



Development of a Coastal Resilience Framework, Lake Erie North Shore Pilot

Pete Zuzek, Linda Mortsch, Larry Hildebrand
January 19, 2023



I – WELCOME



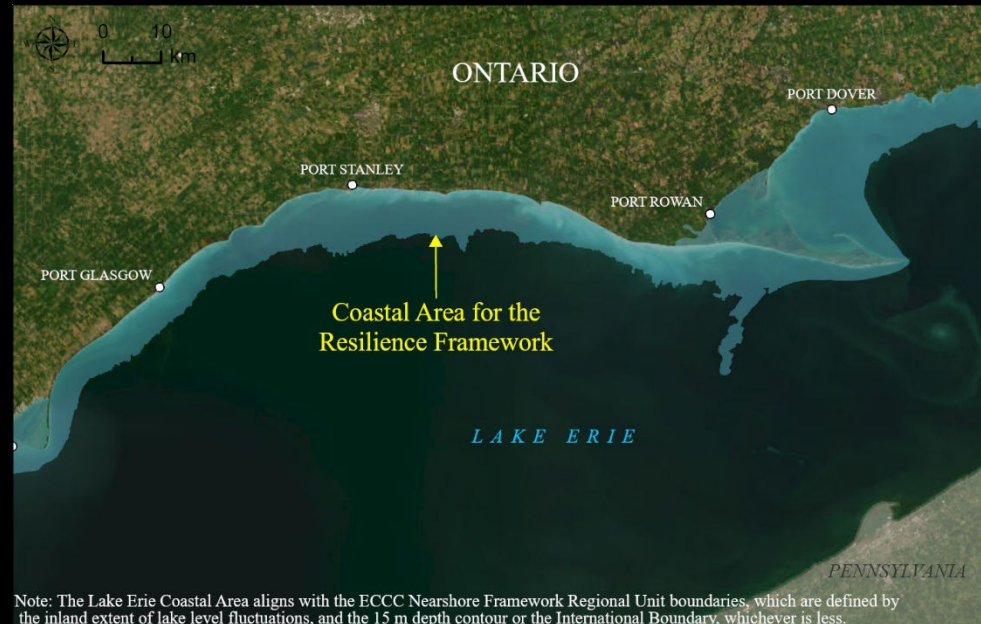


Agenda Review

- I. Welcome
- II. Recap of Previous Meeting Highlights
- III. Updated Narrative and Logic Model (overview only)
- IV. Breakout Discussions on Logic Model
- Break
- V. Breakout Discussion on Mutually Reinforcing Activities
- VI. Next Steps



II – RECAP OF PREVIOUS MEETING HIGHLIGHTS





Legislation and Policy Scan

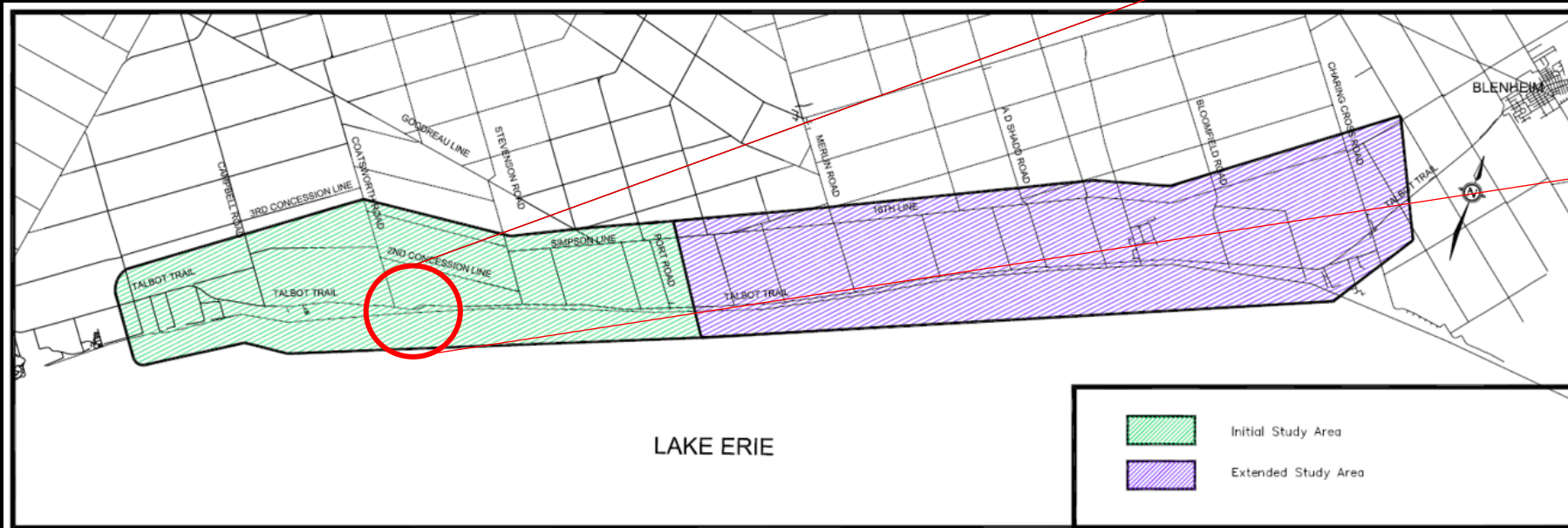
- Found in Downloads at: <https://zuzekinc.ca/ResilienceFramework/>
- Excel file: USE FOR INPUT_SCAN_Legislation_Policy_Programs_Strategies etc. 22.12.16 FINAL
 - Modifications based on December 15 meeting discussions
- The Asks:
 - Provide Agency content – POPULATE
 - Due January 31/2023



