

Adaptation to Climate Change in the LSDs of Cocagne and Grande-Digue

Towards a Sustainable Coastal Plan

Coastline Management Booklet

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Introduction and Purpose

In New Brunswick, nearly 60% of the population lives within 50 kilometres of a shoreline (*A Coastal Areas Protection Policy for New Brunswick*). Coastal areas support economic activity, provide spaces for outdoor recreation, supply habitat for a rich diversity of plants and wildlife, and are an integral part of our history and culture.

The permanent population of Cocagne Bay has grown considerably since the 1970s.

Over the past 50 years or so, coastal areas have become more and more threatened by residential and industrial development. Even though climate variability has always had a huge impact on life and work in coastal regions, there are now new risks associated with climate change, such as sea level rise and the frequency of extreme weather events. It is therefore important to consider taking a sustainable approach to development projects within coastal ecosystems in order to minimize the risks to human life and natural environments.

The key to successfully protecting coastal areas lies with better planning, at both the community and regional levels as well as with landowners. By adopting innovative planning and development methods, individuals and communities will be better able to protect their investment.

Another key to protecting coastlines lies with the political will to turn the protection policy into a regulation and to implement mechanisms for enforcing the legislation, and to do so as quickly as possible. This is an urgent matter because our coastal areas have almost all been altered.

Nature creates land formations, but it also has the power to change them, and this is not necessarily in the interest of human beings. As

a result, coastal residents sometimes use protective structures to control erosion. Building a structure to protect banks from erosion is a complicated undertaking that requires design work, impact studies, permits, and so forth. (See *A Coastal Areas Protection Policy for New Brunswick*, 2002. <http://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/Water-Eau/CoastalAreasProtectionPolicy.pdf>.)

We hope the information in this booklet will be useful not only to landowners in the Cocagne and Grande-Digue areas but to all coastal communities in New Brunswick, much like the Carron Point booklet.

Purpose of Booklet

This booklet was designed to support decision making about adapting to coastal erosion and other impacts of climate change in the Cocagne Bay region, which is served by the Kent District Planning Commission and takes in the local service districts (LSDs) of Cocagne and Grande Digue.

We have included technical information about the procedures for obtaining permits and approval to put up a structure, a glossary, and contact information for resource persons. In addition, we have tried to answer a few of the many questions that residents and other communities might have about their shared problem of coastal erosion.

Coastal Description and Dynamics

Excerpt from *Rapport d'ensemble de l'écosystème de la Baie de Cocagne au Nouveau-Brunswick*, Department of Fisheries and Oceans Canada (Gauvin, Turcotte-Lanteigne, Ferguson, 2009).

Dunes and beaches

Dunes and beaches are among the most sensitive environments in the coastal zone. They provide habitat for many species of plants and wildlife. The sand on New Brunswick's east coast is in constant

motion, and its motion shapes the coastlines and determines the distribution of habitats and species. Sand beaches are found at different locations along the shoreline of the bay. A sand spit to the south of Cocagne Island has been growing for the past few years. There are some pebble beaches near the cliffs, such as those at Jim Long Cape, Cocagne Cape, and Gros Cap on Cocagne Island.

Islands

The Cocagne River watershed has two coastal islands: Cocagne Island and Surette Island (Treasure Island). Cocagne Island has long been recognized for its unique landscape. It supports various habitats, such as wetlands, mudflats, sandbars, dunes, beaches, sandstone cliffs, and wooded areas. There is much biodiversity within a small area. Cocagne Island is one of the few islands on the east coast of Northumberland Strait that remains uninhabited. There are 56 residences on Surette Island, which has an area of 0.06 km². If you drive along the one-way road that goes around the island, you can see a few marshes to the south and a sandstone cliff to the north.

Wetlands

Wetlands are considered extremely important environments for the productivity of estuaries and the many ecological processes that go on there. The different wetlands in the Cocagne Bay watershed are bogs, forested wetlands (including cedar swamps), shrub wetlands, freshwater and saltwater emergent marshes, and aquatic beds.

Bogs

Bogs form in cool wet environments. Organic matter from plants and other organisms decomposes very slowly in bogs because the acidity and anaerobic conditions slow down decomposition. Since peat can hold up to 25 times its weight in water, it has an impact on the groundwater. It can also trap water contaminants or atmospheric depositions like pesticides and mercury for an indefinite period of time. The Cocagne Bay watershed has about 20 bogs larger than 25 hectares. Three are located in the coastal region of the watershed, while the others are distributed along the top of the watershed. The bogs upstream of the Cocagne River are located in the Canaan Bog Protected Natural Area (PNA).

Marshes

Marshes are environments that are flooded daily or periodically by fresh water or salt water. Among the most productive ecosystems in the world, marshes form in lowlands. Coastal areas contain mostly salt marshes. These marshes are typically found on sites that are protected from waves and where there is an accumulation of sediments, such as in estuaries, lagoons, and barachois. Organic and inorganic sediments carried by the action of the waves build up in the marshes. These habitats protect coastal lands from erosion and act as filters that can absorb pollutants from the water and the air. The Cocagne Bay watershed has several small marshes (under two hectares). There are large expanses of unaltered salt marshes on Cocagne Island, in Cocagne Cove, in Cocagne Bay, in the estuary near the Route 11 bridge, and along Route 134. The Cormierville Marsh is identified by a panel designating it as a provincially significant wetland under the Habitat Program of the New Brunswick Department of Natural Resources.

