Miawpukek First Nation

Conne River Climate Change: Assessment and Adaptation Plan

(April 2013)

Project Team

Tract Consulting

Conach Consulting

Independent Consultant

- Dr. Norm Catto, Memorial University

Miawpukek First Nations

- Miawpukek First Nations Band Council
- Climate Change Steering Committee
- Residents of Conne River

Where is Conne River?

Presentation Outline

1. Rationale for Study
2. Local Geography of Conne River
3. Consultation + Engagement
4. Site Assessment
5. Housing + Built Environment Survey
6. Natural Hazards, Risks + Mitigation Plan
7. Community Response Plan
8. Policy + Regulatory Framework
9. Lessons Learned

1. Rationale for Study

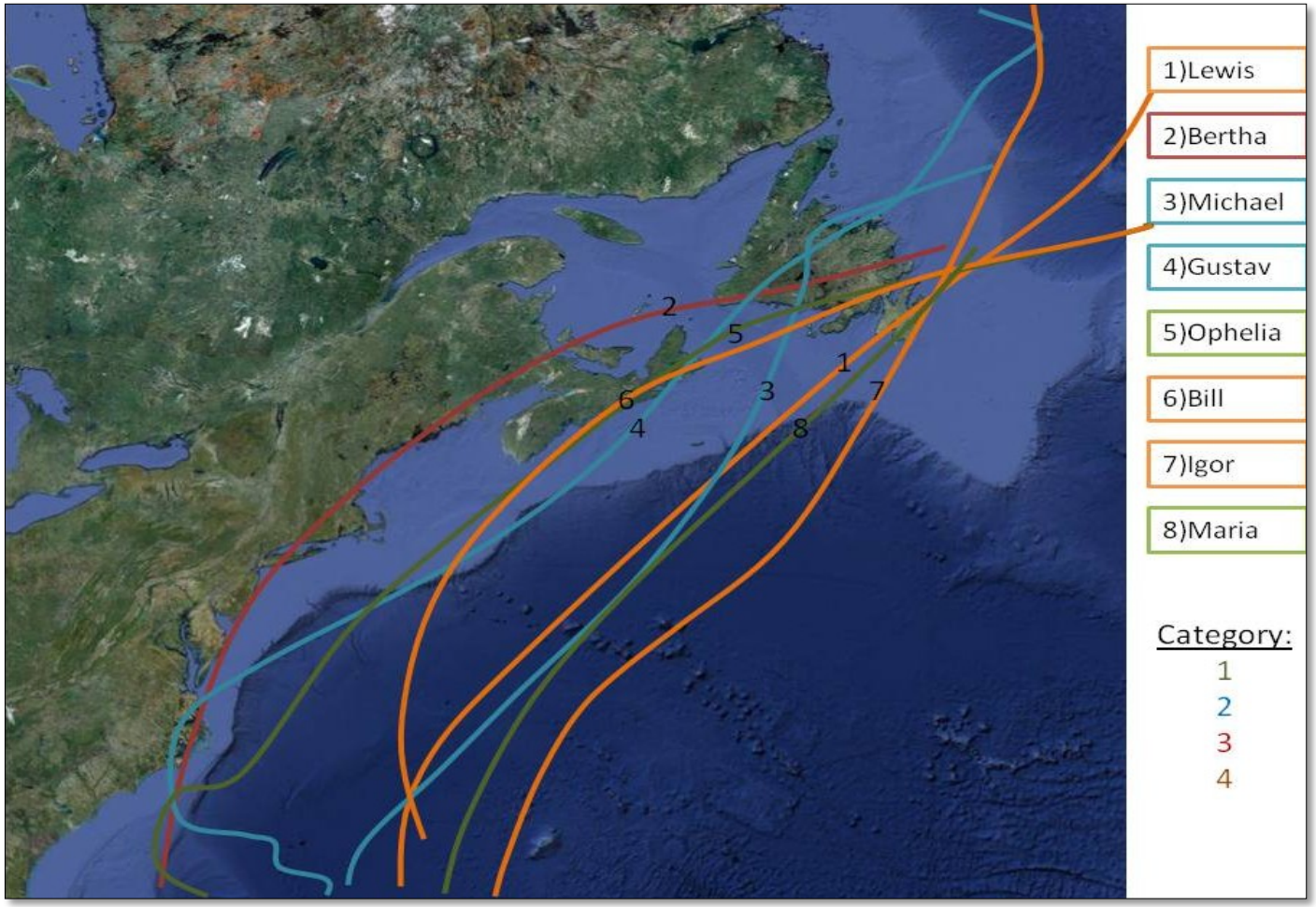
The Miawpukek First Nations community recognizes Climate Change as an important community issue.