Chatham Kent Update: Council Decision on Talbot Trail Relocation EA

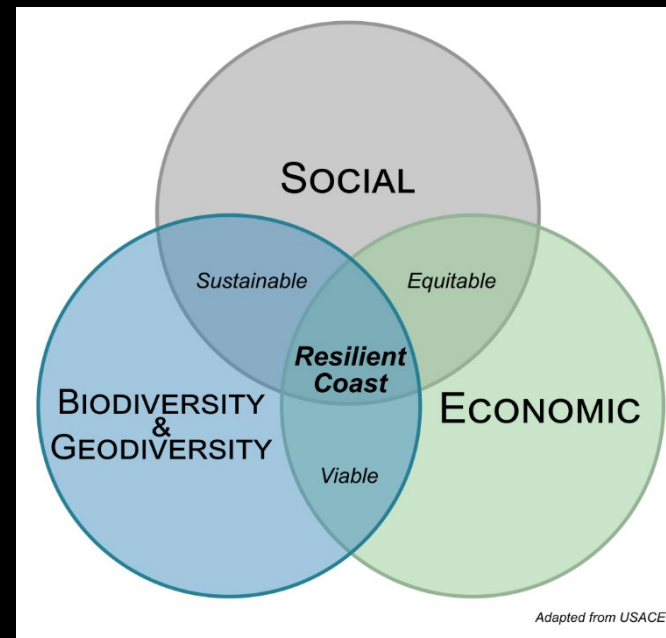
Planned
Retreat

- CK Council voted Monday to reject staff's recommendation to submit the full EA, which identified a plan to solve the current road closure and adopt a Long-range Property Protection Plan (zoning to freeze development on a future corridor inland)
- Chose to only submit a portion of the EA (red circle)
- Many failures and lessons learned ...





III – Updated Narrative and Logic Model





Narrative – Business-as-Usual

- The north shore of Lake Erie faces growing challenges related to more severe coastal hazards, habitat and species loss, and development pressure. Climate change makes these problems worse. A warming atmosphere and lake have caused dramatic reductions in protective winter ice cover and by late century the lakes could be largely ice-free. The record-setting water levels of 2019 are a prelude, as future extremes are projected to increase. Bluff and beach erosion rates are accelerating, flooding events are more frequent and severe, ecosystems and species are threatened, infrastructure maintenance costs are increasing, and irreversible damage is occurring in our protected areas that provide public access to the lake. The health of coastal communities is negatively impacted by these events and threats, and in some cases, disproportionately distributed.
- To meet the mounting challenges, communities and governments need a coordinated and organized response. However, landowners continue to build close to the lake and when assets are threatened, shoreline armouring is the go-to solution, which exacerbates the already exhausted sediment supply needed to maintain healthy beaches and coastal areas. Most municipalities struggle with capacity to undertake land use planning incorporating the lens of climate change. Tax-generating coastal development continues without sufficient consideration of current and emerging hazards. Government departments and ministries focus on core mandates, such as water quality or navigation, and lack the tools or framework for collaborative management at appropriate spatial scales in our coastal areas. Without a legislative framework (i.e., Act) or program that mandates/facilitates integration, sectoral management will continue.
- With the status quo, loss of critical habitat such as coastal wetlands will continue, and species will face extirpation. Recreational beaches will continue to degrade and may eventually disappear. Infrastructure damages from coastal hazards will increase and costs to repair damages will reach unaffordable levels. Homes will continue to be destroyed by storms. Our current response strategy of shoreline armouring will continue to create negative feedback loops, resulting in further degradation of our coastal ecosystems and cause more negative downdrift impacts. Planned retreat for coastal communities won't be one of many adaptation options to consider, it will be the only option.



Narrative – Pathway to Resilience

- In our vision of the future, Lake Erie stakeholders, landowners, rights holders, and all levels of government recognize that the north shore coastal area is a dynamic integrated social, economic, environmental, and physical system. A “Great Lakes coastal resilience ethic”, which recognizes the value of and the need for integration, coordination, stewardship, and investment in the Great Lakes coastal system, will improve the quality of life for present and future generations.
- The Coastal Resilience Framework will be the mechanism to facilitate the implementation of the Great Lakes coastal resilience ethic and co-develop innovative, strategic, and practical solutions. An integrated, regional perspective (e.g., littoral cell management linked to the land) to co-management and governance will be implemented to provide an effective mechanism to engage and involve all levels of government, expand expertise and innovation, and build capacity with rights holders, local stakeholders, and communities to make informed decisions and to develop and implement effective actions to address current stressors and future threats. An “all of society” approach would develop a shared vision, use coordinated and collaborative approaches and adopt a learning framework that includes performance measures to assess, adapt and improve.
- Coastal Resilience Councils will lead and coordinate implementation of the Framework and develop specific goals, activities, outputs, and outcomes for each lake. The Framework focuses on five key pillars of action: data collection, funding, research, stewardship, and collaborative governance, planning, and action. A key outcome for the Framework and Resilience Councils will be integrated littoral cell coastal management plans that leverage new ways of working together, establish coordinated priorities, and take collective action to increase coastal resilience.
- Success will be achieved through participation, monitoring, and evaluation of progress on outputs and outcomes relative to the framework goals. An Adaptive management approach is followed to formalize this process.



“VISION” and GOALS

- “Bring partners together in coastal areas of the Great Lakes to work towards increasing coastal resilience, embrace the process, understand their role, and empower them to collaborate and create beneficial outcomes”
- Recognize the interconnected nature of our social, economic, environmental, and physical systems in Great Lakes coastal areas
- Advocate for and coordinate data collection for coastal resilience projects
- Pursue joint funding applications to plan and execute initiatives that increase coastal resilience
- Share knowledge with stakeholders and increase coastal stewardship
- Advance coastal research and train future professionals/leaders
- Develop integrated littoral cell management plans to increase coastal resilience



Lakewide Resilience Council and Cell Specific Management Plans





Existing Shoreline Management Plans (SMPs) in Ontario (limited by participants)

