



American Planning Association
Pennsylvania Chapter

Making Great Communities Happen

CLIMATE CHANGE ADAPTATION PLANNING IN THE GREAT LAKES

A Project of the International Joint Commission, Water Quality Board

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Potomac-Hudson Engineering, Inc.

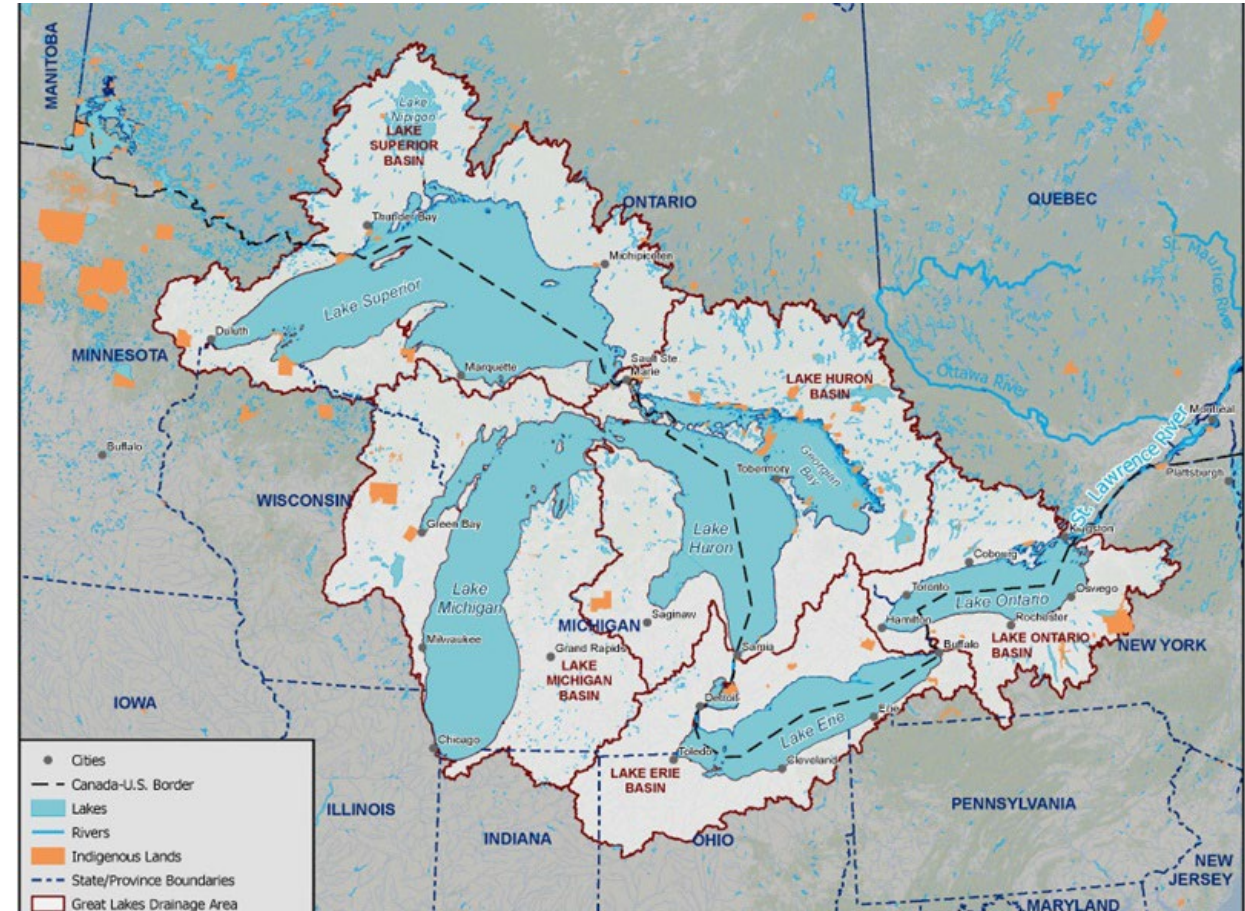


INTERNATIONAL JOINT COMMISSION



- Binational Organization
- Established by Boundary Waters Treaty in 1909
- Responsibilities outlined in the Great Lakes Water Quality Agreement (1972; updated 2012)
- Focus on climate change since the 1980s
 - Lack of coordinated approach
 - Lack of capacity – especially smaller communities