They recognize two major steps in dealing with Climate Change:

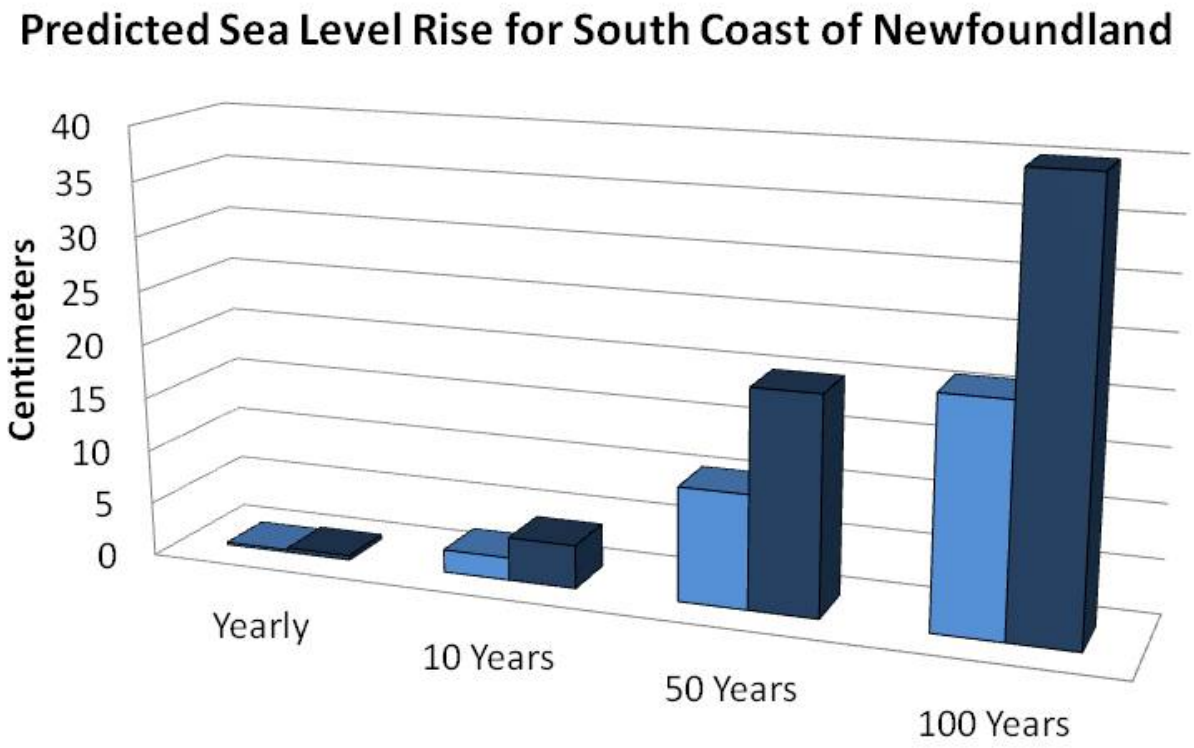
1. **Adaption**: To recognize the local risks and how to adapt to the unavoidable impacts of climate change.
2. **Mitigation**: To lessen the effects of climate change through green, and other, initiatives.

1. Rationale for Study

Eight hurricanes that landed on the Island of Newfoundland since 1995.