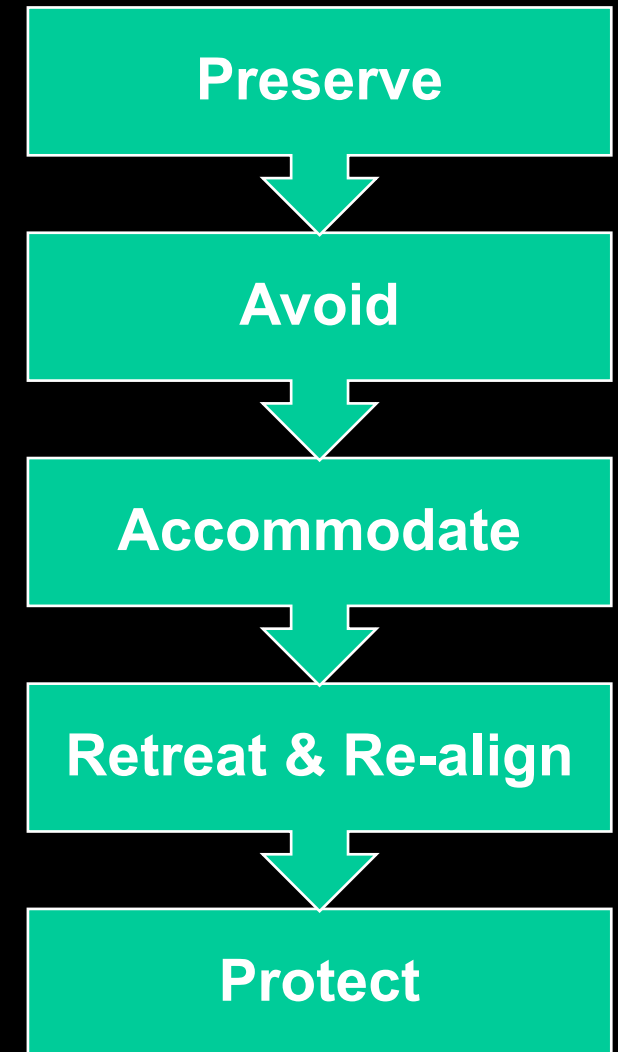
- Developed by Conservation Authorities and/or Municipalities. **SMPs only integrate 'some' coastal management issues facing communities and ecosystems**
- Provincial and federal mandates not included – **limiting management options**
- **Example:** Quinte Conservation Shoreline Management Plan (June 21, 2022)





Addressing Coastal Hazards for Quinte Conservation SMP

- Hierarchy of approaches when making recommendations to increase resilience:
 - **Preserve** nature and enhance beaches. Local studies are needed to improve dunes, parking, washrooms
 - **Avoid** further development on hazardous lands
 - **Accommodate** existing risks with mitigation approaches
 - **Retreat and Re-align** land uses to increase resilience to extreme coastal hazards
 - **Protect** infrastructure and buildings. Enhance landowner stewardship and share knowledge of alternatives to hard grey engineering structures. Embrace nature-based solutions





Shoreline Management Recommendations

Reach 1 Example

- Inventory natural heritage, species and habitat, navigation issues at the littoral cell scale ... but **management recommendations focus only on outcomes related to land use planning and natural hazards** (Municipal/CA mandates)

Reach 1 – Wellers Bay

Local Conditions

- Reach Length = approximately 34 km.
- The Wellers Bay National Wildlife Area shelters a significant portion of Wellers Bay from lake waves. The barrier beach is also low and narrow in several locations, which could breach in future storm events.
- Due to the shallow water depths and low-lying lands surrounding the bay, extensive coastal wetlands are found in Wellers Bay.
- The remaining shoreline is densely developed with cottage and permanent homes.
- Flood impact risks are very high in Wellers Bay and many communities do not have safe emergency ingress and egress.

Wellers Bay Barrier Beach

Shoreline Development and Armouring

Shoreline Characterization

- Provincially significant wetlands are extensive throughout Reach 1. See adjacent image.
- Although not recognized as provincially significant, other wetlands are found throughout the Wellers Bay, including shallow submerged wetlands.
- Isolated stands of the invasive phragmites were observed, including the sheltered side of the Wellers Bay barrier beach.
- Isolated exposures of bedrock were observed at the waters edge, but most is covered with various forms of shoreline protection.
- Much of the shoreline is low-lying and flood prone with flat topography.
- The reach terminates on the lake side of the bay with a 700 m long dynamic beach.
- Reach 1 shoreline is 80% natural and 20% armoured, based on the entire shoreline length (including Wellers Bay barrier beach).
- Of the armoured portion of the shoreline, 69% is ad-hoc field stone or quarry stone bank protection, 12% is concrete seawall, and 8% is scrap concrete placed on the shoreline.
- Tolerance for additional shoreline hardening is low.

Shoreline Type - Reach 1

Shore Protection Type - Reach 1

Challenges Associated with Natural Hazards

- Wellers Bay shoreline is low lying and many of the buildings and underground utilities (septic systems) are located within the Flooding Hazard Limit (see below).

- Several communities feature flooded ingress/egress routes, which may prohibit evacuations during a flood or limit emergency responders from providing services. Affected roads include Harbard Lane, Hiscock Shores Road, and Sunset Lagoon Drive.

- The barrier beach that defines the Wellers Bay National Wildlife Area is very narrow and the northern half has been eroding at least since 1962. The barrier beach has breached in the past, and future breaches of the barrier are likely. This may increase the exposure to natural hazards within Wellers Bay in the future.

