



Welcome



Extreme Water Levels – Impacts and Strategies.

Agenda

- **TOPIC A: Storms, waves and wakes - Natural Coastal Processes - Naturalizing Shorelines - Flooding - High Water Mark - Land Water Interface- Municipal Infrastructure**
- **TOPIC B - Coastal Infrastructure – Marinas & Shoreline Businesses – Docks/Other Shoreline Structures - Impacts & Adaptation Strategies - Regulations**



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Adam Chamberlain

Chair

Georgian Bay Forever



Rolfe Jones
Chair
Georgian Bay Association

Water Levels 2021



GEORGIAN BAY
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Water Levels 2021 - Marilyn Longlade Capreol



- Early spring of 1949, I was born to Napoleon and Norah Geroux Longlade. My first home was the island behind the Ojibway Island. During the winter months we moved to our mainland location on the shores of Pointe au Baril.
- Summer's home was always bustling with Grandparents, aunts, uncles and many cousins. We would hear the song of languages, both Ojibway and French. Hear the fishing stories each day and/or watch Grandma and aunts make their quill boxes.
- Very young we were taught to respect and understand the gifts of water, wind, animals, plants, the sky that holds beautiful stars. Our first knowledge and education were done by our parents, grandparents and community. There are no books to this day for this gift of learning. It was and is strictly learned by the teachings.
- I am very grateful and acknowledge, Mishomis Giiziis (Grandfather Sun) miinwaa (and) Nokomis Dibik Giiziis (Grandmother Moon). They encourage every living being and walk beside all each day.

Water Levels 2021 – Aisha Chiandet



- Aisha is a water scientist with the Severn Sound Environmental Association and focuses on water quality monitoring of lakes and tributaries in the Severn Sound watershed with a particular emphasis on nutrient conditions and responses of biological communities.
- Her work has also included analyses of climate impacts on local waterways, including on water levels. More recently she initiated several citizen science programs with goals to monitor the impacts of climate change, algae growth and water level fluctuations.

Water Levels 2021 – Julie Cayley



- **Julie Cayley B.Sc., P.Ag.,** is the Executive Director of the Severn Sound Environmental Association (SSEA) in Port McNicoll Ontario. Julie is a Government and Industry relations expert with a significant background in creating successful connections within Government, Industry and NGO/Not for Profits. Over her career she has worked for Provincial Government and NGOs as well as running her own consulting business. She specializes in Environment and Conservation with agriculture and rural partnerships and has a passion for working with communities on the Great Lakes.
- Julie is a Professional Agrologist, has a B.Sc. in Environmental and Resource Science from Trent University and is a graduate of Class 8 of Ontario's Advanced Agricultural Leadership Program (AALP). Julie was the first woman to Chair the North East Agriculture and Biological Engineering Community, is a Director on the Huronia Community Foundation Board and in 2019 was appointed by Minister Yurek (MECP) to the Muskoka Watershed Advisory Group.

Water Levels 2021 – Brian Majka



Brian Majka Senior Restoration Ecologist, GEI

- Brian is a professional restoration ecologist with extensive experience in project oversight, design and implementation of wetland construction, soft shoreline engineering, prairie planting, natural areas management and best management practice projects throughout the eastern United States.
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Water Levels 2021 – Alex Ray



- **Alex Ray is the owner and lead consultant for Payette Environmental Services, located in McCall, Idaho.**
- Before starting his own business, Alex spent over 15 years working for federal land management agencies all across the Western US.
- He specializes in the intersection between recreation and water resources, and holds a Masters in Environmental Management degree from Western Colorado University.
- He regularly speaks with activist groups about wake boats and their impacts on aquatic ecosystems, and is currently working with the US Forest Service to re-route trails and restore alpine meadows impacted by motorized recreation on the Payette National Forest in Idaho.

Water Levels 2021 – Roy Brooke



- Roy is Executive Director of the Municipal Natural Assets Initiative (MNAI).
- He served as Director of Sustainability for the City of Victoria between 2011-2013. Between 2003-2011 he worked for the United Nations, including the World Health Organization, United Nations Environment Programme and UN Office for the Coordination of Humanitarian Affairs. During his time with the UN he was based in Geneva, Switzerland, and later in Rwanda, where he was UNEP's Environment Programme Coordinator. Prior to this he served as a political advisor to Canada's environment minister.

Water Levels 2020 – Rick Layzell



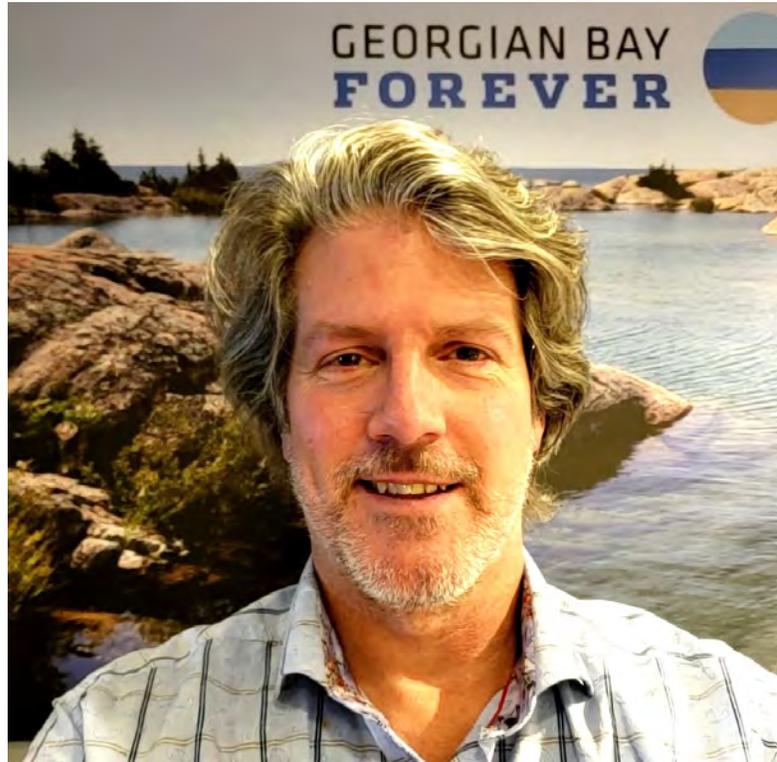
- Rick Layzell is the CEO of the Boating Ontario Association. Since 1967, Boating Ontario has proudly served Ontario's recreational boating industry and the needs of their 530++ member companies.
- Beginning in 1990, a 3-year run with the Canadian National Sportsmen's Shows kicked off Rick's career in the marine industry. This was followed by a short stint with Grew boats, a 19-year run with Yamaha Motor Canada, a brief period with Gordon Bay Marine, several years with MD Marine Insurance and a new beginning with Boating Ontario in 2017.
- Rick and his partner and their 5 kids are all avid boaters spending all available summer hours on Lake Simcoe on their 1997 32' Regal Commodore.



Rupert Kindersley

Executive Director

Georgian Bay Association



David Sweetnam

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TOPIC A: Storms, waves and wakes - Natural Coastal Processes - Naturalizing Shorelines - Flooding - High Water Mark - Land Water Interface – Municipal Infrastructure

Speakers:

Brian Majka, Senior Restoration Ecologist, GEI

Alex Ray, owner & lead consultant, Payette Environmental Services



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Wind and Waves

Brian Majka, Restoration Ecologist

Overview

- What are waves?
- Where do waves come from?
- Wave characteristics
- How do waves impact shorelines?



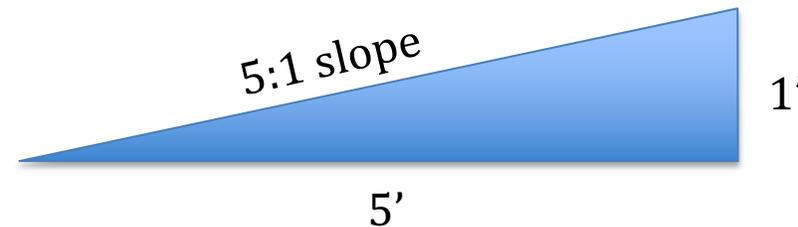
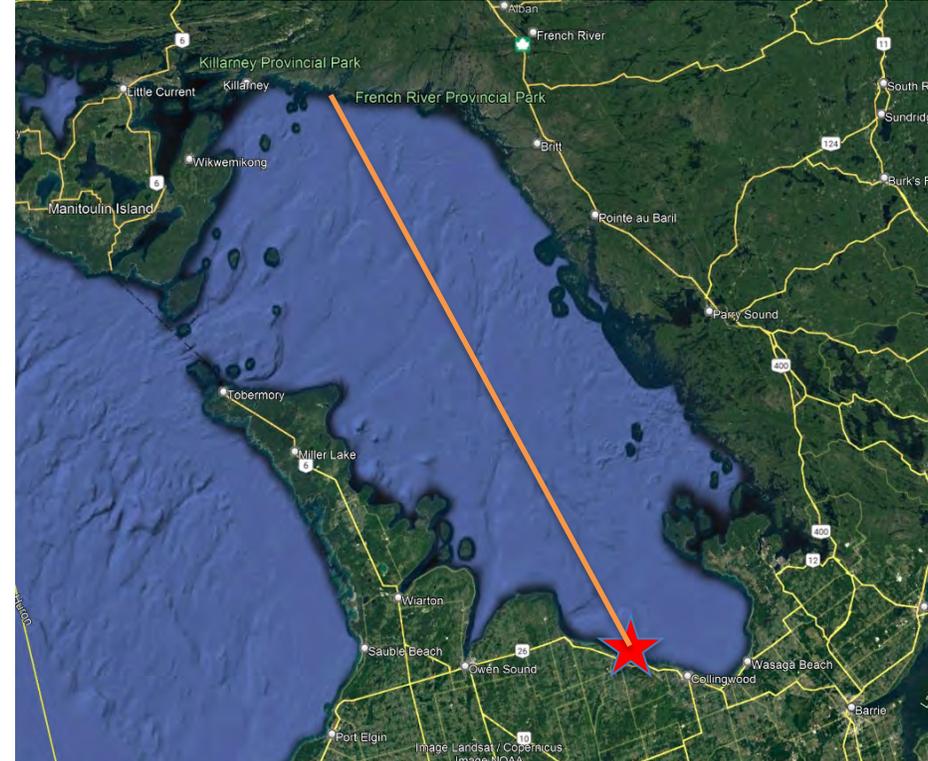
What is a wave?

- A swell in a body of water, typically with forward motion
- Created by energy passing through water
- Waves are a transfer of energy without a transfer of matter
- “Wave energy is just a form of solar energy”



A Few Quick Definitions

- Fetch=longest uninterrupted distance across the open water from a site
- Bathymetry=elevation of the bed in a body of water
- Slope is often described as “Run:Rise”
 - IE, a “5H:1V” slope has 5’ of run for every 1’ of rise



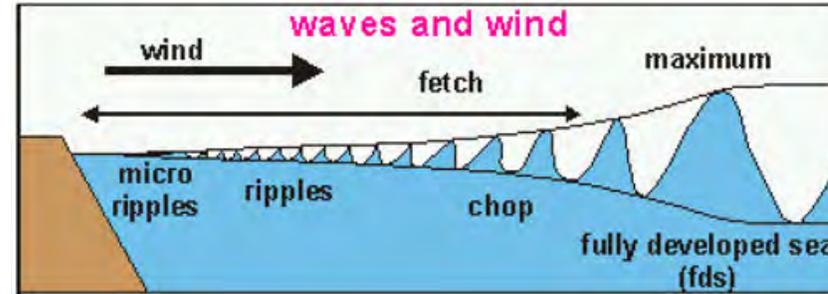
Wave Origins

- Wind driven
- Gravitational (tides)
- Disturbance driven
 - Tsunamis
 - Boats
 - Cannonball?



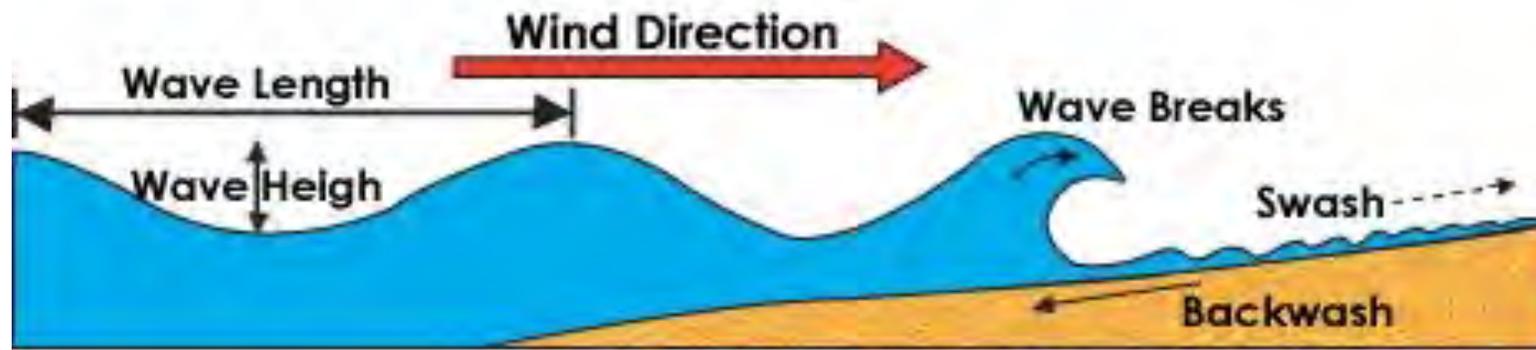
Wind Driven Waves

- Wind causes friction across the water
- Energy from the wind is transferred to the water
- Friction causes microripples, which cause more friction, which cause larger ripples...and wave height grows
- Wave height is a function of fetch, wind speed, duration, and water depth

