



Cap-des-Rosiers Natural Dynamics Restoration and Coastal Ecosystem Enhancement

Final Report



Prepared by: Daniel Sigouin

April 2022





Collaborators

Mathieu Côté, Resource Conservation Manager, Forillon National Park

Frédéric Sainte-Croix, Project Manager, Forillon National Park

Frédéric Ste-Croix, Visitor Experience Manager, Forillon National Park

Michel Queenton, External Relations Manager, Forillon National Park

Marie-Ève Murray, Public Relations and Communications Officer

Andrée-Anne Rouleau, Public Education Outreach Officer

Recommended citation

Sigouin, D. 2021. Cap-des-Rosiers Natural Dynamics Restoration and Coastal Ecosystem Enhancement. Final Report. Conservation and Restoration Program. Forillon National Park. 33 p.

Cover photos: Aerial view of the restored area including the beach, shared-use trail, Irish Memorial and the new path taken by Highway 132 - Source: Jean-David Dupuis, Parks Canada, 2019.





Table of Contents

Summary	3
Background	4
Methodology	8
Results	11
Discussion	20
Conclusion	22
Acknowledgements	23
References	24
Appendix 1	27



Summary

The area located between Cap-des-Rosiers and the tip of Cap-Gaspé is a unique environment in Forillon National Park. It is located on the east coast of the park and faces the Gulf of St. Lawrence. The entire area consists of a combination of soft-substrate beaches and coastal cliffs up to 200 metres high, providing prime habitat for many species of seabirds, including black-legged kittiwakes (*Rissa tridactyla*) and harlequin ducks (*Histrionicus histrionicus*). A freshwater marsh at the northern end of this stretch of coastline is also part of the landscape and contributes significantly to the biodiversity of the area. Despite the richness of the natural ecosystems, this area of the park cannot be separated from its historical heritage of human occupation. The first residents of the area arrived toward the end of the 18th century and remained there until the creation of the park in 1970. In addition, the tragic 1847 sinking of the *Carricks*, which was transporting Irish immigrants, left its mark on the area's history.

The location and condition of the Forillon Peninsula make it particularly vulnerable to the dangers of climate change and coastal erosion, especially in relation to the presence of human infrastructures interacting with coastal dynamics. The purpose of this project was therefore to restore the natural dynamics of the coastal/marine ecosystem of the Cap-des-Rosiers area and to protect and enhance the natural and cultural resources associated with it. In short, the project involves adapting infrastructure and restoring the natural environment to allow natural coastal dynamics to take over. This climate change adaptation process was also intended to promote and renew the visitor experience and to ensure the protection and preservation of the area's cultural resources.

The entire approach is based on adaptive management, with decision-making based on scientific evidence that takes into account the particularities of the environment, natural dynamics and forecasts of changes in these processes over time. As a result, several studies were conducted, and this knowledge was used to guide park managers in selecting which restoration options to focus on. This project also provided additional knowledge about the origin of local community members. It also offered the possibility of redeveloping a commemorative burial site for the victims of the *Carricks* shipwreck to give their descendants a place to gather and remember them.

Overall, the project to restore the natural dynamics and enhance the coastal ecosystem of Cap-des-Rosiers has been a great success. The main objectives in terms of restoring this area's coastal ecosystem and improving visitor experience have been achieved. Almost all the infrastructure that could interfere with natural coastal dynamics has been removed to make way for infrastructure that is compatible with the natural coastal environment and its dynamics. In addition, visitors, including local residents, can now access renewed infrastructure and services that better meet their needs and diversify their park experiences. Furthermore, all communication efforts have reached a wide audience, locally and internationally, on the topic of adaptation to climate change in coastal environments.

Lastly, several ecological monitoring initiatives have been implemented as a result of this restoration project. These initiatives will make it possible to document the long-term evolution of the dynamics in the area and of related developments to continue to apply adaptive management and ensure the long-term maintenance of this jewel of Forillon National Park.



Background

The Cap-des-Rosiers area is located on the east coast of Forillon National Park and faces the Gulf of St. Lawrence (Figure 1). The entire area between Cap-des-Rosiers and the tip of Cap-Gaspé is made up of a combination of soft-substrate beaches and coastal cliffs measuring up to 200 metres high. Several species of seabirds can be found in this area of the park depending on the time of year. Between March and August several species nest there, including the double-crested cormorant (*Phalacrocorax auritus*), razorbill (*Alca torda*), the common murre (*Uria aalge*), black guillemot (*Cepphus grylle*) as well as the great black-backed gull (*Larus marinus*) and herring gull (*Larus argentatus*). The area also boasts the largest colony of black-legged kittiwakes (*Rissa tridactyla*) in eastern Canada (Pronovost et Sigouin 2018) and provides an opportunity to observe the magnificent harlequin duck (*Histrionicus histrionicus*), a species of concern (COSEPAC 2013) that regularly uses the park's shores for foraging. Other species of seabirds tend to winter in this area, such as the great cormorant (*Phalacrocorax carbo*), Barrow's goldeneye (*Bucephala islandica*), a species of concern (COSEPAC 2000), common goldeneye (*Bucephala clangula*), long-tailed duck (*Clangula hyemalis*), red-breasted merganser (*Mergus serrator*) as well as the Iceland gull (*Larus glaucooides*) and glaucous gull (*L. hyperboreus*) in addition to the herring gull and great black-backed gull. A freshwater marsh located directly on the seashore is another special feature of this area. This marsh is an important migratory stopover for several species of birds as well as a nesting area for many others. Bats also frequent the marsh area, including the hoary bat (*Lasiurus cinereus*), big brown bat (*Eptesicus fuscus*) and some species of the *Myotis* genus (Sigouin 2017a). These species are protected under the *Species at Risk Act* (SARA). In terms of the marine ecosystem, the area is frequented by amphipods, crustaceans (American lobster [*Homarus americanus*], Atlantic rock crab [*Cancer irroratus*]), mollusks (blue mussel [*Mytilus edulis*], deep sea scallop [*Placopecten magellanicus*]) and pelagic fish such as Atlantic herring (*Clupea harengus*), Atlantic mackerel (*Scomber scombrus*) and capelin (*Mallotus villosus*) (Comeau et al. 2006). Brook trout (*Salvelinus fontinalis*) are also present in the Cap-des-Rosiers stream, (Brodeur et Sigouin 2018) and striped bass, a coastal fish species of concern, (COSEPAC 2004) has also recently appeared in the park's waters.

The location and condition of the Forillon Peninsula make it particularly vulnerable to the dangers of climate change and coastal erosion. This problem has been identified for many years (Comeau et al. 2006). At the beginning of the 20th century, a road was developed and used by residents on the protruding portion of the beach in the Cap-des-Rosiers area. In 1926, the coastal road (Route du Banc) was officially built between the lighthouse and the Cap-des-Rosiers harbour, directly on the active part of the upper beach. This new road quickly needed to be protected by stone-filled timber cribs. Various additional protective structures (wooden wall, stone embankment) had to be put in place over time to protect it from inclement weather. (Carter et Ouellet 1977, Ouzilleau 1977, Synnott et Chouinard 1986) The last ones to be built consisted of an approximately two-kilometre riprap erected in 1980 and a concrete wall installed in the 1990s (WSP 2015a).

Damage to the road and associated infrastructure (buried power cables, protective structures, Irish Memorial) had been particularly severe since the mid-1990s, and the protective structures were no longer adequate. In 2011, a portion of the road had to be abandoned and relocated because a significant breach in the riprap had appeared and a 15,000-V electrical cable had been damaged. Figure 2 shows the damage over time.