www.ijc.org



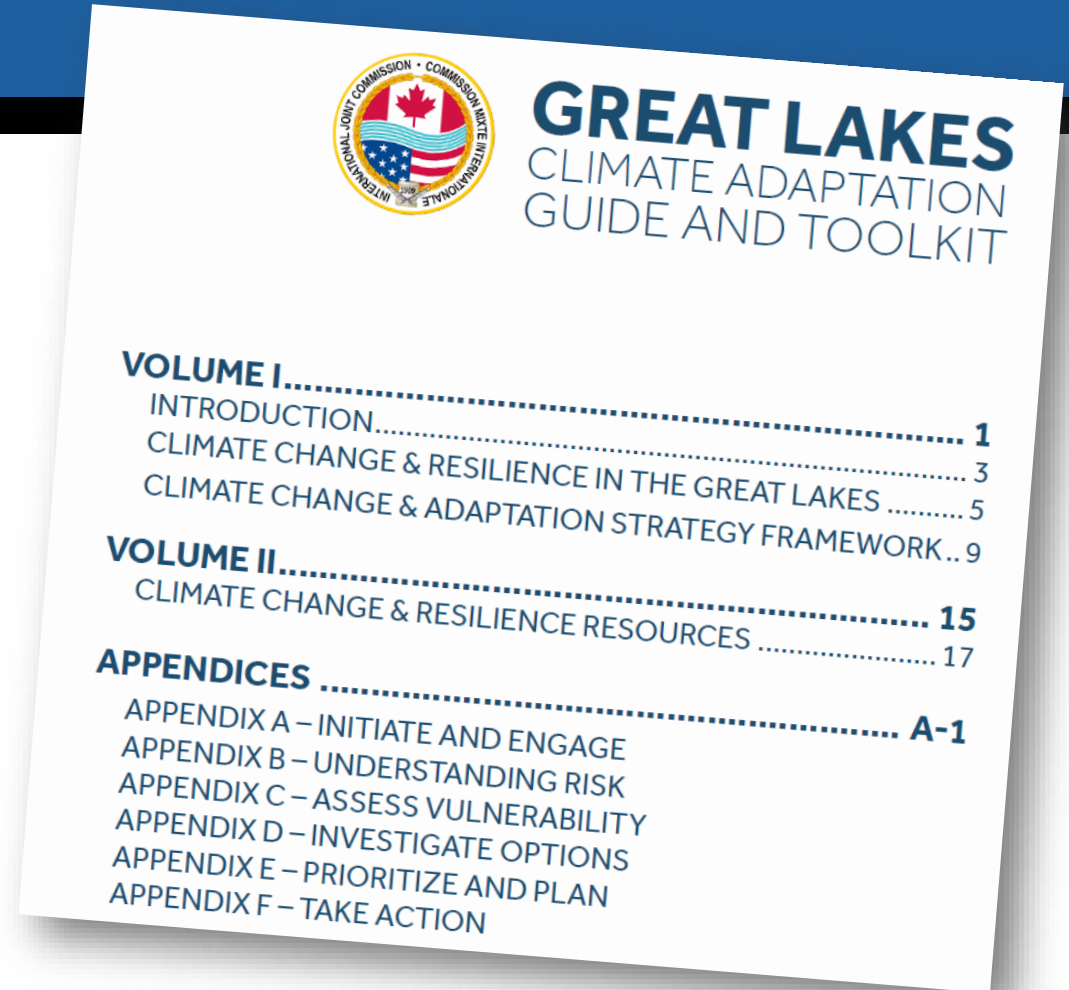
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PROJECT OBJECTIVES

Goal of this project:

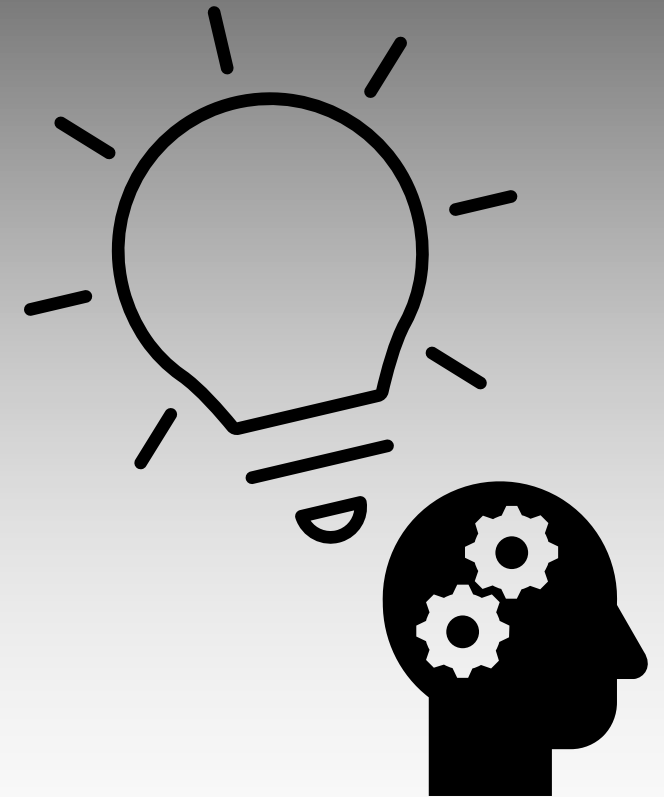
- A robust **toolkit** of planning tools, insights, and learning opportunities
- Some key elements:
 - Focus on small/medium and Indigenous communities
 - Stakeholder engagement
 - Simplified Resilience Framework
 - Organized toolkit of readily available, relevant resources
 - Water focus



SESSION OBJECTIVES



Define	Define "adaptation planning for resilience."
Describe	Describe the steps in the simplified resilience framework.
Use	Use the Guide and Toolkit as a resource for adaptation planning for resilience.



CLIMATE ADAPTATION GUIDE AND TOOLKIT

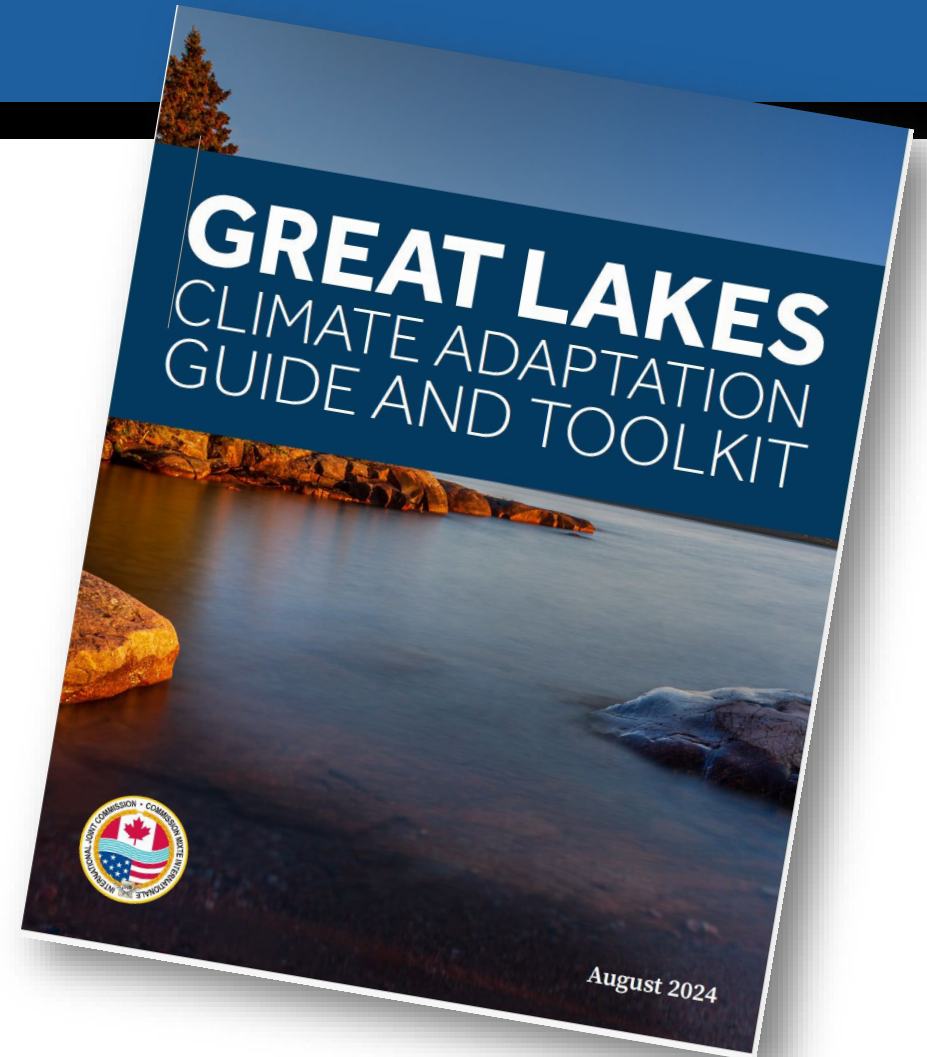
Volume I

- Introduction to climate change, adaptation, and resiliency
- Provides a simplified resilience framework

