidemic, incident of contamination, or other situation that presents a danger to or otherwise negatively impacts the general health and well being of the public.

Subsidence - Mining

Lowering or collapse of the land surface due to loss of subsurface support in mining areas.

Subsidence - Natural

The lowering or collapse of the land surface due to loss of subsurface support. Generally caused by drainage of organic soils, underground fluid withdrawal, underground mining, natural compaction, sinkholes and hydrocompaction (collapsible soils).

Terrorism/Sabotage

An intentional, unlawful use of force, violence or subversion against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political, social, or religious objectives.

Thunderstorm Hazards - Hail

Conditions where atmospheric water particles from thunderstorms form into rounded or irregular lumps of ice that fall to the earth.

Thunderstorm Hazards - Lightning

The discharge of electricity from within a thunderstorm.

Thunderstorm Hazards - Severe Wind

Winds greater than 58 miles per hour, not including tornadoes, are classified as windstorms.

Tornadoes

A violently rotating column of air extending downward to the ground from a cumulonimbus cloud.

Transportation Accident – Air

A crash or other accident involving passenger transportation aircraft, does not include recreational aircraft.

Transportation Accidents - Highway

A crash or other accident involving public passenger transportation, does not include private auto transportation.

Transportation Accident – Highway/Rail Crossings

A crash or other accident involving which occurs at public, at-grade railroad crossings and involves the collision of an automobile and railcar.

Transportation Accident – Marine

A crash or other marine accident involving passenger transportation, does not include public or private recreational accidents.

Transportation Accident – Rail

A crash or other accident involving passenger or freight rail systems, does not include accidents which result in a HazMat response.

Winter Hazards - Ice and Sleet Storms

Freezing rain is rain that freezes on contact with surfaces causing a coating of ice on exposed surfaces.

Winter Hazards - Snowstorms

A period of rapid accumulation of snow accompanied by high winds and cold temperatures.

Weapons of Mass Destruction

Weapons intended to cause widespread damage and high number of casualties. Typically fall into four categories: 1) missiles, 2) biological weapons, 3) nuclear weapons, or 4) chemical weapons.

Critical Asset Definition Wayne County Hazard Mitigation Plan Update

FOR PLANNING PURPOSES, WHAT SHOULD BE CONSIDERED A CRITICAL FACILITY?

The list of assets that are most important to protect, as well as the criticality of any given facility, can vary widely from community to community. Thus, there is no universal definition of a critical facility. For planning purposes, a jurisdiction should determine criticality based on the relative importance of its various assets for the delivery of vital services, the protection of special populations, and other important functions.

FEMA's Public Assistance Guide (FEMA 322) states that "A critical facility is a structure that, if flooded, would present an immediate threat to life, public health, and safety. Critical facilities include the following examples:

- Emergency service facilities and equipment (fire stations; police stations; emergency operations centers, shelters, and schools; custodial facilities, such as jails and juvenile detention centers; hospitals, nursing homes, and other health care facilities; rescue squads; public works facilities, etc.).
- Communications networks (telephones, emergency service radio systems, repeater sites and base stations, television and radio stations, etc.).
- Water supply system/facilities, to include waste water treatment.
- Utilities (power plants, substations, power lines, oil, natural gas, electric power, and communication systems; etc.)
- Transportation networks (roads, bridges, airports, rail terminals, maritime ports).
- Hazardous material facilities.

FEMA Funding Wayne County Hazard Mitigation Plan Update

Items Funded By FEMA - Hazard Mitigation Grant Program (HMGP) Project Eligibility

Projects may be of any nature that will result in protection to public or private property. Eligible projects under the HMGP include, but are not limited to:


1. **Property Acquisition** and **Structure Demolition/Relocation** for floodplain protection;
2. **Structure Elevation** in compliance with federal, state, and local ordinances;
3. **Mitigation Reconstruction** of damaged buildings, outside of the floodway or high-risk erosion areas, to minimize future damage;
4. **Dry Floodproofing** of residential and non-residential buildings;
5. **Minor Flood Control** projects to reduce the frequency or severity of flooding (e.g., modification of culverts or creation of storm water detention/retention);
6. **Localized Flood Control** projects to protect specific critical facilities;;
7. **Structural and Nonstructural Retrofitting** of facilities to eliminate the risk of future damage and to protect inhabitants;
8. **Safe Room Construction** for protection from tornadoes, hurricanes, or other high wind events;
9. **Infrastructure Retrofits** to reduce risks to utilities, roads and bridges;
10. **Vegetative Management** and programs such as:
 - Defensible space for wildlife;
 - Ignition-resistant construction;
 - Hazardous fuels reduction;
11. **Post-Disaster Code Enforcement** that supports reconstruction efforts;
12. **State discretionary projects** (5% set aside funding), that fund mitigation actions consistent state goals and objectives and local mitigation plans, but that otherwise may be difficult to prove cost effectiveness using standard benefit cost analysis.

Table 4: Eligible Activities by Program


Eligible Activities					
1. Mitigation Projects	√	√	√	√	√
Property Acquisition and Structure Demolition	√	√	√	√	√
Property Acquisition and Structure Relocation	√	√	√	√	√
Structure Elevation	√	√	√	√	√
Mitigation Reconstruction	√	√	√	√	√
Dry Floodproofing of Historic Residential Structures	√	√	√	√	√
Dry Floodproofing of Non-residential Structures	√	√	√	√	√
Minor Localized Flood Reduction Projects	√	√	√	√	√
Structural Retrofitting of Existing Buildings	√	√	√	√	√
Non-structural Retrofitting of Existing Buildings and Facilities	√	√	√	√	√
Safe Room Construction	√	√	√	√	√
Infrastructure Retrofit	√	√	√	√	√
Soil Stabilization	√	√	√	√	√
Wildfire Mitigation	√	√	√	√	√
Post-Disaster Code Enforcement	√	√	√	√	√
5% Initiative Projects	√	√	√	√	√
2. Hazard Mitigation Planning	√	√	√	√	√
3. Management Costs	√	√	√	√	√

Advisory Committee Workshop Wayne County Hazard Mitigation Plan Update

Hazard Mitigation Plan Update





Workshop 1: March 14, 2019



Overview

- Introduction
- The Function of a Hazard Mitigation Plan
- The 2013 Wayne County Plan
- The Wayne County Plan Update
- First workshop
- Survey Results