Figure 1. Location of Forillon National Park, located at the eastern tip of the Gaspé Peninsula (red dot in the smaller map) as well as the intervention area (red box) and control area (green box) for the project to restore the natural dynamics and enhance the coastal ecosystem of Cap-des-Rosiers.

The 2010 Management Plan notes the situation and the need for action (Parcs Canada 2010). This issue was also identified in the 2006 State of the Park Report (Comeau et al. 2006) as well as during the implementation of the park's ecological integrity monitoring program (Sigouin et al. 2008). The main cause of the problem is placing infrastructure in an at-risk coastal area and encroaching on a very dynamic natural area. In addition, the placement of riprap has increased the loss of coastal habitat, including areas used as capelin spawning sites. This effect has been amplified by extreme storm events and the reduced period of shoreline protection provided by ice cover, both of which are associated with climate change. The result is a change in the beach's profile resulting in the subsidence and loss of beach in some areas, active erosion and degradation of existing infrastructure (road, protective structure, power and telephone lines), recurring increased road maintenance costs and threats to the integrity of a freshwater wetland and commemorative site (Figures 2 and 3). It should be noted that when this project began to be implemented, the coastal/marine ecosystem indicator in Forillon National Park was considered to be in fair, albeit deteriorating, condition. The indicator for changes in coastal dynamics was also considered in fair, albeit deteriorating, condition.



Figure 2. Typical damage observed over the years on Route du Banc and related infrastructure – Source: Parks Canada.



Despite the fact that it is now a protected environment whose value in terms of natural resources is beyond doubt, the Cap-des-Rosiers beach area cannot be separated from human occupation and related activities. The name Cap-des-Rosiers was recorded as early as 1534 following Jacques Cartier's first voyage, and the first colonists would have settled on the coastal fringe forming small hamlets in the last quarter of the 18th century (Perron 2018). Residents lived by fishing, cultivating the land and exploiting forest resources (Perron 2018). The *Carricks*, an Irish ship, sank in 1847, and the Cap-des-Rosiers lighthouse was built in the years that followed. According to sources consulted by Perron (2018), in the years before the park was created, the Route du Banc area was one of the most dynamic areas in Cap-des-Rosiers. It attracted tourists who enjoyed the view and went camping. The area around the harbour, built in 1946, was also very active at that time. From an archaeological point of view, the whole area is considered to have great potential (Perron 2018).



Figure 3. Modification of the profile of the Cap-des-Rosiers beach showing the difference between the width of the beach in the 1920s (top – Source: unknown) compared to what was observed in the 2000s (bottom – Source: Parks Canada).

Project description

The purpose of this project is to restore the natural dynamics of the coastal/marine ecosystem (condition: fair; trend: deteriorating) of the Cap-des-Rosiers area and to protect and enhance the natural and cultural resources associated with it. In short, the project involves adapting infrastructure and restoring the natural environment to allow natural coastal dynamics to take over while promoting and renewing visitor experience at the site.

Objectives

Project objectives include:

- 1) Restore the coastal ecosystem of the Cap-des-Rosiers beach and the adjacent marsh by removing human infrastructures that interfere with their natural dynamics.
- 2) Relocate the Irish Memorial commemorating the shipwrecked of the *Carricks* of 1847 to a location where it will be protected from coastal erosion.
- 3) Communicate the value of the park and its issues, build support for the park (locally and nationally) and engage Canadians in urban areas as well as interest groups (including youth) in a citizen science project to monitor the effectiveness of long-term restoration efforts.



4) Increase revenue and visitation to the northern area of the park by facilitating access and developing new opportunities for quality experiences, experiential activities and light infrastructure appropriate for the nature of the coastal ecosystem.

Methodology

The project spanned a seven-year period from 2015 to 2021. Management and coordination were entrusted to the Forillon National Park project manager, supported by the park's resource conservation manager and employees from numerous teams (projects, conservation, visitor experience, external relations), thus ensuring the coordination of all project activities (knowledge acquisition, engineering studies, implementation, awareness, education, etc.), financial management, report production, etc.

Management approach

The preferred approach has been to implement adaptive management principles and integrate the knowledge gained from the project as it progresses. This project has benefited from the experience and knowledge acquired during the Conservation and Restoration Program (CoRe) in the Penouille area (Sigouin et al. 2019) and from long-standing observations made by the resource conservation team at Forillon National Park and the data collected by one of our partners, the Laboratoire de dynamique et de gestion intégrée des zones côtières at the Université du Québec à Rimouski (UQAR).

Knowledge acquisition

Despite this, specific knowledge of the site and its coastal dynamics needed to be acquired and additional studies conducted to evaluate different development options.

1. Beginning in 2003, the park was able to benefit from work done by interns who characterized the area, made initial estimates of materials to be removed from the site and proposed improvements following the removal of the road and riprap (Marcouiller et al. 2003).
2. A hydrodynamic study of the area's shoreline was conducted by the WSP Canada Group (WSP 2015a, b). Presented in 2015, this study was also intended to develop restoration options for the area. [TRANSLATION] "This report presents a description of the coastal system, including a history of major events that have occurred and interventions that have been carried out, a characterization of the physical environment and shoreline vegetation, as well as an analysis of the historical evolution of the coastline." One of the objectives of the restoration options study was to [Translation] "further define development criteria to promote the establishment of a stable beach, similar to nearby natural beaches with well-established shoreline vegetation and, if possible, with adequate sediment grain size for capelin spawning."
3. Report on the incidental discovery of bones in January 2011 near the *Carricks* monument (Toupin and Ribot 2013).
4. Conceptual Study for the Redevelopment of the *Carricks* Monument (Gagnon, Letellier, Cyr, Ricard, Mathieu et Associés 2013). The purpose of this study was to determine development options for the Irish Memorial to be relocated to protect it from shoreline erosion and storms.
5. Geotechnical analysis for the feasibility study and options analysis for the restoration of the Cap-des-Rosiers beach (Inspec-sol Engineering and Solutions 2015).



6. Geotechnical opinion (GHD Consultants Ltd. 2015) for the development of a bicycle path (shared-use trail).
7. Geotechnical study (Stantec Experts-conseils ltée 2016) required for the relocation of Highway 132 (infrastructure program funding).
8. Offset project monitoring program. Within the framework of the rehabilitation of the Cap-des-Rosiers harbour, an offset project was required and the restoration of the natural dynamics of the beach was accepted and considered to meet the requirements of the *Fisheries Act* administered by the Department of Fisheries and Oceans Canada (DFO). As part of this monitoring program, a procedure was established (Sigouin 2015a) and four reports have been submitted to date (Sigouin 2015b, 2016, 2017b, 2018). A draft of this report and related technical abstracts were submitted to DFO in 2021.
9. Throughout the project, Forillon National Park also collected data to document the evolution of measures used to evaluate the achievement of targets and the success of this restoration project. The main projects in this regard include:
 - a. Footprint of human infrastructure that no longer interacts with coastal dynamics (Sigouin et Dupuis 2021b).
 - b. Restoration of the natural dynamics of the Cap-des-Rosiers marsh (Sigouin et Dupuis 2020).
 - c. Presence of vegetation on the upper beach (Sigouin et Dupuis 2021a).
 - d. Beach area available for capelin breeding (Sigouin et Dupuis 2021c).
 - e. Stability and physical characteristics of coastal developments (Sigouin et Dupuis 2021d).
10. Isotope composition analysis to trace the origin and reconstruct the diet of individuals discovered on the Cap-des-Rosiers beach (Vigeant 2018). The analyses carried out within the framework of this study aimed to determine the origin of the individuals whose bones were discovered within the framework of the preventive archaeological work carried out upstream of the beach restoration.
11. Bioarchaeological analysis of burials at site 2007G7C, Cap-des-Rosiers (Boisjoli et al. 2019). This study allowed us to inventory and characterize the bones uncovered during the archaeological work carried out within the framework of the project.
12. Summary of the main elements related to the discovery of human remains at Cap-des-Rosiers (site 2007g, Forillon National Park) and synthesis of the specialized analyses carried out on the bodies by the Université de Montréal bioarchaeology laboratory (Perron 2019). This report describes the discoveries made during the archaeological excavations carried out during the restoration project.