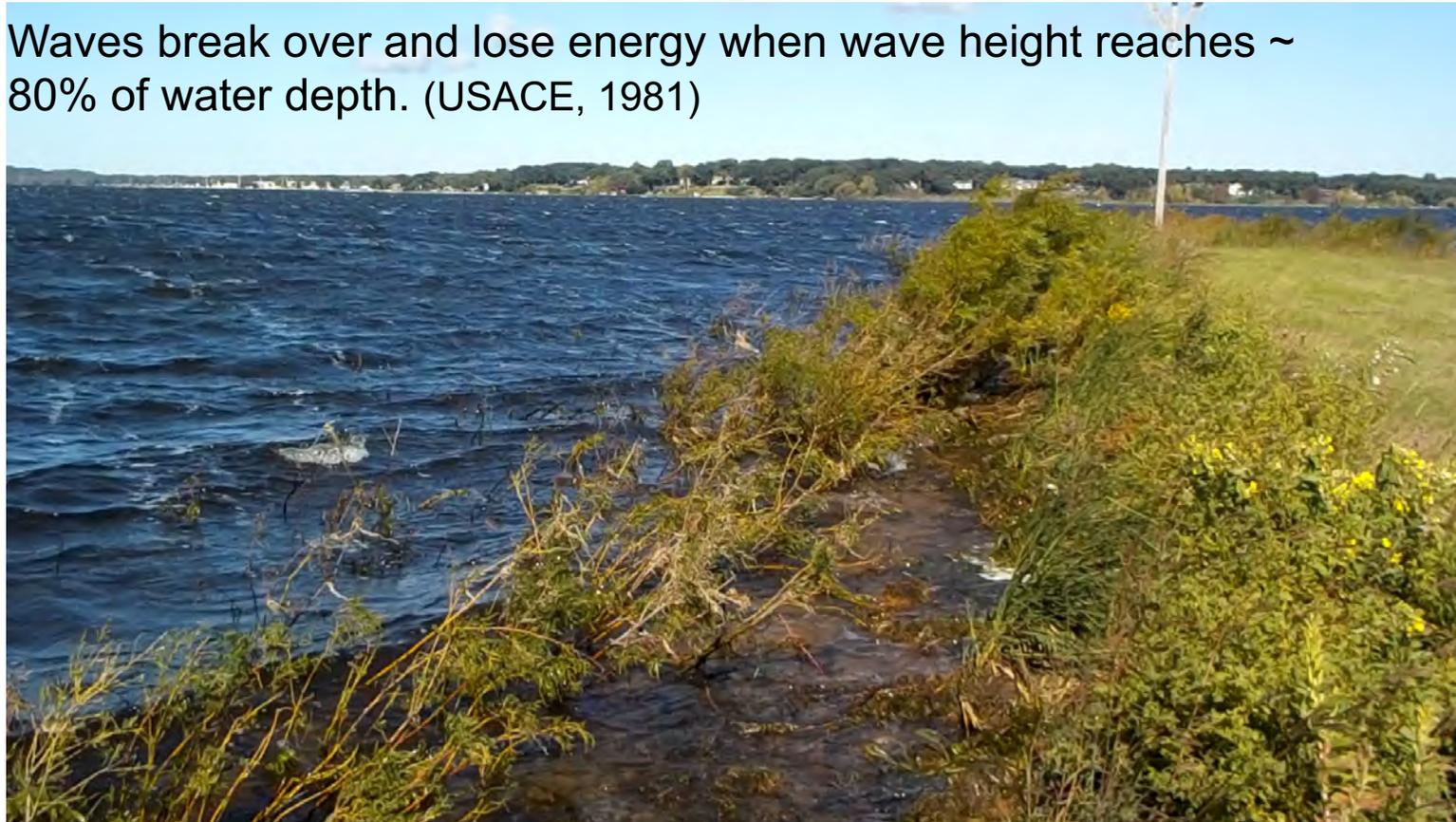


Source: University of Wisconsin



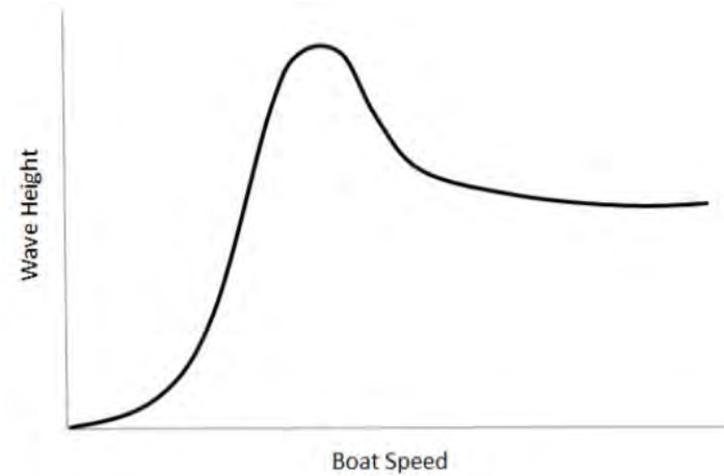


Waves break over and lose energy when wave height reaches ~ 80% of water depth. (USACE, 1981)



Boat Driven Waves

- Boats displace water as they move
- Size and shape of wave influenced by boat hull and speed
- Wave height is reduced when boat begins planing
- Wave height is a function of wind speed, duration, and water depth
- Boats “push” water, creating higher waves than wind-driven waves
- Waves are periodic, but usually have longer period and greater height than wind driven waves



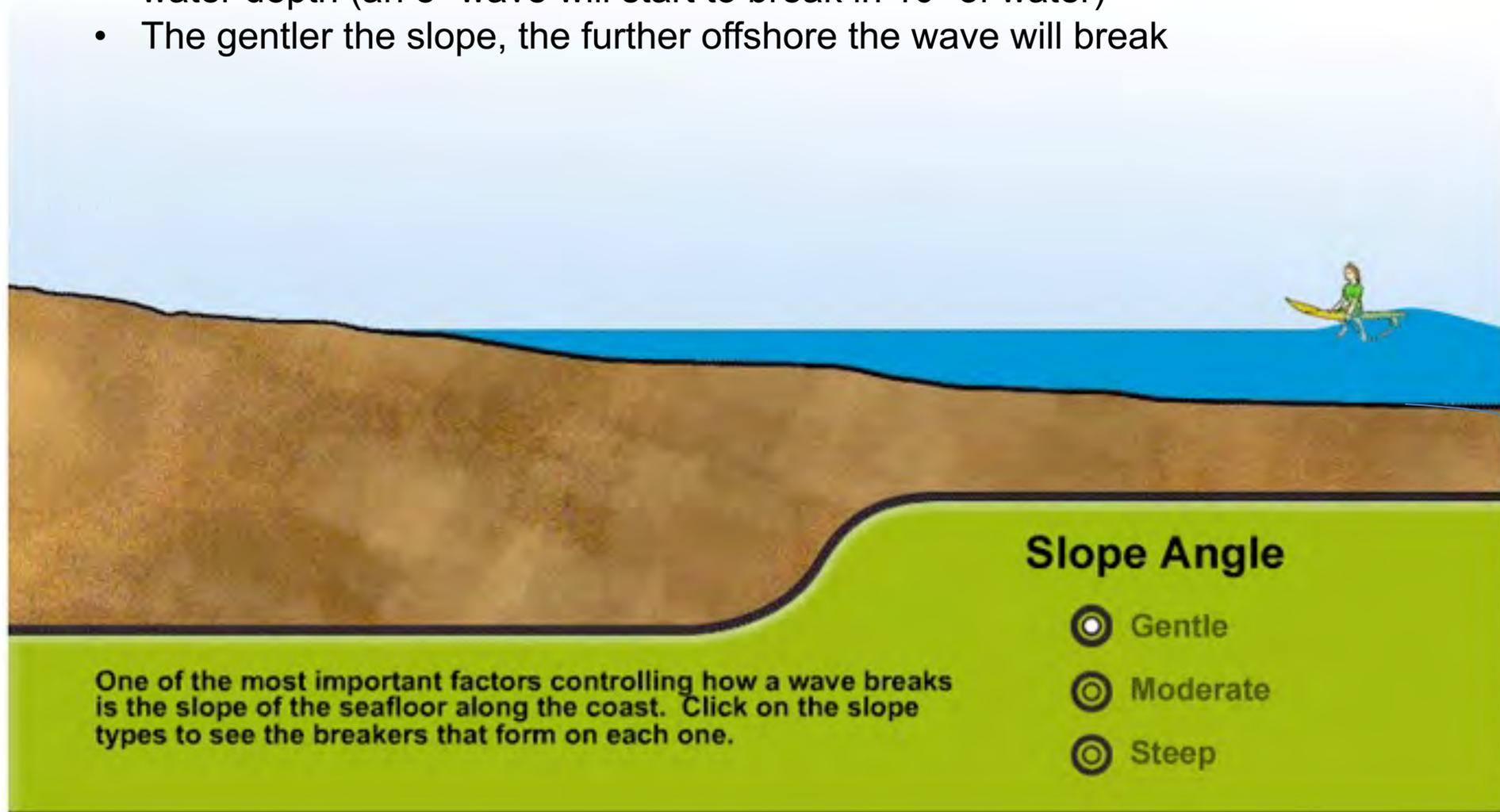
Wave Height

- Wave height comes from
 - Fetch
 - Depth
 - Runup
 - Site orientation
 - Influence of adjacent features
 - Presence/absence of aquatic vegetation

- Wave height is most often limited by either fetch or depth



- Waves break over and lose energy when wave height reaches 80% of water depth (an 8" wave will start to break in 10" of water)
- The gentler the slope, the further offshore the wave will break





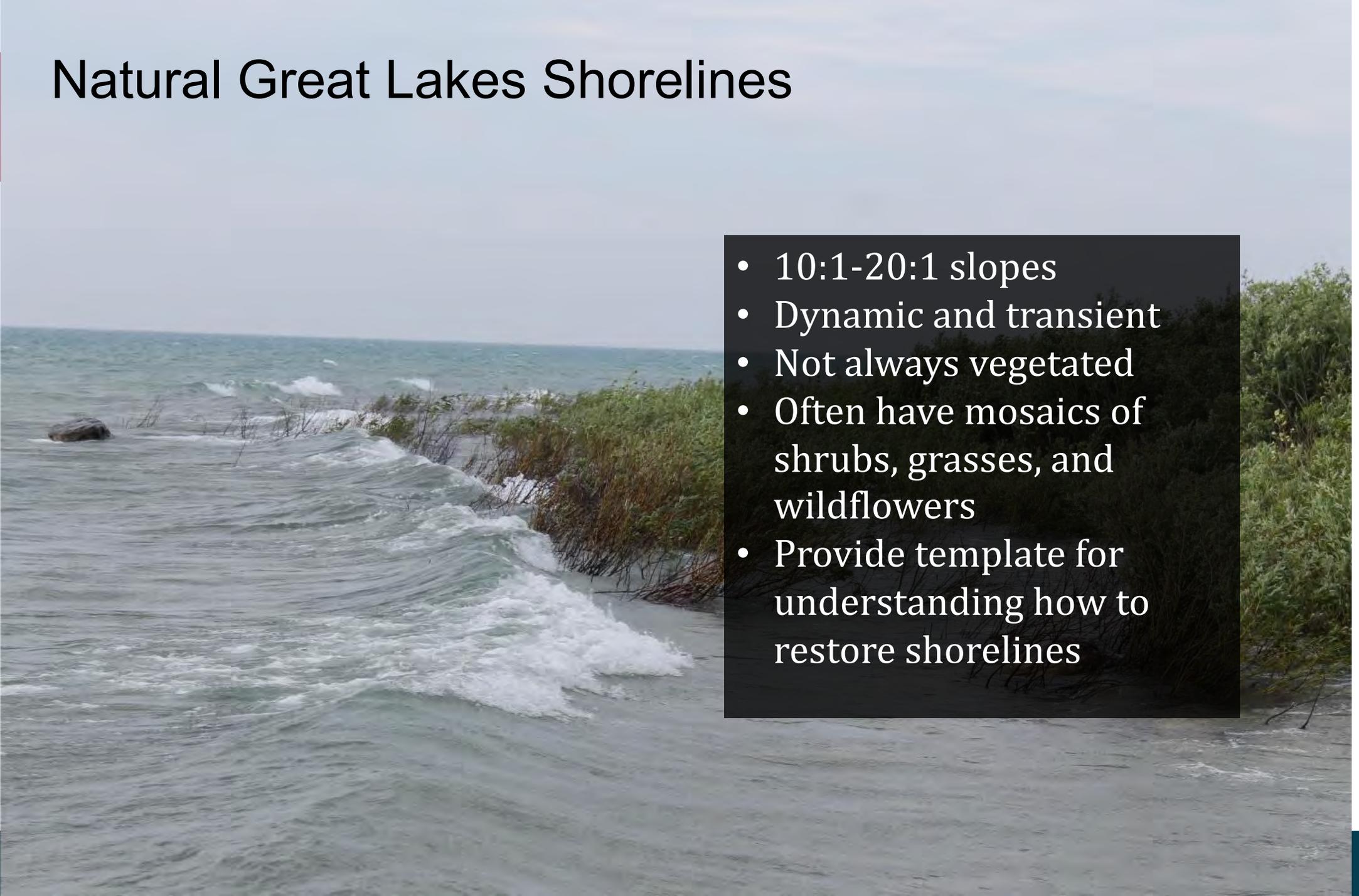
How does wave energy degrade shorelines?