Technical Basis for Natural Hazard Mapping

- Recession Rate for Erosion Hazard Limit (Stable Slope not included):

Geographic Area	Recession Rate (m/year)
Wellers Bay (sheltered shoreline in bay)	0.10
Low bank shoreline (lake shoreline)	0.16

- 100-year Flood Level and Wave Uprush Limit:

Reach	100-year Flood Level (m IGLD'85)	Horizontal Uprush Allowance (m)	Calculated Wave Uprush Elevation (m IGLD85)
Inside Wellers Bay (sheltered)	76.07	15 m	76.7
National Wildlife Areas (lake shoreline)	76.07	Varies	78.1
Exposed Low Bank Shoreline on Lake	76.07	15 m	79.0

- Dynamic Beach(es): Coordinates in UTM Zone 18N, NAD 1983

Start	End	Recession Rate (m/year) or Stable	Dynamic Beach Name
293284, 4873312	293646, 4872609	Stable	SE End of Wellers Bay

- Offshore Wave Climate:

WIS Station	ARI (years)	Depth (m)	Hs (m)	Tp (s)	DIR (deg)
91206	25	19	6.4	10.5	230 – 245
	100	19	7.0	11.0	230 – 245
91209	25	24	6.9	10.7	235 – 250
	100	24	7.5	11.1	235 – 250

Shoreline Management Recommendations

- Preserve:** maintain natural shorelines, geodiversity, and vegetation to preserve resilience, natural protection, and ecological benefits.
- Avoid:** ensure new development occurs outside of hazardous lands, and prohibit development/redevelopment in areas that are inaccessible during major floods.
- Accommodate:** site specific investigations are required for communities with safe access challenges, as identified through the hazard mapping. Floodproof buildings, raise foundations, and upgrade septic systems on flood prone lands. Emergency planning and preparedness for a major flooding event.
- Retreat and Realign:** re-align driveways, roadways through trailer parks, cottage communities, etc. and relocate homes to highest ground, where possible.
- Protect:** hybrid grey/green erosion and flood protection schemes are recommended, as discussed in Section 7.3.2 of the SMP. Engage with the Canadian Wildlife Service, which own the majority of the Wellers Bay barrier beach, and discuss potential restoration options.

Use Disclaimer

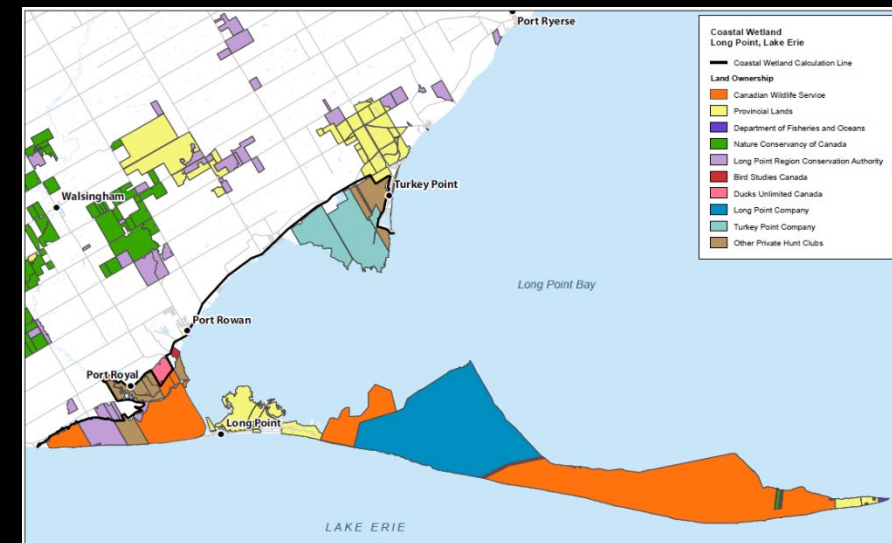
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Sediment Management Challenges in the Long Point Littoral Cell



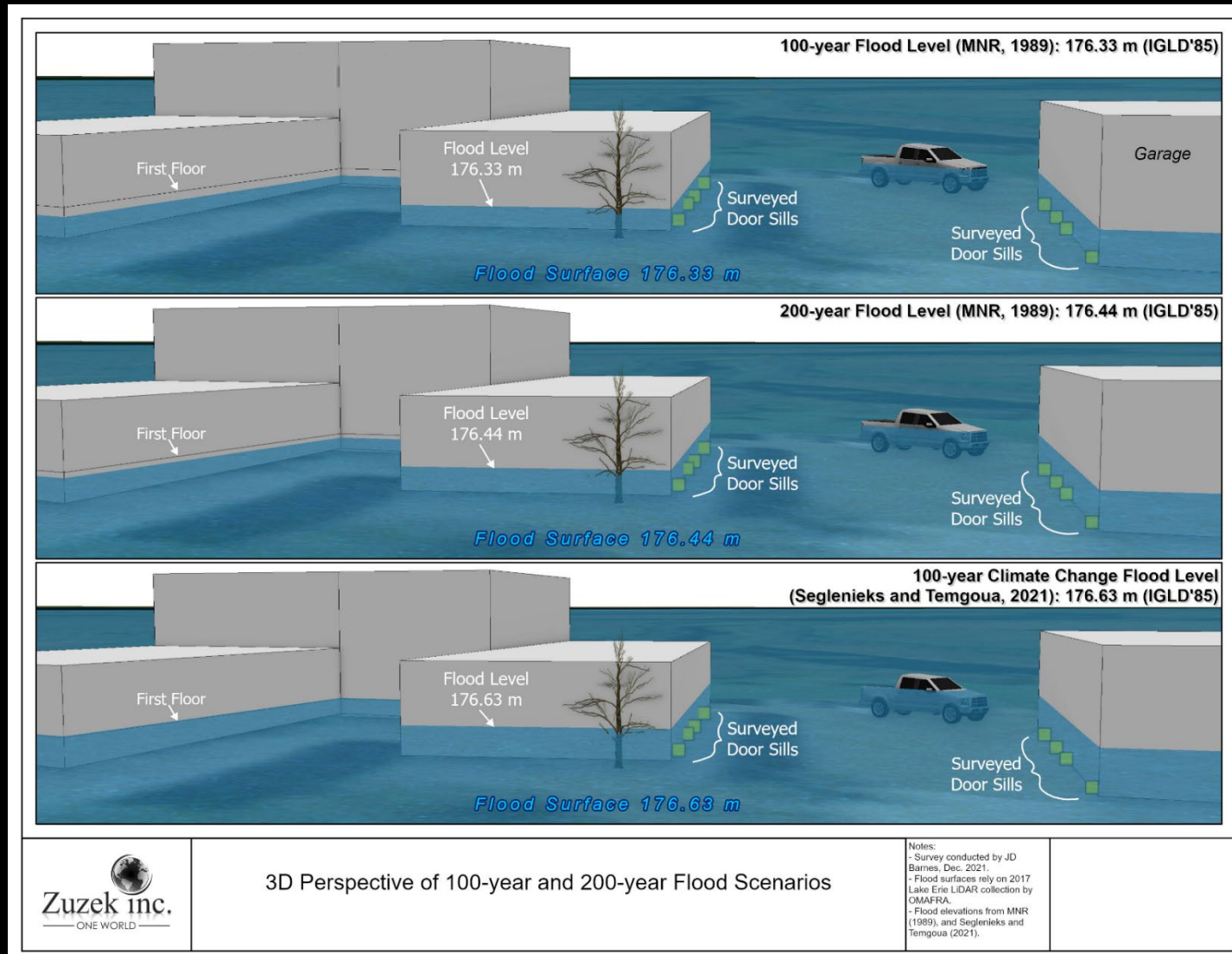
- Federal harbour infrastructure has trapped +18 million cubic metres of sand and gravel destined for the depositional beaches at Long Point
- Long Point has lost 250 hectares of coastal habitat since 1964 (mostly wetlands)
- **Outcome: Lack of integration and collaboration has resulted in 8 separate management plans and no shared vision for the same 40 km sand spit**