Evaluation of available options according to set objectives

The recommended approach was to take advantage of the experience gained in the Penouille project (Sigouin et al. 2019) and of the various studies carried out (Marcouiller et al. 2003, Gagnon, Letellier, Cyr, Ricard, Mathieu et Associés 2013, WSP 2015b, a) to evaluate development options. The scenarios considered took into account the natural dynamics of the environment, predictions of changing coastal conditions due to climate change, and management objectives for this area of the park.



Implementing and carrying out the different project components

Description	Date completed
Conducting a coastal dynamics study	2015
Conducting cultural resource studies (archaeological inventory)	2016
Clearing an initial section of the Du Banc trail right-of-way	2016
Removing Route Du Banc and restoring the beach	2016–2018
Developing phase 1 of the trail and related infrastructures as well as riprap to protect the Cap-des-Rosiers harbour	2016–2017
Developing the Irish Memorial site	2016–2017 and 2021
Clearing a second section of the Du Banc trail right-of-way	2017
Developing phase 2 of the trail and related infrastructure	2017–2018
Installing riprap protection on the parking lot and Highway 132	2018
Refilling the northern area of Cap-des-Rosiers beach	2018
Installing trail signage and interpretation information	2018–2019
Building a picnic table shelter on the Whalen River	2019–2020
Constructing a service building in the Cap-des-Rosiers parking lot	2020–2021

Communications

Numerous communication activities were conducted as part of this project, ranging from meetings and consultations with community members and partners, to social media, traditional media, conferences, advertisements and more. A summary of communication activities is presented in the results section, and a detailed report is provided in Appendix 1.

Aboriginal consultation and involvement

As part of the environmental impact analysis of the Cap-des-Rosiers harbour rehabilitation work, a meeting and site visit for the Cap-des-Rosiers harbour rehabilitation and beach restoration projects took place in 2018 with members of the Mi'g'mawei Mawioimi Secretariat, and the project was well received by the stakeholders at those meetings.

Involvement of various partners

There are three main partners involved in this project. First, the World Wildlife Fund (WWF), in collaboration with Forillon National Park, launched the *Capelin on the Cape* exhibit in 2017. The exhibition provided the opportunity for greater awareness about prey fish and their importance for the health of marine ecosystems, by paying very particular attention to capelin. The self-guided 16-stop interpretive tour was launched along the Prelude-à-Forillon trail but had to be removed in 2018 because the trail had to close during construction for the Visitor Information and Discovery Centre. In addition, the equipment used was not sufficiently well adapted to the harsh environmental conditions of the coastal environment, and the information panels will have to be updated before this interpretive trail can be reopened.

UQAR's Laboratoire de dynamique et de gestion intégrée des zones côtières assisted in collecting various data before and during the project. This included collecting data on marine currents, tides, beach profile



evolution, and LiDAR for several years. In addition, a camera for tracking sediment movement and volumes displaced as a result of storm events live, among other things, was installed in July 2016. Lastly, all this data continues to be collected to ensure long-term monitoring of the impact of restoration interventions on the coastal ecosystem.

The Université de Montréal's Laboratoire de bioarchéologie acted as a major player in confirming the origin of the bones uncovered on the Cap-des-Rosiers beach. Invaluable knowledge was gained for the Irish and local communities as well as in terms of documenting this period in the country's history (Vigeant 2018, Boisjoli et al. 2019, Perron 2019).

Results

Objective 1: Restore the coastal habitat

This objective has several components, four out of five of which are targets from the Conservation and Restoration Program (CoRe) evaluation. These targets and the results achieved are presented in Table 1.

Footprint of human infrastructure that no longer interacts with coastal dynamics

Detailed results for this component are presented in Sigouin et Dupuis (2021b) and can be seen in Figure 4. In summary, Route Du Banc, located directly in the active coastal zone, has been completely removed. As for the associated riprap, the protection structures had to be maintained or even slightly extended at the ends to maintain active protection for Highway 132 and the Cap-des-Rosiers harbour. A total of 400 metres of riprap had to be kept in place. Despite this, an 80% reduction was observed in the number of metres of coastline directly interacting with human infrastructure. This reduction corresponds with the removal of 1,600 linear metres of infrastructure, which exceeds the initial 1,200-metre target.



Table 1. CoRe targets and percentage achieved for the coastal habitat restoration project

Target	% achieved	Notes
<p>Footprint of human infrastructure that no longer interacts with coastal dynamics</p> <p>Significantly reduce the number of linear metres (1,200 m) of human infrastructure interacting with coastal dynamics.</p>	<p>1,600 linear metres (133%) of infrastructure removed – Achieved</p>	<p>The removal of approximately 1,600 metres of the road and its protective riprap has resulted in the removal of most of the infrastructure interacting with the coastal environment.</p> <p>The 1,200-metre target was therefore reached (133%).</p>
<p>Presence of vegetation on the upper beach</p> <p>Presence of vegetation (combination of planting and natural establishment) to obtain an area equivalent to 75% of that found on the control beach.</p>	<p>Equivalent upper beach area between the two environments – 130% of target – Achieved</p>	<p>Only an approximately 2,150-m² area in the northern portion of the intervention area was revegetated (sand ryegrass). In total, a 7,644-m² and 39,166-m² upper beach area was established for the control and intervention areas respectively. The proportion of vegetation in the control area was 16.9% and 16.5% in the intervention area.</p> <p>The target of 75% of the proportion of the control area therefore corresponds with a 12.7% proportion of vegetation in the intervention area (beach). The target was therefore reached (130%).</p>
<p>Beach area available for capelin breeding</p> <p>Restore the beach profile (by removing riprap and refilling the beach) to allow for the recovery of 2,625 m² to 3,500 m² of capelin spawning habitat in the intertidal zone, for a total available area of between 11,765 m² and 12640 m².</p>	<p>Target 11,765 m²</p> <p>Achieved 23,198 m² (197%)</p>	<p>The objective of this measure is to restore the capelin spawning habitat that was lost over the years because of the subsidence of the beach profile caused by the presence of the road installed in 1926 and the associated protective structures.</p> <p>The goal is to achieve an area equivalent in proportion to that of the control beach once the system has stabilized.</p> <p>The target was achieved at 197% based on the estimation method we consider most representative of reality, which is based on the elevation level of sites where eggs were detected.</p>
<p>Restoration of the natural dynamics of the Cap-des-Rosiers marsh</p> <p>Maintain the marsh area within its known historical variability (i.e. between 2,385 m² and 6,781 m²).</p>	<p>Natural variability between 2,385 m² (1966) and 6,781 m² (2004)</p> <p>Value in 2018: 3,389 m² Achieved</p>	<p>The purpose of this measure is to verify that natural dynamics of the marsh have returned by:</p> <ul style="list-style-type: none"> • Maintaining the marsh area, and more specifically the aquatic vegetation, within the natural variability observed; • Re-establishing the natural cycle of periodic saltwater flooding where appropriate. <p>The target was met: the variability in marsh area observed since the work was done is within the known variability.</p>

Presence of vegetation on the upper beach

The objective of this component was to re-establish the natural dynamics of the coastal system by ensuring the presence of upper beach vegetation to restore a naturally evolving environment. In total, the control and intervention areas have an upper beach area of 7,644 m² and 39,166 m², respectively. Analyses conducted determined that the proportion of vegetation in the control area was 16.9%, while it was 16.5% in the intervention area. The target of 75% of the proportion of the control area corresponds with a 12.7% proportion of vegetation in the intervention area (beach). This target has therefore been met (Sigouin et Dupuis 2021a).