Introduction



Confidentiality

- Contact Information Confidential
- But You Will Be Listed in the Plan
- Workshop Sources Confidential
- Secure Version of Final Document
- Critical Assets
- Critical Infrastructure

Teams

- Project Team
 - Wayne County Homeland Security
 - ASTI Environmental
- Advisory Committee
- Local Communities
- Stakeholders
- Public


The Wayne County Plan
www.wchmp.com

ASTI Environmental


Established in 1985
Over 90% Repeat/Referral
Over 11,000 projects in the United States
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Advisory Committee Workshop

Wayne County Hazard Mitigation Plan Update

ASTIEnvironmental

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<i>Restoration</i>			
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<i>Compliance</i>			

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Advisory Committee

- Local Communities
- County LEPC
- Schools
- Industry/Businesses
- Adjacent Communities

The Wayne County Plan
www.wchmp.com

Community Reps

42 Communities

- Emergency Management Coordinators
- Local Leaders



The Wayne County Plan
www.wchmp.com

Stakeholders

- 42 Communities
 - Mayors, Managers
- Adjacent Communities
- Industry and Business
- Non-Government Organizations
- Interested Individuals

The Wayne County Plan
www.wchmp.com

Hazard Mitigation Plans

Advisory Committee Workshop

Wayne County Hazard Mitigation Plan Update

What is a HMP?

A Hazard Mitigation Plan (HMP) will...

- identify hazards in the community,
- evaluate and highlight those hazards,
- provide mitigation alternatives

Hazard Mitigation Plans

What is a HMP?

The objectives of a Plan are to;

- reduce risks from natural, human, and technological hazards by focusing on those hazards,
- provide guidance when committing resources that will reduce the effects of hazards, and
- **provide a basis for technical assistance and funding**

Hazard Mitigation Plans

What is a HMP?

The Plan must comply with:

- the Disaster Mitigation Act of 2000,
- the Emergency Management Act,
- FEMA and Michigan Department of State Police guidance documents,
- and all applicable federal, state, and local regulations.

Hazard Mitigation Plans

What is a HMP?

The Plan is only a part of the emergency planning, mitigation, preparedness, response, and recovery process. Must coordinate with:

- All existing plans and programs
- **Existing Plans can be included in the Final HMP by reference**

Hazard Mitigation Plans

Why Prepare A Plan?

To save lives and protect property
To preserve and protect an area's environment and economy
To preserve and maintain an area's essential services and quality of life

Hazard Mitigation Plans

Why Prepare A Plan?

To provide information to citizens, businesses, and officials (including future emergency managers), for


- Planning
- Economic development
- Project development decisions
- Emergency management

Hazard Mitigation Plans

Advisory Committee Workshop

Wayne County Hazard Mitigation Plan Update

Why Prepare A Plan?



To support hazard mitigation project implementation and **funding**.

- Identifies specific hazards
- Identifies specific vulnerabilities
- Documents mitigation options
- Demonstrates community involvement and support
- Part of an effective overall plan

Hazard Mitigation Plans

The Process

- Prepare hazard history and community profile
- Identify significant hazards and risks
- Identify specific vulnerabilities

Hazard Mitigation Plans

The Process

- Identify hazard mitigation goals and objectives
- Suggest strategies to achieve mitigation goals and objectives
- Evaluate strategies using locally chosen criteria
- Select feasible strategies based on evaluation criteria


Hazard Mitigation Plans

The Process


- Propose specific action steps that will achieve desired objectives
- Prepare the plan
- Adopt the plan
- Implement the plan
- Monitor and update the plan

Hazard Mitigation Plans

The Current Wayne County Plan



Circa 2013-14



Hazard Ranking Criteria

Criteria	Weighting
Health, Safety and Welfare of the Public	6
Loss of life and Injury	8
Population Impacted	4

Hazard Identification
Advisory Committee Meeting of January 30, 2013

Advisory Committee Workshop Wayne County Hazard Mitigation Plan Update

Hazard History – Top 15

Hazard Event	Ranking
Transportation Accidents - Highway	1
Criminal Acts - Vandalism	2
Fire Hazards - Structural Fires	3
Criminal Acts - Arson	4
Fire Hazards - Wildfire	5
Thunderstorm Hazards - Severe Wind	6
Thunderstorm Hazards - Hail	7
Transportation Accidents - Rail	8
Transportation Accidents - Marine	9
Infrastructure Failure - Water Systems	10
Winter Hazards - Snowstorms	11
Infrastructure Failure - Electrical Systems	12
Extreme Temperatures - Extreme Cold	13
Extreme Temperatures - Extreme Heat	14
Flooding - Dam Failure	15
Flooding - Riverine	15
Flooding - Urban	15
Winter Hazards - Ice & Sleet	15

Hazard Identification
Advisory Committee Meeting of January 30, 2013

Workshop Hazard Impact Ranking

Hazard Event	Workshop Rank	Hazard Risk Rank	Action Plan Needed
Flooding - Urban	7	2	2
Hazmat Incidents - Fixed	3	6	3
Public Health Emergency	2	5	1
Infrastructure Failure - Communication and Elec	4	7	3
Infrastructure Failure - Water Systems	4	1	1
Severe Weather Summer	1	4	1
Severe Weather Winter	6	2	2

- Flooding (Non Dam)
- Hazmat Incidences—Transportation
- Infrastructure Failure
- Public Health Emergencies
- Tornadoes

Action Plan Assessment	
Risk	Rank
1-5	1-2
6-7	3-4

Hazard Identification
Advisory Committee Meeting of January 30, 2013

Assets at Risk From Hazards

Critical Asset	Criticality Rank	Asset Risk Rank	Vulnerability
Commercial Sites	11	5	2
Hospitals/Response Facilities	2	1	1
Industrial Sites	5	8	3
Open Space	6	11	4
Public Facilities	9	4	2
Residential Areas	1	2	1
Roads, Railroads, Bridges	4	10	3
Utility Facilities	3	3	1
Schools, Churches	10	7	4
Sports/Entertainment Venues	8	9	4
Central Business Dist.	7	5	2