- Soil erosion
- Physical displacement of plants
- Turbidity
- Waves are a function of fetch, depth, slope, wind speed and wind duration



Natural Great Lakes Shorelines

- 10:1-20:1 slopes
- Dynamic and transient
- Not always vegetated
- Often have mosaics of shrubs, grasses, and wildflowers
- Provide template for understanding how to restore shorelines



In Summary

- Waves typically originate from wind or disturbances such as boats
- Fetch, depth, and wind speed/duration are key factors in wave height
 - Bigger storms + deeper water=bigger waves, closer to the shoreline
- Gentler shoreline slopes and vegetation will dampen/dissipate wave energy and can be used as the basis for creating soft but stable shorelines



Thank you

Brian Majka
GEI Consultants, Inc.
bmajka@geiconsultants.com



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Waves & Wakes

Impacts & Mitigation Strategies



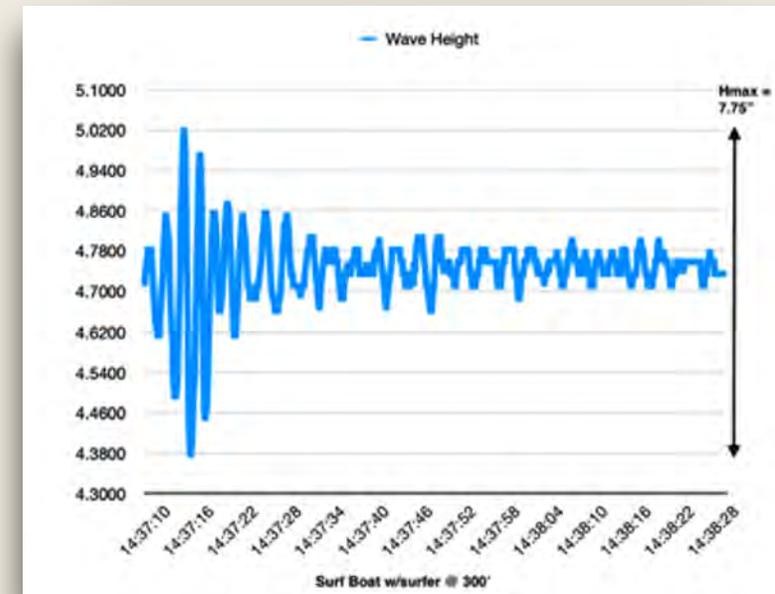
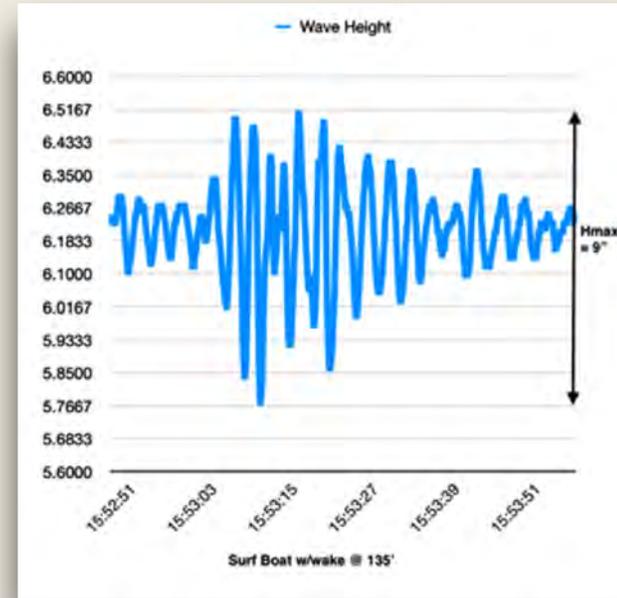
ALEX RAY - PAYETTE ENVIRONMENTAL SERVICES, LLC

Wake Boats

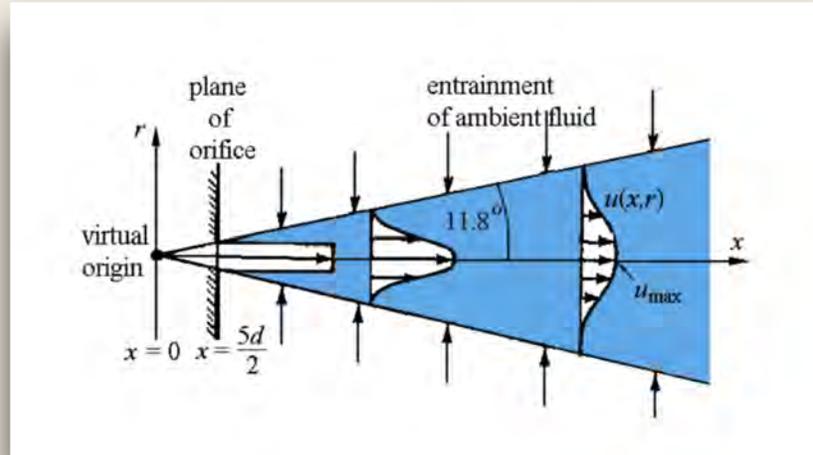


Wake Boat Surface Waves

- A wake boat operating 300' from shore produced a wave that was 7.75 inches high when it reached shore.
- Complete attenuation of wake boat waves occurs at approximately 1000'.
- Due to their greater height and wavelength, surface waves produced by motorized watercraft carry far more energy than wind waves on fetch limited bodies of water.



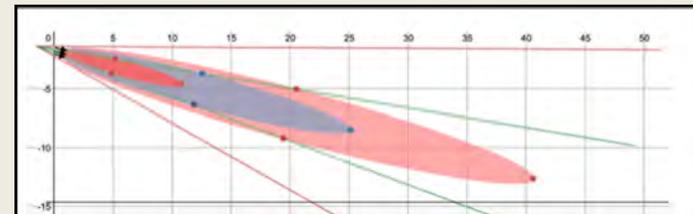
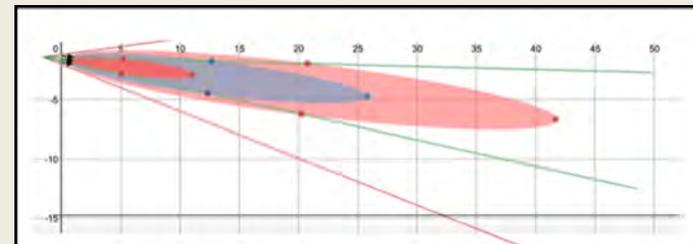
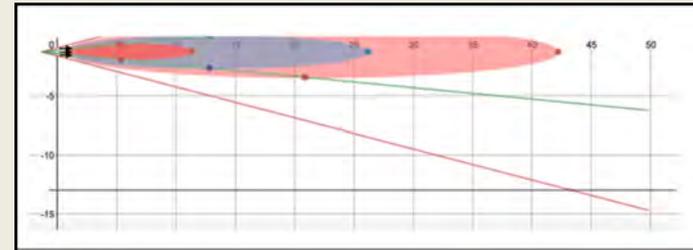
Wake Boat Slip-Streams



- Models developed by researchers with the Department of Civil and Environmental Engineering at Pennsylvania State University and the Department of Civil Engineering at Clemson University

2016 Malibu LSV22 at 0°, 7°, & 15°
Max Slipstream Velocity: 4.49m/s @ 11 mph, 2400 rpm
(chart values in meters)

- Slipstream Velocity > .25m/s
- Slipstream Velocity > .4m/s
- Slipstream Velocity > .9m/s



Implications

- No-Wake Zones for watercraft using Wave Enhancing Technology (WET) should be a minimum 500' from shore.
- Wake boats should be operated in sufficiently deep water to protect bottom sediments and near shore vegetation.
- There is no one-size-fits-all solution; each body of water will have specific limitations.



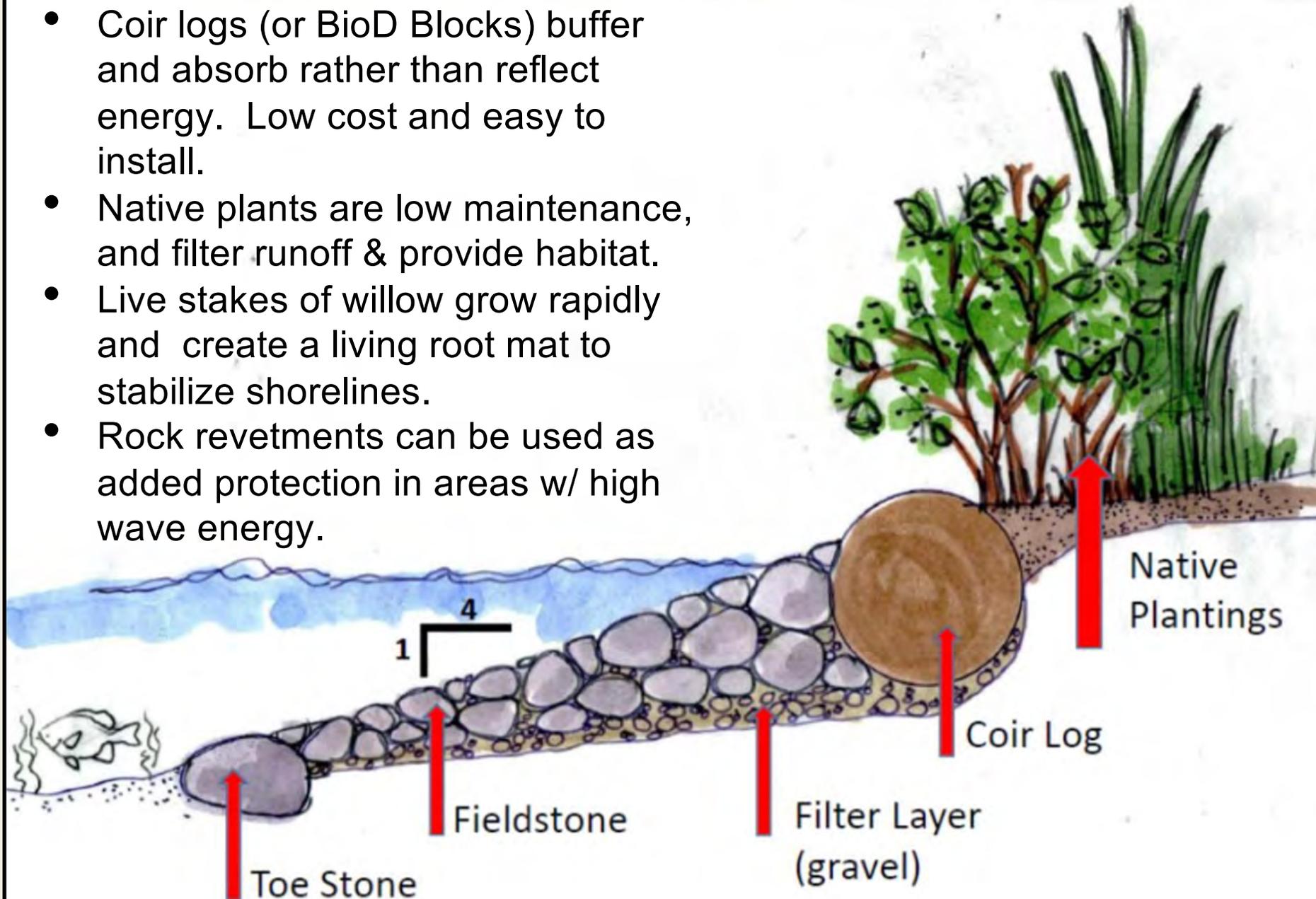
Living Shorelines





- Traditional erosion control techniques, such as rip-rap and seawalls, reflect rather than absorb energy.
- Leads to loss of beaches and near shore habitat.
- Living shorelines absorb energy through the use of softer materials and live vegetation.
- Restored aquatic habitat and aquatic plants can also help buffer wave energy before it reaches shore.

- Coir logs (or BioD Blocks) buffer and absorb rather than reflect energy. Low cost and easy to install.
- Native plants are low maintenance, and filter runoff & provide habitat.
- Live stakes of willow grow rapidly and create a living root mat to stabilize shorelines.
- Rock revetments can be used as added protection in areas w/ high wave energy.



Online Resources

- Tip of the Mitt Watershed Council
<https://www.watershedcouncil.org>
- Michigan Natural Shoreline Partnership
<https://www.mishorelinepartnership.org>
- Living Shorelines Academy
<https://www.livingshorelinesacademy.org>
- St. Anthony Falls Laboratory
<https://cse.umn.edu/safl/healthy-waters-initiative>