Figure 4. Aerial view of the restored beach without the infrastructures interacting with coastal dynamics. Upper beach vegetation can also be observed that contributes to the stability of the coastal system (Jean-David Dupuis, Parks Canada, 2018).

Beach area available for capelin breeding

Restoring and increasing the habitat available for capelin spawning is one of the objectives of the beach restoration project. As presented by Sigouin et Dupuis (2021c), capelin is an ecologically important species in the Gulf of St. Lawrence ecosystem. Three different methodological approaches were used to assess the breeding habitat area available to capelin. Regardless of the methodology used to estimate the habitat gain for capelin reproduction, the objective was largely exceeded (11,765 m²). The estimates obtained made it possible to determine that the available habitat area was between 17,809 m² and 50,202 m² in the intervention area. We determined that the second approach, using the elevation of egg sites, was most representative of reality and allowed us to estimate that the available habitat is probably around 23,000 m². Figure 5 provides an overview of the presence of capelin on the beach following a spawning event.

Restoration of the natural dynamics of the Cap-des-Rosiers marsh

According to property maps dating back to the mid-19th century, the Cap-des-Rosiers marsh (Figure 6) was already present in the area well before the construction of Route Du Banc (in 1926) and the associated protective structures (Carter et Ouellet 1977, Ouzilleau 1977, Synnott et Chouinard 1986).



Figure 5. Presence of capelin on the beach following a spawning event (Pierre Paradis, Parks Canada, 2019)

However, the presence of this infrastructure has altered the natural dynamics of the marsh, first by further channelling its outflow, then by acting as a barrier to water flow as a result of substrate compaction in the upper beach, and finally, by altering the cycle of periodic saltwater flooding during storms (Synnott et Chouinard 1986).

Since property maps could not be used, recent aerial photos allowed us to calculate the area of the marsh and aquatic vegetation in 1966, 2004, 2013, 2016 and 2018 (that is, before and after the main restoration interventions were carried out). Aquatic vegetation is the area delimited by the presence of water, while the marsh includes the surrounding vegetation, making it more open to interpretation when analyzing aerial photos. That is why aquatic vegetation is the parameter chosen to assess the status of this measure.

The objectives for ensuring the restoration of the natural dynamics of the Cap-des-Rosiers marsh is first to maintain the surface area of the aquatic vegetation within the known and observed natural variability as well as to allow the return of the natural cycle of periodic saltwater flooding. Although we are not currently able to evaluate the frequency of the natural cycle of periodic flooding, we do know that aquatic vegetation was at its minimum in 1966 with a surface area of 2,385 m² while the known maximum (6,781 m²) was reached in 2004. In 2018, the year of our assessment, the aquatic vegetation area was 3,389 m², which is within the known variability for this parameter. With respect to periodic seawater flooding cycles, sediment samples were collected in early 2013 and may be analyzed in the future (depending on available funding) to assess the frequency of this phenomenon. Details of this measure can be found in Sigouin et Dupuis (2020).



Figure 6. The Cap-des-Rosiers marsh as seen after the restoration work was completed (Jean-David Dupuis, Parks Canada, 2018).

Stability and physical characteristics of the development

This component included an evaluation of different parameters as required by DFO in the framework of the fish habitat offsetting project following the rehabilitation of the Cap-des-Rosiers harbour. Among the parameters evaluated, the main ones are:

- Monitoring of coastal erosion markers (stability, erosion);
- Beach profiles (stability, slope, elevation, beach area);
- Other physical characteristics (sediment grain size, beach area, elevation).

After these different parameters were analyzed (Sigouin et Dupuis 2021*d*), it was determined that the system still appears to be progressing toward evolving naturally and that we are on track to achieve our restoration goals with respect to the stability and physical characteristics of the developments carried out as part of this project.

Indeed, following the interventions, the maximum elevation and the beach width and slope were more consistent with what was observed in the control area (Figure 7). The beach area has almost tripled due to the restoration of the area, which is more in line with a natural beach area. The monitoring of the erosion markers revealed that the system had not yet regained the same stability in the intervention area as in the control area, which is not unexpected considering the short time that has elapsed since the interventions were completed. This is nonetheless significant and emphasizes the importance of continuing long-term monitoring to follow the evolution of this restored ecosystem and to adequately evaluate the effectiveness of our current and future interventions.



Figure 7. Overview of the physical characteristics observed on the intervention area (beach) after the restoration work was completed (Jean-David Dupuis, Parks Canada, 2018)

Objective 2: Relocate and protect the monument commemorating the 1847 sinking of the *Carricks*

The *Carricks*, a 180-passenger ship, departed from Sligo, Ireland, bound for the port of Québec and ran aground off the coast of Cap-des-Rosiers on April 28, 1847. According to historical sources (Société historique de la Gaspésie 1964, McKeon 2012, Merlicht 2017), it is estimated that between 120 and 150 people perished during the sinking of the *Carricks*. Of those, 87 bodies were found, and only 48 people survived this tragedy. Most survivors went on to Québec, but a few settled in the area and there are a few descendants in today's local population.

The Irish Monument was erected in 1900 in memory of the shipwrecked *Carricks* and was donated by the St. Patrick's Parish Council in Montréal to the Saint-Alban de Cap-des-Rosiers Parish. Next to it is the bell from the *Carricks*, which was found on September 24, 1968 on the beach at Blanc-Sablon on Quebec's North Shore. This monument is of special importance not only for Canadians, but also in Ireland, the country of origin of those who were shipwrecked.

The discovery of human bones on the beach in 2011 brought a very unique dimension to the project. The bones of three individuals between the ages of 7 and 12 were discovered on the Cap-des-Rosiers beach following a violent storm that damaged the shoreline. At the time, it was assumed that these remains were from the *Carricks* shipwreck. According to historical accounts, the bodies of the shipwrecked were buried on the beach, possibly in a mass grave. In 2016, Parks Canada carried out a preventative archaeological dig before undertaking restoration work on the coastal ecosystem at Cap-des-Rosiers. During these digs, the bones of 18 individuals were discovered, bringing the total number up to 21. Most were the remains of women and children. The analyses of the bones (Vigeant 2018, Boisjoli et al. 2019, Perron 2019) confirmed



the assumption that they were the victims of the *Carricks* wreck. They revealed that the diet of these individuals resembled that of a rural population living off of farming based essentially on the cultivation of potatoes, a typical Irish diet in the first half of the 19th century. The analyses also showed that those shipwrecked suffered from pathologies most likely caused by malnutrition, which in and of itself was caused by the famine raging throughout Ireland at that time (Vigeant 2018, Boisjoli et al. 2019, Perron 2019).

Following a consultation with the citizens of Cap-des-Rosiers and members of the Irish community, it was decided that the discovered human remains would be buried near the Monument to the Irish on the Cap-des-Rosiers beach. During a ceremony held on July 4, 2019, 150 people gathered there to honour the memory of the victims of the *Carricks* wreck. During this commemorative ceremony, the representative of the Irish Embassy in Canada, descendants of survivors, community members and visitors attended the burial of the human remains of the 21 shipwreck victims who were found.