Vulnerability Assessment	
Risk	Criticality
1-5	1-2
6-11	3-4

Hazard Identification
Advisory Committee Meeting of January 30, 2013

Considerations - Hazards

2006 Emphasis	2013 Emphasis	2019 Emphasis??
Terrorism	Flooding	Flooding
Weapons of Mass Destruction	Earthquakes	Infrastruct./Subsidence
	Pipeline Ruptures	Changing Climate
	Nuclear Accidents	Cyber Attacks
		Catastrophic Events
		Active Assailant(s)


Considerations - Hazards


Natural – 17 Total
Technological – 17 Total
Human Related – 15 Total

List of Hazards (attached)

Hazard Definitions (attached)

The Wayne County Plan Update





Advisory Committee Workshop

Wayne County Hazard Mitigation Plan Update

Process - Outreach

Public

- One public meeting- Draft Plan
- Community announcements
- Web page
 - Comment Form
 - General Information
 - Plan updates and Draft Plan

Process - Outreach

Stakeholders

- Newsletters
- Web page
 - Meeting agendas and minutes
- Draft Plan Available

Process - Outreach


Advisory Committee

- Two Workshops
- Two Surveys
- Web page
 - Draft Plan
- Telephone/Email Input
- Draft Plan Review

First Workshop




Meeting Agenda



- Identify and rank hazard events
- Rank critical assets
- Analyze threats
- Identify specific vulnerabilities
- Begin discussing mitigation alternatives

First Meeting
March 14, 2019

Keep in Mind

- Analyze threats
 - R = VxPxC
 - vulnerability, probability, consequence
- Importance:
 - Fear ≠ Risk
- Consequence:
 - Typical not Worst Case
- Specific Hazard Definitions
- The End Game: Mitigation ≠ Response

First Meeting
March 14, 2019

Advisory Committee Workshop

Wayne County Hazard Mitigation Plan Update

Keep in Mind

Decision Assisting Tool
Not A
Decision Making Tool

First Meeting
March 14, 2019

Review Goals

Saving lives & protecting property
Preserving & protecting the area's
environment & economy
Preserving & maintaining the
area's essential services &
quality of life

From 2013 Workshops

Review Goals

To retain access to Federal
Emergency Management
Agency (FEMA) funding for the
County and its communities by
complying with Section 104 of
the Disaster Mitigation Act of
2000 (42 USC 5165)

From 2013 Workshops

Review Goals

To provide a basis for identifying
and mitigating hazards that
affect the County and its
communities

From 2013 Workshops

Review Goals

To develop a method to
incorporate hazard identification
and mitigation into the planning
process of the County and its
communities

From 2013 Workshops

Review Goals

Protect & preserve human health & well-being
Maintain & fortify critical assets, structures, &
infrastructure to preserve quality of life
Ensure interagency cooperation & coordination
for preparedness
Enhance emergency response capabilities (incl.
& especially communications)
Review & improve county-wide contingency plans for
maintaining quality of life

From 2013 Workshops



Advisory Committee Workshop Wayne County Hazard Mitigation Plan Update

The Heavy Lifting - Worksheets

- Hazard Ranking
- Critical Assets
- Hazard Likelihood and Consequences

First Meeting
March 14, 2019

Assessment

Survey Results – Open Question

57 Respondents
36 Communities/
Agencies

Natural Hazards			
Response	Count	%	
Thunderstorms - Hail, Lightning, Severe Winds	21	36.8	
Winter Hazards - Snow, Ice, Sleet	14	24.6	
Flooding - Riverine or Shoreline	11	19.3	
Tornadoes	7	12.3	
Extreme Temperatures - Hot or Cold	3	5.3	
Other - Severe Weather	1	1.8	
	57	100.0	

Survey Results – Open Question

Technological Hazards			
Response	Count	%	
Infrastructure Failure - Bridges/Roads	19	33.3	
HazMit Incidents - Transportation	11	19.3	
Infrastructure Failure - Electrical	9	15.8	
Flooding - Urban (stormwater)	5	8.8	
Infrastructure Failure - Communications	4	7.0	
Infrastructure Failure - Sanitary/Storm Sewers	3	5.3	
Nuclear Power Plant Accidents	2	3.5	
Oil, Petroleum, Natural Gas Well or Pipeline Accident	2	3.5	
Flooding - Dam Failure	1	1.8	
HazMit Incidents - Fixed Sites	1	1.8	
	57	100.0	

Survey Results – Open Question

Human Hazards			
Response	Count	%	
Public Health Emergencies - Pandemics/Epidemics/Contaminated Food/Water	14	24.6	
Transportation Accidents - Roads	11	19.3	
Catastrophic Events/National Emergencies	10	17.5	
Criminal Acts - Miss Shooting/Active Assailant(s)	10	17.5	
Civil Disturbance	3	5.3	
Criminal Acts - Arson & Vandalism	3	5.3	
Information Technology Intrusion	2	3.5	
Gas/Oil Shortages or Supply Disruptions	1	1.8	
Transportation Accidents - Air	1	1.8	
Transportation Accidents - Rail	1	1.75	
Other: Criminal Acts - Homicide/Robbery/Carjacking	1	1.75	
	57	100.0	

SIGN-IN LOG

2019 HAZARD MITIGATION WORKSHOP

PLEASE PRINT

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Date MARCH 14, 2019

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2019 HAZARD MITIGATION WORKSHOP

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Date MARCH 14, 2019

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2019 HAZARD MITIGATION WORKSHOP

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Date MARCH 14, 2019

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Date MARCH 14, 2019

Hazard Mitigation Planning Workshop#2

WAYNE COUNTY HAZARD MITIGATION PLAN

The 2nd workshop to update Wayne County's
Hazard Mitigation Plan will be held

March 28, 2019
10 a.m. to 2 p.m.

in the Ray Mix Room, Wayne County Community
College Downriver Campus, 21000 Northline Road,
Taylor, Michigan. Additional information about
the Plan and planning process is also available at:

www.waynecountyhmp.com

Or by contacting:

Paul Rentschler, Project Manager

800.395.ASTI

or prentschler@asti-env.com

Phone: 800.395.ASTI
Fax: 810.225.3800
10448 Citation, #100
Brighton, MI 48116
prentschler@asti-env.com
www.waynecountyhmp.com

The workshop will be facilitated by Paul Rentschler, an ecologist and planner with ASTI Environmental. Mr. Rentschler has been assisting communities develop Hazard Mitigation Plans and seek federal funding for mitigating natural, technological, and human-created disasters since 2003. He has developed or updated FEMA-approved Hazard Mitigation Plans for Canton Township, the Cities of Allegan and Kentwood, and Allegan, Oakland, and Wayne Counties.