Mudflats

Mudflats are expanses of mud that accumulate mostly in coastal areas where there is little wave action and the sea floor has a gentle slope. They are made up of fine sediments, such as clay, loam, and fine sand. These areas can be very productive. Migrating birds eat the worms and amphipods that are found in abundance in these habitats. People go there to fish species such as soft-shell clam (*Mya arenaria*), eastern oyster (*Crassostrea virginica*), and American eel (*Anguilla rostrata*). The coastal zones in the Cocagne Bay watershed have features that lead the development of mudflats. The shores of the watershed are made of a firmer substrate, but the entire bed of the river and the bay consists of mud.

Protecting private coastal properties against erosion and the impacts of climate change requires a knowledge of regulations and statutes. The same goes for Crown land on beaches and submerged land.

Questions about Crown Land

Crown land refers to all land, in whole or in part (including land located underwater), in the province of New Brunswick that is not owned by individuals. This land is managed by the Department of Natural Resources (DNR). Much Crown land is administered and controlled by the Minister of Natural Resources.

No person shall erect or create a barrier or obstacle to impede the free passage of the general public along the bank or shore of a river, lake, or stream over which there is a public right to pass and repass as set out in sections 15 and 16 of the *Crown Lands and Forests Act*, assented to July 16, 1980.

In Cocagne, Grande-Digue, and elsewhere, the land under water belongs to the Crown. However, it is possible to obtain a licence of occupation for submerged Crown land <http://www2.gnb.ca/content/dam/gnb/Departments/nrm/pdf/fr/Publications/LesCotesEtLesPlages.pdf>

Who owns the beach?

Generally, the “dry” part of the beach, or “backshore,” is owned by the landowner, whereas the “wet” or submerged part of the beach, or “foreshore,” that is exposed at low tide is owned by the Province and falls under the jurisdiction of the Department of Natural Resources. The ordinary high water mark (OHWM) is the boundary between a property owner’s land and Crown land. This mark is defined as the average of the normal high tides at a given location. A licensed surveyor can establish the exact location of this mark (NBDNR).

Landowners may build anti-erosion structures or works to protect their property from erosion only in specific cases. Structures may not be built within 30 metres of a coastal wetland or within 30 metres of a river on a dune. However, such structures or works must be located on the landowner’s private property above the OHWM, and all of the required municipal, provincial, and federal permits must be obtained. In addition, all activities must comply with the new management standards established under the *Coastal Areas Protection Policy*. **Contact the New Brunswick Department of the**

Environment for further information before starting any activity or development. In certain circumstances, authorization may be granted for erosion-control structures or works on Crown lands, below the OHWM. <http://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/Water-Eau/CoastalAreasProtectionPolicy.pdf> (*A Coastal Areas Protection Policy for New Brunswick*)



Who owns submerged lands?

Submerged Crown land refers to Crown land that is covered by fresh or salt water, such as a <http://www.dfo-mpo.gc.ca>

The province owns about 2.1 million hectares of submerged Crown lands, including inland waters and certain parts of the Bay of Fundy, Northumberland Strait, the Gulf of St. Lawrence, and Chaleur Bay. The land under water in Cocagne River and Cocagne Bay therefore belongs to the Crown. The Department of Natural Resources manages this land on behalf of the provincial government. Other provincial and federal agencies may have certain legal powers over these lands (NBDNR).

According to the New Brunswick Department of Natural Resources and under the *Submerged Land Policy*, when any hard erosion control structure along the frontage of a landowner's property, such as riprap, gabion baskets, or a vertical wall, is damaged or destroyed by storm surge or falls into a state of disrepair owing to lack of

maintenance or other events, it is the landowner's responsibility to clean up and remove all debris and materials from these damaged structures if they have fallen onto Crown land (beach area below the high water mark) or into Crown waters (oceans and rivers).