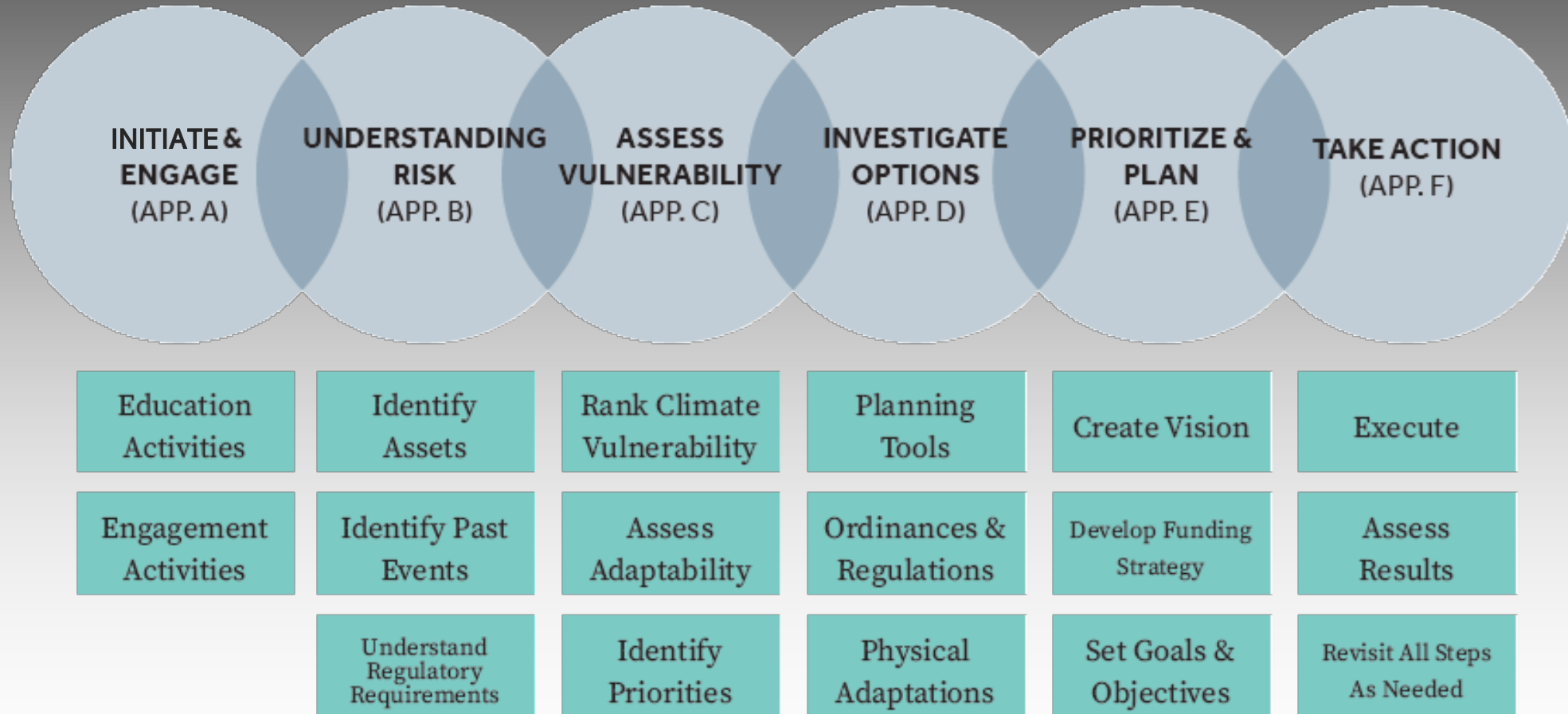
Volume II

- Collection of selected tools, case studies, & other resources
- Organized by type of tools & geography

Appendices



VOLUME I: RESILIENCY FRAMEWORK



VOLUME II: TOOLKIT



- Nearly 100 tools, organized by the six resiliency steps
- Categorized as shown at right
- Examples focus on small to medium communities, including Indigenous communities
- Further categorized by hazard(s) addressed or impacted sector(s)

RESOURCE LEGEND

TYPE OF TOOL



Data Tool



Tool Helpers (guides, training)



Case Studies



Decision-maker Support Tools



Economic Tools



Funding (including grant writing)



Technical Support

GEOGRAPHY (COLOR CODE)



United States (U.S.)