1. Rationale for Study

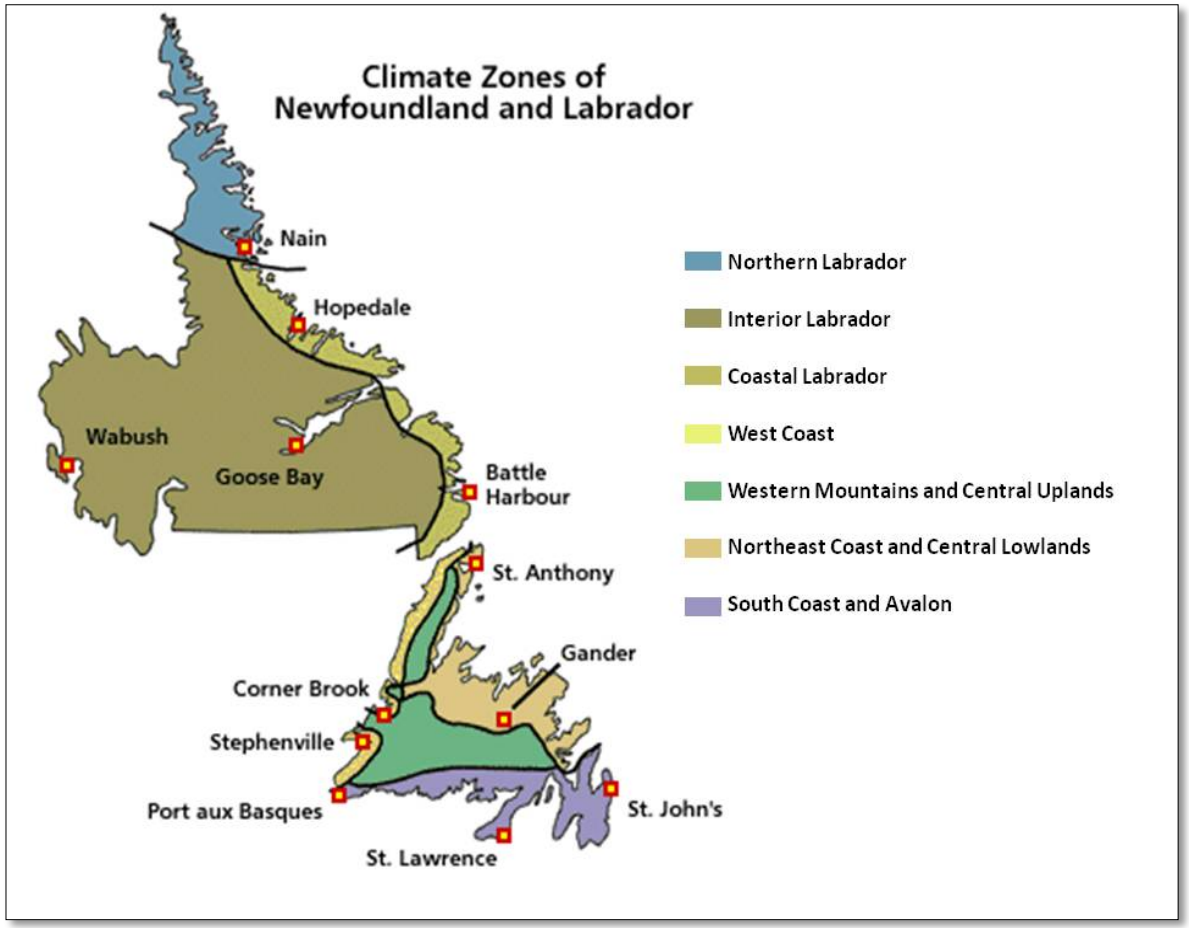


	Yearly	10 Years	50 Years	100 Years
Min	0.21	2.1	10.5	21
Max	0.4	4	20	40

***As a factor in coastal erosion, the trend of relative sea level change was determined to be rising between 2.1 and 4.0 mm/year.**

1. Rationale for Study

At Regional level we need to identify and comprehensively understand local dynamics and potential climate change impacts.



1. Rationale for Study

At Local level Conne River is vulnerable to varied natural resource and weather related risks: storm water discharge, erosion, fire and storm activity.

1. Rationale for Study

Science suggests impacts for the south coast of NL and Conne River over the next 100 years may include:

1. An increase in average annual temperature;
2. More frequent and severe storm events;
3. Increased water runoff, erosion and flood risks;
4. Increased risk for landslides + over-saturated soils;
5. Continued coastal erosion and loss of land; and,
6. Expanded forest fire risks.

1. Rationale for Study

Typical Climate Change adaptation approaches have been 'to protect, to retreat, to adapt or to do nothing'. We seek to expand those boundaries to:

1. Identify innovative alternatives through utilization of traditional knowledge,
2. Propose land use planning recommendations,
3. Seek enhanced engineering design standards; and,
4. Use Climate Change expertise to effectively respond to the local circumstances and needs of the Miawpukek First Nations.

2. Geography of Conne River

Physical characteristics of the local land base is a primary determinant in assessing the magnitude of exposure to the potential effects of Climate Change.

2. Geography of Conne River

The steep slope topography and the local soil profile, are key climate change impact considerations.

3. Consultation and Engagement

- Initiation meeting Chief, Council and Project Steering Committee.
- Project Page on Facebook.
- Training workshop to inform community about the project.
- Project update and public meeting notices.
- Three (3) community wide meetings. One (1) final presentation

Climate Change Assessment and Adaption Plan for the Miawpukek First Nation's of Conne River

First Public Open House | September 12, 2012

You are invited!

