

Coastal Erosion from Space



Annex 2 – Longue-Pointe-de-Mingan

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Signatures

	Name	Company or Institute	Date
Prepared by			
Authorised by			



Applicable and reference documents

Id	Description	Reference
AD-1	Product Validation Plan	SO-TR-ARG-003-055-009-PVP



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The Ministry of Transports of Quebec has recently launched a study to determine the vulnerability of road infrastructure in Eastern Quebec to erosion and coastal flooding. The main objective of the research was to quantify the vulnerability of road infrastructure in order to prioritize actions and targeted policies to be taken in the future¹.

The area of interest (Figure 0.1) lying between the east side of the mouth of the Saint-Jean River and the Longue-Pointe-de-Mingan municipality is characterized by a high erosion rate, mostly due to marine action².

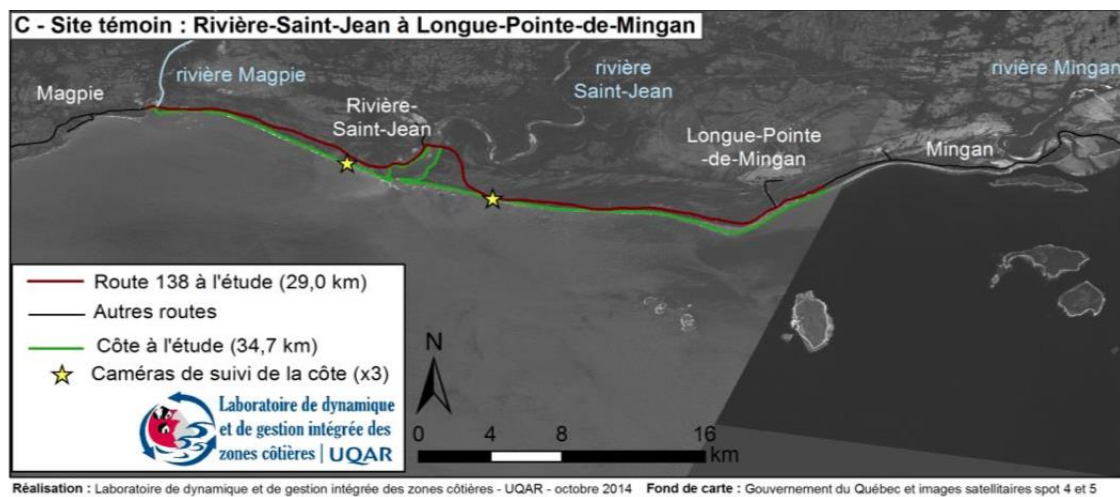


Figure 0.1: Area of interest – Rivière-Saint-Jean and Longue-Pointe-de-Mingan (Adapted from Drejza et al. 2014)

The coast is 34.7 km long and almost half of it consists of beaches (17.1 km or 49.1%). The main drift current is from west to east, however, there are secondary drift currents at the mouth of the Saint John River and in the west, near the Maggie River (Figure 3.1 and 3.2). The sandy cliffs (11.1 km or

¹ Drejza, S., Friesinger, S., Bernatchez, P., et Marie G. (2014), Vulnérabilité des infrastructures routières de l'Est du Québec à l'érosion et à la submersion côtière dans un contexte de changements climatiques : Développement d'une approche et d'un indice pour quantifier la vulnérabilité des infrastructures routières à l'érosion et à la submersion côtière dans un contexte de changements climatiques sur 9 sites témoins. Volume III. Projet X008.1. Laboratoire de dynamique et de gestion intégrée des zones côtières, Université du Québec à Rimouski. Remis au ministère des Transports du Québec, mars 2015, 308 p.

² Corriveau, M., Fraser, C., Caron, T., Bernatchez, P., Buffin-Bélanger, T. Van-Wierst, S., 2016. Étude de la dynamique morphosédimentaire des côtes basses sablonneuses en bordure de la route 138 sur la Côte-Nord du Saint-Laurent en contexte de changements climatiques : Rapport final. Projet X016.1. Laboratoire de dynamique et de gestion intégrée des zones côtières, Université du Québec à Rimouski. Rapport remis au ministère des Transports du Québec, Mars 2016, 421 p.

31.9%) and the low sandy cliffs (2.7 km or 7.8%) are located west of the Saint-Jean River and in its mouth (see Figure 0.2).