U.S. Indigenous



Canada (C.N.)



C.N. Indigenous



Any Geography



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VOLUME II: TOOLKIT - EXAMPLES



1. INITIATE AND ENGAGE

1.1 GLISA GREAT LAKES FACT SHEET



GLISA has developed extensive information on climate change effects in the Great Lakes Region. Their two-page fact sheet provides a thorough overview of the climate changes affecting the Great Lakes Region.

STRATEGY:	Education
TYPE OF TOOL:	Tool Helper (Fact Sheet)
HAZARD(S) ADDRESSED:	Algal Blooms; Droughts; Erosion; Extreme Weather; Flooding; Frost; Lake Level Fluctuation; Rainfall; Snow, Ice Cover & Lake Temperature; Temperature; Water Availability
GEOGRAPHIC SCALE:	Regional
COST TO USE:	Free
MORE INFORMATION:	GLISA (originally the “Great Lakes Integrated Sciences and Assessments”) is one of 12 Climate Adaptation Partnerships (CAP, formerly known as the Regional Integrated Sciences and Assessments or RISA) supported by the National Oceanic and Atmospheric Administration (NOAA).
LINK:	https://glisa.umich.edu/wp-content/uploads/2021/04/GLISA-2-Pager.pdf

1.2 LAKE HURON ENVIRONMENTAL TEACHERS' WORKSHOP



This 2010 workshop can be used as a guidance for educating Great Lakes communities about climate change and impacts.

STRATEGY:	Evaluation & Feedback
TYPE OF TOOL:	Tool Helper (Workshop)
GEOGRAPHIC SCALE:	Canada: Lake Huron
IMPACTED SECTOR:	Agriculture; Biodiversity; Local Climate Change
COST TO USE:	Free
LINK:	https://lakehuroncommunityaction.ca/wp-content/uploads/2016/03/LH-Teacher-Workshop-Final-Report-and-Work-Plan.pdf

4. INVESTIGATE OPTIONS (CONTINUED)

4.11 STORMWATER MANAGEMENT CAPABILITIES



See how the Minnehaha Creek Watershed District in Minnesota considered climate projections to better understand climate threats and vulnerability to stormwater management capabilities.

STRATEGY:	Education
TYPE OF TOOL:	Case Study
HAZARD(S) ADDRESSED:	Flooding; Precipitation
GEOGRAPHIC SCALE:	City; US
IMPACTED SECTOR:	Infrastructure & Property
COST TO USE:	Free
LINK:	https://www.epa.gov/arc-x/minnehaha-mn-creek-watershed-district-assesses-stormwater-management-climate-vulnerability (Source: US EPA Arc-X)

4.12 QUINULT INDIAN NATION VILLAGE RELOCATION PLAN



See how the Quinault Indian Nation is considering climate (sea level rise, storm surge, and river flooding) and non-climate (tsunami) risks together to form a village relocation plan.

STRATEGY:	Local Planning, Regulations & Policy
TYPE OF TOOL:	Case Study
HAZARD(S) ADDRESSED:	Flooding; Sea Level Rise; Storm Surge
GEOGRAPHIC SCALE:	Tribal Nation(s)
IMPACTED SECTOR:	Infrastructure
COST TO USE:	Free
LINK:	https://www.epa.gov/arc-x/quinault-indian-nation-plans-relocation (Source: US EPA Arc-X)

6. TAKE ACTION (CONTINUED)

6.3 GREEN ROOF BYLAW



Initiative from Toronto's Climate Action Plan, which requires new buildings over a certain size to include green roofs or other forms of green infrastructure to help manage stormwater runoff.