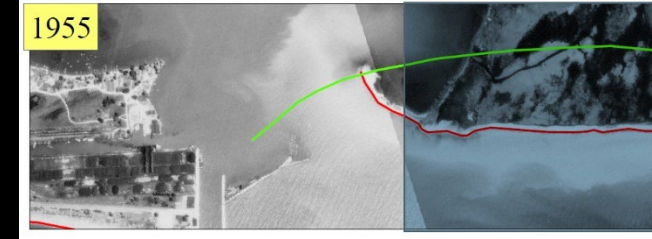
Conservation Authority Hazard Mapping at Long Point (and beyond)

- Conservation Authorities **do not** map hazards on provincial and federal lands
- Long Point Region CA received federal NDMP funding to update hazard mapping in 2019 - no mapping of provincial or federal lands
- **Outcome:** A federal building cluster was re-built on lands below the 100-year lake level (adjacent) **because no collaboration**

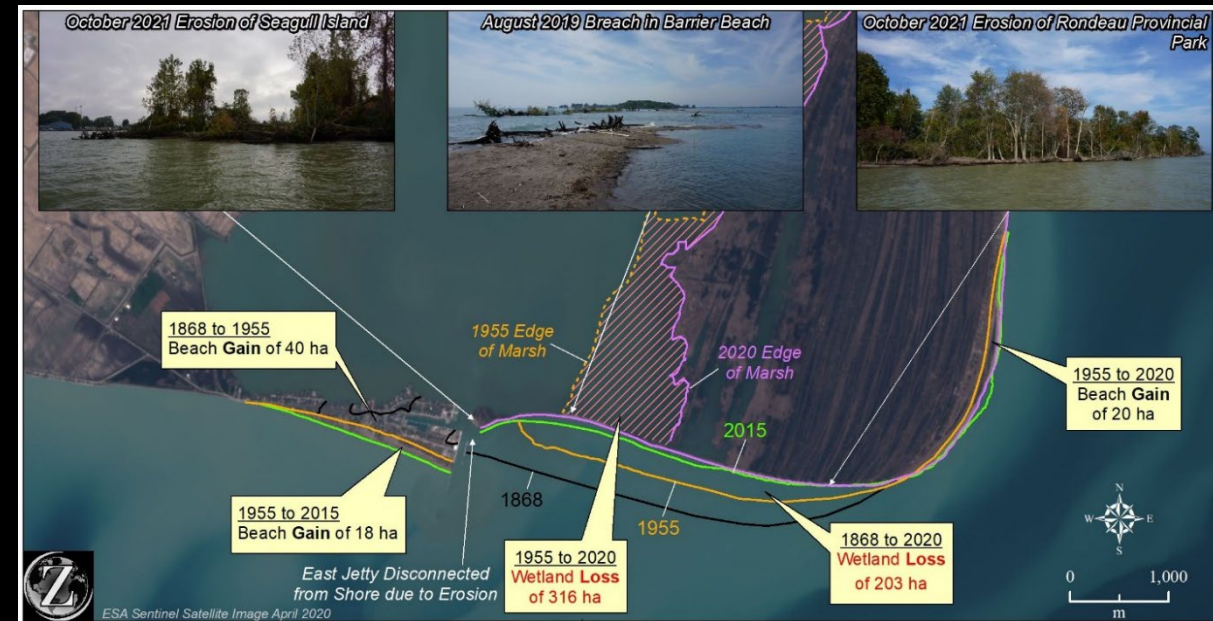




Rondeau East and West Littoral Cell Issues



- Navigation channel jetties have starved the tip of Rondeau PP of sediment since mid-1800s, yet no management plan to solve the problem
- **Outcome:** lost 500+ hectares (1,200+ acres) of coastal wetlands
- **Outcome:** ~500,000 m³ of sediment eroded from barrier beach and trapped in the navigation channel (bottom left, brown shading) due to east jetty configuration