Agenda

Date: March 28, 2019

RE: **Second Advisory Committee Meeting**
Wayne County Hazard Mitigation Plan Update (ASTI File No. 10943)

Agenda

Item #	Subject
--------	---------

1. **Overview** - 10:00 A.M.
2. **Review of Hazard Identification Process** (see summary sheets)
 - Hazards Ranking
 - Top Hazards for Consideration
3. **Critical Assets**
4. **Mitigation Goals and Objectives**
 - Workgroups (see worksheets)
 - Overall Selection
5. **Evaluation Criteria**
 - Workgroups (see worksheet)
6. **Mitigation Survey Results**
 - Results of Surveys
 - Top Mitigation Strategies (see summary sheets and Attachments)
 - Discussion of Additional Mitigation Strategies
7. **Mitigation Selection**
 - Combining Mitigation Strategies with Goals and Objectives and Evaluation Criteria
8. **Action Plan Selection**
 - Specific Strategies to Address
 - Development of Action Plan (see example worksheet)
 - Roles and Responsibilities
9. **Homework**
 - **Action Plans due April 11, 2019**
10. **Homework**
 - **Comments on DRAFT HMP due April 26, 2019**

Summary of Hazard Evaluation – Initial Advisory Committee Meeting

Wayne County

Hazard Mitigation Plan Update

From Workshop of March 14, 2019

Criteria for Hazards

- Loss of Life and Injury (weighted at 15)
- Infrastructure Failure (weighted at 8)
- Population Impacted (weighted at 7)
- Ability to Recover from Incident (weighted at 7)

Hazard Ranking

Hazard Selection at the Advisory Committee Meeting

2019 Hazards to Consider	Open Ended	Listing	Average	Notes
	Question Rank	Rank		
Thunderstorms - Hail, Lightning, Severe Wind	1	1	3	
Winter Hazards - Snow, Ice & Sleet	2	2	12	
Infrastructure Failure - Bridges, Roads	1	3	8	
Infrastructure Failure - Electrical Systems	3	8	1	
Criminal Acts - Mass Shootings/Active Assaults	4	5	19	
Public Health Emergencies - Pandemics, Epidemics	1	4	23	
Transportation Accidents - Surface Roads/Highways	2	10	4	
Infrastructure Failure - Sanitary/Storm Sewers	6	13	2	
Infrastructure Failure - Communications	5	15	5	
Extreme Temperatures - Extreme Hot or Cold	5	7	9	
Civil Disturbance	5	19	22	
Criminal Acts - Vandalism and Arson	5	20	27	

		2019 Survey			2013
Hazard		Open Ended Question Rank	Ranking No. Times Listed	Ranking Average Score	
Natural Hazards	Celestial Impact		38	39	
	Drought		27	30	
	Earthquake		37	37	
	Extreme Temperatures - Extreme Hbt or Cold	5	7	9	1, 5
	Fire - Wildfires		36	36	
	Flooding - Riverine or Shoreline	3	21	6	
	Fog		33	31	
	Invasive Species		34	34	
	Subsidence - Natural		39	32	
	Thunderstorms - Hail, Lightning, Severe Wind	1	1	3	
	Tomatoes	4	6	7	
	Winter Hazards - Snow, Ice & Sleet	2	2	12	
Technological Hazards	Fire - Scrap Tire		35	35	
	Fire - Structural		23	20	
	Flooding - Dam Failure	9	28	33	
	Flooding - Urban	4	12	16	6
	Hazmat Incidents - Fixed Site		18	11	3
	Hazmat Incidents - Transportation	2	9	15	
	Infrastructure Failure - Bridges, Roads	1	3	8	
	Infrastructure Failure - Communications	5	15	5	4
	Infrastructure Failure - Electrical Systems	3	8	1	4
	Infrastructure Failure - Sanitary/Storm Sewers/Water	6	13	2	
	Infrastructure Failure - Water System		11	13	4
	Nuclear Power Plant Accidents	7	14	21	
	Oil and Gas Well or Pipeline Accidents	8	25	14	
Subsidence - Mining or Infrastructure		29	38		
Human Related Hazards	Catastrophic Events/National Emergencies	3	16	24	
	Civil Disturbance	5	19	22	
	Criminal Acts - Mass Shootings/Active Assailant(s)	4	5	19	
	Criminal Acts - Vandalism and Arson	5	20	27	
	Criminal Acts - Homicide/Robbery/Carjacking				
	Gas/Oil Shortages or Supply Disruptions	7	30	18	
	Information Technology Intrusion	6	17	29	
	Public Health Emergencies - Pandemics, Epidemics, Food/Water	1	4	23	2
	Terrorism/Sabotage		26	17	
	Transportation Accidents - Air	7	22	10	
	Transportation Accidents - Marine		32	28	
	Transportation Accidents - Rail	7	31	26	
	Transportation Accidents - Surface Roads/Highways	2	10	4	
Weapons of Mass Destruction		24	25		
Additional Hazards to Consider	Opicid Crisis - MI 8th in the Nation in Deaths				

Summary of Hazard Evaluation – Initial Advisory Committee Meeting
 Wayne County
 Hazard Mitigation Plan Update
 From Workshop of March 14, 2019

2019 Plan Update Meeting Results

Hazard Events to Consider	Avg Rank	Concern About Impacts of Hazardous Events			Geographic Area of Impact	Hazard Sum	Workshop Rank
		Ability to Recover from Disaster/Incident	Infrastructure Failure	Loss of Life and Injury			
Extreme Temperatures - Extreme Hot or Cold		1	2	2	3	74	5
Flooding - Riverine or Shoreline		2	3	1.5	2	74.5	4
Thunderstorms - Hail, Lightning, Severe Wind		1	1	1	1	37	14
Tornadoes		2	1	2	1	59	8
Winter Hazards - Snow, Ice & Sleet		1	2	1	3	59	8
Flooding - Urban		3	2	1	1	59	8
Hazmat Incidents - Transportation		2	2	2	2	74	5
Infrastructure Failure - Water & Sewer Systems		3	3	2	3	96	1
Catastrophic Events/National Emergencies		2	1	1	3	58	11
Civil Disturbance		2	1	1	1	44	13
Criminal Acts - Mass Shootings/Active Assailant(s)		3	1	3	1	81	3
Criminal Acts - Vandalism and Arson		1	1	2	1	52	12
Public Health Emergencies - Pandemics, Epidemics, Food/Water, Opioid Crisis		3	1	3	3	96	2
Transportation Accidents - Surface Roads/Highways		1	2	2	1	60	7