STRATEGY:	Local Planning, Regulations, & Policy; Programmatic
TYPE OF TOOL:	Case Study
HAZARD(S) ADDRESSED:	Greenhouse Gases; Heat; Runoff
GEOGRAPHIC SCALE:	Canada; City
IMPACTED SECTOR:	Biodiversity; Economy; Energy; Public Health
COST TO USE:	Free
LINK:	https://www.c40.org/case-studies/city-of-toronto-s-eco-roof-incentive-program-and-green-roof-bylaw/

6.4 INTEGRATING EDUCATION AND STORMWATER MANAGEMENT FOR HEALTHY RIVERS AND RESIDENTS



Ann Arbor reduced stormwater runoff by updating the rate structure for its stormwater utility with educating the public and building support.

STRATEGY:	Local Planning, Regulations, & Policy
TYPE OF TOOL:	Case Study
HAZARD(S) ADDRESSED:	Extreme Weather Events; Precipitation
GEOGRAPHIC SCALE:	US; City
IMPACTED SECTOR:	Ecosystems; Human Health
COST TO USE:	Free
LINK:	https://toolkit.climate.gov/case-studies/integrating-education-and-stormwater-management-healthy-rivers-and-residents

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TRIBAL AND FIRST NATIONS

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UNITED STATES

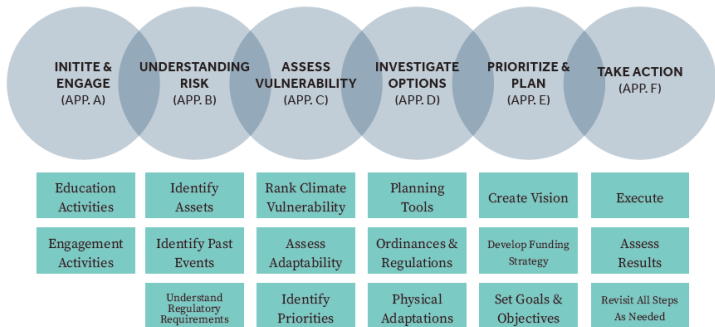
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GREAT LAKES CLIMATE ADAPTATION GUIDE AND TOOLKIT

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REFERENCES:
Government of Canada (CN). 2023. Canada's National Adaptation Strategy. <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/national-adaptation-strategy/full-strategy.html> Last accessed January 8, 2024.

U.S. Climate Resilience Toolkit. Case Studies. <https://toolkit.climate.gov/#case-studies>

U.S. Climate Resilience Toolkit. Great Lakes. 2022. <https://toolkit.climate.gov/regions/great-lakes> Last accessed January 8, 2024.

U.S. Environmental Protection Agency (USEPA). 2023. The Great Lakes: Great Lakes Facts and Figures [webpage]. <https://www.epa.gov/great-lakes/great-lakes-facts-and-figures#:~:text=The%20Great%20Lakes%20are%20one%20of%20the%20world%E2%80%99s,of%20the%20world%27s%20supply%20of%20surface%20fresh%20water> Last accessed January 5, 2024.

United States (U.S.). 2023. The Fifth National Climate Assessment. <https://nca2023.globalchange.gov/> Last accessed January 8, 2024.

APPENDIX A – INITIATE AND ENGAGE

WHAT IS CLIMATE RESILIENCE?
The ability to bounce back and recover from a disaster event.

70% of North America's fresh water comes from the Great Lakes

HOW CAN YOU HELP THE GREAT LAKES?

- Use less water.
- Keep it green (reduce pavement, concrete ditches, etc.)
- Reduce fertilizer use.
- Support legislative solutions.