Point Pelee East and West Littoral Cells Issues



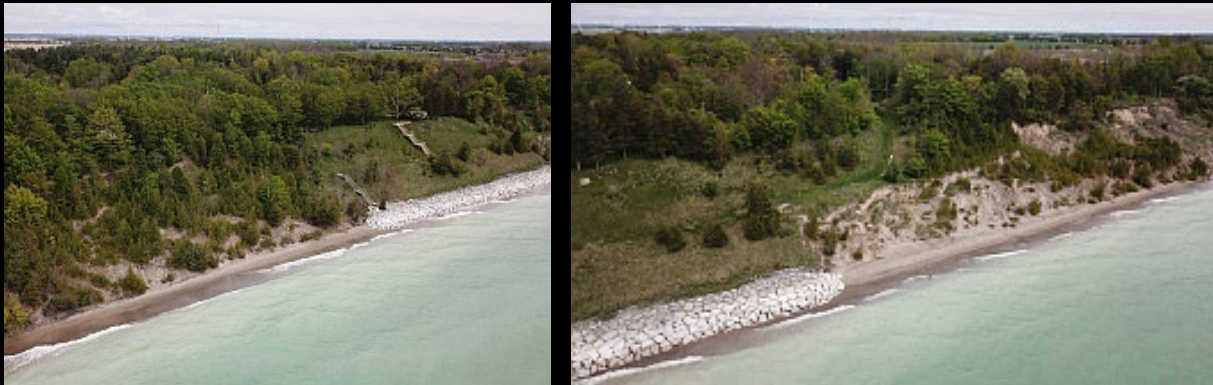
- **Shoreline armoring** has compromised sediment supply to the Pelee Peninsula and Point Pelee National Park
- Harbours trap or interfere with the remaining supply
- **Outcomes:** Habitat loss, endangered species impacted, vulnerable infrastructure





Framework Can Highlight Shoreline Armouring Impacts in Littoral Cell (and other governance issues)

- In the PPS (2020), it states:



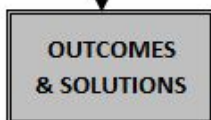
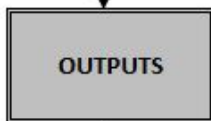
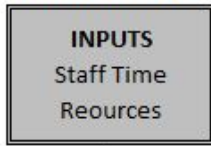
- Great Lakes – St. Lawrence River Technical Guide (2001), Section 7.4 ‘Addressing the Hazards’, outlines the following tests that must be satisfied to permit development on hazardous lands (e.g., an eroding bluff shoreline) from 1997 PPS:

- 3.1.7 Further to policy 3.1.6, and except as prohibited in policies 3.1.2 and 3.1.5, *development and site alteration* may be permitted in those portions of *hazardous lands* and *hazardous sites* where the effects and risk to public safety are minor, could be mitigated in accordance with provincial standards, and where all of the following are demonstrated and achieved:
- development and site alteration* is carried out in accordance with *floodproofing standards, protection works standards, and access standards*;
 - vehicles and people have a way of safely entering and exiting the area during times of flooding, erosion and other emergencies;
 - new hazards are not created and existing hazards are not aggravated; and
 - no adverse environmental impacts will result.

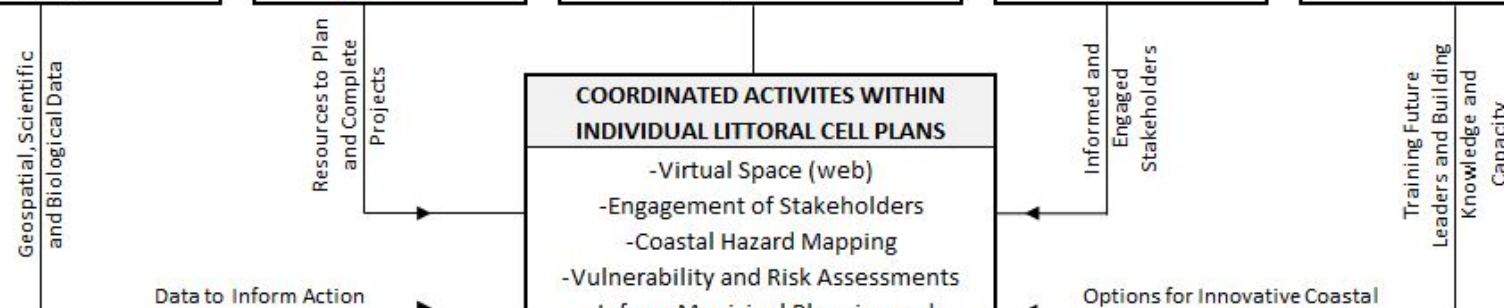
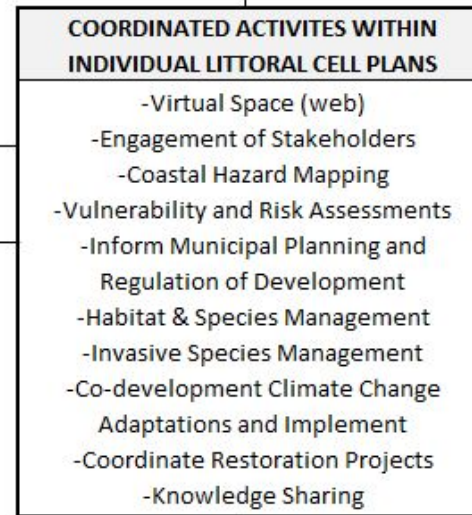
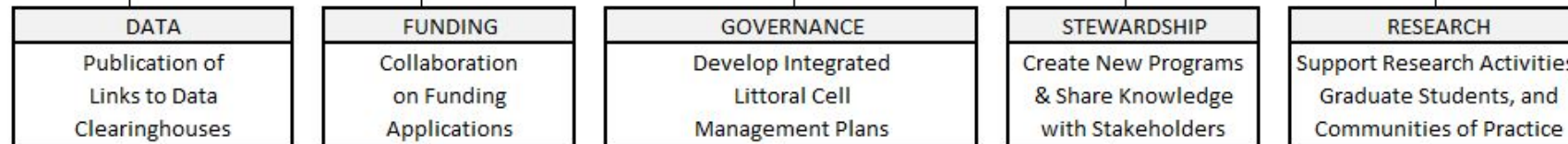
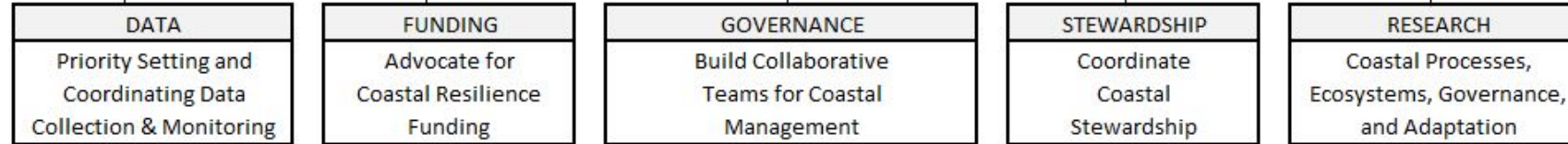
- 3.1.3 Except as provided in policy 3.1.2, *development and site alteration* may be permitted in *hazardous lands* and *hazardous sites*, provided that all of the following can be achieved:
- the hazards can be safely addressed, and the *development and site alteration* is carried out in accordance with *established standards and procedures*;
 - new hazards are not created and existing hazards are not aggravated;
 - no adverse environmental impacts will result;
 - vehicles and people have a way of safely entering and exiting the area during times of flooding, erosion and other emergencies; and
 - the *development* does not include *institutional uses* or *essential emergency services* or the disposal, manufacture, treatment or storage of *hazardous substances*.