	Enter the Cell Value
High	3
Medium	2
Low	1

Notes - additions and removals
Opioid Crisis explicitly part of Public Health Emergencies
Combined water, storm, and sanitary sewer infrastructure
Priority levels determined using Jenk's optimization method

Highly Impact		≥74.6
Med. Impact		Between 52.1-74.5
Low Impact		≤52

2019 Plan Update Survey Results

Asset to Consider	Asset Criticality Ranking			Sum
	Size of Population Impacted	Impact to the Environment	Impact to Economic Activity	
Commercial Sites	3.44	3.95	2.72	10.11
Hospitals/Response Facilities	2.60	2.49	2.96	8.05
Industrial Sites	3.27	2.12	3.03	8.42
Open Space	4.38	3.35	4.50	12.23
Public Facilities	3.37	3.17	3.46	10.00
Residential Areas	2.42	2.73	3.20	8.35
Roads, Railroads, Bridges	2.88	2.75	2.38	8.01
Utility Facilities	3.04	2.77	2.96	8.77
Schools, Churches	2.85	3.35	3.50	9.70
Sports/Entertainment Arenas	2.67	4.10	3.68	10.45
Central Business Dist.	3.55	4.08	2.66	10.29

Notes	Notes
Yellow indicates top five	Answers are based on the 2019 survey results, average value. Lower values indicate greater importance (Descending Scale 1-5).

Summary of Hazard Evaluation – Initial Advisory Committee Meeting

Wayne County

Hazard Mitigation Plan Update

From Workshop of March 14, 2019

Workshop Hazard Impact Ranking

2013 Workshop Results

Hazard Event	Workshop Rank	Hazard Risk Rank	Action Plan Needed
Flooding - Urban	7	2	2
Hazmat Incidents - Fixed	3	6	3
Public Health Emergency	2	5	1
Infrastructure Failure - Communication and Ele	4	7	3
Infrastructure Failure - Water Systems	4	1	1
Severe Weather Summer	1	4	1
Severe Weather Winter	6	2	2

2005 Workshop Results

Hazard Event	Hazard Impact Rank	Hazard Risk Rank	Hazard Assessment
Flooding - Urban	9	8	4
Flooding - Riverine	9	9	4
Hazmat Incidents - Transportation and Fixed	7	5	2
Infrastructure Failure	1	2	1
Thunderstorms - Severe Wind	4	1	1
Public Health Emergencies	6	6	4
Extreme Temperatures: Hot and Cold	3	3	1
Tornadoes	2	4	1
Transportation Acc. - Highway	8	10	4
Winter Hazards - Ice and Sleet	4	7	3

Action Plan Assessment		
	Rank	
Risk	1-5	6-10
1-5	1	2
6-10	3	4

Summary of Hazard Evaluation – Initial Advisory Committee Meeting
 Wayne County
 Hazard Mitigation Plan Update
 From Workshop of January 30, 2013

Assets at Risk from Hazards

2013 Workshop Results

Critical Asset	Criticality Rank	Asset Risk Rank	Vulnerability
Commercial Sites	11	5	2
Hospitals/Response Facilities	2	1	1
Industrial Sites	5	8	3
Open Space	6	11	4
Public Facilities	9	4	2
Residential Areas	1	2	1
Roads, Railroads, Bridges	4	10	3
Utility Facilities	3	3	1
Schools, Churches	10	7	4
Sports/Entertainment Arenas	8	9	4
Central Business Dist.	7	5	2

2005 Workshop Results

Critical Asset	Asset Criticality	Asset Risk Rank	Vulnerability
Commercial Sites	7	6	4
Hospitals/Response Facilities	2	2	1
Industrial Sites	10	7	4
Open Space	11	11	4
Public Facilities	7	8	4
Residential Areas	3	1	1
Roads, Railroads, Bridges	5	5	1
Utility Facilities	1	3	1
Schools, Churches	4	4	1
Sports/Entertainment Arenas	7	10	4
Central Business Dist.	6	9	4

Vulnerability Assessment		
	Criticality	
Risk	1-5	6-11
1-5	1	2
6-11	3	4

Goals Worksheet

Wayne County

Hazard Mitigation Plan Update

From Workshop of March 14, 2019

Objective: To identify the top goals for hazard mitigation in Wayne County.

Thought Questions: What are the top five priorities for the community when considering hazard mitigation? What do the community leaders represent as important? Consider the types of hazards that are most important, and the assets and locations that are most vulnerable. Your answer should reflect your best estimate of the administration or your organization's constituency.

Individual Worksheet

1	
2	
3	
4	
5	

Group Worksheet

1	
2	
3	
4	
5	

Example Goals

Improve, Encourage, Enhance, Maintain, Protect, or Preserve...

Identify, Create...

Goals Worksheet

Wayne County

Hazard Mitigation Plan Update

From Workshop of March 14, 2019

Goals from 2013 Plan

2.1 Plan Goals and Objectives

The general goals of any Hazard Mitigation Plan include: saving lives and protecting property, preserving and protecting an area's environment and economy, and preserving and maintaining an area's essential services and quality of life. This Plan includes these general goals. In addition, specific goals of this Plan are:

- To retain access to FEMA funding for the County and its communities by complying with Section 104 of the Disaster Mitigation Act of 2000 (42 USC 5165)
- To provide a basis for identifying hazards that affect the County and its communities
- To develop a method to incorporate hazard identification and mitigation into the planning process of the County and its communities

Through the hazard mitigation planning process presented in this Plan, Advisory Committee members also identified specific goals and objectives, consistent with the overall planning process and supported by specific mitigation strategies, to do the following:

- Protect and preserve human health and well being
- Maintain and fortify critical assets, structures and infrastructure to preserve the quality of life.
- Ensure interagency cooperation and coordination for preparedness
- Enhance emergency response capabilities (including and especially communications)
- Review and improve county-wide contingency plans for maintaining quality of life
- **Coordinate response to disasters occurring in Wayne County that overwhelms the resources of local communities**
- **Communication goal from Wayne County USE goals & objectives**

Evaluation Criteria Worksheet

Wayne County

Hazard Mitigation Plan Update

From Workshop of March 14, 2019

Objective: To identify five criteria, consistent with County Goals, to be used to evaluate mitigation strategies.