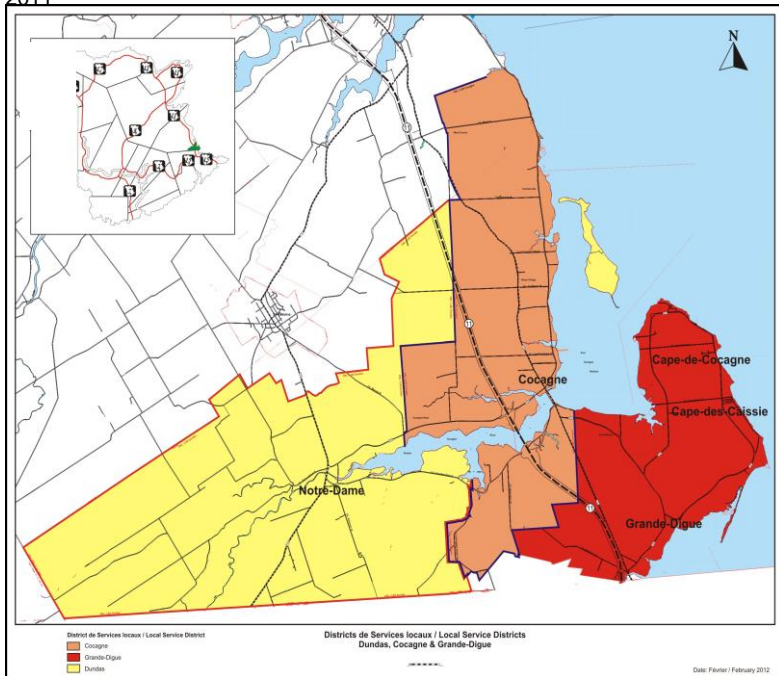
Source: *Submerged Land Policy*, New Brunswick Department of Natural Resources, and Letter from the Minister of Natural Resources to the Carron Erosion Study Team, dated April 24, 2009.

At the present time, under the *Coastal Areas Protection Policy for New Brunswick* and the *New Brunswick Watercourse and Wetland Alteration Regulation*, **no erosion control structure is permitted to be built within 30 metres of a coastal wetland. Contact the New Brunswick Department of the Environment for further information before starting any activity or development.** (<http://www2.gnb.ca/content/dam/gnb/Departments/nr-rn/pdf/Wetlands-TerresHumides.pdf>)

Brief description of projects in the region over the past four years

The goal of this 2008-2011 climate change adaptation project was to help with making decisions about adaptation to erosion and other impacts of climate change and sea level rise in the rural area served by the LSDs of Cocagne, Grande-Gigue, and Dundas. A number of coastal residents in this area are contending with erosion and flooding problems. So far, little concerted effort has been made to ensure effective planning with a view reducing these impacts in the LSDs. The proposed project is designed to address that deficiency. It is the direct result of earlier work done by researchers at the Université de Moncton in collaboration with the departments of the Environment and Natural Resources and with different municipalities or LSDs, such as the work that has been going on at Carron Point Carron since 2007 (Chouinard and Martin, 2008, 2009).

Map 1: Study Area - DSL of Cocagne, DSL of Dundas and DSL of Grande-Digue, New Brunswick Source: Statistics Canada, 2011



Erosion and Other Impacts of Climate Change

During the focus groups' data validation sessions, it was noted that climate change (CC) is generally understood by the project participants to mean warming temperatures over a long period of time due to pollution. This understanding is influenced by several factors, including level of education, occupation, and whether the media consulted are capable of changing a person's perception of the climate change phenomenon.

Climate change is being experienced in the LSDs of Cocagne and Grande-Digue as a result of the following:

1. Atmospheric warming: The greenhouse effect was quite well understood even though a number of participants mixed up air pollution and atmospheric warming and even, in some cases, destruction of the ozone layer. Most understood that human activities, such as transportation, thermal electricity generation, and manufacturing, are the direct causes of the increase in greenhouse gases, although they did not fully understand the dynamics of these emissions, the different gases, their retention of infrared radiation, the albedo effect, or the concept of radiative budget.
2. Sea level rise: The most informed individuals in the sample had a good understanding of the links between changes in certain weather parameters and sea level rise. Others had a rather confused understanding of the interactions between atmospheric temperature and sea level. Few participants mentioned the effect of thermic expansion or the positive feedback effects of the increase in surface water temperature on storm frequency and intensity. All of them clearly understand that water from a melting glacier that ends up in the ocean will add to sea level rise. Sea level rise was noted through the following examples:
 - a. *Decrease in the height of dune crests, more breaches in the coastline, more rain and runoff. We can see the effects of runoff, for example the beach at Caissie Cape.*
 - b. *There is sedimentation at the end of Cocagne Cape wharf; it varies from year to year. There are abandoned roads in the northwest (Cocagne River).*
 - c. *There's a lot of erosion going on in front of the house, 30 feet since 1975; there's no grass left.*
 - d. *Coastal erosion is the trend, however I've noticed that the dune on Cocagne Island is advancing.*
 - e. *Erosion is occurring more and more frequently. The cliff at my place has lost 2 feet in 6 years. Freezing and thawing are more and more frequent; they increase erosion and damage stabilizing structures.*
 - f. *I used to be able to see the dunes from my place 30 years ago at Cormier's Point, and the rock wall that we built 30 years ago isn't effective anymore.*
 - g. *The river's getting narrower; it's filling with sediments below the*

bridge on the 115. It's because of the logging, I think. And I can't fish for clams anymore!