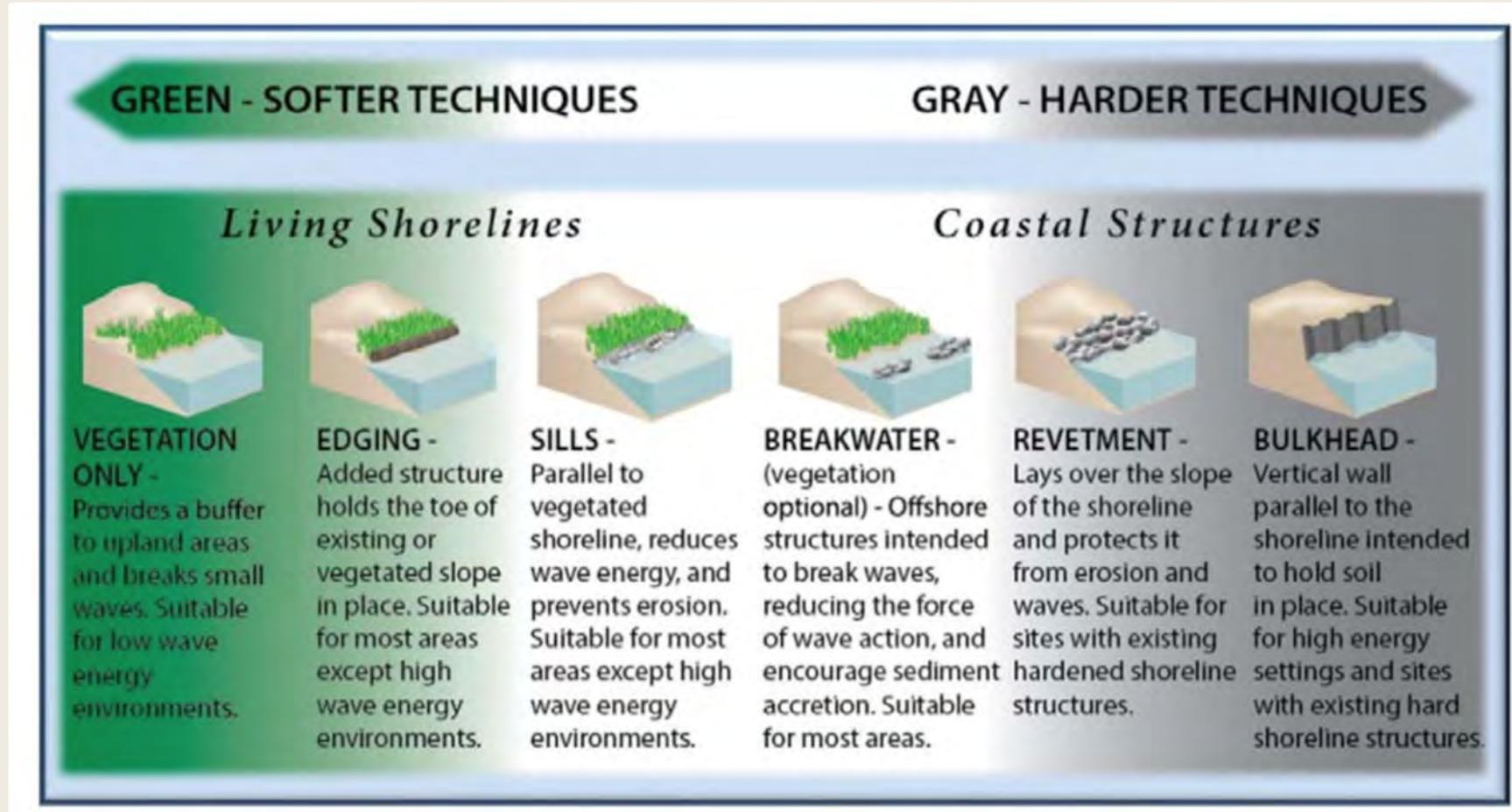


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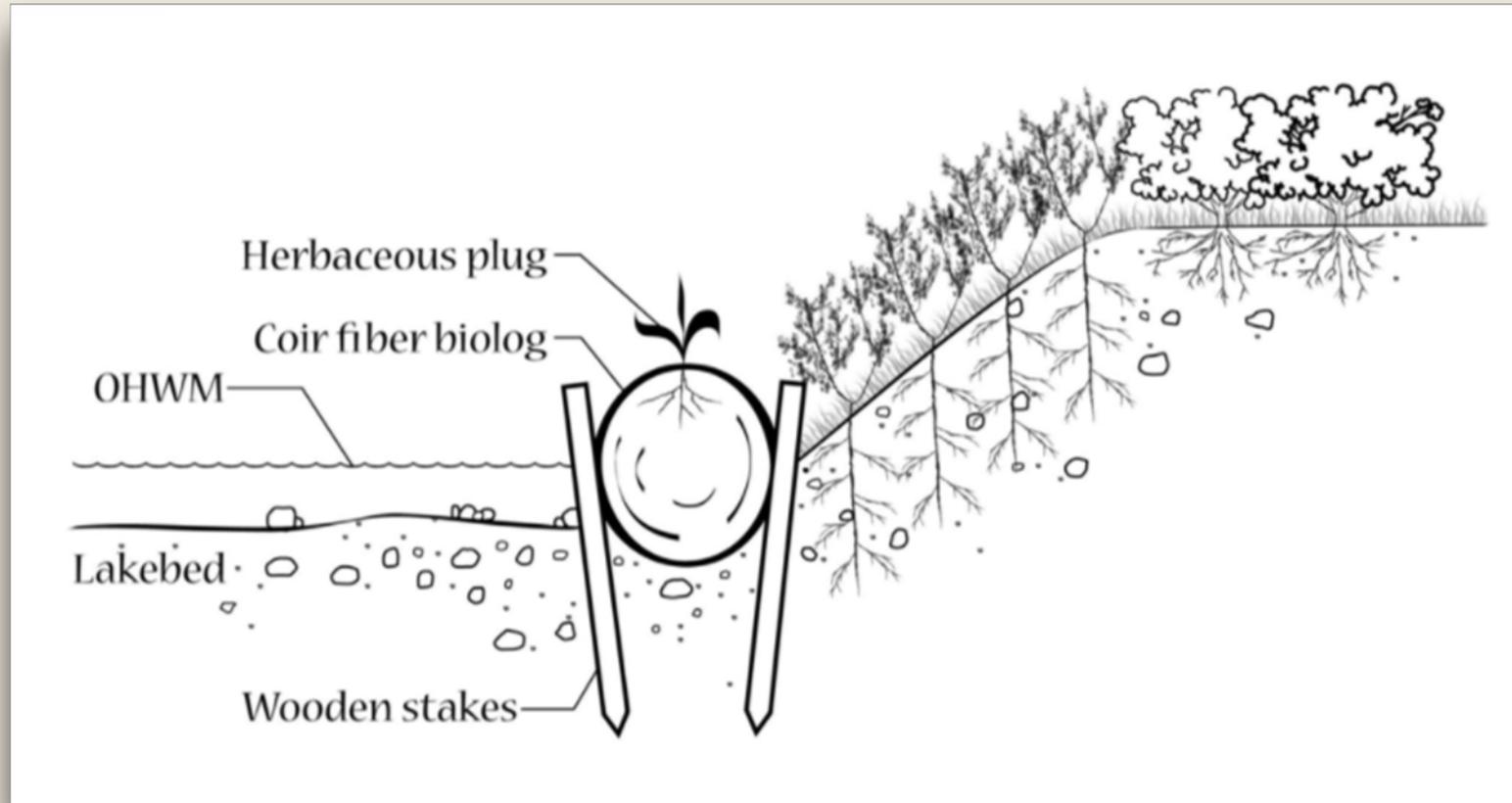
- Alex Ray
- Payette Environmental Services, LLC
- McCall, Idaho
- 208-315-0447
- alex@payetteenvironmental.com



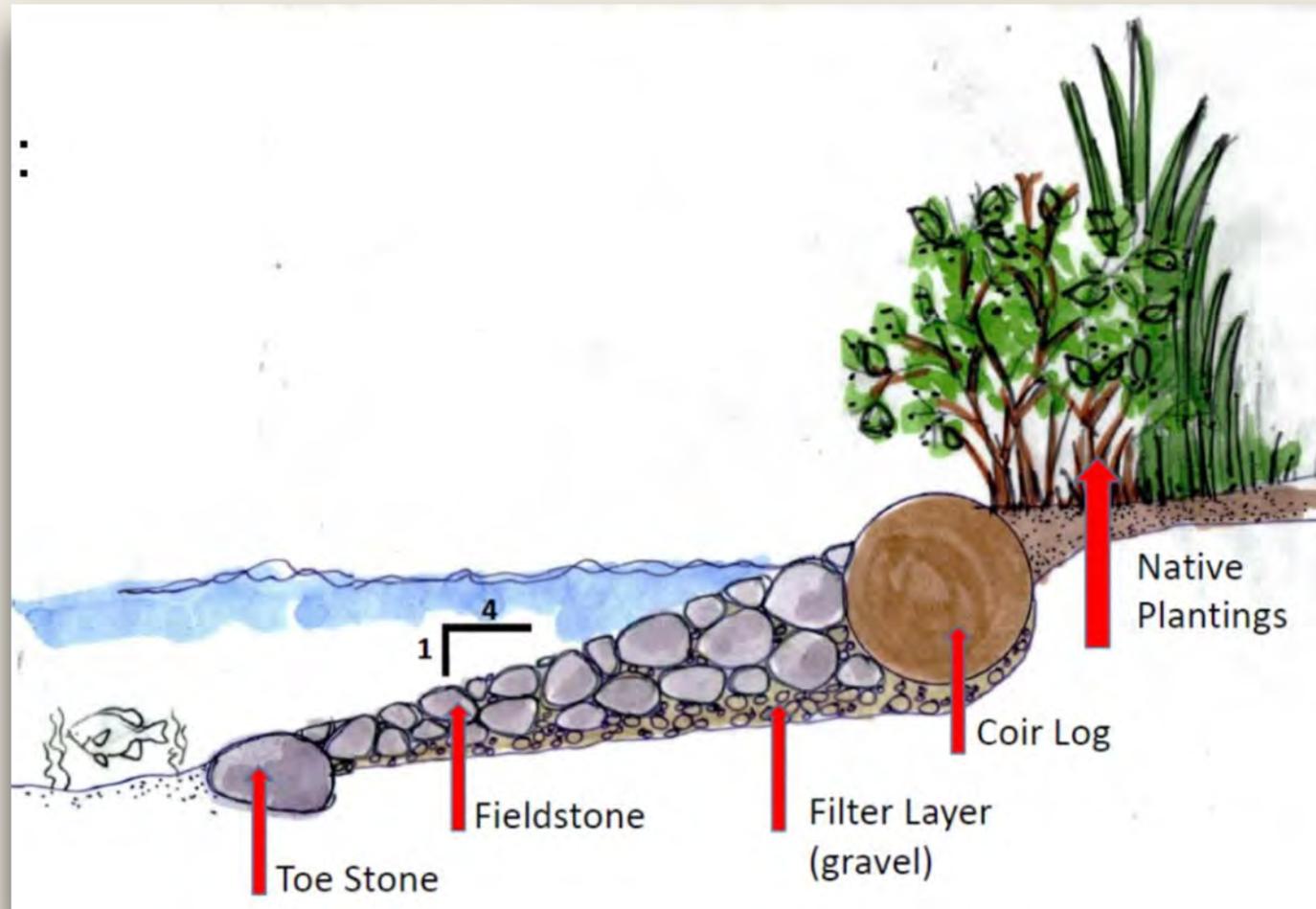
Bioengineering Continuum



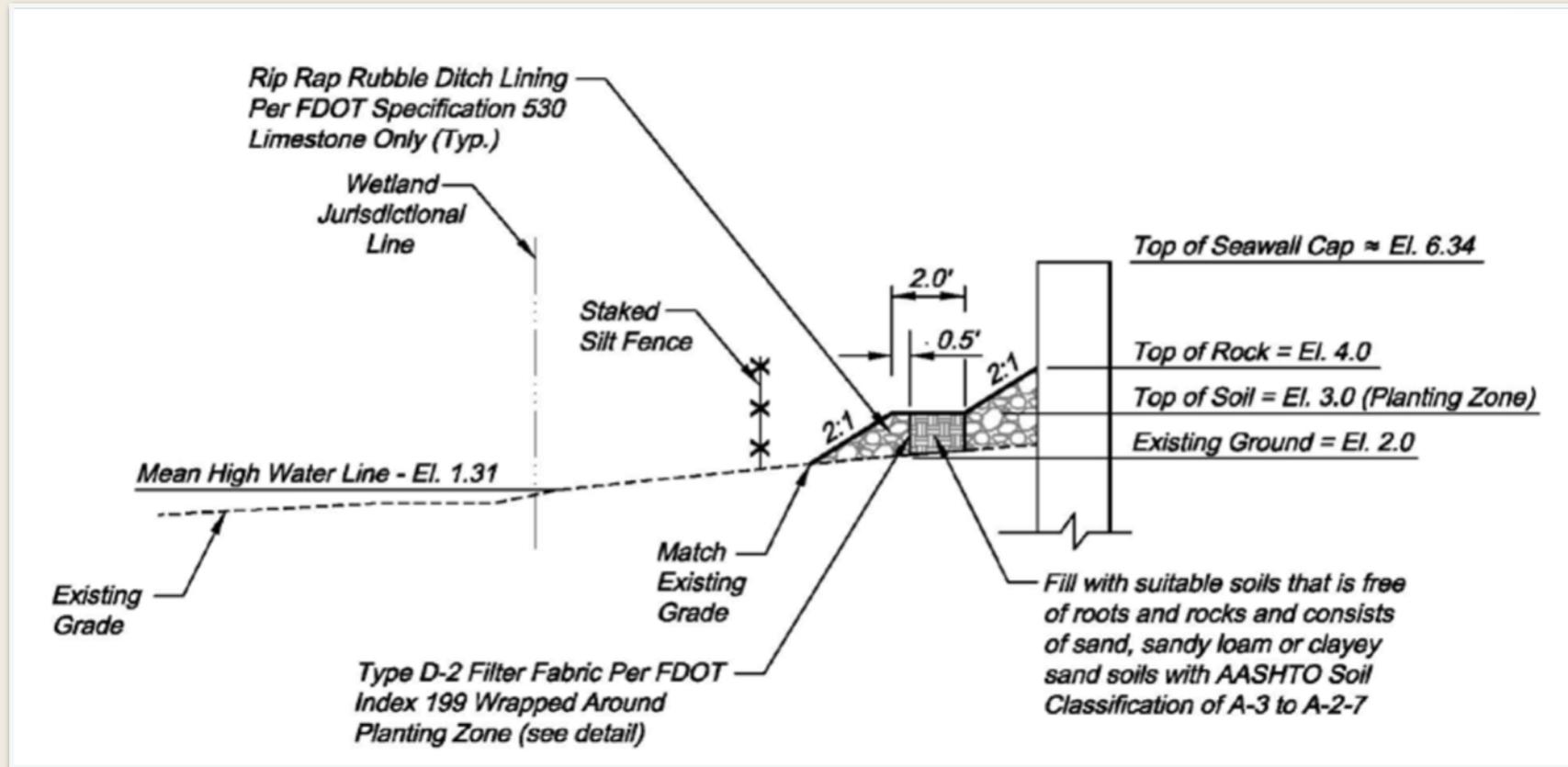
Low Energy Living Shoreline Design



Medium - High Energy Living Shoreline Design



Hybrid Seawall / Living Shoreline Design

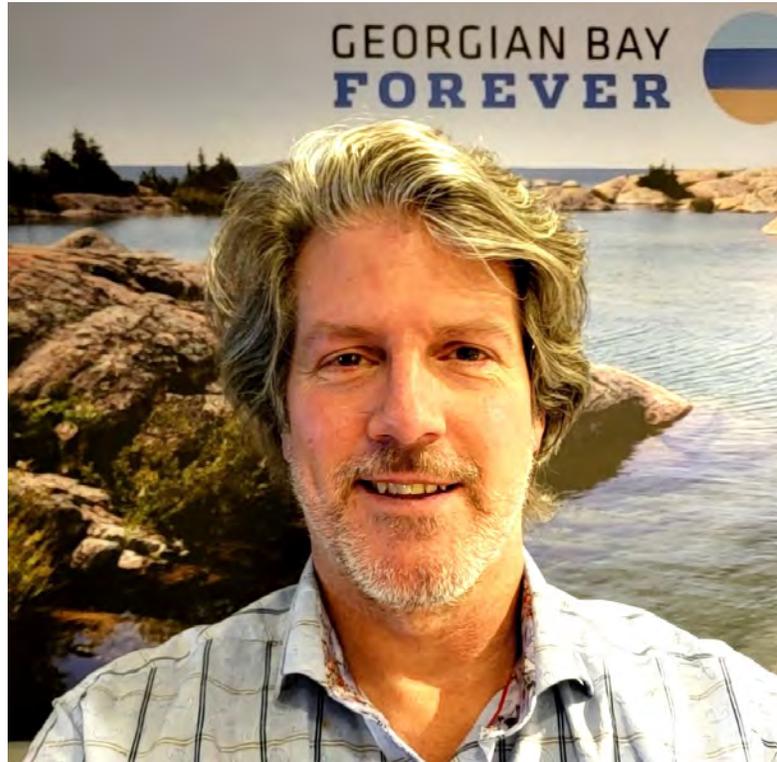


Hybrid Seawall / Living Shoreline Example 1 - High Energy



Hybrid Seawall / Living Shoreline Example 2 - Low Energy





David Sweetnam

Georgian Baykeeper
Executive Director
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Evaluations of hazard existence, management and remediation are often based on **two distinct** and somewhat differing perspectives:

1. flooding, erosion and dynamic beaches **are naturally occurring processes** which in and of themselves are not hazards, that they only become hazards when humans activities and development encroach within shoreline environments influenced by these natural processes. Activities which in some instances have accelerated the severity of the resulting hazards.
2. flooding, erosion and dynamic beaches **are hazards** which must and can be addressed through various remediation measures (i.e., shore protection, lake regulation, floodproofing), and that the siting of development within shoreline environments is a right and should not be limited by the existence and/or susceptibility of hazards within the defined stretch of shoreline.

Before



After



Photo credit Watersheds Canada

GBF Fall 2021 Newsletter article by Monica Seidel: <http://www.georgianbayforever.org/flipbook/fall2021/4/>

Water Levels 2021



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TOPIC A: Natural Asset Management for Climate Resilience

Speaker:

Roy Brooke, Executive Director, Municipal Natural Assets Initiative
(MNAI)



Water Levels 2021 – Roy Brooke



- Roy is Executive Director of the Municipal Natural Assets Initiative (MNAI).
- He served as Director of Sustainability for the City of Victoria between 2011-2013. Between 2003-2011 he worked for the United Nations, including the World Health Organization, United Nations Environment Programme and UN Office for the Coordination of Humanitarian Affairs. During his time with the UN he was based in Geneva, Switzerland, and later in Rwanda, where he was UNEP's Environment Programme Coordinator. Prior to this he served as a political advisor to Canada's environment minister.



Accelerating natural asset management for climate change resilience

Presented by **Municipal Natural Assets Initiative** | November 13, 2021

Orientation

Concepts and fundamentals

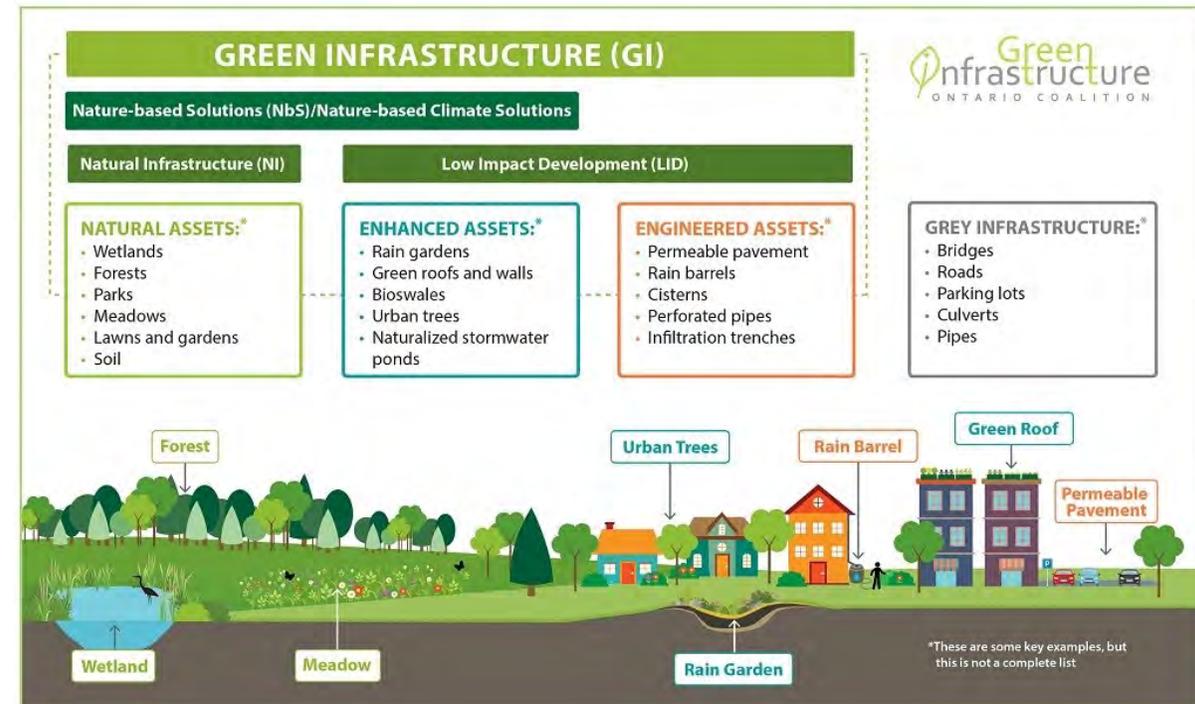
Case examples

Places to start

Discussion

Situating natural asset management

- Scale: home-owner actions versus watershed
- Types: GI, NBS & their subsets
- **Local government level natural asset management as one subset**



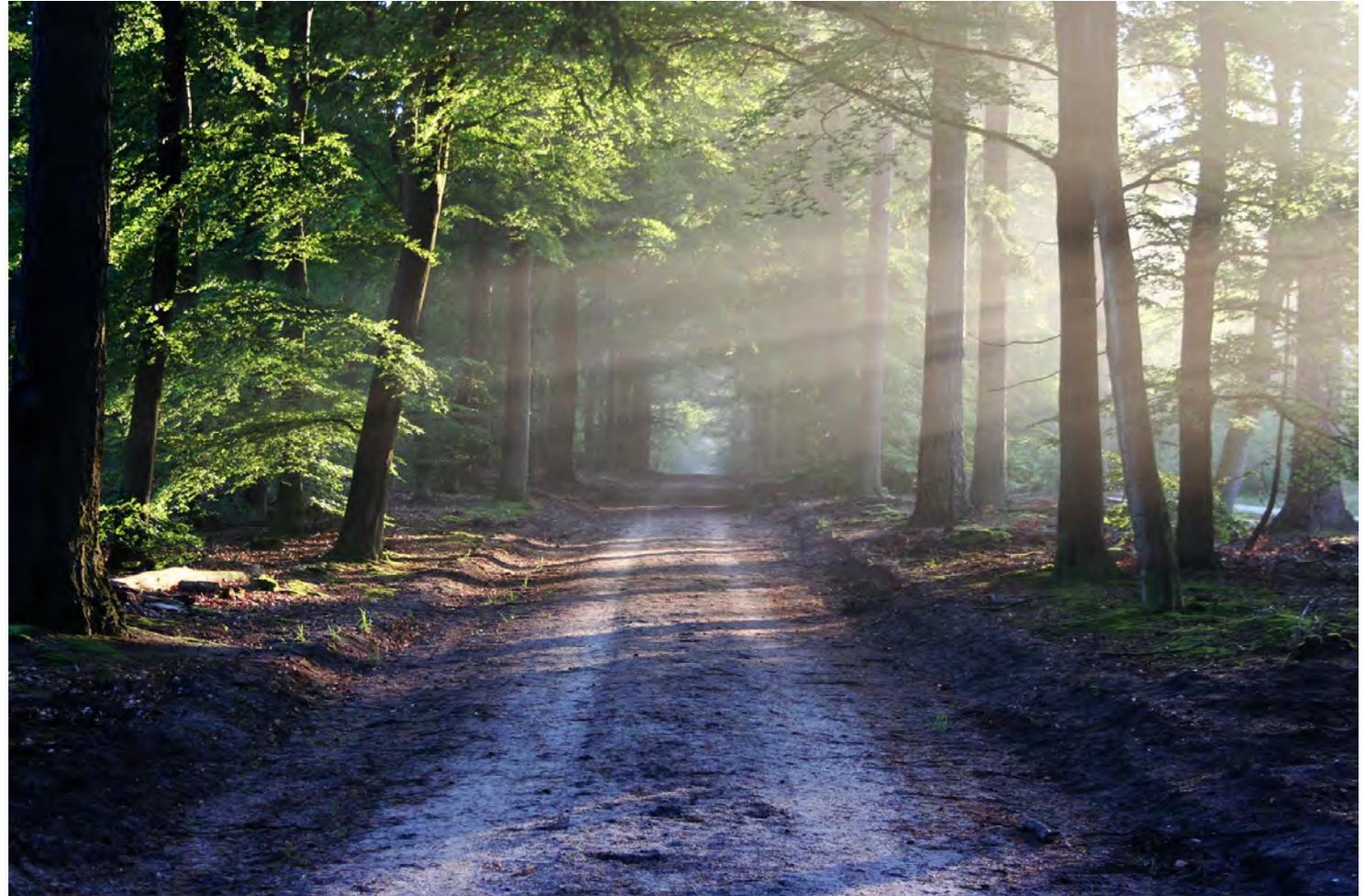
Core idea

Nature is:

One of our most vital assets

Central to any resilient infrastructure system

Potentially an investable asset



Case for natural assets

Deliver core services

Can be managed

Often over-used,
under-recognized

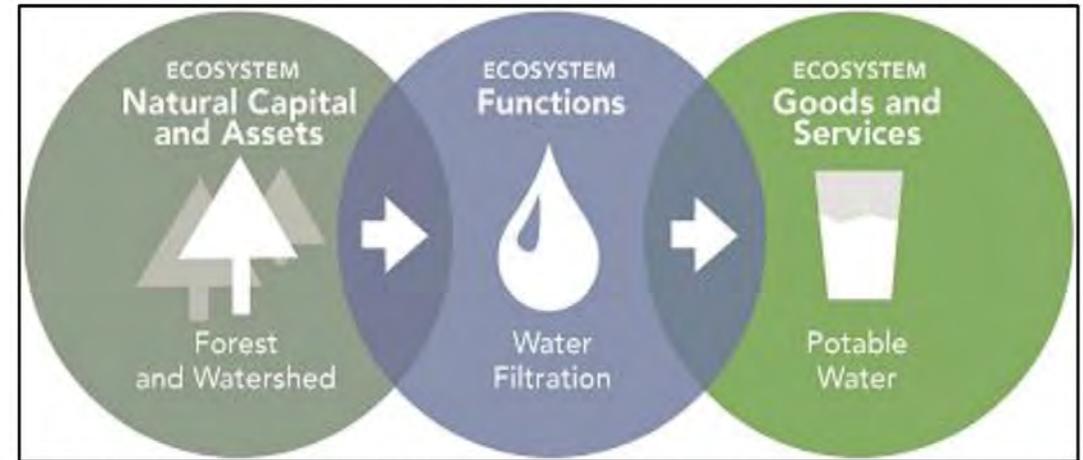
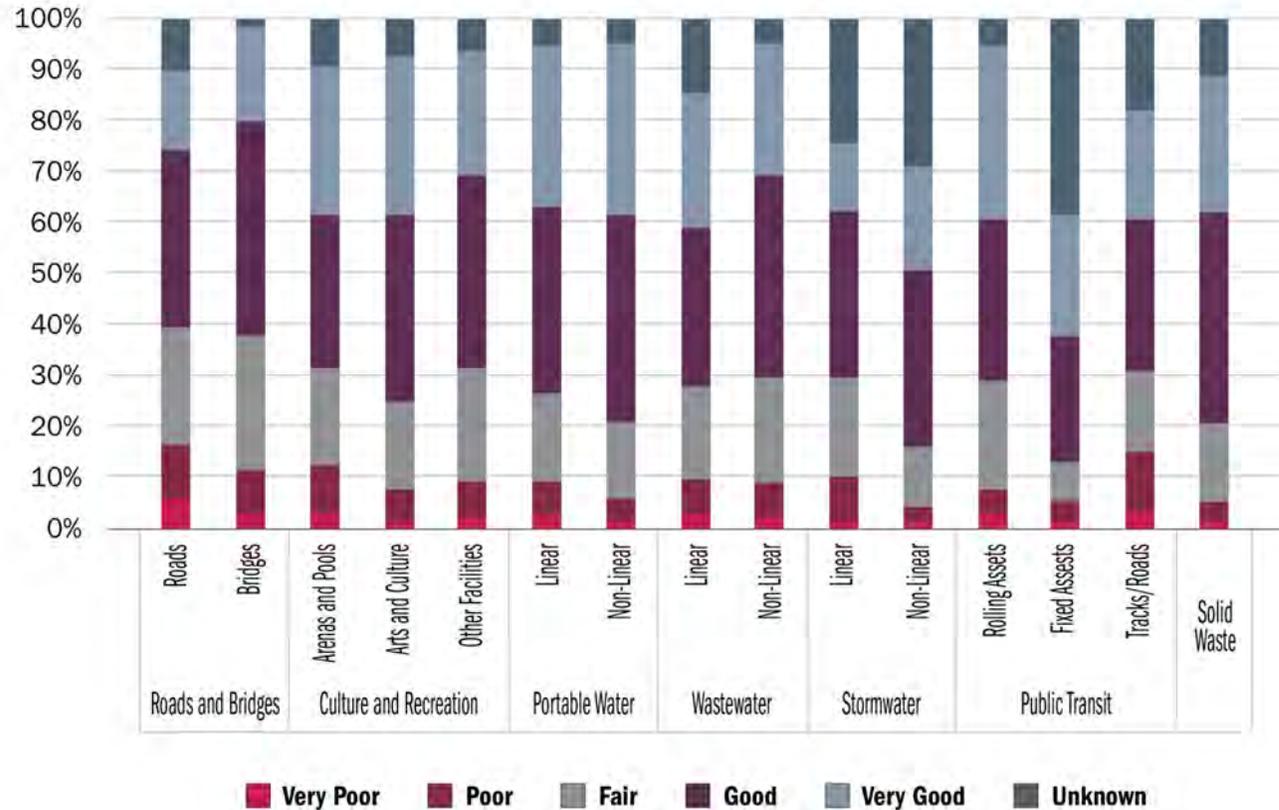


Figure 1: Natural Capital creates Ecosystem Goods and Services
(image source: Earth Economics <http://www.eartheconomics.org/science-economics/>)



State of built infrastructure



Federation of Canadian Municipalities (FCM):

1/3 of infrastructure in very poor to fair condition.

