Flood Mitigation- From Provincial Review to Municipal Action

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A4- CLIMATE CHANGE

NATIONAL WATER AND WASTEWATER CONFERENCE NOVEMBER 13, 2023

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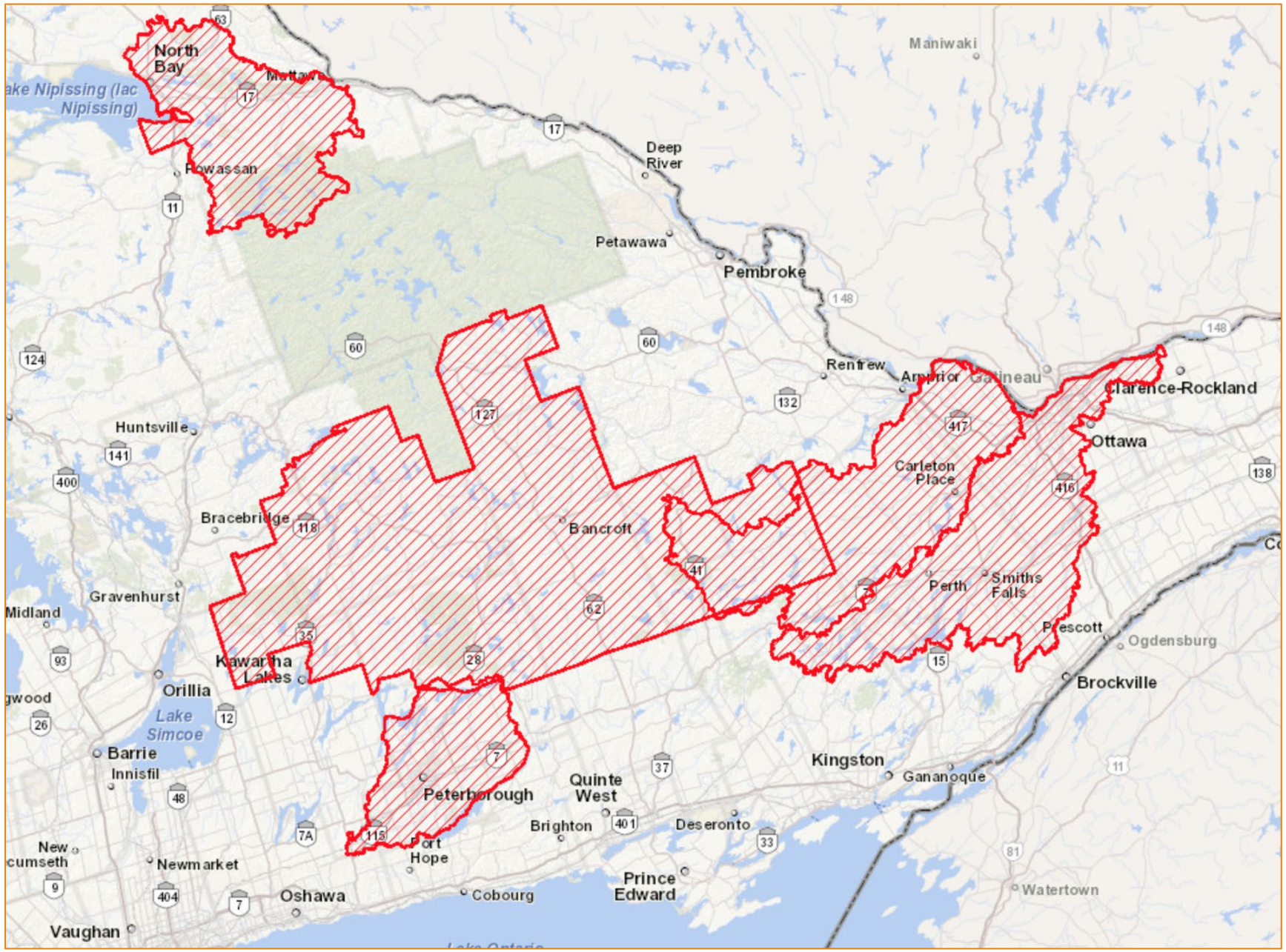
2019 Spring Conditions Across Ontario

- Longer and colder winter with more snow
- Fewer seasonal melts
- Rapid spring temperatures
- High and extensive rain events
- All culminated in devastating flood conditions and emergency declarations for 23 municipalities and 1 FNC