Although not the objective, this ceremony and the surrounding studies and consultations generated a great deal of visibility and benefits for the region and the project, with over 100 articles published across Canada, the United States and Ireland (approximately 23,000,000 people reached). Figures 8 and 9 show the observed impacts of coastal conditions on the Irish Memorial as well as the new burial site developed as part of the project.

Objective 3: Communicate the value of the park and its issues and obtain support and engagement from Canadians

Interpretive panels based on recent scientific knowledge that is presented in a way that promotes understanding and appreciation of the natural and cultural history of the area have been installed along the Du Banc trail.

The education and communication products developed have also raised awareness about the issue of coastal erosion among the Canadian population. They have also highlighted the results of studies as well as the interventions carried out and provided information on local natural resources and on the heritage and cultural resources of the area. By fostering a better understanding for visitors of natural and coastal phenomena related to climate change on ecosystems, these products promote visitor engagement in protecting the park's natural and cultural heritage.

Details of the education and communication products being promoted are available in Appendix 1. The following is an overview.

- Over 2,000 views of our coastal erosion web pages between fall 2018 and spring 2020;
- Over 110,000 views of our social media posts;
- Over 40 media mentions (not including those related to the *Carricks* commemoration);



Figure 8. Example of the impacts observed prior to work on the Irish Memorial (Parks Canada, 2016).



Figure 9. On the left, the new memorial and burial site in commemoration of the victims of the Carricks wreck (Jean-David Dupuis, Parks Canada, 2019), and on the right, about 150 people gathered on July 4, 2019 to honour the memory of the victims of the Carricks wreck at the Irish Memorial (Éric Leblanc, Parks Canada, 2019)

- 6 advertisements;
- 8 presentations to various audiences (managers, students, scientists);
- An exhibition in partnership with the World Wildlife Fund (WWF) and a citizen's initiative on capelin spawning and the importance of this resource in the ecosystem;
- 6 public meetings with regional stakeholders;
- Numerous mentions and publications in the park's information and promotional tools (visitor's guide, year in review, partner newsletters);



- Creation of an educational game to be used during promotional events to inform young people about the projects to restore and protect the Cap-des-Rosiers, Penouille and Cap-Bon-Ami beaches.
- 2 video productions on coastal erosion broadcast on different platforms including the web, Facebook and YouTube.

Objective 4: Facilitate access to the northern area of the park and develop new opportunities for experiences and activities as well as light infrastructure adapted to the nature of the coastal ecosystem

Before this restoration project was carried out, one of the issues was related to access to the northern area of the park—more specifically the intervention area between the park boundary north of the beach and the Cap-des-Rosiers harbour. While the presence of a narrow road (Route du Banc) provided access to the shoreline for visitors, there were safety issues, particularly for pedestrians and cyclists. The road also suffered recurring damage from storm events that made the road connection precarious. In addition, the riprap made access to the beach difficult and risky, and there was practically no access at high tide. During the pre-project consultations, maintaining and improving access was identified as a priority by those consulted.

Previous studies (Marcouiller et al. 2003) had already evaluated the possibility of integrating a backshore trail to provide access to the shoreline and diversify user experience while avoiding the dynamic beach area. A shared-use trail was consequently installed, allowing visitors to access it on foot or by bicycle. The trail is also accessible to people with reduced mobility. This trail also includes a raised walkway to limit impacts on a wetland it crosses. Interpretive panels have been installed along the trail to highlight historical and natural features. An observation lookout was installed to showcase the marsh and surrounding area (Figure 10). The trail also provides access to the Irish Memorial and extends from the north end, at the parking lot at the park entrance, to the harbour and the new Visitor Information and Discovery Centre.

Two parking lots have also been put in: one near the Irish Memorial and another north of the trail, which also has a service building with washrooms that was not previously available in this area of the park. Both parking lots are accessible directly from Highway 132.

Lastly, with the removal of the riprap and the various access points created (parking lots and trail), access to the beach has been greatly improved. Through the installation of cameras to assess the impact of coastal hazards, the UQAR team was able to observe a 27.4% increase in the number of beach users between mid-July and mid-August for the years 2011 and 2018 (before and after the removal of the riprap).

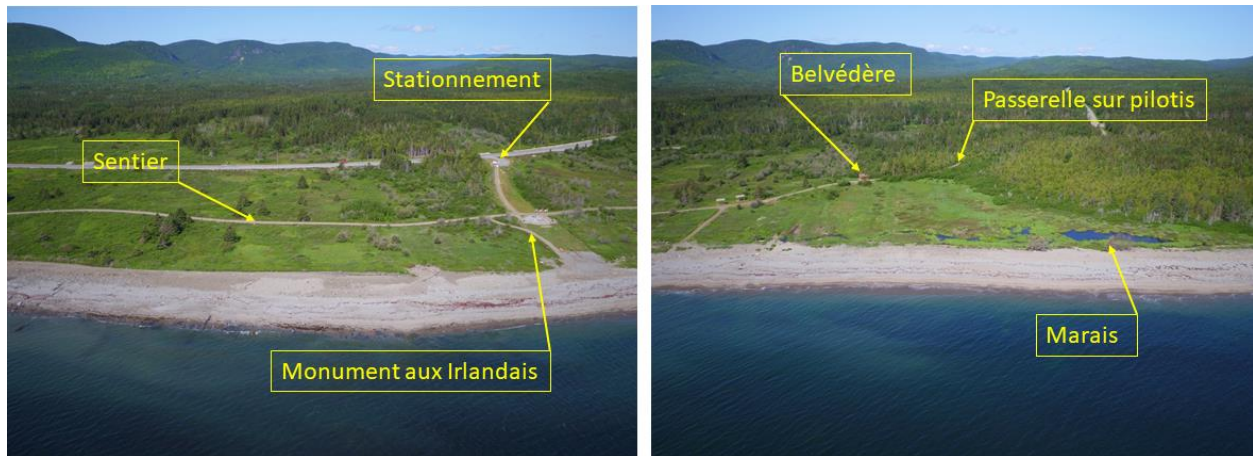


Figure 10. Aerial view of the new Du Banc trail with the Irish Memorial, one of the trail's parking lots, its lookout, its interpretive panels and the raised walkway in the wet woodland portion (Jean-David Dupuis, Parks Canada, 2019).

Discussion

Overall, the project to restore the natural dynamics and enhance the coastal ecosystem of Cap-des-Rosiers has been a great success. In brief, the established objectives were met and even exceeded in several cases. Installing infrastructures adapted to coastal ecosystems (such as the trail, lookout, raised walkway, access points and increased security thanks to the new parking lots) allow users to appreciate and immerse themselves more in the context of the natural environment where they are. Similarly, removing the road and riprap has made the free flow of waves and sediment on the beach possible. The beach is accessible not only to visitors, but also to other living organisms, such as capelin, which use it as a breeding habitat. The natural revegetation underway is in addition to that carried out on the northern part of the beach and is progressing at a satisfactory rate.

In terms of cultural resources, the relocation of the Irish Memorial has ensured the protection of this heritage symbol commemorating the *Carricks* shipwreck. In addition, the restoration of natural beach profiles (altered by the presence of human infrastructure) will help reduce the risk to cultural resources that remain buried on the seashore. Lastly, as evidenced by the statistics collected, this project was a unique opportunity to raise awareness of the value of Forillon National Park and its issues and to obtain Canadians' support and engagement.