StatsCan 2017:

164.3 billion litres of raw sewage overflows from combined sewers; systems are not handling downpours effectively.

Need new service delivery solutions in changing climate

WEATHER

Flooding forces evacuations in some communities along Saint John River in N.B.

By Alison Auld • The Canadian Press

Posted May 1, 2018 8:12 am • Updated May 1, 2018 5



Source: CBCnews Network
<https://www.youtube.com/watch?v=WzuMTtIDk58>



Rising floodwaters have triggered a voluntary evacuation order for about 2,000 people in Saint John. (Matthew Bingley/CBC)

Dassouki said more than 140 provincial roads, bridges and culverts have been affected by flooding, including 81 road closures. That number is expected to rise.

Source: CBCnews Network <https://www.cbc.ca/news/canada/new-brunswick/flood-new-brunswick-2018-1.4646141>

Good news

Asset management integrates:
People's skills, expertise, activities

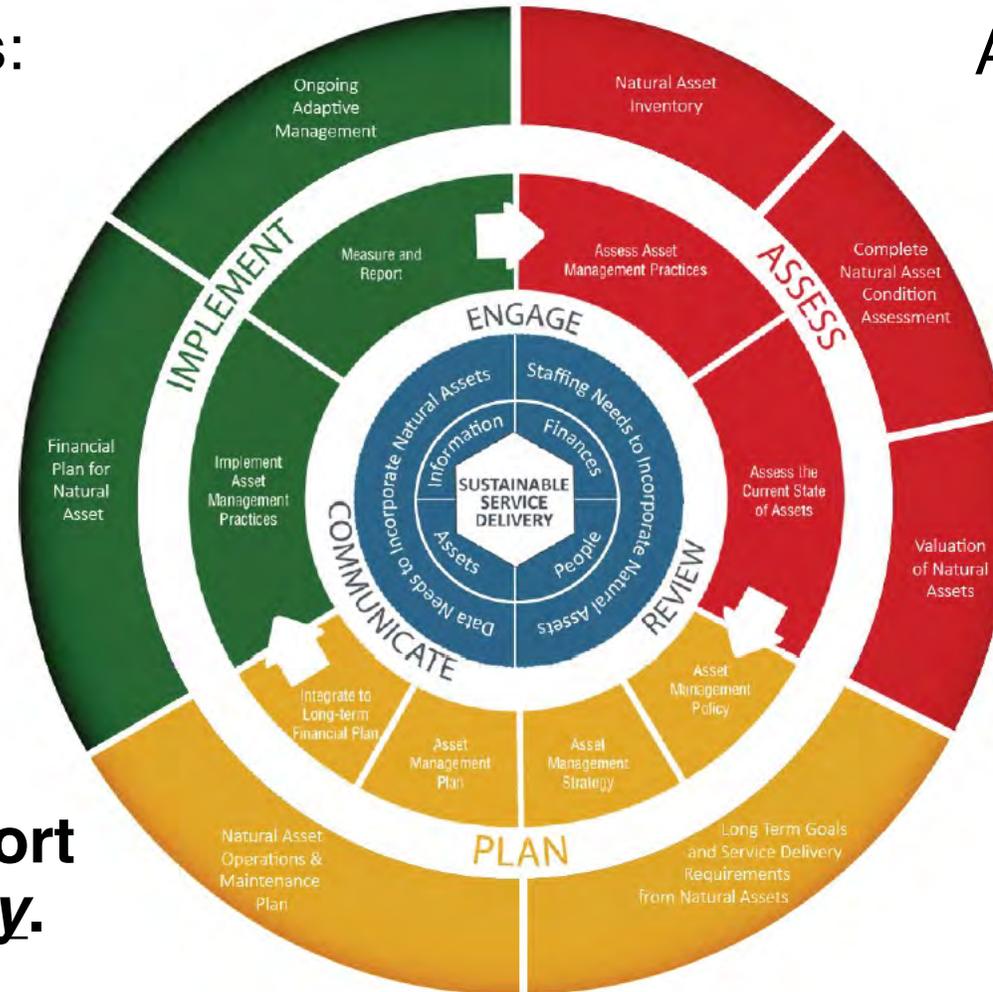


information about community's physical assets and finances



informed decisions to support Sustainable Service Delivery.

Asset management:
a valuable tool
for managing
natural assets



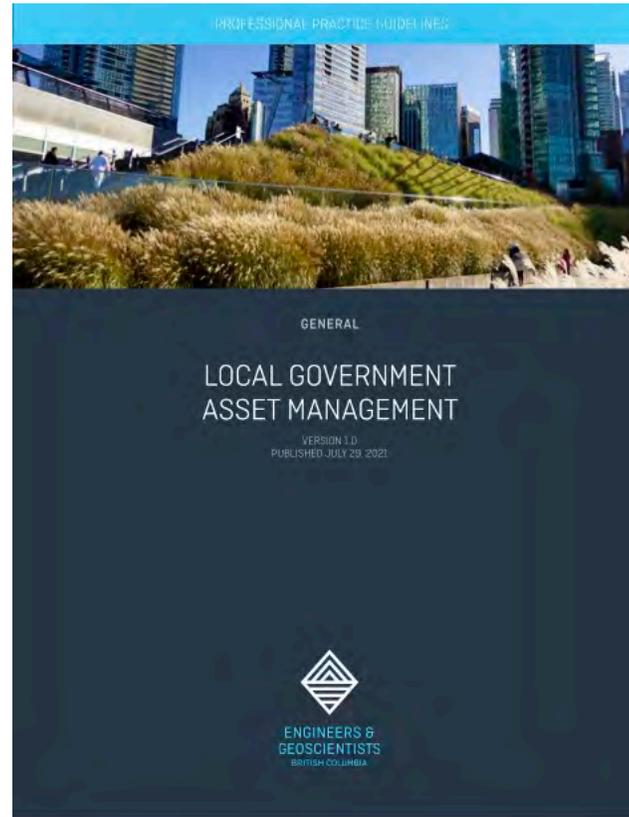
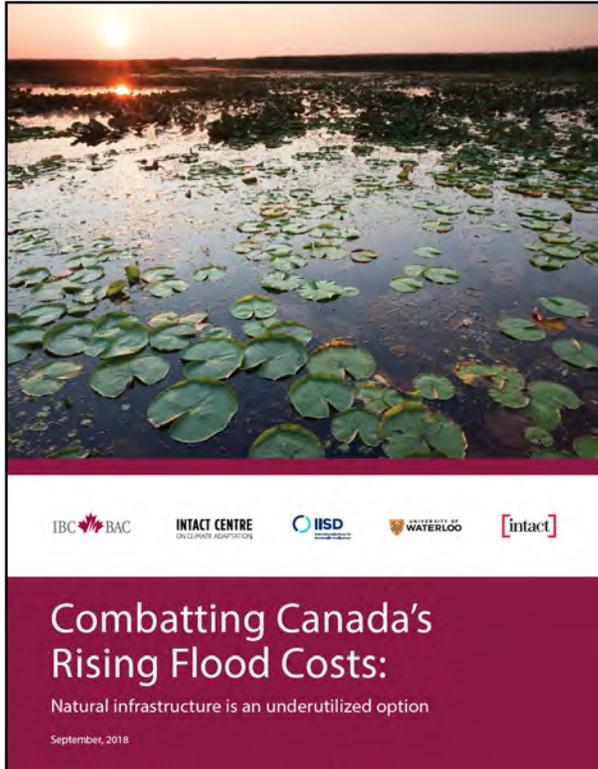
Growing number



Case examples



Growing enabling environment



Upcoming/ongoing opportunities:

PSAB

Engineering sector in B.C. & beyond and other professional disciplines

Norms for asset management cycle

Norms for data

Funding environment



First steps

RoyB@MNAI.ca

Readings

Recommended reading

[MNAI Natural Asset Primer](#)

[What are Municipal Natural Assets: Defining and Scoping Municipal Natural Assets \(2019\)](#)

[Asset Management for Sustainable Service Delivery: A BC Framework](#)

[Blog on what we are valuing and not valuing in natural assets: Nature: Is it worth it?](#)

Optional reading

- [The Dasgupta Review on the Economics of Biodiversity \(UK Treasury\)](#)
- [IPBES \(Intergovernmental Science-Policy Platform for Biodiversity & Ecosystem Services\) summary report](#)

TOPIC A: High Water Mark - Land Water Interface - Should the municipal high water level mark be changed? How can municipalities adapt?

Speakers:

David Sweetnam, Executive Director, Georgian Bay Forever

Rupert Kindersley, Executive Director, Georgian Bay Association



Resiliency

- Erosion setbacks
- Relocation of dwellings
- Flood elevation and protection requirements
- Shoreline alteration requirements
- Real estate disclosure requirements
- Acquisition of high-risk properties
- Hazard insurance



Methods of Alleviating the Adverse Consequences of Fluctuating Water Levels in the Great Lakes-St. Lawrence River Basin: A Report to the Governments of Canada and the United States. December 1993. <https://ijc.org/sites/default/files/ID1007.pdf>

How can municipalities adapt? Should the municipal high water level mark be changed?

- High water marks for coastal municipalities that have one may be under review given that they are below the 2019/20 level and higher levels are expected in future years

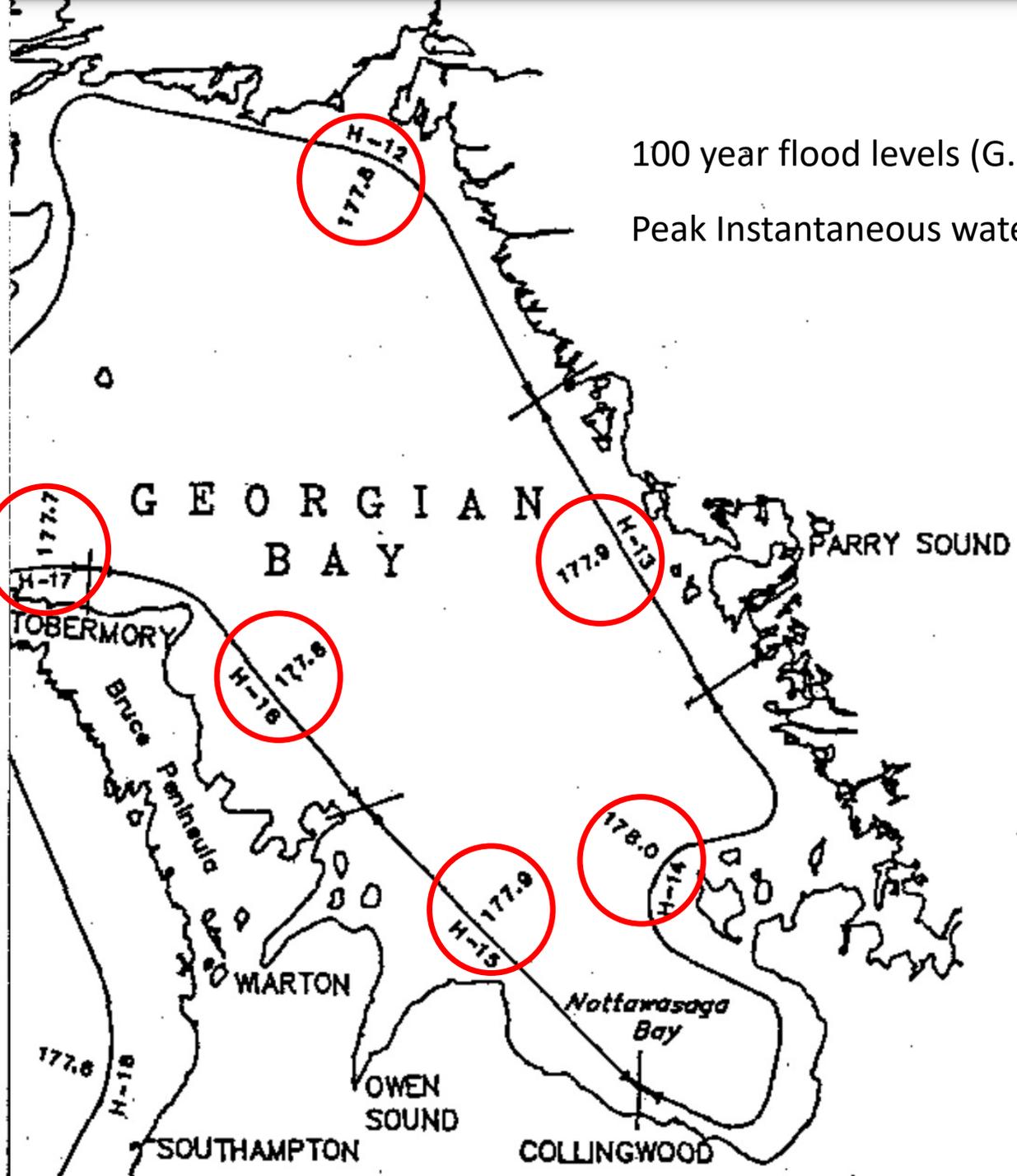
	High water mark	Document Section	Reference (THIS IS NOT A FORMAL REFERENCE)
Township of the Archipelago	176.44 metres G.S.C. above sea level	3.83 (page 11)	Township of the Archipelago: Consolidate Version of Comprehensive Zoning By-Law A2000-07, as amended Passed June 22, 2007 (consolidated December 31 st , 2020)
Township of Carling	176.44 metres G.S.C above sea level	4.69 (page 11)	Township of Carling: Consolidated – Comprehensive Zoning By-Law No. C500-2011
Township of Georgian Bay	177.4 C.G.D	Section 19 (page 210)	Township of Georgian Bay: Zoning By-Law 2014-75 November 10, 2014 (OMB approved: August 26, 2016 and Consolidated to March 8, 2021)
Town of Northeastern Manitoulin and the Islands	measured by Ontario Land Surveyor or controlled level by a dam	Section 5 (page 12)	Town of Northeastern Manitoulin and the Islands: Comprehensive Zoning By-Law 2018-41 (as adopted by council November 6, 2018) Prepared by J.L. Richards & Associates Limited Engineers, Architects, Planners. 314 Countryside Drive Sudbury, ON P3E 6G2
Municipality of Killarney	Flexible measurement – see below*	Section 5: line 113 (page 32)	Municipality of Killarney: Zoning By-Law (adopted by Council June 17, 2014)
Town of Parry Sound	Flexible measurement – see below*	3.H (page 28)	Town of Parry Sound: Zoning By-Law 2004-4653 (this by-law incorporates the following amendments which came into force prior to July 30, 2021)
Township of Tiny	178.0 metre elevation**	4.0 A. (page vi)	Township of Tiny: Zoning By-Law 06-001 (enacted by council January 9 th 2006, approved by the OMB November 18, 2015 and consolidated January 29, 2021)