3. Adaptation measures: There was frequent mention of a progressive and permanent rise in the level of ocean, which is creeping up on land little by little. Residents have to adopt viable adaptation strategies to mitigate the dangers associated with the increase in frequency and intensity of storm surges, which are more of an ad hoc threat but destructive nonetheless. It is important for residents to understand that most of the threats they could be facing in the years to come will be the result of the increase in storm surge frequency and intensity (IPCC, 2007). Then, but in the longer term and in a more localized manner, they will have to consider the intrusion of salt water into the groundwater, the destruction of wetlands, the accumulation of sediments in the river, ice storms, flooding, extreme temperatures, well contamination, impacts on septic systems, effects on plant growth (gardens), and so forth.

Storms and Return Periods

Hare et al. (1997) have said that the return periods for extreme events have grown considerably shorter since the last century. This means that the average amount of time between events is shorter. The change estimates for the future (2025, 2055, 2085, and 2100) are presented in Table 1 and represent the worst-case scenarios resulting from the simultaneous occurrence of a major storm surge according to the return period, with consideration given to sea level rise (Daigle, 2012).

We might recall, for example, the Saxby Gale, which hit New Brunswick and western Nova Scotia in 1869. That hurricane, considered to have a return period of 100 years, caused the tide to rise two metres above the normal high tide. There were many deaths, hundreds of boats were washed up on shore, and all lowland areas were flooded (Desplanque and Mossman, 2004). No other storm of this category has occurred since then.

New Brunswick's coasts have always been affected by such extreme events, but their frequency and intensity seem to be increasing, particularly since 2000 (GNB, 2013).

In the last decade, a number of storms have hit the coast of New Brunswick. For example, in 2000, two major storms (January 20, 2000, and October 29, 2000) whose return periods were estimated at once in 30 years, led to record-high water levels. During the night of January 21, 2000, a low-pressure system passed over the Maritimes, causing destruction in a number of coastal regions. The water reached a record high and caused flooding along the New Brunswick coast, resulting in nearly \$1.7 million worth of damage. Eight months later, on October 29, another storm hit with violent winds and a record-high tide. The coastline, rivers, and a number of buildings and structures were damaged to the tune of nearly \$2.4 million.

Table 1. Estimated return periods

Kent County – Saint-Édouard-de-Kent on the Westmorland County line						
High tide $0.8 \text{ m} \pm 0.1$						
Return period	Residual wave	2000	2025	2055	2085	2100
1 year	0.92 ± 0.20	1.72 ± 0.30	1.86 ± 0.33	2.13 ± 0.45	2.51 ± 0.66	2.74 ± 0.78
2 years	1.11 ± 0.20	1.91 ± 0.30	2.05 ± 0.33	2.32 ± 0.45	2.70 ± 0.66	2.93 ± 0.78
5 years	1.36 ± 0.20	2.16 ± 0.30	2.30 ± 0.33	2.57 ± 0.45	2.95 ± 0.66	3.18 ± 0.78
10 years	1.54 ± 0.20	2.34 ± 0.30	2.48 ± 0.33	2.75 ± 0.45	3.13 ± 0.66	3.36 ± 0.78
25 years	1.79 ± 0.20	2.59 ± 0.30	2.73 ± 0.33	3.00 ± 0.45	3.38 ± 0.66	3.61 ± 0.78
50 years	1.98 ± 0.20	2.78 ± 0.30	2.92 ± 0.33	3.19 ± 0.45	3.57 ± 0.66	3.80 ± 0.78
100 years	2.17 ± 0.20	2.97 ± 0.30	3.11 ± 0.33	3.38 ± 0.45	3.76 ± 0.66	3.99 ± 0.78

By 2025, a storm return period of 25 years or greater would result in a water level of about 3 metres, including margin of error (see Appendix 3 for the impact). However, this same 3-metre level could be reached more frequently starting in 2055 with five-year storm return periods and in 2085 with one-year storm return periods. This water level would have a considerable impact on roads. For example, the main road to the school would be flooded, as would a number residences along the coast.

Also, a storm with a 100-year return period occurring in 2025 would result in water level rise of about 3.4 metres (see Appendix 4 for the impact), including margin of error. However, the same water level of

3.4 metres could be reached with storms having a return period of 25 years in 2055 or a return period of only 5 years starting in 2085.

Protection against Erosion

There are forms of natural protection against erosion. These include wetlands (marshes, swamps, bogs, etc.) that carry out various functions, such as protection against flooding and storm surges, stabilization of shorelines and riverbanks, and protection of human health by storing and purifying groundwater and surface water.

Salt marshes are coastal wetlands located within bays and protected estuaries where fresh water flows into the ocean. Salt marshes are similar to prairie grasslands dotted with streams and ponds. They are often flooded during daily tides. They act as sponges and provide some protection against erosion. In Cocagne Bay, a number of salt marshes have been destroyed, and those that remain must be protected because they play a very important role.

Suggestions for protecting marshes

- **Never fill in a marsh.**
- **Don't drive your truck, all-terrain vehicle (ATV), or motorcycle in marshes, on dunes, or on the beach. You could destroy the plants that serve as food for the ringlet butterfly.**
- **Don't burn the vegetation along the edges of marshes and rivers.**
- **Don't dump fill, garbage, or other debris into marshes. Report illegal dumping.**
- **Don't pick native plants such as sea lavender or saltmeadow grass.**
- **Avoid going into marshes as you could damage this fragile habitat.**
- **Leave trees and dead branches in buffer zones: insects and other animals depend on them for their survival.**

What is a wetland buffer zone?