This project is the second large-scale project carried out in Forillon National Park to adapt to climate change and, more specifically, to the phenomenon of coastal erosion. The Penouille Peninsula integrated management project (Sigouin et al. 2019) was more focused on adapting infrastructure to climate change; it allowed us to acquire important knowledge on coastal ecosystem dynamics and develop some expertise in adapting and implementing appropriate coastal infrastructure in a dynamic ecosystem. As part of the project to restore the natural dynamics and enhance the coastal ecosystem of Cap-des-Rosiers, a strategy involving removing and relocating infrastructure was adopted. The project also further integrated visitor experience concerns and issues. Six public meetings were held to discuss the project as a whole or the issues related to the Irish Monument with the public. These meetings took into account the concerns of the public and resulted in a project that respected the interests of all parties. In short, these projects have allowed us to increase our experience and develop our expertise on climate change adaptation in coastal areas.



This restoration project took its first steps in the early 2000s as part of the review of the management plan, when issues involving interactions between infrastructure and coastal dynamics had already been identified for several years. This is therefore a long-term project that was made possible by documenting these issues over several years. It is also important to mention that the success of the project is also due to the harmonization of several related projects created in an overall vision for this area of the park. The removal of Route Du Banc and its protective structures meant that the path of Highway 132 had to be revised and was improved as part of an infrastructure project to not only reduce the length of roads in the area by approximately 2.5 km (20%), but also provide a new path for the road that would make it possible to restore aquatic connectivity in a biodiversity-rich area of the park. The abandoned sections of the old road are the subject of another CoRe project currently underway (Restoration of Forest and Aquatic Connectivity in the Cap-des-Rosiers Area). In addition to these projects, there are two other revitalization projects in the northern area of the park: the project to repair the Cap-des-Rosiers harbour and to repair the Interpretation Centre (Figure 11), which has become the Visitor Information and Discovery Centre. All these projects offer visitors and users a renewed experience in a natural and cultural landscape that complement each other. Needless to say, the success of these developments provides a unique opportunity to educate visitors about the ecology of coastal systems, fragile ecosystems, sustainable human infrastructure development, cultural resources and local history.

The project to restore the natural dynamics and enhance the coastal ecosystem of Cap-des-Rosiers has also made it possible to establish long-term monitoring to assess the effectiveness of interventions over a period more consistent with the real time required for natural environments to adjust and recover their natural processes following those interventions. In addition to the monitoring projects presented (Sigouin et Dupuis 2020, 2021a, b, c, d), the permanent installation of a camera by UQAR made it possible to monitor sediment movement and the impact of storm events, which will be extremely informative for future years.

Lessons learned

Despite the great success detailed above, some aspects of the project have caused delays in carrying out and finalizing the project. Funding was announced for this project in 2015, but the project was not completed until seven years later (2021), when the original planning called for a four- to five-year timeline. These delays can be attributed mainly to delays at various stages of the process, such as preparing specifications, awarding contracts, carrying out field work, needing to harmonize and coordinate certain phases of the project with other ongoing projects to optimize resources, etc. Also, we cannot ignore the fact that the discovery of new human bones from the *Carricks* wreck required many adjustments to allow us to adapt the project to this new input factor and to ensure an appropriate monitoring component during the work.

With regard to long-term monitoring to evaluate the effectiveness of our interventions, it will be important to set up funding programs that include carrying out this type of monitoring. Long-term monitoring is particularly important in the context of restoration projects in natural environments (Lindenmayer 2020). Ecosystems and their processes are known to recover gradually from a disturbance, particularly if the changes have been substantial and extensive over a long period of time (Lindenmayer 2020). Since coastal ecosystems are very dynamic by nature, the ecosystem is expected to take an extended period to recover its natural functioning. Implementing long-term monitoring will help improve the success rate of future restoration projects by learning from interventions that worked compared to those that did not (Lindenmayer 2020).



Figure 11. The Cap-des-Rosiers harbour with its restored south pier and the new Visitor Information and Discovery Centre (Jean-David Dupuis, Parks Canada).

Conclusion

This project has proven to be extremely beneficial for Forillon National Park, the surrounding communities and visitors. It has made it possible to proceed with the restoration of an ecosystem degraded by the presence of infrastructures in coastal environments directly interacting with the natural dynamics of this area of the park.

The project also increased our knowledge of the history of human occupation and the various ecosystems and coastal processes of the Cap-des-Rosiers area. In addition, the network established with research teams has encouraged the application of the knowledge acquired and its direct application to management issues and to adapting our infrastructures to current and future conditions in this area of the park. Our conservation, asset management, outreach, and visitor experience teams have also benefited from the work carried out as part of this project and can now bring the knowledge and experience gained to other projects.

Visitors can now enjoy an environment developed in harmony with the natural processes present in the coastal environment. They have access to renewed infrastructure and services that better meet their needs and diversify their park experience. In addition, the memory of the *Carricks* shipwreck is being honoured and the site is protected from coastal erosion. The education and communication component of the project also reached a wide audience on the subject of adaptation to climate change in coastal areas.



Acknowledgements

We would like to thank all Parks Canada employees who were involved in some way with this ecological restoration project. We would like to offer our special thanks to all the staff of Forillon National Park who have worked to restore the natural dynamics and enhance the coastal ecosystem of Cap-des-Rosiers over the years, and without whom the realization and success of this project would not have been possible.

All the researchers and their collaborators also deserve our thanks. Without their openness and availability, it would have been impossible to implement the innovative system that allowed us to adapt our strategies based on the knowledge acquired during the project and make it a success.



References

- Boisjoli, M.-È., I. Ribot, et O. Graf. 2019. Analyse bioarchéologique des sépultures du site 2007G7C , Cap des Rosiers (Parc Forillon, Gaspésie).
- Brodeur, S., et D. Sigouin. 2018. Situation des communautés de poissons. Abrégé technique 2016.
- Carter, D., et Y. Ouellet. 1977. Stabilité de la zone littorale comprise entre le phare et le havre de Cap-des-Rosiers.
- Comeau, D., S. Brodeur, V. Bujold, D. Sigouin, J.-G. Chavarie, J. Fournier, K. Marcoux, et C. Samson. 2006. Rapport sur l'état du parc 2006. Parc national Forillon.
- COSEPAC. 2013. Évaluation et Rapport de situation du COSEPAC sur l'Arlequin plongeur (*Histrionicus histrionicus*), population de l'Est au Canada.
- COSEPAC. 2000. Évaluation et Rapport de situation du COSEPAC sur le Garrot d'Islande (*Bucephala islandica*), population de l'Est.
- COSEPAC. 2004. Évaluation et Rapport de situation du COSEPAC sur le Bar rayé, population du sud du golfe Saint-Laurent.
- Gagnon, Letellier, Cyr, Ricard, Mathieu et Associés, A. 2013. Réaménagement du Monument du Carrick - Étude conceptuelle.
- GHD Consultants limités. 2015. Avis géotechnique - Aménagement d'une piste cyclable.
- Inspec-sol Ingénierie et solutions. 2015. Analyse géotechnique. Étude de faisabilité et d'analyse des options de restauration de la plage de Cap-des-Rosiers, parc national Forillon.
- Lindenmayer, D. 2020. Improving Restoration Programs Through Greater Connection With Ecological Theory and Better Monitoring. *Frontiers in Ecology and Evolution* 8:1-8.
- Marcouiller, F., R. Guillaume, et C. Rousseau. 2003. Comment réaménager la route du banc tout en conservant l'intégrité écologique ? Rapport de stage.
- McKeon, J. 2012. Sligo's Famine Diaspora: Emigrants from Palmerston's Sligo Estate, 1847 (extrait). C. S. L. P. C. Limited, éditeur.
- Merlicht. 2017. Revue de littérature et recueil de références sur le naufrage du Carricks réalisée dans le cadre de l'aménagement d'un sentier multi-usagers.
- Ouzilleau, J. 1977. Étude écologique secteur du havre. Parc Forillon.
- Parcs Canada. 2010. Parc national Forillon du Canada - Plan directeur 2010.
- Perron, M. 2018. Avis archéologique, parc national Forillon - Installation d'un nouveau système septique au camping de Cap-des-Rosiers (PRO-1409).
- Perron, M. 2019. Résumé des principaux éléments reliés à la découverte des restes humains de Cap-des-Rosiers (site 2007g, parc national Forillon) et synthèse des analyses spécialisées réalisées sur les corps par le laboratoire de bioarchéologie de l'Université de Montréal.
- Pronovost, S., et D. Sigouin. 2018. Situation des oiseaux marins - Abrégé technique 2016.
- Sigouin, D. 2015a. Restauration de la dynamique naturelle de la plage du secteur de Cap-des-Rosiers -