* Flexible Measurement: "... the mark by the action of water under natural conditions on the shore or bank of a body of water which action has been so common and usual that it has created a difference between the character of the vegetation or soil on one side of the mark and the character of the vegetation and soil on the other side of the mark."

**note that this value is NOT the high water mark but actually the "flood hazard limited" associated with Georgian Bay, which was established by the Ministry of Natural Resources.

LAKE HURON

H-1 Neebish	177.9
H-2 Richards	177.8
H-3 Hilton	177.7
H-4 St Joseph	177.8
H-5 Thessalon	177.7
H-6 Mississagi Bay	177.8
H-7 Little Current	177.9
H-8 Cape Robert	177.8
H-9 N. Cockburn Is.	177.7
H-10,H-11 S. Shore	177.6
H-12 N Georgian Bay	177.8
H-13 Parry Sound	177.9
H-14 Collingwood	178.0
H-15 Meaford	177.9
H-16 Dyer's Bay	177.8
H-17 Tobermory	177.7
H-18 Southampton	177.6
H-19 Point Clark	177.7
H-20 Goderich	177.8
H-21 Kettle Point	177.9
H-22 Bright's Grove	178.0



100 year flood levels (G.S.C.)
Peak Instantaneous water levels (I.G.L.D.)

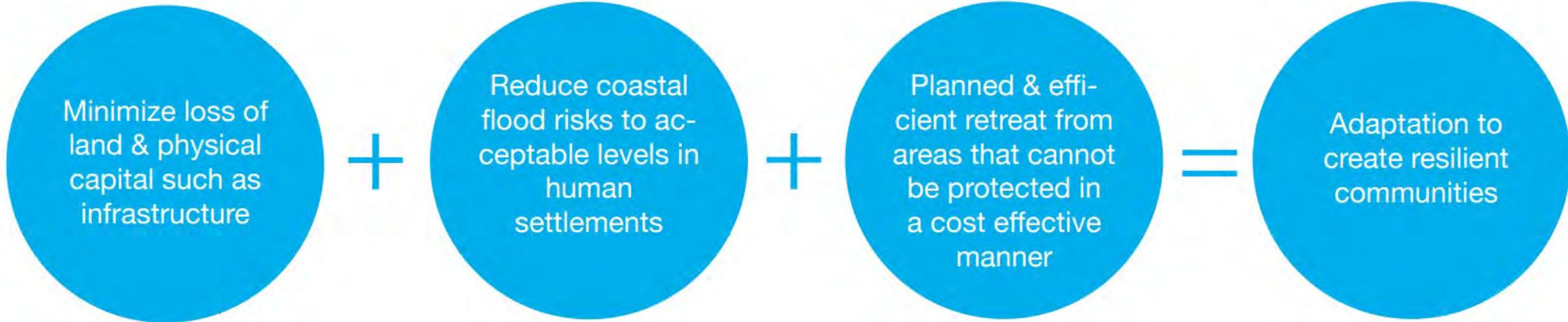
- What areas of our community are at risk?
- What is the nature and magnitude of the risk?
- What is the value of the property, buildings and infrastructure at risk?
- What is the overall community vulnerability?

Protect

Accomodate

Retreat

Avoid



Planning Tools	Objectives & Policies	Coastal Hazard Mapping	Risk Management	Emergency Planning and Preparedness	
Regulatory Tools	Subdivision Regulation	Building Regulation	Regulation of Land Use	Development Permit	
Land Use Tools	Land Acquisition	Transfer of Development Potential	Easement, Covenant or Other	Land Trusts	Foreshore Tenure
Structural Tools	Scour Protection	Structural Elevation	Dikes	Other Hard Protection	Wet Floodproofing
Non-structural Tools	Coastal Wetland Creation	Dune Building	Beach Nourishment		

“What it means for the Great Lakes is that we need to be prepared for extremes. Whether it’s extreme weather patterns, whether it’s extreme water levels, whether it’s extreme droughts and storms, we just need to be prepared for extremes.” - Wendy Leger, co-chair of the Great Lakes-St. Lawrence River Adaptive Management (GLAM) Committee of the binational [International Joint Commission](#) (IJC).



Questions

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Rupert Kindersley

Executive Director

Georgian Bay Association

TOPIC B - Coastal Infrastructure - Coastal Infrastructure - Marinas & Shoreline Businesses – Docks/Other Shoreline Structures – Impacts & Adaptation Strategies – Regulations

Speakers:

Rick Layzell, CEO, Boating Ontario



Water Levels 2020 – Rick Layzell



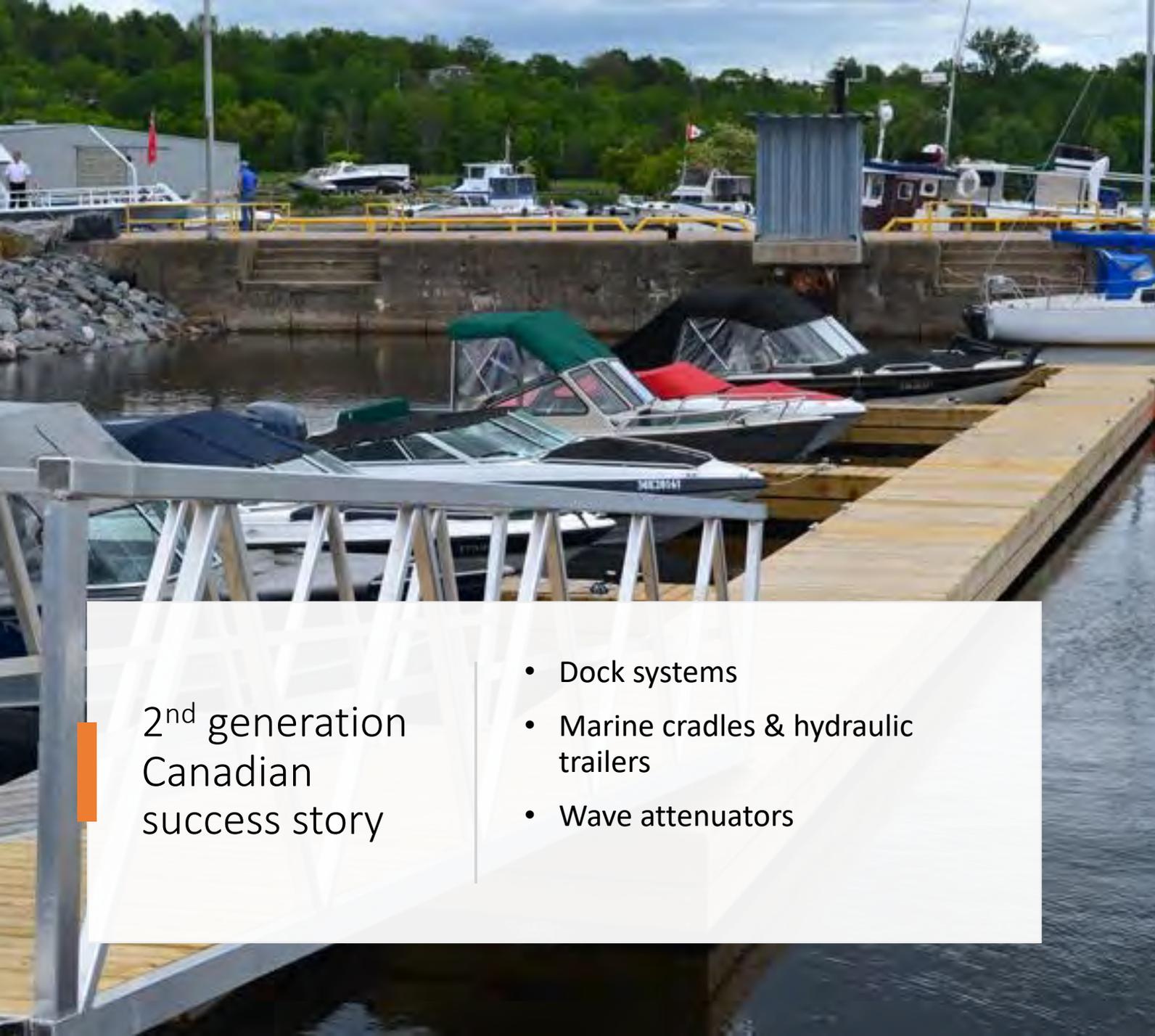
- Rick Layzell is the CEO of the Boating Ontario Association. Since 1967, Boating Ontario has proudly served Ontario's recreational boating industry and the needs of their 530++ member companies.
- Beginning in 1990, a 3-year run with the Canadian National Sportsmen's Shows kicked off Rick's career in the marine industry. This was followed by a short stint with Grew boats, a 19-year run with Yamaha Motor Canada, a brief period with Gordon Bay Marine, several years with MD Marine Insurance and a new beginning with Boating Ontario in 2017.
- Rick and his partner and their 5 kids are all avid boaters spending all available summer hours on Lake Simcoe on their 1997 32' Regal Commodore.



Boating *Ontario*

61 Marinas / 9,983 slips / families
(average 163 slips / families)

Tobermory to
Sault Ste. Marie



2nd generation
Canadian
success story

- Dock systems
- Marine cradles & hydraulic trailers
- Wave attenuators



KROPE



CONOLIFT
AQUACULTURE
MARINE



I N D U S T R I A L I N G



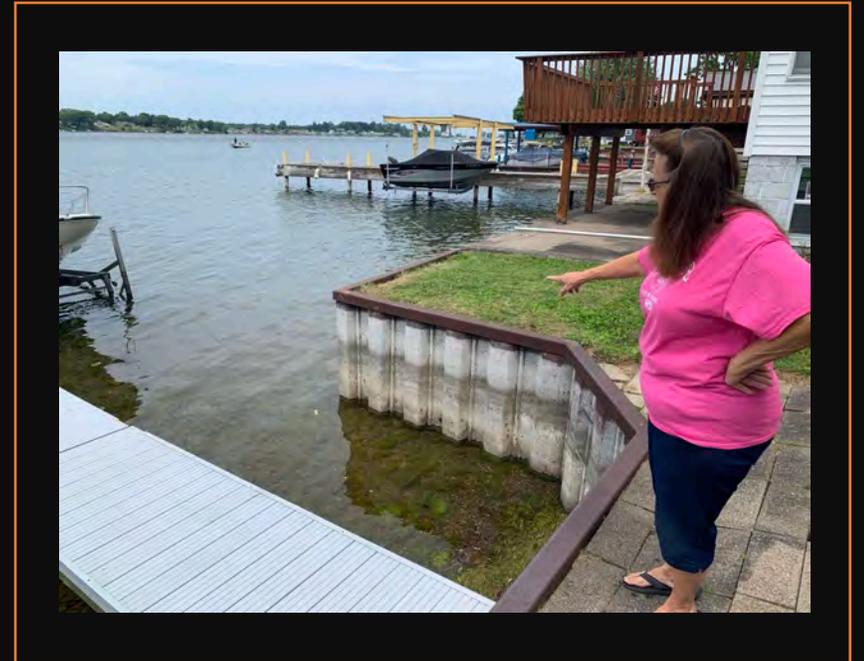
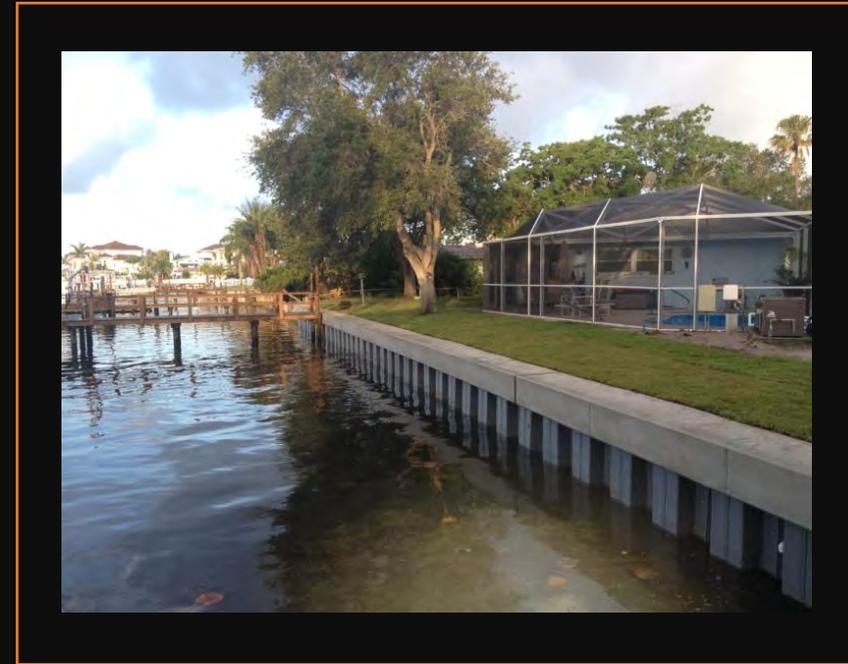
Dock systems