April 19, 2019 reporting on flood warning areas

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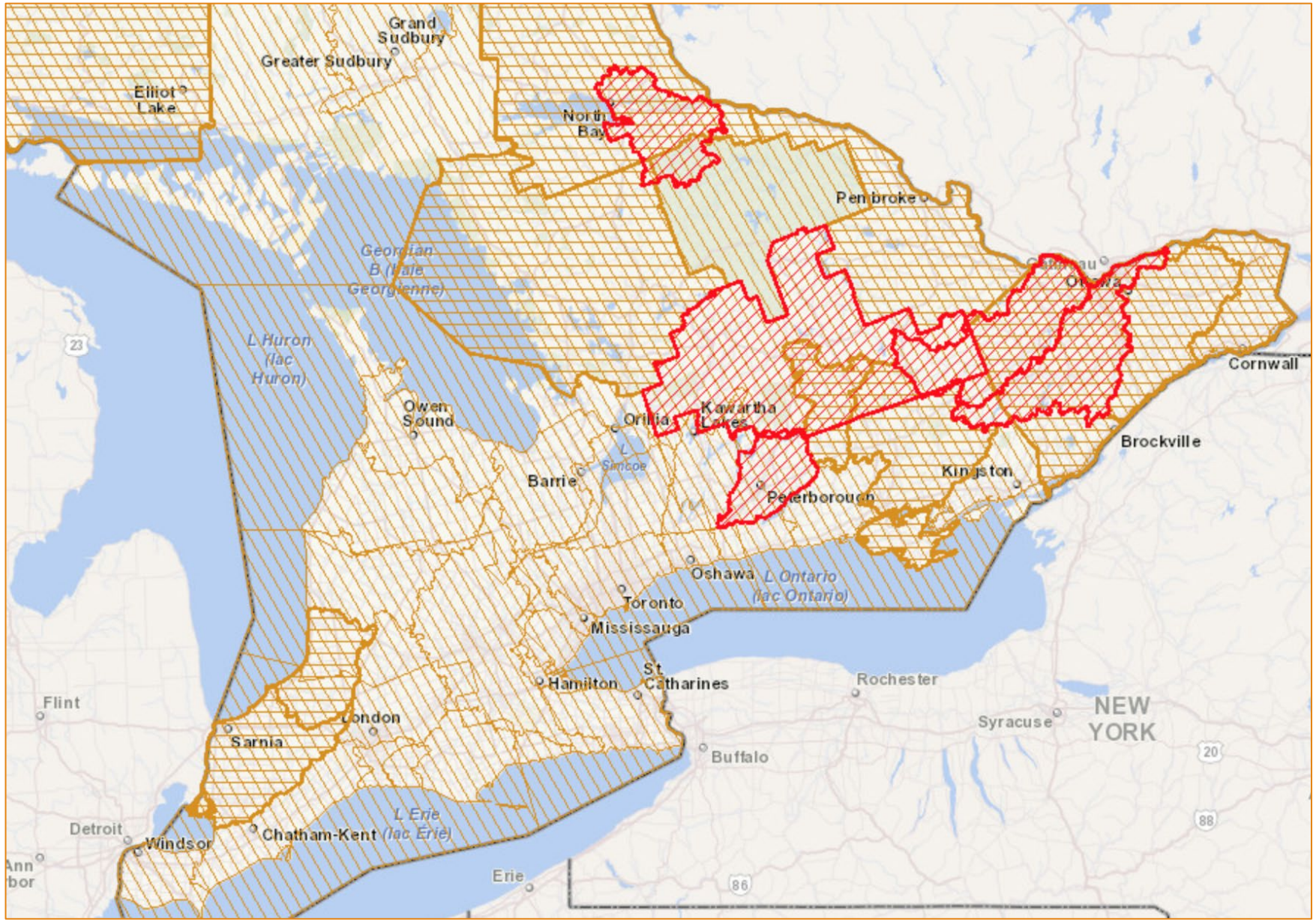

April 19, 2019 reporting on flood watch areas in brown

Independent Review of 2019 Flood Events

- Initiated by MNRF
- Terms of Reference Focus
  - Roles of Responsibilities of various Agencies
  - Increase homeowner awareness to flood plain areas
  - Review land use planning and flood mitigation in policy and regulation
  - Other mitigation approaches to enhance protection and awareness
  - How to improve community resilience as threats continue to grow
- Applying Ontario's Approach to Flood Risk Management
  - Prevention
  - Mitigation
  - Preparedness
  - Response
  - Recovery
- Total of 66 Recommendations that in many cases are outside the control of the MNRF