- Programme de suivi du projet de compensation réalisé dans le cadre de la réfection du havre de Cap-des-Rosiers.
- Sigouin, D. 2015*b*. Restauration de la dynamique naturelle de la plage du secteur de Cap-des-Rosiers - Rapport de suivi du projet de compensation (étape 1) réalisé dans le cadre de la réfection du havre de Cap-des-Rosiers.
- Sigouin, D. 2016. Restauration de la dynamique naturelle de la plage du secteur de Cap-des-Rosiers - Rapport de suivi du projet de compensation réalisé dans le cadre de la réfection du havre de Cap-des-Rosiers.
- Sigouin, D. 2017*a*. Chauves-souris – Inventaire 2016. Programme sur les espèces en péril et d'intérêt. Abrégé technique. Parc national Forillon.
- Sigouin, D. 2017*b*. Restauration de la dynamique naturelle de la plage du secteur de Cap-des-Rosiers - Rapport de suivi du projet de compensation réalisé dans le cadre de la réfection du havre de Cap-des-Rosiers.
- Sigouin, D. 2018. Restauration de la dynamique naturelle de la plage du secteur de Cap-des-Rosiers - 4^{ème} Rapport de suivi du projet de compensation réalisé dans le cadre de la réfection du havre de Cap-des-Rosiers.
- Sigouin, D., M. Côté, F. Sainte-Croix, F. Ste-Croix, et M. Sinnette. 2019. Aménagement intégré de la péninsule de Penouille.
- Sigouin, D., et J.-D. Dupuis. 2020. Restauration de la dynamique naturelle et mise en valeur de l'écosystème côtier de Cap-des-Rosier - Rétablissement de la dynamique naturelle du marais de Cap-des-Rosiers. Programme de restauration écologique / Projets CoRe. Abrégé technique.
- Sigouin, D., et J.-D. Dupuis. 2021*a*. Restauration de la dynamique naturelle et mise en valeur de l'écosystème côtier de Cap-des-Rosier - Présence de végétation de haut de plage. Programme de restauration écologique / Projets CoRe. Abrégé technique.
- Sigouin, D., et J.-D. Dupuis. 2021*b*. Restauration de la dynamique naturelle et mise en valeur de l'écosystème côtier de Cap-des-Rosier - Empreinte des infrastructures humaines qui n'interagissent plus avec la dynamique côtière. Programme de restauration écologique / Projets CoRe. Abrégé tech.
- Sigouin, D., et J.-D. Dupuis. 2021*c*. Restauration de la dynamique naturelle et mise en valeur de l'écosystème côtier de Cap-des-Rosier - Superficie de la plage disponible pour la reproduction du capelan. Programme de restauration écologique / Projets CoRe. Abrégé technique.
- Sigouin, D., et J.-D. Dupuis. 2021*d*. Restauration de la dynamique naturelle et mise en valeur de l'écosystème côtier de Cap-des-Rosier - Stabilité et caractéristiques physiques des aménagements côtiers. Programme de restauration écologique / Projets CoRe. Abrégé technique.
- Sigouin, D., C. Samson, S. Brodeur, D. Comeau, et S. Pronovost. 2008. Plan surveillance de l'intégrité écologique 2008-13. Parc national du Canada Forillon.
- Société historique de la Gaspésie. 1964. Les Kavanah à Cap-des-Rosiers. 5-15.
- Stantec Experts-conseils ltée. 2016. Étude géotechnique. Réfection majeure de la route 132 au parc national Forillon - phase III.
- Synnott, G., et J.-Y. Chouinard. 1986. Plan de gestion du marais de Cap-des-Rosiers. Parc national Forillon. Service de la conservation des ressources naturelles. Parc national Forillon.



Toupin, R. et I. Ribot. 2013. Sépultures de 2007G3A7-1Q, Parc Forillon, Cap des Rosiers, Gaspésie.
Rapport bioarchéologique pour Parcs Canada. 28 p.

Vigeant, J. 2018. Analyse de la composition isotopique pour retracer l'origine et reconstituer
l'alimentation d'individus mis au jour sur la plage de Cap-des-Rosiers , site 2007G7C , Parc national
Forillon , Québec, 2016.

WSP. 2015a. Étude hydrodynamique du littoral dans l'anse du Cap-des-Rosiers - Rapport d'étape 1.

WSP. 2015b. Étude hydrodynamique du littoral dans l'anse du Cap-des-Rosiers pour le démantèlement
d'une route, d'un enrochement et pour la restauration de la plage - Rapport d'étape 2.



Appendix 1

SOME STATISTICS ON EXTERNAL RELATIONS RELATED TO THE CAP-DES-ROSIERS BEACH RESTORATION PROJECT

Table of Contents

Summary	3
Background	4
Objectives	7
Methodology	8
Results	11
Discussion	20
Conclusion	22
Acknowledgements	23
References	24
Appendix 1	27
Website	29
Web page statistics from October 1, 2018 to March 13, 2020.....	29
Social media	30
Videos on the Forillon National Park Facebook pages.....	30
Publications.....	31
Media communications	31
Advertisements.....	31
Conferences	32
Capelin on the Cape: Capelin exhibition in partnership with WWF	32
Citizen science initiative to indicate the presence of capelin.....	32
Other initiatives	32
Mentions in the visitor’s guide	32
Reviews	33
Public meetings with stakeholders in Cap-des-Rosiers	33
Newsletter for partners	33
Creating an interactive educational game in kiosks for youth	33



Programme de conservation et de restauration

CoRe - Final Report
275
April 2022



Website

No website data is available prior to October 2018, as the compilation-by-page system has since been changed.

Web page statistics from October 1, 2018 to March 13, 2020

English	Unique Page View (UPV)	French	Unique Page View (UPV)
Coastal ecosystem restoration ¹ <i>Pc.gc.ca/en/pn-np/qc/forillon/discover/cote-coastal</i>	246	Restauration des écosystèmes côtiers ² <i>Pc.gc.ca/fr/pn-np/qc/forillon/decouvrir-discover/cote-coastal</i>	70
Videos – Coastal restoration ¹ <i>Pc.gc.ca/en/pn-np/qc/forillon/découvrir-discover/cote-coastal/videos</i>	35	Vidéos — Restaurations des milieux côtiers <i>Pc.gc.ca/fr/pn-np/qc/forillon/découvrir-discover/cote-coastal/videos</i>	141
Infrastructure program ³ <i>Pc.gc.ca/en/pn-np/qc/forillon/visit/Infrastructures</i>	352	Programme d’infrastructure ³ <i>Pc.gc.ca/fr/pn-np/forillon/visit/Infrastructures</i>	1550

¹ It is important to remember that these pages were created around 2014, but we do not have any statistics from before October 1, 2018.