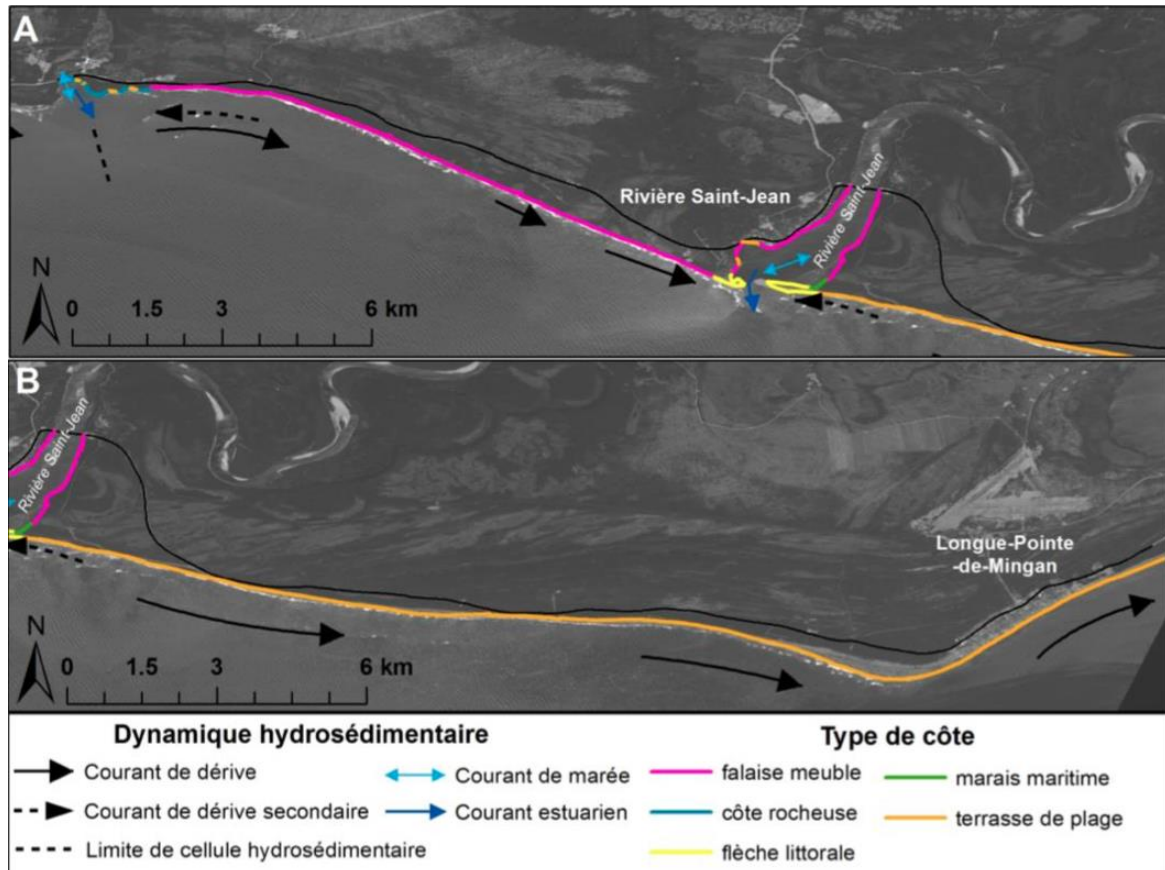


Figure 0.2: Coast types of the Rivière-Saint-Jean and Longue-Pointe-de-Mingan sites (Adapted from Drejza et al. 2014)

Since 1948, sector A is characterized by an average rate of decline of -1.0 m/year (Figure 0.3). Sector B also has a high average erosion rate of -0.82 m/year, but mainly due to strong erosion between 1948 and 1967 (Figure 0.3). In the sub-areas A and B, and particularly in the sector A, the problem lies in the local inability to retain sand, which transits east towards sectors favourable to accumulation or offshore. The average erosion rate for the whole area is of -0.15 m/year (Figure 0.3). Overall, the site is characterized by a shoreline that has high mobility over time and responds quickly to changing coastal conditions, as an example, the decrease in coastal ice and the increase in the storm frequency (Corriveau et al., 2016).