ADAPTATION ACTIONS
REDUCE IMPACTS & BUILD RESILIENCE

BETTER LAND USE PLANNING

POLLUTANT CONTROLS

ADAPTATION BENEFITS

- INCREASED PROPERTY VALUES
- REDUCED PROPERTY DAMAGE
- LESS LOSS OF LIFE
- LOWERED POLLUTION

SOURCES

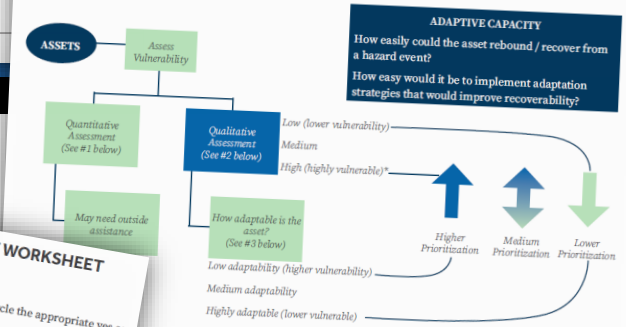
- <https://www.toolkit.climate.gov/#case-studies>
- <https://www.climatepolicyinitiative.org/wp-content/uploads/2021/10/Building-Climate-Resilience.pdf>
- <https://www.farmers.gov/sites/default/files/2022-08/farmersgov-fact-sheet-smart-nutrition-2022.pdf>
- <https://ont.org/publications/green-stormwater-infrastructure-impact-on-property-values>

Understand Risks Worksheet

Asset	Who Owns?	Hazard				Outcome of an Event
		-----	-----	-----	-----	

APPENDIX C – ASSESS VULNERABILITY

The following decision diagram is intended to help municipalities understand how to assess and evaluate the vulnerability status of assets.



ASSET VULNERABILITY QUALITATIVE ASSESSMENT WORKSHEET

Name of the Asset: _____

Ask the following questions, depending on applicability to the asset being analyzed and circle the appropriate yes or no response.

Question	Vulnerability Assessment	
	Yes	No
ASSET SPECIFIC QUESTIONS		
Is the asset located in an area that has historically experienced storm damage, flooding, etc.? (higher vulnerability)		
Is the asset likely to be damaged by a climate-induced hazard? (higher vulnerability)		
Will loss of / damage to the asset greatly impact the community (higher vulnerability)? ("No" indicates more of an "inconvenience" than an impact to the community)		
THE FOLLOWING QUESTIONS MAY APPLY DEPENDING ON THE ASSET BEING ANALYZED.		
Natural waterbody assets (streams, shorelines, lakes, etc.)		
Are the water bodies in your community surrounded by a robust and vegetated (not including agricultural fields) riparian corridor (generally 55 feet or more of width from the edge of the water) without the presence of development / buildings? (lower vulnerability)		
Are the water bodies surrounded by development (hardscape, buildings and agricultural fields) that abut or come within 55 feet of the water edge? (higher vulnerability)		
Treatment plants, potable water supplies, and stormwater		
Are your treatment plants elevated above past and projected flood stages (lower vulnerability)? ("No" indicates that treatment plants are low in elevation making them susceptible to flood damage. Higher vulnerability)		

Planning Level Cost Estimates Tips

Cost estimates for a variety of adaptation strategies may be available in the various case studies included in this guide or via an internet search. Contact communities identified in the Volume II Case Studies that have completed similar projects and ask them for input on costs. There are many ways to estimate how much a project / strategy might cost to implement and the easiest and typically most useful way is to base your estimate on past similar projects.

Timeline for Development Tips

Once you have solutions prioritized, develop a simple timeline for how long it will take to implement each solution. Changes to ordinances might take a couple of months, while changes to an existing plan could take six months to a year. Adaptation strategies that require some level of design may take one to two years to implement. Funding is an important consideration. Needing to apply for grants and other sources of funding could add several months to a year or more to implementation timelines.

Grant Funding Sources (snapshot as of February 2024)

Numerous possible funding sources are available for climate adaptation in Canada. The following website is a useful place to start: <https://www.canada.ca/en/environment-climate-change/services/climate-change/adapting/funding.html>. This link provides an overview of a number of funding sources available in Canada.