- Average cost PER SLIP \$8,000 - \$10,000
 - Incl. power, water
- PLUS existing removal = \$2,000 / slip
- PLUS - On land utilities (can be 100's of 1,000's of \$\$)
- PLUS – gangways, security
- Significant increased maintenance costs, adjusting floats, adding / extending / shortening chains
- 163 slip marina = \$1.6M +++



Shore wall systems

- Average cost \$2,000 / running foot
 - 300' minimum / marina
- PLUS existing system removal
- PLUS – Boardwalks
- 300' = \$600,000 +++



Shoreline property

- Showrooms
 - Parts stores
 - Fuel buildings
 - Roadways
 - Parking facilities
 - Owner & staff homes
-



Permits, inspections & regulations

- Utilities
- Local & Provincial government agencies



How they manage

- One 'bite' at a time, eg;
 - Year 1 – main finger docks
 - Year 2 – secondary docks, security systems and gangways
 - Year 3 – shore wall
- Other capital investments on hold
 - Roadways
 - Major building repairs
 - Storage facilities



Boating *Ontario*



- Rick Layzell
 - rlayzell@boatingontario.ca

- Jordan Kropf
 - Jordan@kropfindustrial.com

TOPIC B: Coastal Infrastructure - Marinas & Shoreline Businesses – Docks/Other Shoreline Structures – Impacts & Adaptation Strategies – Regulations

Speakers:

David Sweetnam, Executive Director, Georgian Bay Forever

Rupert Kindersley, Executive Director, Georgian Bay Association



Respecting our natural spaces

Increasing shoreline resilience by respecting natural processes, enhancing terrestrial and marine habitats, and providing recreational opportunities



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- Increasing variability in water levels, more rapid transitions between extremes and escalating violence of storms is going to present increasing challenges to managing shoreline structures that are sensitive to water level changes and waves.
- For new construction or relocations consider placing them above the minimum setback from the high water mark required by the municipality to mitigate for higher water levels



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Sunset Point Restoration \$300,000



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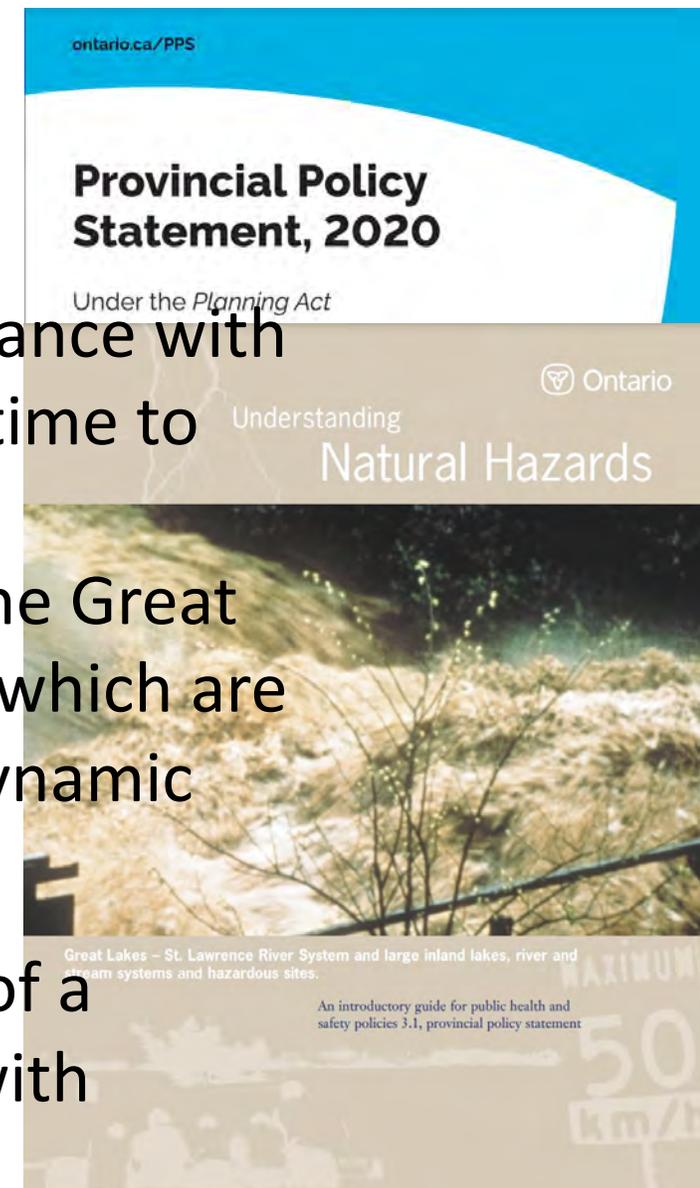
Ontario Provincial Policy Statement, 2020

3.1 Natural Hazards

3.1.1 Development shall generally be directed, in accordance with guidance developed by the Province (as amended from time to time), to areas outside of:

a) hazardous lands adjacent to the shorelines of the Great Lakes - St. Lawrence River System and large inland lakes which are impacted by flooding hazards, erosion hazards and/or dynamic beach hazards;

3.1.3 Planning authorities shall prepare for the impacts of a changing climate that may increase the risk associated with natural hazards.



What are the regulations?

- Planning permission requirements for new/replacement docks and relocating shoreline structures vary by municipality – consult your municipal planning department – setback requirements need to be considered

	<u>Crib Docks</u>	<u>Floating Docks</u>	<u>Shoreline Structures</u>
Regulatory Authority	MNDMNRF	Municipality	Municipality
Relocation along shore	Approval	Dock Permit	Building Permit Planning Permission
Relocation up/down shore	N/A	None	Building Permit Planning Permission
Expansion	Approval	Dock Permit	Building Permit Planning Permission
Removal	Approval	None Safe disposal important	Demolition Permit
Reconfiguration Raising	Approval	None	Building Permit

* Ministry of Northern Development, Mines, Natural Resources and Forestry is the new name for MNRF

What are the regulations?

- For new construction or relocations consider placing them well above the minimum setback from the high water mark required by the municipality to mitigate for higher water levels

- Need to plan - next extreme high water level could be higher than it was in 2019/20 – vulnerable buildings may be flooded
- Raising buildings that do not have plumbing and extensive decks is usually straightforward
- Relocating is more expensive but may be the best solution if higher ground is available
- Some boathouses can be converted to floating structures – consider new/replacement boathouses should be floating
- Contractors will have solutions





Photo: Robert Stephenson

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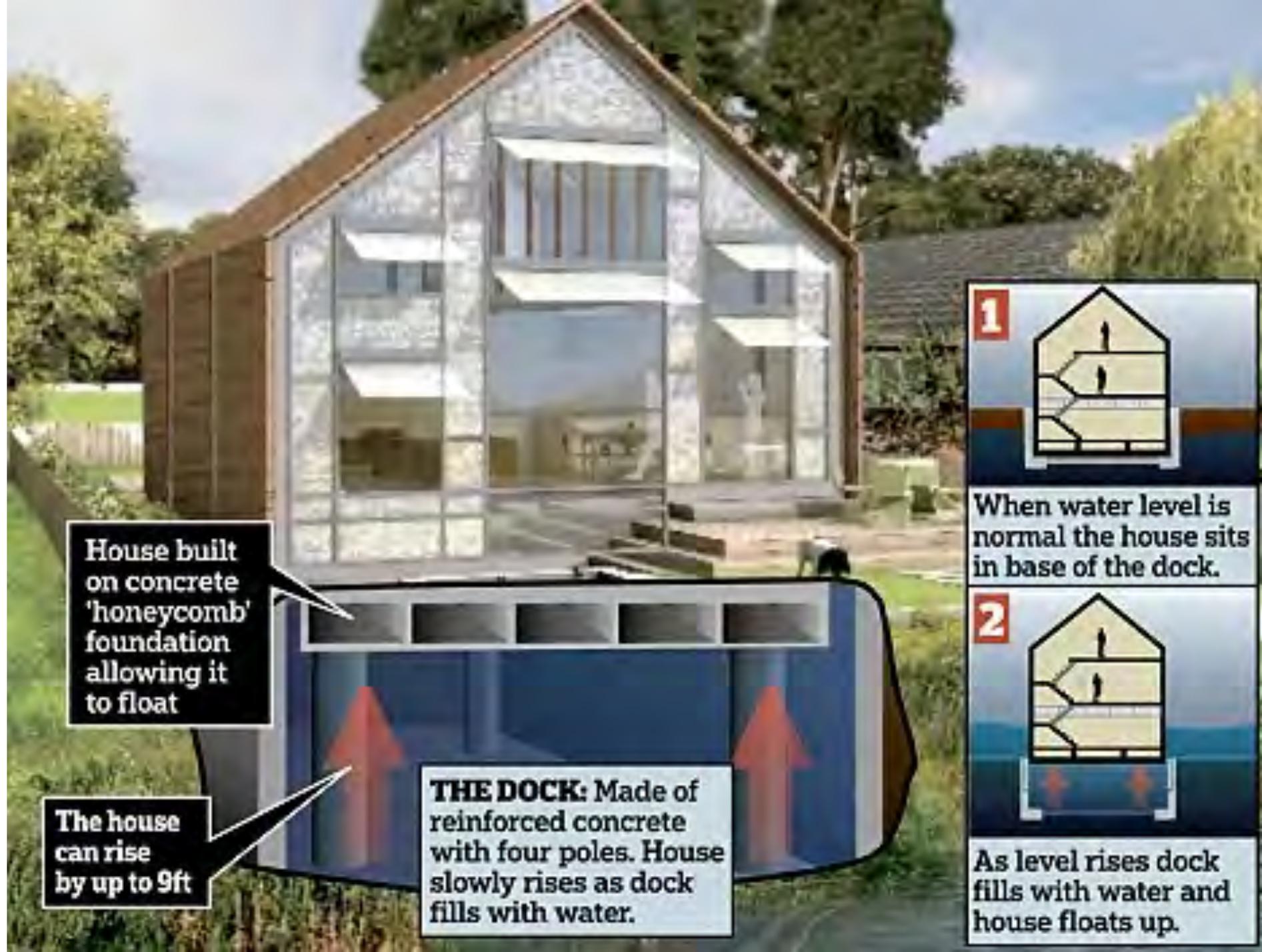
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House built on concrete 'honeycomb' foundation allowing it to float

The house can rise by up to 9ft

THE DOCK: Made of reinforced concrete with four poles. House slowly rises as dock fills with water.



1
When water level is normal the house sits in base of the dock.



2
As level rises dock fills with water and house floats up.

If a property along the Great Lakes is getting wet now, it will almost certainly be wetter in the future. While there is some scientific uncertainty about exactly what climate change will do to water levels, the extreme highs and lows will get worse. Volatility is the **new normal**. - [Daniel Macfarlane](#), Senior fellow, Bill Graham Centre, University of Toronto & Associate Professor, Western Michigan University. The Conversation.



Questions

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**NEXT: WHAT
CAN YOU DO**

**REGISTER
ONLINE AT
GBF.ORG/H2O**

A graphic for a webinar series. It features a large blue water droplet on the left containing the text 'H2O' in white, with '21' in a smaller font below it. The background is a dark blue, rippling water surface. To the right of the droplet, the text 'EXTREME WATER LEVELS: IMPACTS AND STRATEGIES WEBINAR SERIES' is written in white. Below that, 'SEPTICS, INSURANCE AND BUSINESSES' is written in a larger, bold white font. At the bottom right, the time '10 AM - 12 PM' and the date 'DEC 04' are displayed in white.

**EXTREME WATER LEVELS:
IMPACTS AND STRATEGIES WEBINAR SERIES**

**SEPTICS,
INSURANCE AND
BUSINESSES**

**10 AM - 12 PM
DEC 04**

Closing

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Rupert Kindersley

Executive Director

Georgian Bay Association

Water Levels 2021 - Marilyn Longlade Capreol



- Early spring of 1949, I was born to Napoleon and Norah Geroux Longlade. My first home was the island behind the Ojibway Island. During the winter months we moved to our mainland location on the shores of Pointe au Baril.
- Summers home was always bustling with Grandparents, aunts, uncles and many cousins. We would hear the song of languages, both Ojibway and French. Hear the fishing stories each day and/or watch Grandma and aunts make their quill boxes.
- Very young we were taught to respect and understand the gifts of water, wind, animals, plants, the sky that holds beautiful stars. Our first knowledge and education were done by our parents, grandparents and community. There are no books to this day for this gift of learning. It was and is strictly learned by the teachings.
- I am very grateful and acknowledge, Mishomis Giizis (Grandfather Sun) miinwaa (and) Nokomis Dibik Giizis (Grandmother Moon). They encourage every living being and walk beside all each day.

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Thank you!