Thought Questions: Based on the Goals and Objectives, how will mitigation strategies be evaluated? What are the key considerations in choosing a strategy for Wayne County?

Individual Worksheet

1	
2	
3	
4	
5	

Group Worksheet

1	
2	
3	
4	
5	

Example Criteria

Ability to accomplish

Availability of outside funding

Community acceptance

Consistency with existing plans and programs

Consistency with mitigation goals

Cost effectiveness (FEMA Requirement)

Downside risk

Equitable distribution of services

Economically Justifiable

Environmentally Sound

Leadership effort required

Non-discriminatory (EO12898 compliant)

Protection of Critical Response Facilities

Socially Equitable

Specific mitigation goals

Technical feasibility (FEMA Requirement)

Definitions for Mitigation Evaluation Criteria

Wayne County

Hazard Mitigation Plan Update

From Workshop of March 14, 2019

Be technically feasible. (The project must use design and construction methods and materials that are approved, codified, recognized, fall under standard or accepted level of practice, or otherwise are determined to be generally accepted by the design and construction industry.)

Be cost-effective and substantially reduce the risk of future damage, hardship, loss, or suffering resulting from a major disaster. This must be demonstrated by documenting that the project:

1. Addresses a problem that has been repetitive, or a problem that poses a significant risk if left unsolved;
2. Will not cost more than the anticipated value of the reduction in both direct damages and subsequent negative impacts to the area if future disasters were to occur;
3. Has been determined to be the most practical, effective, and environmentally sound alternative after consideration of a range of options;
4. Contributes, to the extent practicable, to a long-term solution to the problem it is intended to address; and
5. Considers long-term changes to the areas and entities it protects, and has manageable future maintenance and modification requirements.

Mitigation Strategies - Vulnerabilities/FEMA Funded

Wayne County

Hazard Mitigation Plan Update

From Workshop of March 14, 2019

Objective: To finalize the list of mitigation strategies to include in the Plan. To preserve access to funding, this list should be as complete as possible. (Refer to Table at end of handout)

Thought Questions: Have the most significant hazards been addressed? Have specific vulnerable areas been adequately considered? Have mitigation strategies that are eligible for FEMA funding been considered? Are there general strategies that are part of the County's overall plans that are not included? Are there some categories (see list below) that have not been adequately applied?

Individual Worksheet - Specific Vulnerabilities

1	
2	
3	
4	
5	

Group Worksheet - Specific Vulnerabilities

1	
2	
3	
4	
5	

Individual Worksheet -FEMA Funded

1	
2	
3	
4	
5	

Group Worksheet - FEMA Funded

1	
2	
3	
4	
5	

FEMA Funding Wayne County Hazard Mitigation Plan Update

Items Funded By FEMA - Hazard Mitigation Grant Program (HMGP) Project Eligibility

Projects may be of any nature that will result in protection to public or private property. Eligible projects under the HMGP include, but are not limited to:

1. **Property Acquisition** and **Structure Demolition/Relocation** for floodplain protection;
2. **Structure Elevation** in compliance with federal, state, and local ordinances;
3. **Mitigation Reconstruction** of damaged buildings, outside of the floodway or high-risk erosion areas, to minimize future damage;
4. **Dry Floodproofing** of residential and non-residential buildings;
5. **Minor Flood Control** projects to reduce the frequency or severity of flooding (e.g., modification of culverts or creation of storm water detention/retention);
6. **Localized Flood Control** projects to protect specific critical facilities;;
7. **Structural and Nonstructural Retrofitting** of facilities to eliminate the risk of future damage and to protect inhabitants;
8. **Safe Room Construction** for protection from tornadoes, hurricanes, or other high wind events;
9. **Infrastructure Retrofits** to reduce risks to utilities, roads and bridges;
10. **Vegetative Management** and programs such as:
 - Defensible space for wildlife;
 - Ignition-resistant construction;
 - Hazardous fuels reduction;
11. **Post-Disaster Code Enforcement** that supports reconstruction efforts;
12. **State discretionary projects** (5% set aside funding), that fund mitigation actions consistent state goals and objectives and local mitigation plans, but that otherwise may be difficult to prove cost effectiveness using standard benefit cost analysis.

Table 4: Eligible Activities by Program

Eligible Activities					
1. Mitigation Projects	√	√	√	√	√
Property Acquisition and Structure Demolition	√	√	√	√	√
Property Acquisition and Structure Relocation	√	√	√	√	√
Structure Elevation	√	√	√	√	√
Mitigation Reconstruction					√
Dry Floodproofing of Historic Residential Structures	√	√	√	√	√
Dry Floodproofing of Non-residential Structures	√	√	√	√	√
Minor Localized Flood Reduction Projects	√	√	√	√	√
Structural Retrofitting of Existing Buildings	√	√			
Non-structural Retrofitting of Existing Buildings and Facilities	√	√			
Safe Room Construction	√	√			
Infrastructure Retrofit	√	√			
Soil Stabilization	√	√			
Wildfire Mitigation	√	√			
Post-Disaster Code Enforcement	√				
5% Initiative Projects	√				
2. Hazard Mitigation Planning	√	√	√		
3. Management Costs	√	√	√	√	√

Action Plan Worksheet
 Wayne County
 Hazard Mitigation Plan Update
 From Workshop of March 14, 2019- **Due April 11, 2019**

Mitigation Strategy Description (What do you want to accomplish?):

-

Specific Hazards Addressed:

Primary Responsibility (Person and Department):

Initiatives Needed (What changes must be made, or new programs started, to make this work?):

<u>Item</u>	<u>By Date</u>
•	
•	

Implementation (What milestone tasks will you need to accomplish to get it done?):

<u>Task</u>	<u>Date</u>
•	
•	

Assessment (Provide a general description of the economic costs and benefits.):