Dear Residents,

This project is about assessing the effects of Climate Change on the community and to identify measures that can be taken to mitigate these risks. With the increased frequency and intensity of extreme weather occurring in the region, the Band wishes to be proactive, rather than reactive, to the risks that Climate Change can bring. This Open House is to introduce the project to the people of Conne River and get their feedback/comments on it. We would also like to invite people to bring in photos and/or stories of any weather related damages to their property in recent years.

What: First Public Open House
Date: September 12th, 2012
Time: 1:30 pm
Location: Great Hall (located in the Band Office)

TRACT

conach consulting

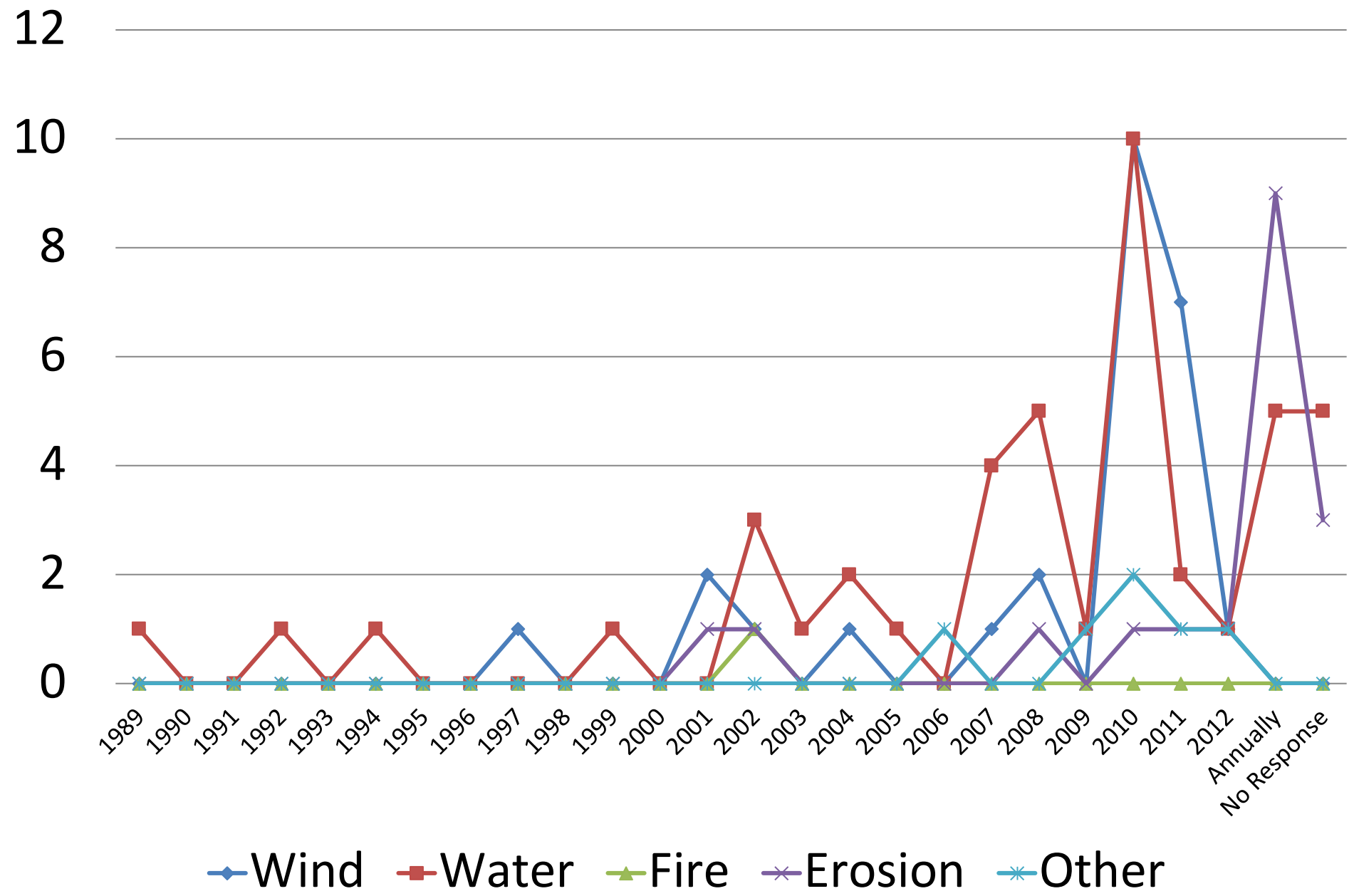
Miawpukek Mi'kamawey Mawi'omi | P.O. Box 10, Conne River, NL A0H 1J0
Telephone: 1-709-882-2470 | Toll Free: 1-866-882-2470 | Fax: 1-709-882-2292

4. Site Assessment

Community Features Assessed:

- Water and sewer infrastructure system
- Watershed and water quality
- Storm Water drainage patterns
- Transportation network
- Housing and other land development
- Local industry
- Topography and slopes
- Vegetation type and location
- Erosion risks
- Aquatic and marine environment
- Coastal management
- General physiology of the area.