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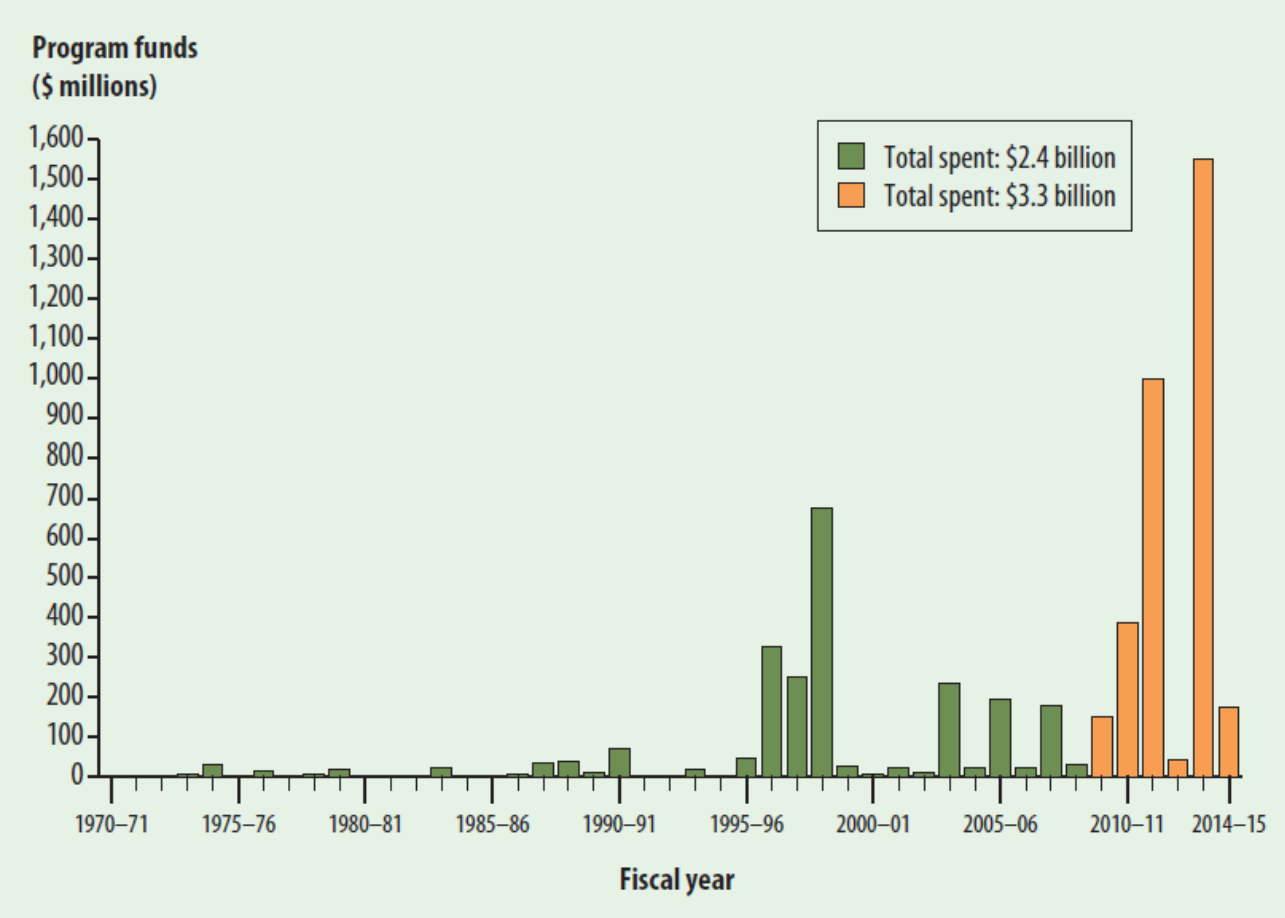
Recommendations Themes

- Increased communication and coordination between various levels of government and agencies
- Updated and introduction of new policies and practices on flood management that consider hazards-based approach and the risk-based approach to managing flooding
- Floodplain mapping be improved and completed
- Disaster recovery and funding sources be improved
- Better watershed monitoring and data collection
- Identify flood risk properties and tighter planning policies to protect home buyers
- Provincial role in pluvial flooding and urban development stormwater management oversight
- Role of insurance industry and engagement with property owners
- Comprehensive asset management and funding support for municipalities
- “Build back better” policies
- Proactive planning and communication between all stakeholders to increase response effectiveness