A buffer zone is an area where a variety of plants (grasses, bushes, and trees) grow together and protect the marsh from the direct impacts of adjacent land use. If your property is located in a buffer

zone, you can help restore this sensitive habitat by planting species native to the region and by not mowing down the naturally occurring vegetation. By treating your property in this way, you will have a positive impact on the survival of wild species such as birds and other animals since you will be providing them with food and shelter.

Buffer zones reduce the impact of storms and flooding by absorbing some of the force generated by these weather events.



Agricultural buffer zone: Leopold Center for Sustainable Agriculture, http://fr.wikipedia.org/wiki/Zone_tampon, consulted on 17/12/2013.

The wider a buffer zone is, the better it will be at protecting sensitive habitats and reducing the effects of erosion. In accordance with several regulations, the *Coastal Areas Protection Policy for New Brunswick*, and the *New Brunswick Wetlands Conservation Policy*, a 30-metre buffer zone must be maintained near coastal regions and around watercourses and wetlands. **The New Brunswick Watercourse and Wetland Alteration Regulation requires a buffer zone 30 metres wide in areas where activities must be approved by the Department of the Environment.** Contact the New Brunswick Department of the Environment for further information before starting any activity or development.

Erosion Control - Soft (non-structural) Options

Option 1 – Do nothing

Some landowners wait before taking action, while others, when they see the banks on their property eroding, react immediately. Landowners should assess the losses before taking action, particularly if the lot has not been developed or if the structures that

are threatened have little value. It may be that erosion is not a major problem or that it occurs only during very intense storms. In this case, it might be a good idea to take no action and to let nature take its course on this part of the coastline.

Option 2 – Protect and restore coastal features

Protecting and restoring sand dunes, coastal wetlands, beaches, and their natural vegetation are the best ways to control erosion caused by sea level rise, wind, and storm surges. Erecting sand fences and planting native dune grass are two of the so-called soft methods that are often used in some locations. The success of this approach depends on local conditions. However, it may be necessary to take into account legislation on coastal zone protection, the *Wetlands Conservation Policy* (Department of the Environment), and the *Crown Lands and Forests Act* (Natural Resources). Landowners may contact the New Brunswick Department of the Environment and/or certain local environmental groups.

The residents of Cocagne and Grande-Digue mentioned other techniques that are used elsewhere and could be adapted to their community. These include the following:

- *Use sandstone instead of hard stones since sandstone will ultimately break down and provide sand for beaches. It would have to be changed more often, but this type of stone is available locally.*
- *Stop over-protecting capes (but without endangering anyone), which nourish beaches as they erode.*
- *Plant hundreds of shrubs per hectare along the coast, and require new coastal landowners to conserve a certain percentage of the vegetation on their property; request approval from the Department of the Environment.*
- *Prohibit construction on the coast. Authorize construction only on the landward side of coastal roads.*
- *Plant beach grass or other dune plants, and enhance the richness of dunes and their coastal species.*

Erosion Control - Riprap and Structures

The structures used to control erosion in the LSDs of Cocagne and Grande-Digue are riprap or rock walls, gabion baskets, wood walls or block partitions, wood walls and riprap, cement blocks, and gabion baskets with riprap (Paulin, 2009). Other structures are recommended only in certain very specific cases where there is very

high wave energy and other control methods have not produced good results. These are more costly but may offer better protection over a longer period of time. They require in-depth studies and engineering plans. However, all permits must be obtained from the Kent District Planning Commission, and approval from the Department of the Environment is required in most cases before any erosion control structure can be built.

Adaptation to Climate Change

Adaptation to climate change can be defined as “the set of organization, localization, and technical changes that societies will have to implement to limit the negative effects of climate change and maximize the beneficial ones.” According to the IPCC (2007), there are three different strategies for adapting to sea level rise: retreat, accommodation, and protection. Each community, each entity, chooses the strategy that best suits its needs, on the basis of its location and specific characteristics.

To meet the challenges of climate change, the communities of Cocagne and Grande-Digue have expressed a need to identify the priority sites most vulnerable to storm surges along their coastline, given the importance of these sites for the safety and well-being of communities, in order to identify what information about those sites should be collected and to consider possible solutions.

The weather events that occurred on December 21, 2010, amply demonstrated the vulnerability of certain structures along the coast, as well as the importance of documenting and considering which sites should be deemed priorities.

Impact of the storm of 21/12/2010 on road infrastructures in New Brunswick



Photos: Nicolas Bastien, 2010

Sites vulnerable to climate change have been identified and prioritized as follows:

1. All sections of Route 535 located right on the ocean shore, including the bridges over Goguen and Howard brooks
2. Lover's Lane
3. The four corners of the Route 134 bridge over the Cocagne River in order to protect access to businesses (priority to businesses that provide essential products – the grocery store and gas station on the north side)
4. The bridge on Highway 11
5. The road to Treasure Island
6. Cormierville Marsh (bird sanctuary)
7. Cormierville wharf
8. Cocagne Cape Marina.