<u>Costs (List categories: example – staff time, printing, etc.)</u>	<u>Benefits</u>
•	•
•	•

Anticipated Funding Sources (How will you cover the costs?):

-

SIGN-IN LOG

2019 HAZARD MITIGATION WORKSHOP

PLEASE PRINT

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Date MARCH 28, 2019

SIGN-IN LOG

2019 HAZARD MITIGATION WORKSHOP

PLEASE PRINT

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Date MARCH 28, 2019

SIGN-IN LOG

2019 HAZARD MITIGATION WORKSHOP

PLEASE PRINT

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Date MARCH 28, 2019

Wayne County Hazard Mitigation Plan

Revision Number/Date: 0/June 2019

Publication Date: June 17, 2019

Appendix D. Example Community Resolution for Plan Adoption

SAMPLE Resolution No. _____

ADOPTION OF THE WAYNE COUNTY HAZARD MITIGATION PLAN

WHEREAS, the mission of **(insert community name here)** includes the charge to protect the health, safety, and general welfare of the people of **(insert name of community here)**; and

WHEREAS, **(insert community name)**, Michigan is subject to flooding, tornadoes, winter storms, and other natural, technological, and human hazards; and

WHEREAS, and the Wayne County Department of Homeland Security and Emergency Management and the Wayne County Local Emergency Planning Committee, comprised of representatives from the County, municipalities, and stakeholder organizations, have prepared a recommended Hazard Mitigation Plan that reviews the options to protect people and reduce damage from these hazards; and

WHEREAS, **(insert community name)** has participated in the planning process for development of this Plan, providing information specific to local hazard priorities, encouraging public participation, identifying desired hazard mitigation strategies, and reviewing the draft Plan; and

WHEREAS, the Wayne County Department of Homeland Security and Emergency Management, with the Wayne County Local Emergency Planning Committee (LEPC), has developed the WAYNE COUNTY HAZARD MITIGATION PLAN (the "Plan") as an official document of the County and establishing a County Hazard Mitigation Coordinating Committee, pursuant to the Disaster Mitigation Act of 2000 (PL-106-390) and associated regulations (44 CFR 210.6); and

WHEREAS, the Plan has been widely circulated for review by the County's residents, municipal officials, and state, federal, and local review agencies and has been revised to reflect their concerns; and

NOW THEREFORE BE IT RESOLVED by the **(insert community name and governing body here)** that:

1. The Wayne County Hazard Mitigation Plan (or section(s) of the Plan specific to the affected community) is/are hereby adopted as an official plan of **(insert Community name here)**.
2. The **(insert name of position)** is charged with supervising the implementation of the Plan's recommendations, as they pertain to **(insert community name here)** and within the funding limitations as provided by the **(insert community governing body)** or other sources.
3. The **(insert name of position)** shall give priority attention to the following action items recommended in portions of the Plan specific to **(insert community name)**:
 - a. _____ (Recommendation _____, Section _____, page _____)
 - b. _____ (Recommendation _____, Section _____, page _____)
 - c. _____ (Recommendation _____, Section _____, page _____)

Passed by the **(insert community name and governing body here)** on **(insert date)**.

Signature

Signature

Vote:

Yes _____

No _____

COVID-19 Second Wave Considerations
Updated July 16, 2020

CARES Act Projects

- **Cloth Masks for Indigent Population**
 - Purchasing masks that can be distributed to the residents of low-income communities in out-Wayne County who are not able to afford masks.

- **Neoprene Masks for First Responders**
 - Purchasing specialized masks that wrap around the back of the head instead of looping on ears to provide a more secure fit while performing high-activity duties. Respirator filters are replaceable and can utilize both N-95 and N-99 inserts. Masks to be provided to all First Responders (police/fire/ems) in out-Wayne County.

- **Memorial Hospital as a Reference Lab**
 - Testing machines were purchased for Memorial Hospital's lab to expand their testing capacity to support processing of specimens from Out-Wayne County facilities.

- **Garden City Hospital Testing Site**
 - Testing machines were purchased for Garden City Hospital to support the opening of a long-term drive-thru testing site at their facility. This site is the primary testing site for employees of Wayne County, and is also open to the general public with no out-of-pocket charges.

- **Pandemic Response Support Staffing**
 - Twenty-four (24) positions to support pandemic response operations. Positions include: (2) Emergency Preparedness Specialists, (1) Finance Specialist, (2) Research Analysts, (1) Volunteer Coordinator, (4) POD Coordinators, and (14) Contact Tracer/Case Investigators.

Testing

- **Inmate Testing**
 - Conducting testing for each inmate upon intake. The jails are utilizing Pinnacle Senior Care (company subcontracted by lab) for specimen collection and Memorial Hospital as a reference lab.

- **First Responder Testing**

COVID-19 Second Wave Considerations

Updated July 16, 2020

- Referring first responders to Garden City Hospital provides free diagnostic and antibody testing for the general public. Multiple vendors within Out-Wayne County have been identified to have the ability to conduct mobile testing as an additional option. A further consideration is to provide guidance for first responders and their agencies including protocols for self-monitoring, quarantine, isolation, and returning to work after testing positive.
- **Vulnerable Populations**
 - Multiple vendors within Out-Wayne County have been identified to have the ability to conduct mobile testing in long term care facilities and homeless shelters, as these congregate settings have been identified to house vulnerable populations. Other facilities may include low-income or senior housing complexes, and substance abuse rehabilitation centers. A further consideration is to provide guidance for residents and their agencies including protocols for self-monitoring, quarantine, and isolation.

Data Reporting

- **7-Day Positivity Rate Summary**
 - This weekly report states the average percentage of tests in Out-Wayne County and the State of Michigan that were positive over the previous 7 days. The rate of positivity will be used to determine if the County is conducting enough testing to find cases.
- **Case Completion Report**
 - This weekly report details the current number of cases that are active (assigned and in the investigation process), New (not yet investigated), and completed and organized by month. Associated percentages are also included.
- **Out-Wayne County Community Cases and Deaths**
 - This daily details confirmed cases and deaths in each Out-Wayne County municipality.
- **Long-Term Care (LTC) Report for Mass Distribution**
 - This daily report details confirmed cases and deaths in LTCs by municipality.
- **Out-Wayne County COVID-19 Race Data**
 - This bi-weekly report examines the current trends for the spread of COVID-19 observed in Out-Wayne County, Michigan, in both the general population and among the African-American community.

