

Coping with Shoreline Erosion in Sept-Îles

This example illustrates the collaboration between government decision-makers and researchers in defining adaptation strategies to reduce the impacts of climate change.

Along the shoreline, some owners are experiencing land loss of up to 8 m per year.

In Quebec, shoreline erosion primarily affects the estuarine regions and the Gulf of St-Lawrence that extends from Québec city to the Magdalen Islands. Shoreline erosion has particularly significant impacts along the coast of the city of Sept-Îles (population over 28 000), where 80% of the shoreline is comprised of unconsolidated sediment that is very vulnerable to marine erosion. Several community areas built on the Sept-Îles shoreline, in the low-lying coastal plains, are experiencing losses of land of up to 8 m per year. Since these communities are faced with the constant threat of storms, they have put protective structures (such as rock protections) in place as an emergency response. However, several of the structures have exacerbated erosion rates in the adjacent sectors and, as a result, new protective measures are now required.

In order to evaluate the risks and vulnerability of coastal populations exposed to these problems, certain provincial Ministries (*Ministère des Affaires municipales et des Régions*, the *Ministère du Développement durable, de l'Environnement et des Parcs*, the *Ministère de la Sécurité publique*, the *Ministère des Transports*, and the *Ministère des Ressources naturelles et de la Faune*), in collaboration with the *Conférence régionale des élus de la Côte-Nord* (Regional Conference for the North Shore), signed a specific agreement in March 2000. The agreement's purpose was to analyse the status of the shoreline erosion and to design a preliminary integrated management plan for the coast.

From 2000 to 2004, a study of the entire North Shore Region was conducted based predominantly on a time-dependent analysis of aerial photographs that dated back 70 years. This approach allowed researchers to determine that average erosion rates during that period were not at all comparable to current rates measured over the last decade, which are much higher. Most coastal dynamic researchers agree that the current climate is altering the historical erosion rates. Sea level rise, the reduction of sea-ice cover coupled with the shorter sea-ice period, and increases in cyclonic activity (storms), as well as several other climate-related factors are thought to be contributing to a probable increase in the erosion rates for the entire Gulf of St-Lawrence. Nevertheless, the increase in erosion will not be the same everywhere, and is expected to vary according to the type of coastal shoreline and its vulnerability to climate processes.

Consequently, efficient management of shoreline areas will depend, to a large extent, on our capacity to evaluate the impacts of climate change on coastal regions.

In order to validate these hypotheses, a group of experts from the Ouranos Consortium was asked to explore different adaptation measures with regard to climate change impacts on the occurrence of shoreline erosion. With the technical support of Ouranos experts, several committees of coastal area stakeholders and user groups from three study areas in the Gulf (including Sept-Îles) were formed to evaluate possible adaptation strategies for the region. This evaluation is currently being conducted on the basis of erosion scenarios considered optimistic (S1), moderate (S2) or pessimistic (S3), which in turn are based on projections of the historically observed rates of erosion. Over the course of the project, the climate and oceanographic analysis as well as coastal dynamic studies will allow researchers to identify which of the scenarios studied are the most probable in a future climate, and to support the corresponding preferred adaptation measures.

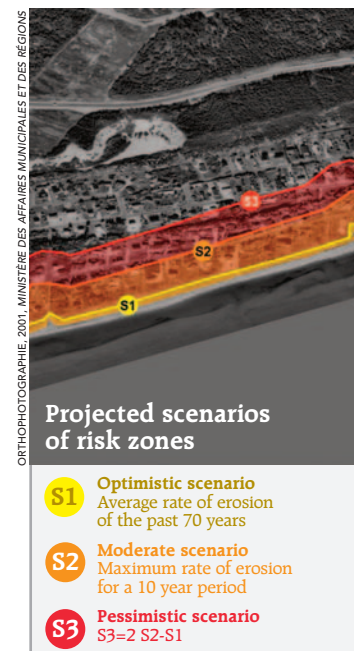
While experts are working on improving the scientific knowledge of the evolution of the maritime climate and its impacts on the coast, the city of Sept-Îles - already in the clutches of a growing problem - had to take action. Three main initiatives were undertaken (or are currently being undertaken) by the municipality in order to adapt to the challenges posed by the erosion:

1 In September 2004, following the presentation by government experts of the risk analysis, the city set about informing its population of the trend. Four public sessions, attended by 400 citizens, were held in order to explain the phenomenon of the erosion, as well as to release the results of the shoreline erosion study.

2 In the spring of 2005, the regional county municipality of Sept-Rivières used erosion maps to determine “areas at risk”, which were established for a 25-year future time horizon. These maps were used to implement a temporary control measure that provides guidelines for permitted and/or disallowed structures to be built in the protected areas (whose width varies between 20 and 135 meters depending on the area). Given the current knowledge of the risks involved, it is important to limit development and to prohibit all new construction in the erosion-affected areas. This approach was the first phase of an adaptation and risk management strategy. At a future date, and based on the outcomes of the study undertaken by Ouranos researchers, the protected areas may be modified and either widened or narrowed.

3 A technical committee, comprised of representatives from the provincial government, the regional county municipality and the city, is working to establish a master plan for coastline intervention, in order to deal with erosion and coastal management problems over the short, medium and long terms. The plan consists of recommendations for each of the city’s coastal areas, an intervention scenario that entails either the implementation of protective measures (riprap, beach development and nourishment, groins, reconstruction of adjacent dunes), or actions related to a gradual withdrawal and relocation of buildings and roads. This master plan, established with a 25-year time horizon, will be the subject of a cost-benefit analysis and will be based on climate change projections established by the work on coastal erosion completed by the Ouranos Consortium group.

Shoreline erosion is a complex problem that affects several sectors, which is why the contribution of all stakeholders is needed. The Sept-Îles community is being assisted by the technical support of government departments and climate change scientists. This dynamic combination will allow appropriate adaptation strategies for anticipated future impacts to be established. Until then, the municipality is advocating the precautionary principle by establishing temporary legislation.



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