² It is normal for the statistics for the French pages to be so low. The Google algorithm favours recent pages, and these pages were not really modified in 2018–2019. They have also not been promoted as much in the media as the English pages.

³This page was updated numerous times in 2018, 2019 and 2020 and promoted more on social media.



Social media

Forillon National Park has focused its social media presence on two pages: @pnForillon and @ForillonNP. These statistics are not representative of what may have been showcased on Parks Canada’s national office Facebook pages, their Twitter accounts or their Instagram accounts.

Videos on the Forillon National Park Facebook pages

English	Date	Estimated coverage	Number of unique views	French	Date	Estimated coverage	Number of unique views
Forillon: Tackles the Challenge of Coastal Erosion	2017/01/24	743	122	Forillon face à l'érosion (1 de 2)...	2017/01/24	21,220	4,382
Forillon Adapts to Coastal Erosion (Part 2 of 2)...	2017/01/24	726	138	Forillon s'adapte à l'érosion (2 de 2)...	2017/01/24	19,963	3,873
Question for an expert (1/3): What weakens the coastline? ...	2017/12/15	439	117	Question pour un expert (1/3) : Qu'est-ce qui fragilise la côte ?...	2017/12/15	10,963	3,654
Question for an expert (2/3): What accelerates it? ...	2017/12/20	387	83	Question pour un expert (2/3) : Qu'est-ce qui peut accélérer l.....	2017/12/20	5,394	1,522
Question for an expert (3/3): What can we do? ...	2017/12/28	273	89	Question pour un expert (3/3) : Comment intervenir ?...	2017/12/28	3,206	963
Coastal erosion in Forillon NP...	2018/08/21	751	291	Érosion côtière au pn Forillon...	2018/08/21	45,679	19,435



Publications

Excluding the posts related to the citizen science initiative presented below and the published videos presented earlier, the following is a summary of results of the Facebook posts related to the Cap-des-Rosiers beach restoration project.

Publication category	Number of publications	Estimated reach
Info-Work	5	Undetermined
<i>Carricks</i> and archaeology ¹	4	Undetermined
General publications	5	Undetermined

Undetermined = Not available due to the change in calculation method used by the Facebook platform

¹ These are publications related to the relocation of the Irish Memorial only, excluding the ceremony and studies related to the discovery of the bones.

Media communications

Years	Number of media mentions	Filming (documentaries on the subject)
2013	5	
2014	0	
2015	10	
2016	10	<ul style="list-style-type: none"> • <i>Découverte</i> show
2017	7	<ul style="list-style-type: none"> • <i>Carricks</i> by Tortuga Films Productions II Inc.
2018	5	<ul style="list-style-type: none"> • Parks behind the scenes at the National Office
2019	4	
2020	4	
2021	2	

This table does not include all the media coverage related to the commemoration of the Carricks shipwreck.

Advertisements

Six advertisements appeared from 2016 to 2018 that mentioned the Cap-des-Rosiers beach restoration project.

Date	Title	Media
June 15, 2016	Regard sur les projets en cours au parc national Forillon	<i>Le Pharillon</i>
June 15, 2016	Forillon National Park's Current Projects at a Glance	<i>The Gaspé Spec</i>
July 2017	80 M\$ investis au parc national Forillon	<i>Le Pharillon</i>
July 26, 2017	\$80 million invested in Forillon National Park	<i>The Gaspé Spec</i>
October 10, 2018	Coup d'œil sur les projets au parc national Forillon	<i>Le Pharillon</i>
October 11, 2018	Forillon National Park's Current Projects at a Glance	<i>The Gaspé Spec</i>



Conferences

Event	Dates	Given by	Number of attendees
Coastal Zone Canada conference	2012	Daniel Sigouin	~25
Comité Zip de la Gaspésie	2017	Daniel Sigouin	15
Parks Canada environment webinars	2018	Daniel Sigouin	~25
Canadian Parks Conference	October 2019	Mathieu Côté and Daniel Sigouin	~25
École en réseau.	February and November 2021	Andrée-Anne Rouleau and Daniel Sigouin	2,082 students
Canadian Parks Council for Innovation and Leadership	March 2021	Daniel Sigouin	~25
Society for Ecological Restoration	June 2021	Daniel Sigouin	~25
Cégep de la Gaspésie et des Îles	September 2021	Daniel Sigouin	5

Capelin on the Cape: Capelin exhibition in partnership with WWF

The “Capelin on the Cape” exhibition produced by WWF Canada, in collaboration with Forillon National Park, was proposed in 2017 as an awareness-raising tour on prey fish and their importance for the health of marine ecosystems, with a special focus on capelin, a key species of the St. Lawrence.

The 16-stop interpretive trail has been put in along the Prélude-à-Forillon trail. It was removed for the 2018 season following the closure of this trail for major work at the Interpretation Centre.

Citizen science initiative to indicate the presence of capelin

Citizens were invited to help Forillon National Park scientists determine when capelin roll onto the beach at Cap-des-Rosiers.

- Over 2,000 copies of a segment on capelin in the RCM of La Côte-de-Gaspé family planner were distributed to families.
- From 2015 to 2019, 16 publications in French and 16 publications in English have appeared on this subject and on the capelin exhibit on Forillon National Park’s Facebook pages. The diffusion index for these posts is not available because Facebook changed its analytics system in September 2019.

Other initiatives

Mentions in the visitor’s guide

The 2019 visitor’s guide had a segment on page 7 explaining the Cap-des-Rosiers beach restoration project.

Visitor’s guide distribution:



- Nearly 14,000 copies of the “Ambassador” version were mailed to homes in the greater Gaspé area.
- Nearly 60,000 copies were provided to visitors in the 2019 season.
- Nearly 3,000 copies were handed out at promotional shows, including the Montréal and Québec RV shows and the Montréal Outdoor Show.

The Cap-des-Rosiers beach restoration project was also mentioned in the 2016, 2017 and 2018 visitor’s guides with similar diffusion statistics.

Reviews

The Forillon National Park annual Year In Review is a document that is widely distributed to the population of the greater Gaspé area (approximately 14,000 homes and businesses) and is available online during the year. It highlights Forillon National Park projects.

The Cap-des-Rosiers beach restoration project was mentioned in the 2015, 2016, 2017 and 2018 editions. In 2017 and 2018, a flier mentioning the Cap-des-Rosiers beach restoration project was distributed by direct mail to over 14,000 households.

Public meetings with stakeholders in Cap-des-Rosiers

Two recurring topics are:

- Beach restoration and marsh protection
- Protecting the Irish Memorial

Meetings took place:

- March 8, 2010
- November 19, 2012
- June 4, 2014
- June 4, 2016 (31 participants)
- November 29, 2016
- June 19, 2017

These meetings exclude the specific meetings that took place with the Fabrique de la paroisse de Saint-Alban following the discovery of bones on the Cap-des-Rosiers beach, and meetings concerning the commemoration ceremony for the *Carricks* shipwreck.

Newsletter for partners

Two newsletters for partners addressed the Cap-des-Rosiers beach restoration project and the relocation of the Irish Memorial. These were the May and December 2016 newsletters.

Creating an interactive educational game in kiosks for youth

The “Destination Forillon” game was created to educate young people on the restoration and protection projects for the Cap-des-Rosiers, Penouille and Cap-Bon-Ami beaches. Although no statistics are currently



available on the reach of this game, it has been tested in kiosks and was still being used when this report was written. New avenues for using this game will be explored in the coming years.

Document prepared by: Andrée-Anne Rouleau (Public Outreach Education Officer)

*Revised by: Marie-Ève Murray (Public Relations and Communications Officer)
and Michel Queenton (External Relations Manager)*