Information that might be useful for coming up with solutions could come from different sources, including the following:

- photos of the sites before, during, and after a storm surge

- history of the sites (origin, construction, repairs, past maintenance, etc.)
- information resulting from the work of the IPCC and the 2006 study by Environment Canada and the Planning Commission concerning the sites selected
- LiDAR images, and ideally, their update in accordance with the most recent IPCC assessments
- knowledge of the institution, the group, and even the stakeholders and people responsible for maintenance and planning the future development of the site
- level of priority identified
- planning for future developments, existing or not, announced or not
- demographic characteristics that are as accurate as possible of the sectors around the selected sites
- buildings that could be used during an evacuation
- detailed, small-scale maps of the sites selected
- examples of what is being done elsewhere.

Possible solutions for Cocagne and Grande-Digue

Residents have suggested a few possible solutions, made comments, and asked questions in relation to dealing with climate change. These fall into the following categories:

Communication and structures

- Find effective ways for the parties concerned to communicate amongst themselves.
- Form a discussion group among planners, engineers, decision makers, and the residents affected.
- It is important to have a better understanding of the entire issue of public safety – what government and what agency or department is responsible for what.

- It is essential to understand how the different government jurisdictions are involved in the issues we are facing in our region.
- Community members are disappointed about the lack of engagement and leadership being shown by our governments.

Accommodation

- Community members want to do their part, but how can they implement our recommendations? Who will help them do it? Will a real commitment be made to take concrete action (with funding) to support the efforts of communities?
- Put buildings on pilings.
- Raise the road.

Retreat

- Move the road further inland.
- Move the buildings that are too close to the ocean, and set up a fund to finance all or part of this initiative.
- Have a buyout program under which the government would buy back at-risk properties (not supported by the Department of the Environment).

Protection

- System of dikes put in place in accordance with IPCC forecasts.
- Angled fences, e.g., Cap Bimet pilot project (Maltais, Université de Moncton).

Dynamics of Cocagne and Grande-Digue stakeholders and area organization

Several participants in the study expressed the wish to see a local government for the area. This wish was not unanimous; some are against turning their LSD into a municipality. Those in favor of the municipalization option want the community to become responsible for itself so it can better control its development and prevent abuse, particularly in fragile vulnerable environments, and those against it are afraid of losing the privilege of doing what they want on their own land and of seeing their taxes increase.

Tensions and Conflicting Land Use

Conflicting land use seems to be quite frequent and results mainly from two sources: loss of ocean view caused by new construction and loss of access to the ocean caused by the construction of cement walls, riprap, or gabions. It was noted that works that lower landscape quality are often the source of conflict in the two LSDs.

Shared vision and challenges to be addressed in the Cocagne and Grande-Digue areas

The future of the area and, more specifically, the challenges to be addressed in the next 10 years were topics of discussion during the focus groups. Some participants were afraid of uncontrolled development, while others were hoping for economic growth, but everyone wanted policies and regulations to ensure the sustainability and vitality of this rural area. The challenge is to start a dialogue in an effort to agree on a common vision and a plan for adapting to climate change, with consideration given to the area's socioeconomic and sociodemographic makeup. Last of all, the media will have to be used to disseminate information about adaptation.

Activities that would require a comprehensive environmental assessment

Certain activities in the coastal zone may require that an environmental assessment be done and submitted to the New Brunswick Department of the Environment. These activities are as follows:

- Permanent wharves, docks, or piers
- Bridges and causeways, including repair, upgrading, opening of gates, and decommissioning
- Intake/outflow/run-off pipes, as well as cables, pipelines, road ditches, and culverts
- Breakwaters and jetties
- Beach nourishment
- Removal, repair, rebuilding, upgrading, or altering of any existing permanent works
- Roads associated with allowable coastal works that may cross or impact coastal marshes or dunes, including within the associated Zone B area
- Dredging or disposal activities associated with Ocean Disposal Permits under the *Canadian Environmental Assessment Act*
- Floating boardwalks crossing tidally influenced areas for public access
- Coastal lands clean-up activities affecting large marine mammals or other species
- Harvesting, collection, or other activities involving organic matter on coastal lands, including beach wrack and seaweed, as well as beach raking
- Opening of natural tidal barriers for water exchange purposes
- Any coastal works not otherwise addressed

Source: *A Coastal Areas Protection Policy for New Brunswick*, New Brunswick Department of the Environment

N.B.: Any activities within 30 metres of the OHWM may require approval from the New Brunswick Department of the Environment.

Web addresses for New Brunswick statutes and regulations, December 2011

The list below provides a sample of the legislation and policies governing activities in watersheds that are designed to conserve and protect water quality. It also provides an overview of the permits

required for any development activity near a watercourse. Please note that this list is not exhaustive.