Ontario- Approach to Manage Flood Risk

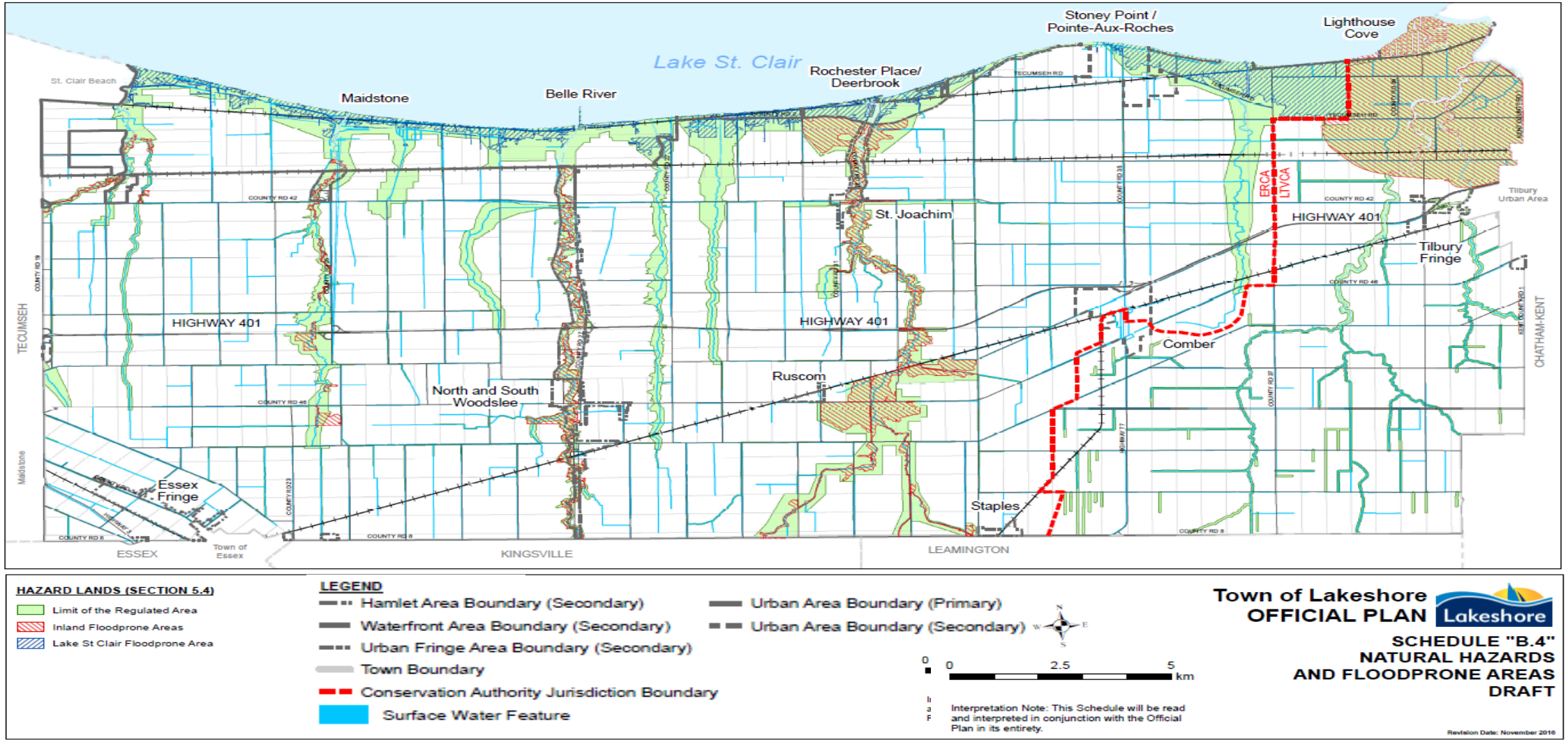
- Prevention
  - Goal is to keep development out of flood plains
  - MNRF goal is to identify hazardous areas and floodplains
  - Municipalities to limit development in these areas
  - Main tools are Planning Act, PPS, Conservation Authority Act
- Mitigation
  - Goal to reduce effect of flooding
  - Structures and floodproofing to protect development areas and buildings
- Preparedness
  - Flood forecasting and warning for effective community response
  - Coordination between MNRF and CA's
- Response
  - Emergency Service, community response and evacuation
  - Training and stakeholder engagement in advance
  - Social and health services
  - Use of emergency Management and Civil Protection Act
- Recovery
  - Disaster Recover for Citizens funding
  - Disaster Recover for Municipalities funding
  - Federal funding to Provinces and Territories
  - Greatest burden for disaster funding is carried by municipalities and property owners

The Impact of Climate Change on Community



- More has been spent from 2009 to 2014 than in previous 39 years
- Auditor General Report 2016 on Mitigating the Impacts of Severe Weather- Conclusion
  - Federal government has not provided support to mitigate severe weather
  - Not provided adequate provision for infrastructure resilience
  - Has not made sever weather impact a priority

Municipal Action- Town of Lakeshore



4 Approaches to Developing Solutions

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Approach 1

Policy Level Approach

What is a Policy Level Approach?