Weather Related Damages by Date

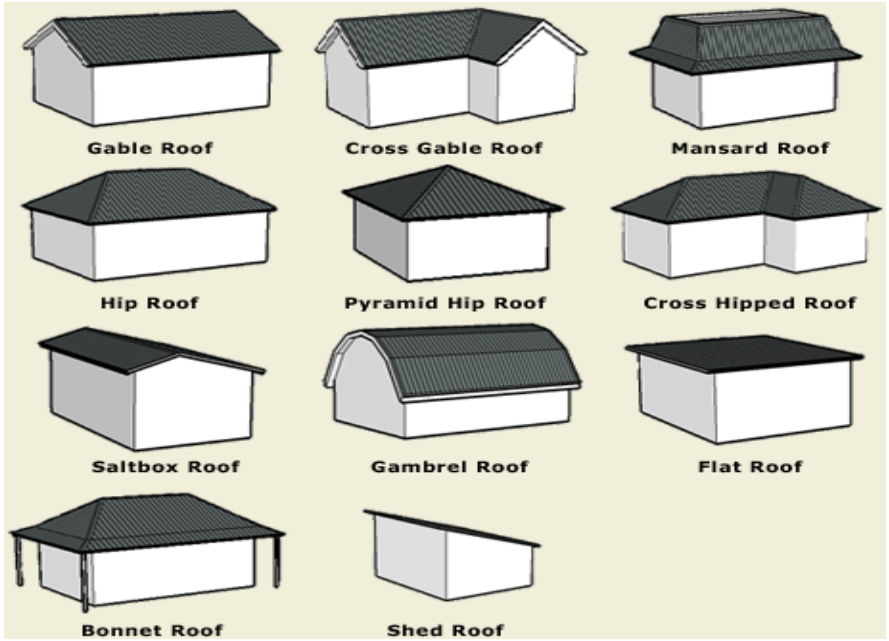


Coastal Erosion:

A) McDonald Clay Bank Site
B) McDonald Clay Bank Site
C) Erosion along coast
D) Erosion along coast with vegetation falling down
E) Erosion along coast
F) Erosion along coast with bedrock substrate

5. Housing/Built Environment Survey

Roofing Types



Foundation Types

All structures assessed:

- building materials,
- building type,
- age,
- foundations, and,
- location.

Examples of the types of culverts used in Conne River

Examples of choked culverts that may inhibit proper storm water drainage

Examples of problem areas regarding drainage:

A) Minimal amount of soil coverage over the culverts. Some cases of culverts not being placed deep enough and water running under the culvert opening.

B) Water drainage from steep driveways running over the road instead of into the ditches and culverts

Bog Area:

A) View of the Bog from beside the apartments
B) Cross-section of Bog material
C) Stream drainage from Bog east of apartments
D) Below the Bog east of apartments
E) Area of Bog drainage above new subdivision area

Examples of steep driveways and runoff issues

6. Natural Hazards Risk Assessment + Mitigation Plan

Climate Change Mitigation Steps:

1. Potential natural hazards and risks.
2. Probability of occurrence: High, Median or Low.
3. Evaluate potential consequences to community.
4. Hazards/risks prioritized: consequences, impacts + exposure.
5. Action strategies minimize/manage hazards + risks.
6. Actions assigned responsibility.
7. Applicable cost to be identified.
8. Timeframe identified for task completion.