Figure 0.3: Coastal Evolution for 4 sub-coastal area (see transects), only for areas A and B and for the whole area (adapted from Corriveau et al., 2016)

The infralittoral zone between the mouth of the Saint-Jean river and Longue-Pointe-de-Mingan is formed by a shallow platform, long 14 km and about 2 km wide (Figure 3.4). Including the opposite part to the village of Longue-Pointe-de-Mingan, we can define three relatively homogeneous sections based on the bathymetric data (Figure 0.4 – sections I, II and III).

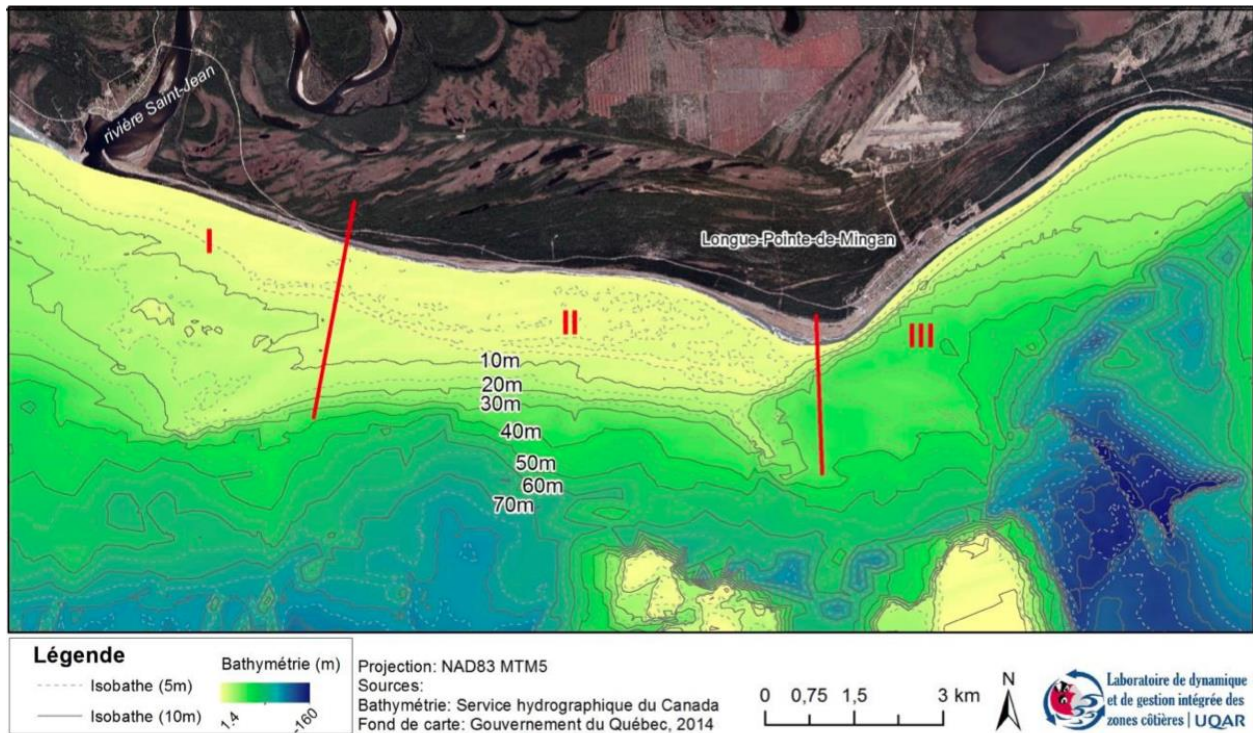


Figure 0.4: Bathymetry of the zone (adapted from Corriveau et al., 2016)

The bathymetry of section I regularly drops down to 20m. After the distance of about 3500 m from the coastline, the depth increases up to 50m. This sedimentary body corresponds to the delta of the Saint-Jean river and is positioned slightly east of the mouth of the river. Part of the sediments has accumulated to form, in part, the Longue-Pointe-de-Mingan. In section II presents a well-defined plateau with an average depth of less than 10m, the slope increases rapidly after 10m to a depth of about 60m. In section III, located opposite the village of Longue-Pointe-de-Mingan, the 10 m isobath is only 250 m from the coast. The slope increases rapidly to a depth of about 35 m, creating a plateau about 2 km wide (Figure 3.4).

To validate EO products over Longue-Pointe-de-Mingan end-users need to check their consistency with ground truth information. Are the erosion rates from the Erosion rate processor in adequacy with previous study results, are classes labelling and location true regarding aerial photography?



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