

Climate Change and the Newfoundland & Labrador Marine Tourism Industry

Cost Benefit Analysis of Infrastructure Adaptation



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Environment and Climate Change

Portugal Cove

Business Profile

Name	Jigs and Reels Fishing Company
Location	Portugal Cove-St. Phillip's
Services	Fishing charters and iceberg tours
Operations	<ul style="list-style-type: none"> ▶ Boat is launched from St. Phillip's Marina in late April/early May ▶ Tours operate from the Portugal Cove Marina from May to September



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 a higher risk of damage due to climate change impacts.



Potential Climate Change Impacts

- ▶ Damage to coastal infrastructure such as 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



- ▶ Climate adaptation can be described as actions that reduce the negative impact of climate change. Anticipating, preparing for, and responding to hazardous events, trends, or disturbances related to climate are all forms of climate change adaptation.
- ▶ Businesses can incorporate climate adaptation into their operations by developing plans to mitigate operational disruptions or other impacts such as damage to infrastructure.
- ▶ Jigs and Reels Fishing Company relies on a nearby municipal slipway to launch its boat for the season. Recently, the slipway was significantly damaged during a storm surge event and was closed for an extended period of time, including a significant portion of the tourism season.

Business as Usual Scenario

- ▶ Rely on infrastructure that was not constructed to withstand the impacts of coastal climate change.
- ▶ No backup plan in place to continue operations if infrastructure is damaged or unsafe to use.



Climate Adaptation Plan

- ▶ Develop business management protocols to proactively plan for climate change.
- ▶ Identify alternative plans for continuing operations if regular infrastructure is unable to support operations for a period of time.

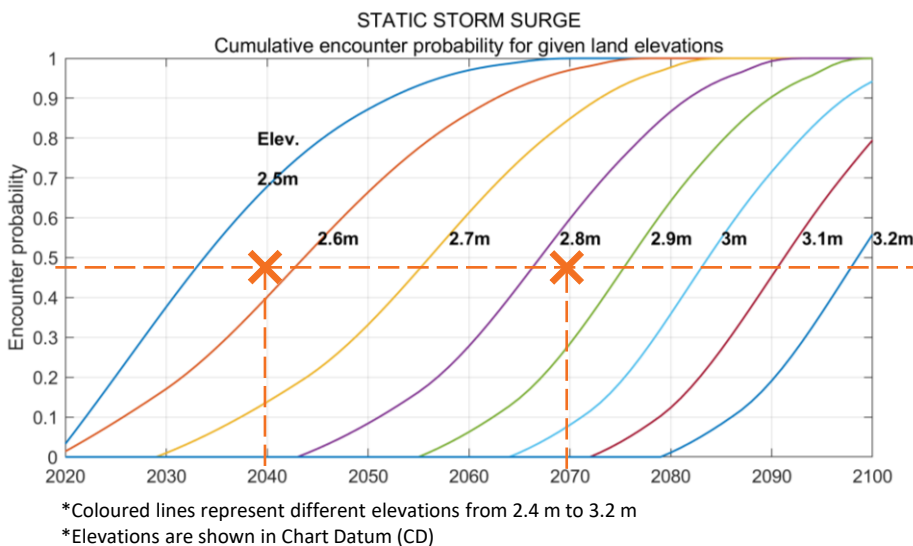
Coastal Climate Change Projections in Portugal Cove-St. Phillip's

Sea Level Rise

- ▶ By 2040, sea level is projected to increase by approximately 0.17 m beyond 2010 levels.
- ▶ By 2070, sea level is projected to increase by approximately 0.47 m beyond 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).



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 Developing Alternative Operational Plans

Climate Adaptation Measures:

- ▶ Prior to the season starting, a backup location was identified where the business' boat could be launched if the usual marina was not operable at the start of the season.
- ▶ Repairs at the usual marina would not be completed until July, meaning that without an alternate location, two months of the season would be lost.

Investment:

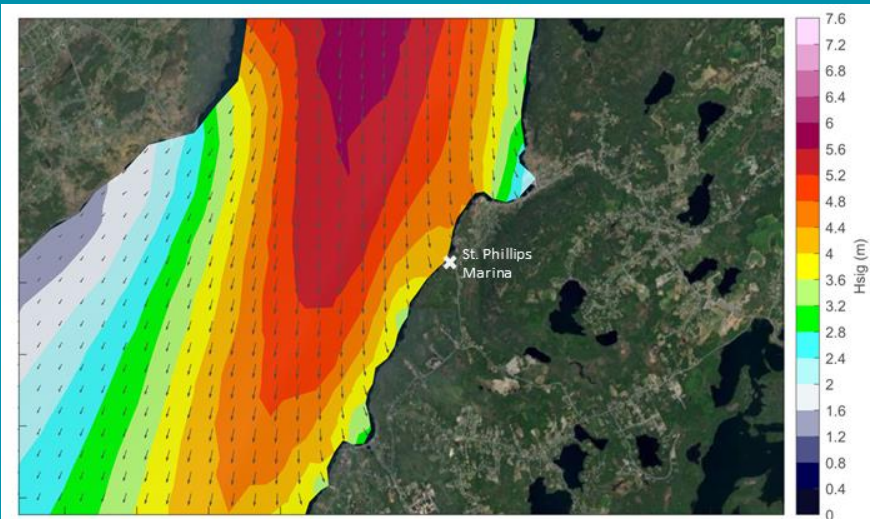
- ▶ Negligible additional expenses associated with launching boat approximately 20km further away from normal location.

Loss Avoided:

- ▶ Approximately 30% of seasonal revenue from iceberg season (May/June).

Wave Action

- ▶ Waves are typically experienced from the north and can reach over four meters in the area of the boat launch (100-yr event).
- ▶ With sea level rise, more wave energy will be propagated towards shore, resulting in increasingly severe impacts to infrastructure.



Summary

- ▶ Climate projections indicate that the Portugal Cove-St. Phillip's region will experience an increase in extreme water levels and wave action. These intensifying coastal conditions will likely result in increasingly severe damage to infrastructure that has not been built to withstand these changes.
- ▶ Actions show that incorporating climate adaptation measures into businesses operations through proactive planning can help maintain revenue during periods of uncertainty.