6. Natural Hazards Risk Assessment + Mitigation Plan

Risk Evaluation Template

Risk		**Description of the risk that threatens the community.**
Risk Evaluation Criteria	**Level of Impact:** Rating the magnitude of the natural risk	• **Low:** Affects a localized portion of the community land base; Affects a minimal number of residents or one population cohort; Damage to one type of structural infrastructure systems; Minimal cost for repairs. • **Medium:** Affects several areas of the community land base; Affects most residents or more than one population cohort; Damage to two or three structural infrastructure systems; Moderate cost for repairs. • **High:** Affects most or the entire community land base; Affects all members of the community; Damages to all structural infrastructure systems; High costs for repairs.
	Likelihood: Rating the probability of occurrence	• **Low:** Not likely to occur and highly preventable • **Medium:** Somewhat likely to occur and somewhat preventable • **High:** Very likely to occur and not preventable
	Adaptive Capacity: Rating the Preparedness and ability to react	• **Low:** Little to no access to resources, personnel, and equipment and no partnership identified or established • **Medium:** Limited access to resources, personnel, and equipment with limited partnerships identified or established • **High:** Complete access to resources, personnel and equipment with existing partnerships identified or established.
Suggested Adaption Action		Suggested corrective measures that can be applied to the identified hazard
Overall Priority Level		Based on the Risk Evaluation ratings, an overall priority will be assigned: • **First Priority:** Corrective action to be taken within the first year

6. Natural Hazards Risk Assessment + Mitigation Plan

Storm Water Management

6. Natural Hazards Risk Assessment + Mitigation Plan

Storm Water Management

Risk		**Over capacity of Stormwater drainage systems and corridor resulting in localized floods or washouts**
Risk Evaluation Criteria	**Level of Impact**	High
	Likelihood	High
	Adaptive Capacity	Medium
Suggested Adaption Action		• Conduct comprehensive mapping inventory of all storm water management and natural drainage systems, including all piped systems and culvert locations ; • Continue ongoing inspection and maintenance of all storm water ditches, culverts, drainage corridors and discharge locations, including removal of sedimentation and impediments; • Prepare an Engineered Infrastructure Standards Manual to establish standards and requirements in the construction and operation of the storm water management system, and all other engineered infrastructure of water, sewer, roads and utilities.
Overall Priority Level		First Priority
Lead Partner		Department of Public Works
Support Partners		Band Council

6. Natural Hazards Risk Assessment + Mitigation Plan

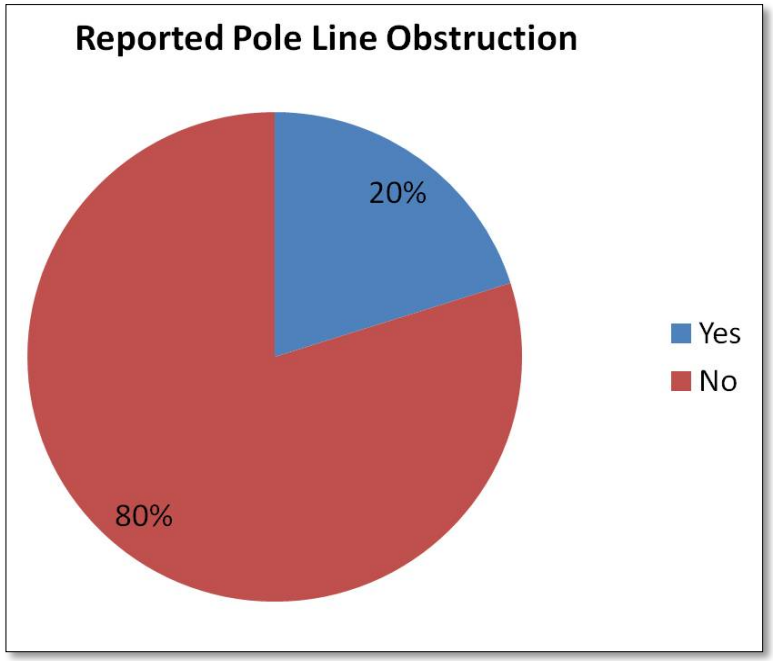
Flooding

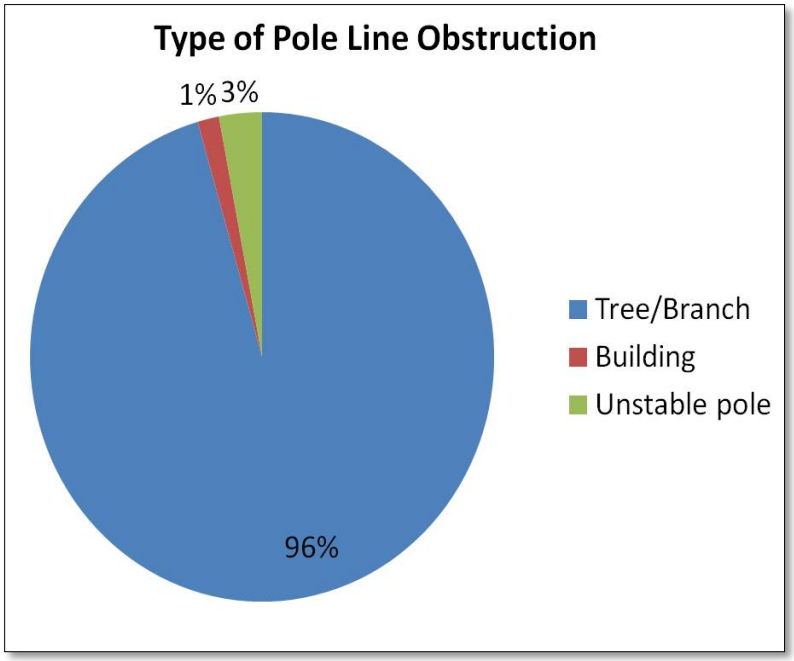
6. Natural Hazards Risk Assessment + Mitigation Plan