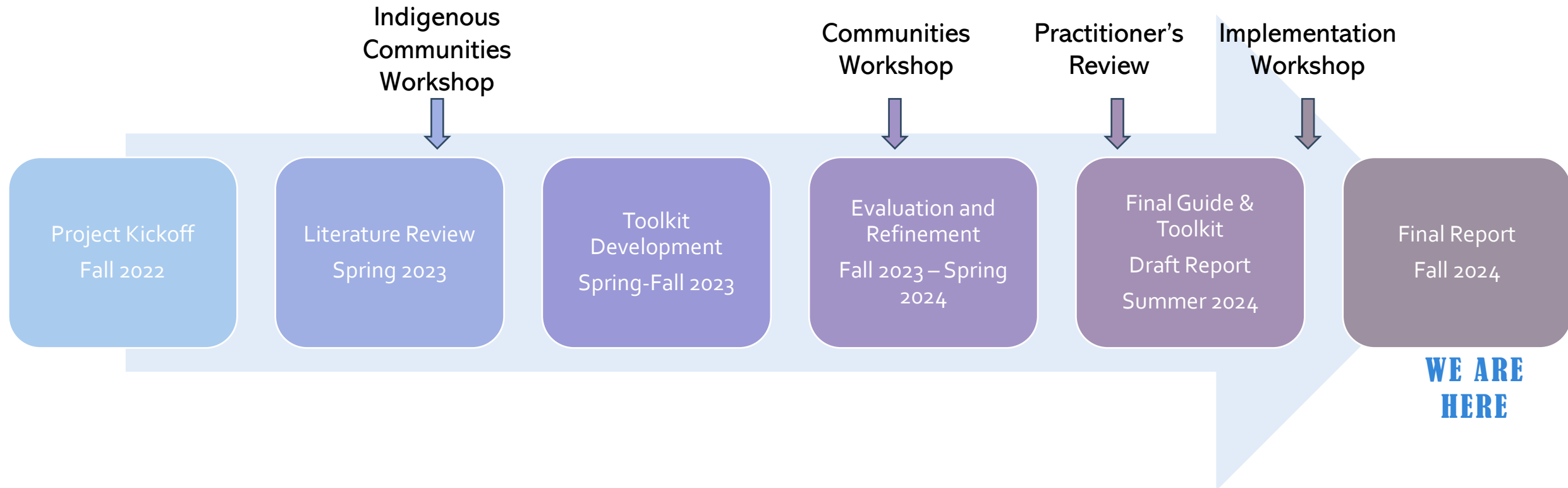
A wide variety of grants and funding programs are also available from the government of Ontario, CN (<https://www.ontario.ca/page/available-funding-opportunities-ontario-government>). No open grant or funding programs were identified at the time of writing of this guide that would support climate adaptation projects. Several closed opportunities were noted that could, if they become available again, provide funding for climate adaptation projects and initiatives, including (see this link for information on the closed opportunities <https://www.ontario.ca/page/closed-funding-opportunities-ontario-government>):



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TIMELINE AND NEXT STEPS



PROJECT TEAM



Work Group Members, Contractors and IJC staff

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Bridget Brown

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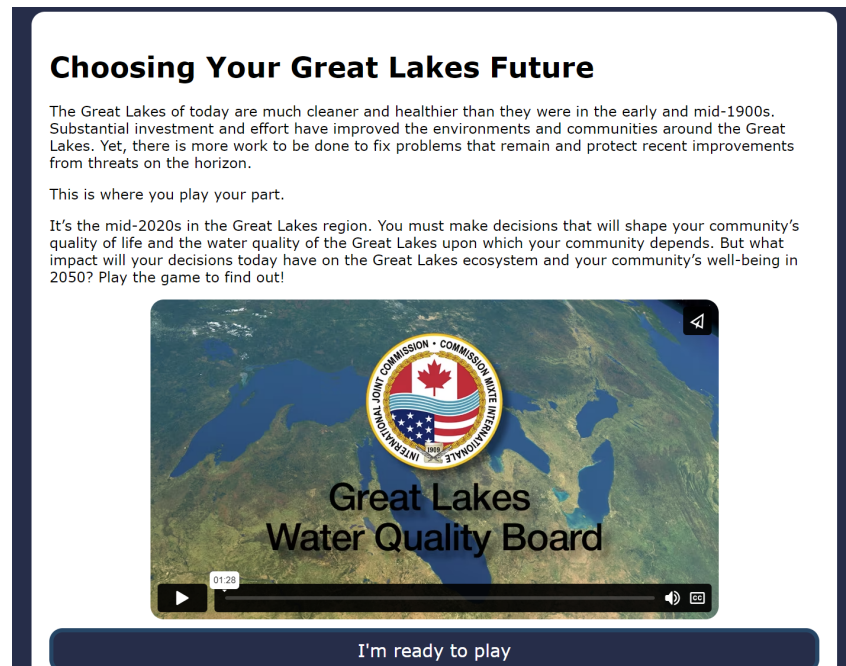


IJC - HORIZONS II - CHOOSING YOUR GREAT LAKES FUTURE



- Online “game”

<https://static.ijc.org/wqb/horizon>



<https://www.ijc.org/en/wqb/great-lakes-horizons-project>

- Overview Video

<https://vimeo.com/990771764>



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