CANADIAN GREAT LAKES COASTAL RESILIENCE FRAMEWORK

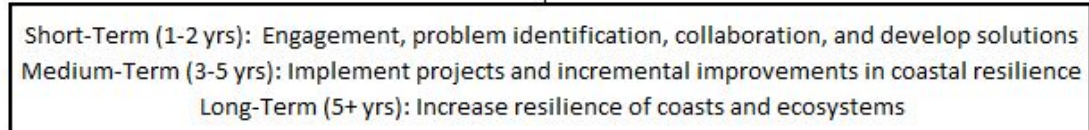
LOGIC MODEL



BY LAKE



Learn from Outputs and Revise Activities As Required

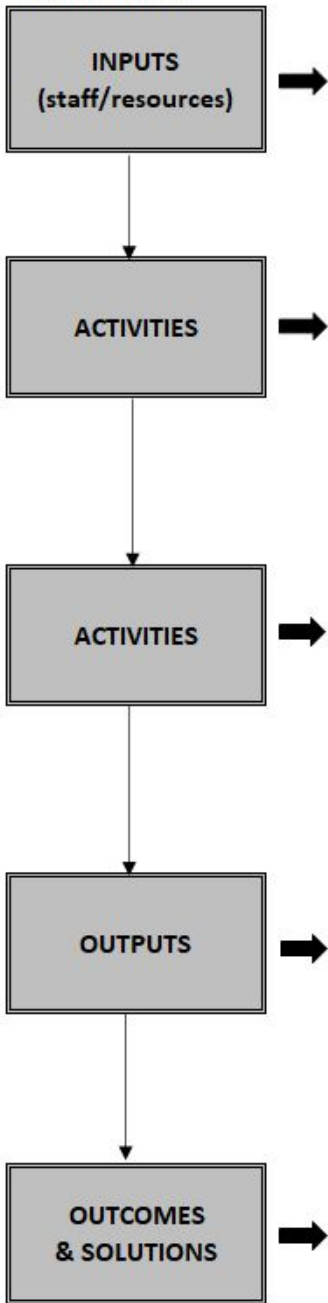


Evaluate Outcomes and Update Goals and Activities (as required)

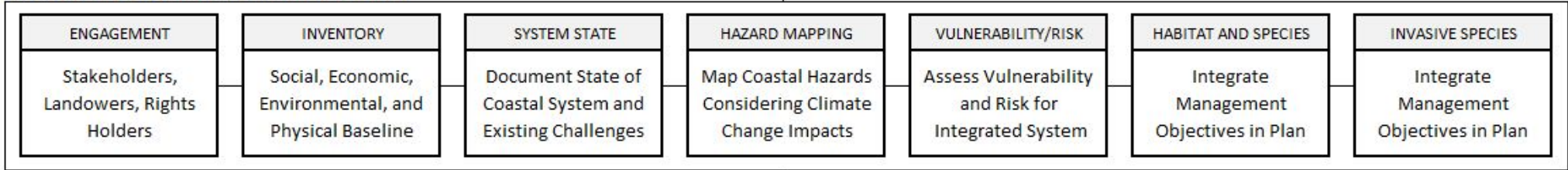
ADAPTIVE MANAGEMENT LOOP

LITTORAL CELL MANAGEMENT PLANS

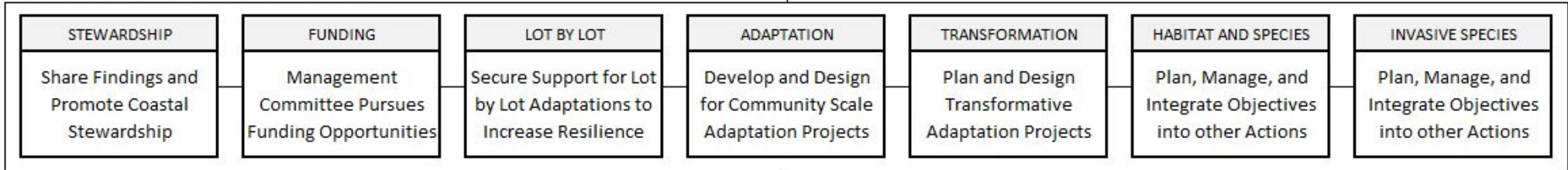
LOGIC MODEL



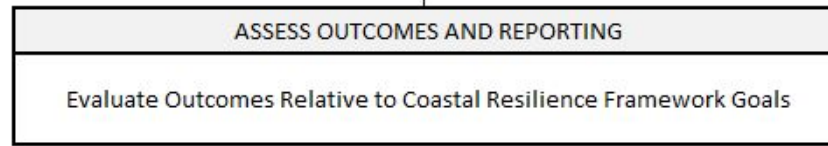
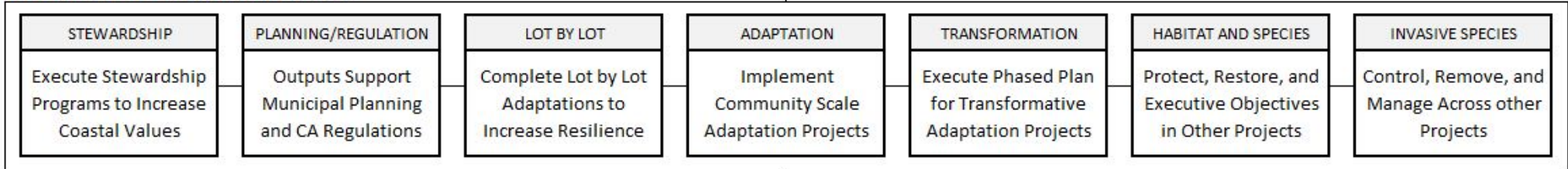
ASSESS AND PLAN (integrated activities)



