

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

Norris Point

Business Profile

| | |
|------------------|---------------------------------|
| Name | BonTours |
| Location | Norris Point |
| Services | Boat tours and fishing charters |
| Operating Season | May – October |



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 resilience measures, coastal infrastructure is anticipated to 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 – Upgrading the Floating Dock



- ▶ The current floating dock is chained in place to concrete blocks on the ocean floor. Divers are needed to release the chains in order to take the dock out of the water. For this reason, the dock is generally kept in the water year-round and is exposed to harsh ocean conditions (e.g., intense storms or winter conditions), that result in costly damage or displacement.
- ▶ The dock is nearing its end of useful life and will be replaced in the near future. To minimize future damages, the design for the new dock should allow the system to be unhooked from above the water and easily taken out of the water, rather than replacing like-for-like. This would reduce annual damage incurred and eliminate the need for divers.

Business as Usual Scenario

- ▶ Replace existing floating dock with similar infrastructure.
- ▶ Divers are still required to remove dock.
- ▶ Floating dock remains in the water year-round and continues to incur costly damages or displacement.

VS

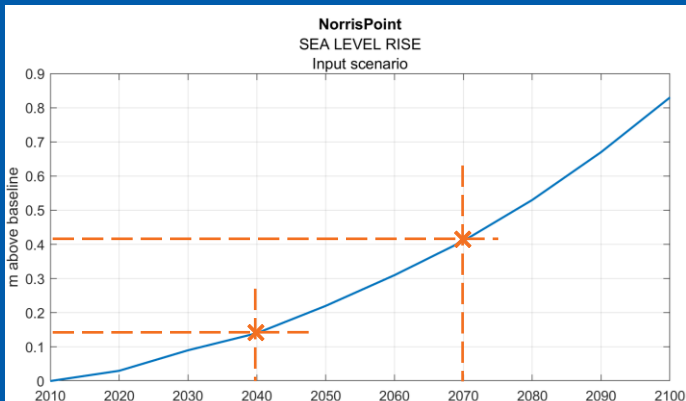
Adaptation Plan

- ▶ Invest in climate resilience dock that can easily be removed from the water when needed (e.g., end of season, before large storm events).
- ▶ Upgrades will minimize damages and keep repair or maintenance costs to a minimum.

Coastal Climate Change Projections in Norris Point

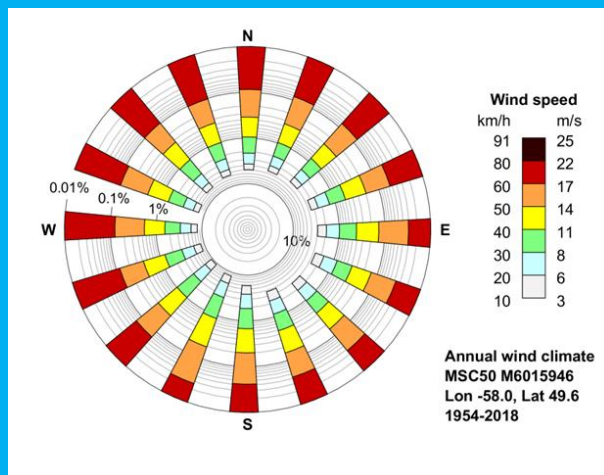
Sea Level Rise

- ▶ By 2040 sea levels are projected to increase by approximately 0.15 m above 2010 levels.
- ▶ By 2070 sea levels are projected to increase by approximately 0.41 m above 2010 levels.



Wind and Wave Action

- ▶ The operating location is subjected to significant wind generated waves from the east.



The site is currently exposed to significant wave action. Projected increases in sea level rise will result in more wave energy reaching the shore, resulting in increasingly severe impacts to infrastructure.

Cost Benefit Analysis – Upgrading the Floating Dock

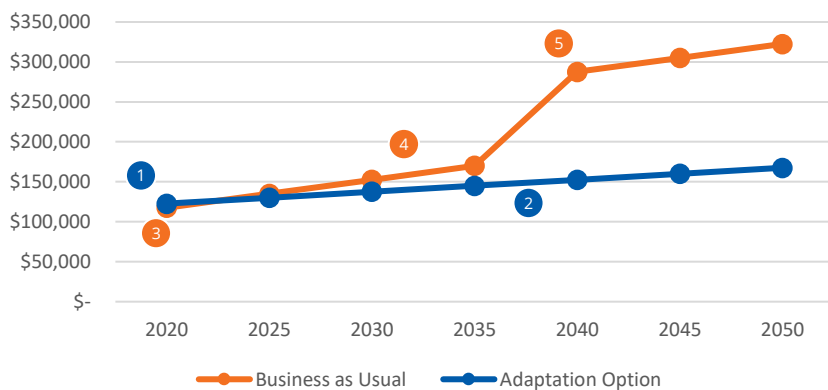
Adaptation Option

- 1 Significant capital investment to install a new floating dock that can be released above water and easily removed.
- 2 Regular annual costs for launch/removal, and maintenance costs between 2020-2050. Service life of the upgraded floating dock is longer because of reduced time spent in the water.

Business as Usual Option

- 3 Significant, but lower, capital investment to replace the floating dock with infrastructure that is similar to the existing dock.
- 4 Annual repair and maintenance costs to uphold infrastructure are relatively higher due to increased exposure to wave action and harsh ocean conditions.
- 5 Due to the relatively high damage incurred, it is assumed infrastructure would have a lower service life, requiring replacement again in approximately 20 years.

Cumulative Repair and Maintenance Costs



Summary

- ▶ Analysis shows that initial investment will pay off over the lifespan of the new infrastructure.
- ▶ Having operational plans in place to remove the infrastructure from the water during the winter or before major storms will minimize damages, ultimately lengthening the overall lifespan of the infrastructure and reducing operational costs.

Cost to Benefit Ratio

1.92
1