Road Washouts

6. Natural Hazards Risk Assessment + Mitigation Plan

High Winds: Fallen Trees and Power Outages





6. Natural Hazards Risk Assessment + Mitigation Plan

Coastal Erosion

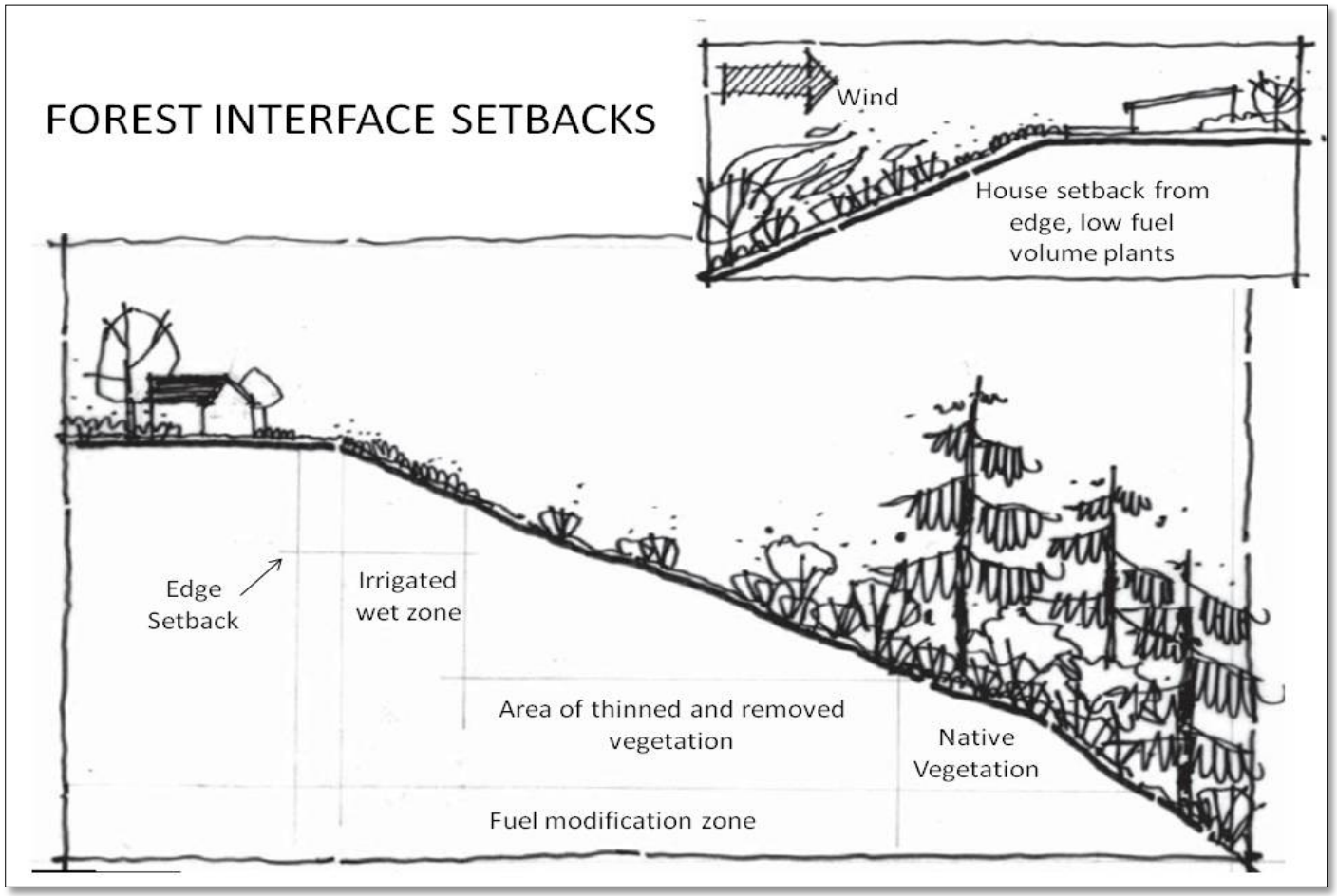
Site	Dominant Material	Shoreline Classification	Short Term Risk	Longer Term Risk
Conne River	pebbles, coarse sand	9: Sand & Gravel Beach with Rock Cliff	Low	Moderate
Conne River	Pebbles, coarse sand	18: Steep Sand & Gravel Beach	Low	High
Vyse Cove	Pebbles, coarse sand	9: Sand & Gravel Beach with Rock Cliff	Low	High
Arran Cove	Pebbles, coarse sand, cobbles	18: Steep Sand & Gravel Beach	Low	High
Reuben Point	pebbles, cobbles	9: Sand & Gravel Beach w. Rock Cliff 3: Rock Cliff	Low	Moderate
Morrisville	Medium,-coarse sand, pebbles	17: Narrow Sand & Gravel Flat 18: Steep Sand & Gravel Beach	Low	High