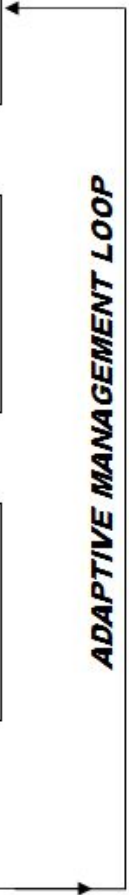
TAKE ACTION (integrated activities)



IMPLEMENT (integrated activities)



ADAPTIVE MANAGEMENT LOOP





IV – Breakout Discussion on Logic Model



Break



V – Breakout Discussion on Mutually Re-enforcing Activities

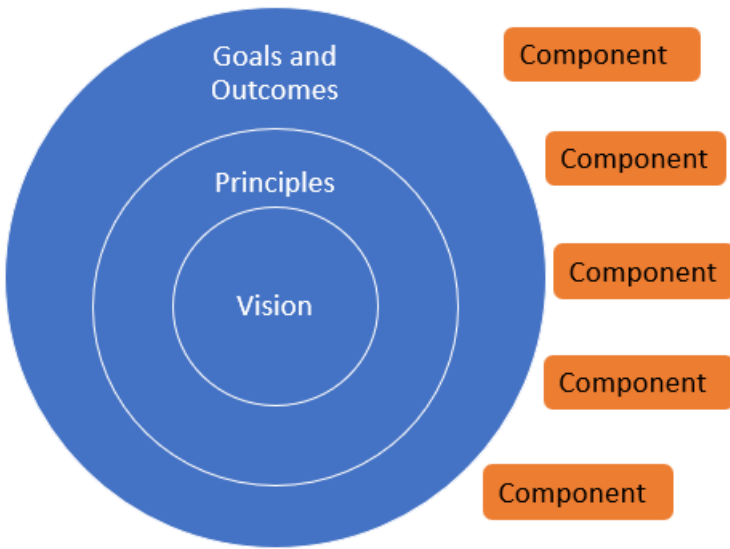


VI – NEXT STEPS



Meeting 1: Common Understanding and Shared Vision

*What is coastal resilience?
What are the narrative, goals and outcomes?
What are we aspiring to achieve?
Why do we Need It?*



All of Society Approach
Equity in Collective

November 2022

Meeting 2: Who Needs to Be Involved & What Others are Doing?
*Who is actively working on coastal resiliency (stakeholder mapping)?
What is happening internationally?*

December 2022

Meeting 3 & 4 Mutually Re-enforcing Activities

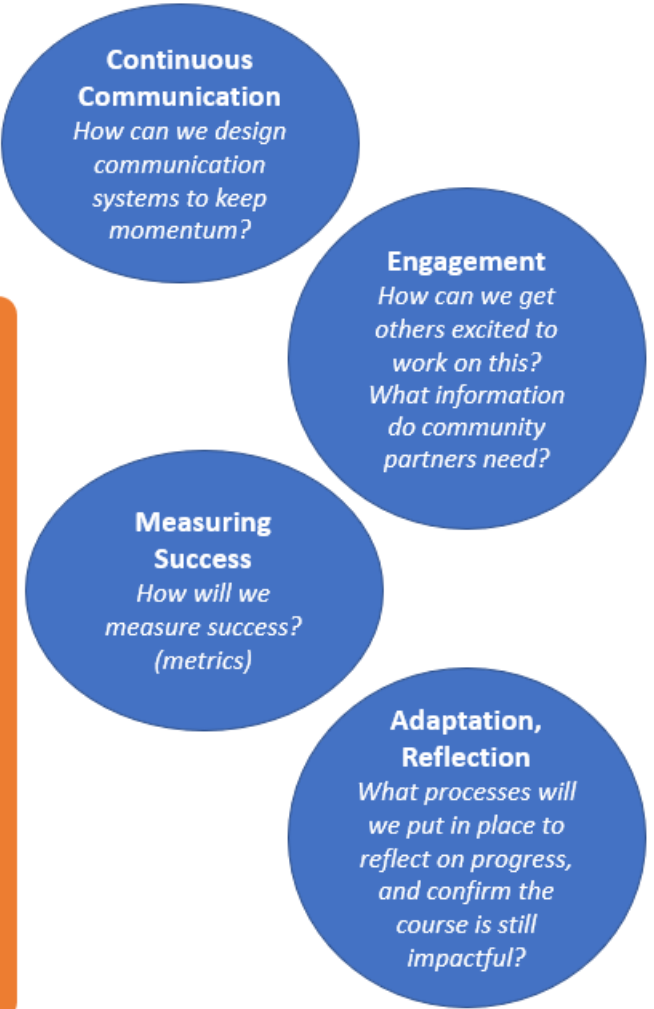
*What activity is already occurring?
What roles exist? What are possible leverage points to consider? How can current activity be better shared/coordinated?*

*Does anything work at cross purposes? What are the gaps? To improve resiliency outcomes, where could we start?
What actions are needed and by which organizations?*

January-February 2023

**Governance Model/
Backbone Support**

Meeting 5: Draft Framework and Measuring Success



March 2023



Discussion at Next Think Tank Meeting

- Findings from legislation and policy scan
 - Highlights from the international literature and best practice review
 - Communication and engagement approach for FY2 (April 2023+)
 - Continued discussion of mutually reinforcing activities
-
- Final FY meeting, March 23, 2023



MEETING ADJOURNED

