

(2) dyke overtopping at these low areas and flooding of portions of the CNR and TCH during storm surges at high tide (delays in trade with a value of \$50 million per day), (3) extensive flooding of local roads and protected dykelands (~2 200 ha in Nova Scotia), and (4) salt water damage to agricultural lands and the many non-agricultural, public and private assets.

With extreme predictions of SLR, up 4–5 m by 2100, the low lying areas behind the dykes are vulnerable unless the dyke system is considerably upgraded or other adaptation options implemented. While this event is likely a long time off, or a rare occurrence, it is prudent for stakeholders to start planning for the long-term sustainability of the Atlantic Gateway.

Vulnerability of Nova Scotia's transportation link to Canada from coastal climate change impacts

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With sea-level rise (SLR) estimates of 1 to 5 m predicted for the Chignecto Isthmus by 2100, and more intense storms another likely consequence of climate change, Nova Scotia Transportation and Infrastructure Renewal (NSTIR) has concerns for protecting the significant transportation infrastructure in this area. At present, a system of agricultural dykes and the Canadian National Railway (CNR) hold back the sea and protect the Trans-Canada Highway (TCH), and residents of Amherst and Sackville and thousands of hectares of land with public and private assets exceeding \$100 million. The area has flooded many times over the past 300+ years including major flooding events in 1758, 1869 (the Saxby Gale), 1887, 1958, and 1976 (the Groundhog Day Storm). These flooding events led to considerable property damage and loss of lives, and all were associated with storm surges that coincided with very high tides.

Flood modeling using a new high-resolution digital elevation model (Lidar-DEM) of the Isthmus terrain between the upper Bay of Fundy and the Northumberland Strait clearly shows (1) critically-low segments within agricultural dykes in Nova Scotia and New Brunswick,