6. Natural Hazards Risk Assessment + Mitigation Plan

Coastal Erosion

6. Natural Hazards Risk Assessment + Mitigation Plan

Forest Fires



6. Natural Hazards Risk Assessment + Mitigation Plan

Landslide or Slumping

7. Community Response Plan

- The data findings and community input integrated into the MFN Community Response Plan.
- This information becomes actionable strategy required to address the management of the risks from climate change.
- The Plan establishes a chain of command, muster stations, emergency housing, transportation, medical, food and additional supply resources, and alternate routes for evacuation.

7. Community Response Plan

Evaluation Table

Requirement	Meet Requirements		
	Yes	Somewhat	No
Generally			
Layout			✓
Current		✓	
Specific		✓	
Specifically			
Identify the authorities	✓		
Identify all the hazards	✓		
Identify the availability of emergency equipment and facilities		✓	

8. Policy and Regulatory Framework

To update current Community Plan and Zoning Bylaws (2009) reviewing current policies and regulations and identify a more integrated approach to land use planning at the local level.

- To effectively manage growth and change in the future in the face of climate change challenges.
- To direct land development patterns to the most appropriate and environmentally sound locations.
- To establish companion policies and regulations that guide and manage land uses within the community.

Lessons Learner:

Pathway to Climate Change Adaptation

Make Climate Change Adaptation an integral part of community Municipal Plan.

Embrace guiding principles of climate change adaption / mitigation in all land use planning.

Within the Municipal Plan adopt policies/regulations that define adaptive infrastructure.

Utilize land use mapping of vulnerable lands, as basis to define future land uses and development.

Preserve natural areas to protect against hazards, while ensuring the built environment in risk areas can withstand a range of environmental stress.

Adopt three tiered planning adaptation structure – high, medium and low risks.

Utilize, for open space and public recreational, lands within identified hazard lands.

Prohibit development in high risk areas of community, increase development density and lot coverage in low impact locations of community.

New design standards for subdivision and servicing of land from climate change perspective and pursue requirements for tree retention, lot grading, driveway slope and stormwater design innovation.

Evaluate drainage regime from entire watershed and hydrological perspective and utilize on-site stormwater retention facilities to control flow volumes and velocities.

Develop a comprehensive coastal lands management approach, including shoreline classification and re-establish and introduce foreshore vegetation wherever feasible.

Introduce a maximum slope gradient of 15% for all new roads and land developments and require developer to engage external geotechnical expertise on sloping lands of concern.

Identify, assess, cost all current infrastructure repair/replace through Asset Planning and Mapping, and use "State of Infrastructure Reports" to identify new priorities in unison with adaptation/mitigation.

Place emphasis on strategic location of future critical infrastructure and facilities and adopt a longer term Capital Budget process of 20 years to identify all adaptation infrastructure.

The Pathway to Climate Change Adaptation

Summation

- Local Government responsible for managing change.
- Climate change/weather related impacts are serious.
- Integrating climate change challenges into local land use planning is a responsible pathway.
- Sustainable planning and climate change growth management share concern for the future.
- Consider your Municipal Plan update in the context of Climate Change Adaptation.
- Asset Management Planning, Green Infrastructure and Preservation Lands and Open Space important planning considerations.

Miawpukek First Nation

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