

Executive Summary

Rainbow Haven is a popular provincial beach park just east of Halifax near Cole Harbour. It is located on a sandy spit separating the Atlantic Ocean to the south and the Cole Harbour Salt Marsh to the north. Facilities notably include parking, a day-use building and accessible boardwalks. Swimming is supervised in the summer. To inform future planning and design for park infrastructure upgrades, DNR engaged CBCL to conduct a coastal risk assessment at Rainbow Haven Beach.

Flood and Erosion Hazards

The access roads, parking lot and day-use building are at low elevation and vulnerable to coastal flooding from extreme storm surge, both from the ocean and salt marsh side. The most vulnerable areas to coastal flooding are the parking lot and south entrance road, followed by sections of the north exit road. The dunes are the highest natural feature in the park and offer a natural protection from wave action.

Comparison of historical air photos indicates typical dune retreat rates of 0.3 to 0.4 m per year. High current speeds along the estuary channel present further potential erosion hazards for the beach area. The access roads, parking lot and building are outside the erosion hazard zone within the foreseeable future.

Sustainable Management Options

Sustainable management requires the intentional alignment of intervention approaches with dynamic processes and increasing hazards. The most sustainable approach is to locate new assets, or migrate existing assets at risk, away from flood and erosion hazard areas. Only short-term infrastructure should be considered within vulnerable areas. Such infrastructure should be set back from the shore and raised above flood levels where practical, depending on intended lifetime.

As part of future planning work for the site, it is recommended to raise the elevation of infrastructure, including parking lot and roads, to an elevation of 2.4 m CGVD2013. This is typically in the order of $1.4 \text{ m} \pm 0.5 \text{ m}$ above existing elevations and may be carried out in phases. In the long-term, the north exit road could be phased out, and upgrading efforts focused on the shorter south road. The more protected location of the south entrance road and higher elevation of the secondary parking lot makes the south area better suited for permanent infrastructure.

Natural protection offered by the existing beach-dune system can be optimized by monitoring and maintaining the health of the dunes, including planting of native dune grasses, not having fixed infrastructure on the seaside of the dunes, and providing a horizontal buffer behind the dunes in line with dune migration rates. A minimum horizontal buffer of 70 m should be provided between the leeward side of the dune and any permanent infrastructure. Continuous monitoring should include regular beach surveying and maintaining storm damage and flooding records. The resulting datasets can be used to improve coastal risk predictions and make better informed decisions for future management.