- *Shared Responsibilities*
- *Emergency Management of Prevent, Prepare, Respond, and Recover*
- *Planning and Engineering Policies*
- *Includes a wide range of approaches*

Approach 2

Watershed Level Approach

What is a Watershed Level Approach?

- *Considers flooding variations within channel, shoreline, and inland communities.*

Approach 3

Street Level Approach

What is a Street Level Approach?

- *Issues identified on local roads, including right-of-way conditions and drainage challenges*
- *Street-level analysis considers the existing drainage and infrastructure, connectivity, gap analysis, and local road issues and drainage options.*

Approach 4

Private Property Approach

What is a Private Property Approach?

- *Focuses on communication with residents to increase risk awareness to flooding*
- *Property risk awareness, assessment, and mitigation to minimize the impact of flood risk and water damage due to overland and groundwater flow*

Approach 2 - Watershed Approach

Approaches for Channel, Shoreline, and Inland Communities

These approaches have been reviewed considering flooding variations within channel, shoreline, and inland communities.

Watershed Level Solutions

- Awareness
- Predictive and early warning options
- Drainage improvements
- Berm and protection improvements

Example of an open municipal drain in Tilbury Fringe – 2023

Channel Flooding

What is Channel Flooding?

- *When streams/rivers or municipal drain channels exceed the capacity of their natural or constructed channels and water overflows the banks to dry land.*

Communities of Focus:

St. Joachim, Woodlsee, Ruscom, Tilbury Fringe

Lake Flooding

What is Shoreline (High Water Level) Flooding?

- *The inundation of land areas adjacent to a lake caused by lake water exceeding normal levels. Lakeshore flooding impacts the immediate lakefront, bays, and connecting waterways, such as rivers.*

Communities of Focus:

Lighthouse Cove, Stoney Point/Pointe-aux-Roches, Rochester Place/Deerbrook

Flooding in Areas away from Lake or Rivers (Inland)

What Flooding Can Occur in Areas with No Lakes or Rivers?

- *Normally dry land can become inundated with water during extreme rainfall events. This occurs when more rain enters an area than can be removed by infiltration into the ground or redirected overland and through infrastructure.*

Communities of Focus:

Staples, Essex Fringe, Comber

Approach 3: Approaches for Street Level Analysis

These approaches focus on a street-by-street basis review of each community. These would be implemented on specific streets and would depend on local context and nature of the roadway.

Street Level Solutions

Where the Community is Serviced with Sanitary Sewers

- Protect from basement flooding with backflow prevention
- Placement of inflow dishes in sanitary manholes

Stormwater Collection Infrastructure

- Ensure right-of-way drainage is effective and not impacting private property; meets engineering standards
- Ensure adequate ditch drainage for rural areas is available, and access to the outlet is maintained
- Where the collection system is substandard, assess the benefit of upgrading to the current design standard
- Increase network capacity
- Stormwater storage options
- LID/Environmental resilience options
- Community barrier/berm alternatives

Emergency Services and Resident Access

- Raise roadway above high-water level
- Identify Emergency routes

Example of a catch basin identified in North Woodslee – 2023

Approach 4 - Private Side Approach

Approach 4: Approaches for Private Side Mitigation

These approaches have been reviewed on the private side and focus on communication and encouragement with residents to increase risk awareness of flooding and protect private property.

Private Side Solutions

Communication with Property Owners

- Education tools
- Opportunities to potentially support programs for property owners to assist with flooding (i.e. water and sewer service line repair insurance provided by Service Line Warranties of Canada (SLWC) through Local Authority Services (LAS)).
- Promote tools for private property owners such as flood risk assessment and reduction assessments (i.e. University of Waterloo Flood Risk Evaluation tool or other available resources)
- Funding/grant tools
- Equipment inspection & operation verification to increase homeowner awareness of accountability

Example of flat road drainage in St. Joachim – 2023

Example of enclosed municipal drain in St. Joachim – 2023

Guidance Documentation

Provincial Regulatory and Design Standards (MECP, MMAH etc.)

Conservation Authority Regulated Area Policies and Development Review

Municipal Land Use, Planning and Official Plan and Design Criteria

Industry Best Practices

CSA W211:21 Management Standard for Stormwater Systems

CSA W210:21 Prioritization of Flood Risk in Existing Communities

FCM tools and practices

Asset Management tools and practices

Emergency Planning and Response Best Practices

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