COVID-19 Second Wave Considerations
Updated July 16, 2020

- **Out-Wayne County 14- and 28-Day Look Back Period Report**
 - This report describes “Confirmed” case trend data for the previous 14 and 28 days. Deaths are not included in this report.

- **Local Schools Report**
 - The MI Safe Schools Return to School Roadmap has a requirement for the Local Health Department to provide a weekly report to the school districts, the weekly report needs include:
 - Number of positive COVID-19 cases
 - Percent positivity rate
 - Capacity information (i.e. hospital, testing, etc.)
 - Updates on outbreak events/ clusters

- **Mass Distribution Site Reporting**
 - Once a vaccine is available, there will be a daily, weekly, and monthly report detailing distribution information (e.g., throughput, doses administered, demographic information, etc.).

- **Tracking of staff and volunteer hours**
 - In the event a vaccine is delivered and PODS (Points of Distribution Sites) are activated the tracking of staff and volunteer hours will allow for record-keeping in the event FEMA offers reimbursement. This will also be the case if the vaccine is distributed through clinics, outreach events, schools, etc.

Mass Vaccination

- **Open PODs**
 - Need to determine which POD sites should be activated based on the community needs. Factors to consider include: community impact (number of cases/deaths, vulnerable population census), and access to vaccine through other sources. It is unclear at this time how the federal government intends to handle distribution of the vaccine, but will most likely be sourced through existing vaccine programs and not via SNS channels.
 - Currently, all Wayne County PODs are walk-thru. Based on the recent success of the COVID-19 Drive-Thru Testing outreaches, we need to explore the feasibility of running drive-thru vaccination clinics. Factors to consider include: vaccine storage, staffing, site resources (tents, cones, lavatories, etc.), internet access for MCIR data entry, and inclement weather plans.
 - The registration & screening questions will need to be developed before we can begin POD operations. Because there is no vaccine yet, we are not able to create a

COVID-19 Second Wave Considerations

Updated July 16, 2020

screening algorithm. We also need to make a determination if online registration will be an option and, if so, creating that process as well.

- Staff
 - POD Managers are being hired with CARES Act funding. In the months prior to opening the PODs, they will work on planning and logistics of the PODs and related processes.
 - General staff roles will be filled through community volunteers. A Volunteer Manager is being hired with CARES Act funding and will coordinate with local volunteer groups and the Michigan Volunteer Registry to recruit, train, and ultimately schedule staff for PODs.
- Once a vaccine has been developed and we know what the storage and handling requirements will be, POD Managers will need to work with the Communicable Disease and Immunization staff to ensure that necessary infrastructure and resources are in place at POD locations to properly store vaccine.
- A process will need to be created to ensure that vaccines administered at Open PODs are correctly entered into the MCIR system in a timely fashion.
- Closed PODs
 - Inventory allocation and tracking will be coordinated by the IMATS coordinator in the PHOC. It is unclear at this time how the federal government intends to handle vaccine distribution.
 - Once a vaccine is developed, health department will need to coordinate with closed POD partners to ensure that the necessary infrastructure and resources are in place to properly store vaccine.
 - A process will need to be created to ensure that vaccines administered at Closed PODs are correctly entered into the MCIR system in a timely fashion.

Training

- **Training courses include:**
 - POD (Point of Dispensing) Essentials
 - Just-in-Time Training for POD staff
 - MCIR (Michigan Care Improvement Registry (MCIR))
 - Patient Registration Software/App/Database Reporting
 - Contact Tracing/MDSS (Michigan Disease Surveillance System)
 - Vaccination Administration

COVID-19 Second Wave Considerations
Updated July 16, 2020

Personal Protective Equipment (PPE)

- Coordinate with DHSEM as they maintain the primary role of acquisition and management of PPE. Continued PPE requests for HHVS operational needs, PHD programs, and jail staff may be made through DHSEM. An inventory needs list should be developed for any additional drive-thru testing campaigns, as well as for staff providing COVID-19 vaccinations once available.

Public Information

- Educational Materials
 - Development of “No Shirt, No Shoes, No Mask, and No Service” signs to be posted on the Wayne County webpage for businesses to print and post. Coordinating with Economic Development to reach out to businesses to provide them with the COVID-19 educational material catalog for material to be self-printed and posted within their facilities.
- Prepared Announcements
 - Preparing scripts and statements regarding any large increases in COVID-19 cases and reiteration of preventative measures. Prepared announcements for vaccination availability and locations can also be considered.
- The Information Center and 2-1-1
 - Provide information including updated testing sites, Save-A-Life program, State requirements for businesses and the public, large increases in cases, and any useful information that may be assistive with contact tracing.

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ENVIRONMENTAL INVESTIGATION, REMEDIATION, COMPLIANCE AND
RESTORATION PROJECTS THROUGHOUT THE GREAT LAKES SINCE 1985.

OUR SERVICES INCLUDE:

- **ASBESTOS, LEAD, MOLD, AND RADON ASSESSMENTS**
- **BROWNFIELD/GREYFIELD REDEVELOPMENT ASSISTANCE**
- **DEVELOPMENT INCENTIVES AND GRANT MANAGEMENT**
- **ECOLOGICAL ASSESSMENTS AND RESTORATION**
- **ENVIRONMENTAL ASSESSMENTS AND IMPACT STATEMENTS**
- **ENVIRONMENTAL OPPORTUNITIES ASSESSMENT**
- **GIS MAPPING**
- **HAZARD MITIGATION PLANNING**
- **MINING AND RECLAMATION ASSISTANCE**
- **REMEDIATION IMPLEMENTATION, OPERATION AND MAINTENANCE**
- **PHASE I ESA AND ENVIRONMENTAL DUE DILIGENCE ASSESSMENTS**
- **REGULATORY COMPLIANCE AND PERMITTING**
- **SOIL AND GROUNDWATER ASSESSMENTS**
- **SOIL AND GROUNDWATER REMEDIATION**
- **STORAGE TANK COMPLIANCE AND CLOSURE**
- **THREATENED AND ENDANGERED SPECIES SURVEYS**
- **WATERSHED AND STORMWATER MANAGEMENT PROGRAMS**
- **WETLAND DELINEATION, PERMITTING, MITIGATION AND BANKING**