Clean Water Act - Depending on the location, plans may need to be submitted to the New Brunswick Department of the Environment, which will determine whether a permit is required before undertaking any activity or development along a coast, river, brook, or lake. No watercourse or wetland may be altered without a permit issued under the *Watercourse and Wetland Alteration Regulation*. <http://laws.gnb.ca/en/ShowPdf/cr/90-80.pdf>

Crown Lands and Forests Act (assented to July 16, 1980) - <http://laws.gnb.ca/en/ShowPdf/cs/C-38.1.pdf>.

Water Well Regulation – Clean Water Act (90-79) <http://laws.gnb.ca/en/ShowPdf/cr/90-79.pdf>

Potable Water Regulation - Clean Water Act (93-203) <http://laws.gnb.ca/en/ShowPdf/cr/93-203.pdf>

Watercourse and Wetland Alteration Regulation – Clean Water Act (New Brunswick Regulation 90-80) <http://laws.gnb.ca/en/ShowPdf/cr/90-80.pdf>

Wellfield Protection Area Designation Order – Clean Water Act (2001-83) <http://laws.gnb.ca/en/ShowPdf/cr/2000-47.pdf>

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Quarriable Substances Act - The Department of Natural Resources, Mining Division, requires a quarry permit for the extraction of substances 300 metres above or 300 metres below the ordinary high water mark. An application is required. <http://laws.gnb.ca/en/ShowPdf/cr/93-92.pdf>

Fish and Wildlife Act, Endangered Species Act, New Brunswick Wetlands Conservation Policy – All applications must be submitted to DNR, Fish and Wildlife Branch, to ensure there is no conflict among the different acts and regulations. <http://laws.justice.gc.ca/en/F-14/index.html>.

Clean Environment Act - Under certain regulations (*Water Quality Regulation, Environmental Impact Assessment Regulation*), the Department of the Environment

may have to review and approve certain activities, depending on the nature of the work and the location. An application and a written approval in the form of a certificate of determination and/or a certificate of approval may be required. <http://www.gnb.ca/0062/acts/acte-e.asp>

Species at Risk Act (federal) www.registrelep.gc.ca

Migratory Birds Convention Act (federal), http://www.cws-scf.ec.gc.ca/legislations/laws1_f.cfm. You may also contact the Canadian Wildlife Service in Sackville, N.B., at 506-364-5044.

Did you know?

The Intergovernmental Panel on Climate Change (IPCC, 2007) predicts that the mean global sea level could rise by 50 cm by 2100 owing to ocean warming, glacier melt, and other phenomena. Natural Resources Canada predicts an increase of ± 140 cm by 2100 in southeastern New Brunswick.

A large portion of Canada's Atlantic coast is very sensitive to the effects of sea level rise. The most sensitive areas are generally low-lying regions containing salt marshes, barrier beaches, and lagoons. Predicted effects include increased erosion, rapid beach migration, and flooding of coastal freshwater marshes.

Tips for protecting your private land for the future

As a landowner, you can protect your property in perpetuity through various options, including ecological gifts, conservation easements, and private land stewardships. The Nature Trust of New Brunswick Inc. welcomes all suggestions for land protection and encourages you to contact one of its staff for more information. <http://www.naturetrust.nb.ca/>

Another good option for protecting your property is through a conservation easement. This is a legal agreement between a

landowner and a third party such as the Nature Trust that allows the owner to place permanent restrictions on certain uses of the land to ensure its conservation for the future. The landowner retains ownership of the property, while the holder of the easement has the right and responsibility to inspect the property and ensure compliance with the provisions of the agreement.

The Nature Trust of New Brunswick is a non-profit charitable association that seeks to establish and maintain outstanding nature preserves in New Brunswick.

Donating an ecologically sensitive property to the Nature Trust will ensure that your land is protected in perpetuity. There are several ways to donate land, including the following:

1. Ecological gifts (donation of a private property)
2. Ecological gifts in a will - If you aren't ready to donate your property in your lifetime, the Trust will take possession of your land after your death.
3. Life estate – You can continue to live on your property after donating it for conservation purposes.

There are other organizations that can help you to protect and conserve your land.

The Nature Trust of New Brunswick Inc.

404 Queen Street, P.O. Box 603, Station A

Fredericton, N.B. E3B 5A6

Tel.: 506-457-2398

Fax: 506-450-2137

Email: ntnb@nbnet.nb.net

Website: <http://www.naturetrust.nb.ca/>

Nature Conservancy of Canada (regional office)

180 – 924 Prospect Street

Fredericton, N.B. E3B 2T9

Tel.: 506-450-6010

Fax: 506-450-6013

Toll-free no.: 1-877-231-4400

Email: atlantic@natureconservancy.ca

Ducks Unlimited Canada

752 Union Street

Fredericton, N.B. E3B 3P2

Tel.: 506-458-8848

Fax: 506-458-9921

Email: du_fredericton@ducks.ca

Website: <http://www.ducks.com>

Glossary

Accelerated erosion: Erosion that is much more rapid than normal geologic erosion, primarily as a result of land-disturbing activities.

Backshore: The part of the beach that stays dry at normal high tide. It is located landward of the ordinary high water mark, where sand and other sediments typically gets deposited. The backshore is normally freehold land.

