Climate Change and the Newfoundland & Labrador

Marine Tourism Industry

Cost Benefit Analysis of Infrastructure Adaptation

Natural Resources Canada | Ressources naturelles Canada | Canada | Newfoundland & Labrador

Funded by the Department of Environment and Climate Change

Business Profile

Name	Rocky Island Tours
Location	Burgeo
Services	Sea Kayaking, Fishing, and Boat Tours
Values	Environmental Sustainability & Maintaining Traditional Heritage Aesthetics

Coastal Climate Change Risks

- Climate change is projected to cause rising sea levels, increased storm surge, and increased wind and wave action throughout Newfoundland and Labrador.
- Without implementing climate adaptation measures, coastal infrastructure will be at higher risk of damage due to climate change impacts.

Potential Climate Change Impacts

- Damage to coastal infrastructure such as buildings and wharves from wave action, overtopping, and flooding.
- Increased maintenance costs.
- Operational disruptions, prolonged closures for maintenance or repair, and potential revenue loss.
- Increased health and safety concerns.

Climate Adaptation Focus – Increase Elevation of Boathouse

- The current boathouse sits at approximately 2 m elevation.
- In recent years, operators have observed waves reaching the bottom of the boathouse windows resulting in minor damages to the infrastructure. This problem will be exacerbated by the impacts of a changing coastal climate.
- Operators have recognized the need to raise the elevation of the boathouse to proactively reduce the risk to infrastructure.
- Note: due to business heritage and sustainability values, upgrades will be conducted by operator using primarily recycled materials collected by hand, which will keep upgrade costs to a minimum.

Business as Usual Scenario

- Boathouse remains at current elevation.
- No upfront investment in climate resilience measures.
- Maintenance and repairs are conducted as necessary to address infrastructure damage or wear and tear as it occurs.

VS

Adaptation Plan

- Capital investment to raise the boathouse:
  - Increase elevation by adding a wooden and stone platform underneath existing structure.
  - Structural upgrades beneath existing wharf to accommodate additional weight.

Coastal Climate Change Projections in Burgeo

Wave Action

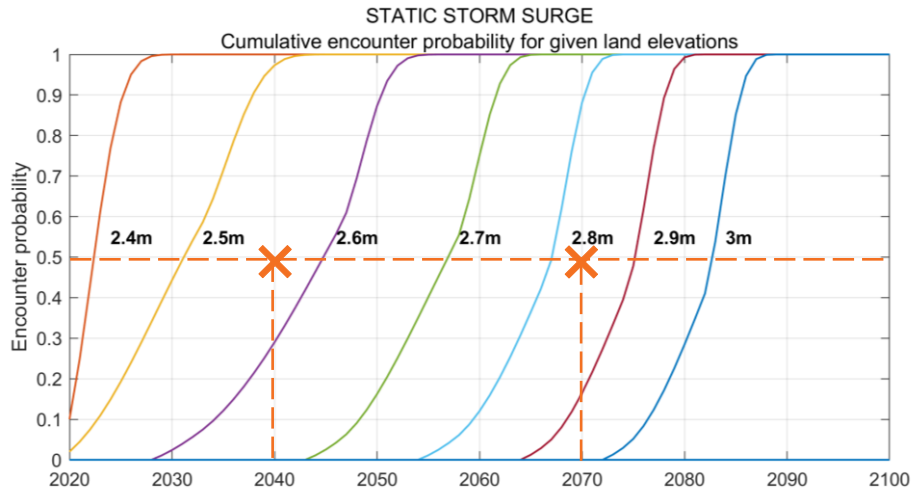
- Nearshore waves are locally generated by wind and come from the northeast.
- Climate change projections do not show significant increases in wave action beyond what is currently experienced; however, projected decreases in seasonal ice cover will result in increased wave exposure during the winter months.

Sea Level Rise

- By 2040 sea levels are projected to increase by approximately 0.2 m above 2010 levels.
- By 2070 sea levels are projected to increase by approximately 0.5 m above 2010 levels.

Extreme Water Level

- Extreme Water Level is the sum of Sea Level Rise + Storm Surge + High Tide.
- Climate resilient infrastructure is typically designed to accommodate a 50% encounter probability (see orange dashed lines on below figure).



*Coloured lines represent different elevations from 2.4 m to 3.0 m
*Elevations are shown in Chart Datum (CD)

Recommended Minimum Infrastructure Elevation for Climate Resilience

2040

- 50% encounter probability falls between 2.5 and 2.6 m CD.
- Recommended minimum infrastructure elevation by 2040 is **2.6 m CD.**

2070

- 50% encounter probability falls between 2.8 and 2.9 m CD.
- Recommended minimum infrastructure elevation by 2070 is **2.9 m CD.**

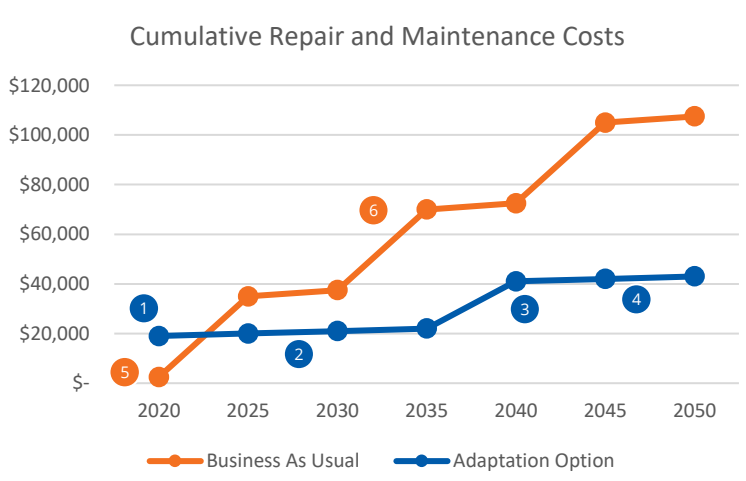
Cost Benefit Analysis of Raising the Boathouse

Adaptation Plan

1. Investment to raise the boathouse to 2.6 m elevation and add additional structural support underneath the wharf.
2. Minor maintenance costs between 2020-2040 to address usual wear and tear.
3. Boathouse is raised again near the foundation's end of useful life to account for climate change projections for 2070.
4. Continued annual repair costs throughout next infrastructure life cycle.

Business as Usual Scenario

5. No investment to raise boathouse. Higher annual maintenance costs incurred due to exposure to extreme water levels.
6. Because of the relatively low elevation, the boathouse is continuously subjected to storm surge impacts. Damages are regularly incurred requiring substantial maintenance, and cyclical repair/rebuild to keep the infrastructure operational.



Summary

- Analysis indicates that a relatively minor investment to raise the boathouse can result in long term cost savings.
- By raising the boathouse, annual maintenance costs are minimized, and the operator can avoid substantial costs to repair or replace the boathouse because of extreme water level impacts.

Cost Benefit Ratio **2.5 / 1**