Energy dissipater: A structure or a shaped channel section with mechanical armour placed at the outlet of a pipe or conduit to reduce the energy from high-speed water flow.

Erosion: Wearing away of the land surface by the action of wind, water, gravity or any combination thereof.

Estuary: A semi-protected body of water that has one or more rivers or streams flowing into it and has an open connection to the ocean.

Foreshore: The part of the shoreline that lies between the highest known tide and lowest known tide.

Geomorphology: The branch of geology that studies the characteristics, configuration, and evolution of landforms.

Hard erosion control structure: An erosion control structure built only of inert materials, such as riprap, gabions filled with rock laid on a slope, and retaining walls.

Littoral drift: Materials moved by waves and currents in coastal zones.

Ordinary high water mark (OHWM): Coastal – A natural line on the shore corresponding to the visible average high tide under normal weather conditions.

Inland – A natural line visible on the banks of a lake, river, or stream corresponding to the visible high water mark, excluding floods and droughts. (NBDNR).

Salt marsh: Coastal wetlands in the intertidal zone where plant communities, shrubs, and grasses grow. These marshes provide food and habitat for a wide variety of animal species. Salt marsh plants help to retain and hold soil along the coast.

Sediment: Fragments of organic and inorganic matter produced by the alteration of alluvial and rocky soil; these materials are released by erosion and transported by water, wind, ice, and gravity.

Sedimentation: The process by which sediment resulting from accelerated erosion or land-disturbing activities is deposited in lakes or natural watercourses.

Siltation: The presence of large quantities of sediment produced by accelerated erosion that settles or is suspended in water. It may settle on the bottom or be diverted by erosion control structures designed specifically for this purpose. This sediment has been carried far from its place of origin, near the site of activities such as construction, agriculture, and forestry.

Soft erosion control structure: Natural method of erosion control, including salt marshes, dunes, and beach nourishment.

Submerged Crown land: Crown land that is covered by fresh water or salt water, such as a lake bottom, riverbed, or seabed.

Terminal scour: Erosion caused by the motion of the tides.

Flow velocity: The average flow speed through the cross-section of a main channel when the storm in question produces peak flow. The cross-section of a main channel is defined as the zone limited by the structure of channel itself, plus the area of flow below maximum flood height, which is defined by vertical lines in the banks of the main channel. Overload flows are not to be included in the calculation of flow velocity.

Sources: *The above definitions were taken from the websites of the Ministry of Natural Resources of Ontario, the New Brunswick Department of the Environment, and the US Environmental Protection Agency.*

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Appendix 1: Feedback Form

1. Did you find this booklet useful?

Yes _____ No _____

2. Are you using any of the tips suggested in this booklet?

Yes _____ No _____

3. What new actions have you taken to help in the stewardship of the ringlet butterfly, salt marshes, and coastal ecosystems?

4. Suggestions or comments?

For the benefit of our community, please return this feedback form to the following address:

By mail:

Pays de Cocagne Sustainable Development Group Inc.

4585 Route 134

P.O. Box 1035

Cocagne

NB E4R 1N6

By email:

gddpc@nb.aibn.com

Appendix 2: Example of how to obtain a permit to build a hard erosion control structure for landowners in the LSDs of Cocagne and Grande-Digue

1. The landowner submits a written application to the Kent District Planning Commission (KDPC) requesting a building permit for an erosion control structure (506-743-1490).
2. The landowner consults the New Brunswick Department of Natural Resources (NBDNR) (506-457-2070) and the New Brunswick Department of the Environment (NBDE) (506-856-2374) to see whether the project needs approval from these departments as well. The exact location of the protective structure is required in order for a complete assessment of the application to be done.
3. The *Coastal Areas Protection Policy*, New Brunswick Regulation 90-80 under the *Clean Water Act*, and New Brunswick Regulation 2009-62 under the *Crown Lands and Forests Act* describe and serve as guides in the selection of acceptable protective structures.
4. If approval is given, the landowner must ask DENV for the requirements concerning design, materials, and structure under the *Coastal Areas Protection Policy for New Brunswick*. The landowner must consult both departments and receive a response to the application before any work is undertaken.
5. In order to comply with all requirements, the landowner, in consultation with the KDPC, may have to hire an engineer, a land surveyor, or a building contractor to design and oversee the placement and construction of the structure.
6. If the proposed structure is built below the ordinary high water Mark (Crown lands), a licence of occupation issued by the NBDNR is required before any construction work begins.
7. Once the design and placement of the structure are approved, the

landowner applies to the KDPC for a building permit.

8. The landowner builds the structure in accordance with the approved plans and specifications.
9. The landowner is responsible for maintaining the structure.

Appendix 3: Coastal impact of a storm surge resulting in water levels higher than 3 metres



Source: James Bornemann, GIS Analyst, Mount Allison University, 2012.

Appendix 4: Coastal impact of a storm surge resulting in water levels higher than 3.4 metres



Source: James Bornemann, GIS Analyst, Mount Allison University, 2012.