A community plan for adaptation in Pointe-du-Chene, New Brunswick

Combining science, values and local knowledge in designing a climate change adaptation plan

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1. Purpose of the document

This document summarises efforts undertaken by members of the community of Pointe-du-Chene in developing a community plan towards adaptation to some impacts of climate change, especially flooding due to sea-level and storm surges. The central part of the document lists priorities for adaptation as envisioned by the community. This work, first initiated in 2004, was coordinated by a team of researchers from the Université de Moncton. Researchers from the Departments of Environment and Natural Resources, from Environment Canada and the Canadian Wildlife Services assisted in presenting various information related to climate change and impacts to ensure decisions were made considering scientific and up to date information.

The plan presented here is preliminary since some options presented will need further evaluation (costing and environmental impact assessment) before they can be adopted as viable solutions. This work will be ongoing in 2007. Also, since not all community members have participated in the process, a broader community consultation will need to be engaged to ensure the proposed plan represents the views of residents and users of Pointe-du-Chene.

It is important to stress that options chosen represent views of community participants and not those of researchers involved.

2. Background information.

Pointe-du-Chene is a small community of approximately

It is a small peninsula north of the Town of Shediac, a very important tourist destination in New Brunswick, with over 900 000 visitors per year (APECA, 2003). Like Shediac, Pointe-du-Chene plays an important role in the tourism industry. According to Acoa, approximately 50% of tourists to the area visit the wharf in Pointe-du-Chene. The nearby marina is also an important attraction. Also, the community is located adjacent to Parlee Beach Provincial Park, the busiest park in the province. The attraction of the area is such that the summer population Pointe-du-Chene is well over 3000 residents.

In the 19th century however, the area and the port especially were very important in the booming wood industry. The tourism industry was also slowly developing and cottages were built at the Pointe as early as 1860 (town of Shediac, 2006, http://www.shediac.org/fr/visiteurs/attractions/parlee.html).
In 1860, the railway between St-John and Shediac and Pointe-du-Chene was inaugurated and was active until .

Pointe du Chêne, 1887, McCord Museum of Canadian History

2.1 Climate change impacts:

Pointe-du-Chene is a low-lying area and flood events have been part of the local history. Some residents have tales of flooding events dating to the 1930s. However, recent events including storm surges of October and January 2000 have accentuated the citizens' preoccupations with climate change impacts, especially in regards to flooding during storm surge events. Erosion is not as severe a threat as is the case in other coastal communities, although the community and especially the Church has invested in rock walls for protection on exposed areas.

Major restoration of the wharf has recently been completed thanks to funding by ACOA (approximately 2 million). The repairs were deemed necessary following damages by severe storms and rising sea-levels. The sea wall was elevated by approximately 1 metre to resist future climatic events. The Pointe-du-Chene wharf is seen as « a cornerstone for tourism in Southeastern New Brunswick, and an essential element in the economic development of this region » according to the federal MP of the region.

3. Plan rationale:

The need for a plan towards climate change adaptation stems from recent storm surge events and severe impacts witnessed by this and other coastal communities in Atlantic Canada. Many studies recognize the need to act proactively in order to be better equipped to face future climatic events (IPCC, 2001). "The degree to which a future climate change risk is dangerous depends greatly on the likelihood and effectiveness of adaptations in that system » (IPCC 2001, p. 646). However, adaptation is not an easy task and although there have been much discussions in the literature on the topic, little in terms of direction or resources is available to communities to help deal with problems associated with climate change such as sea-level rise and storm surge events.

The problem is even more obvious for small communities such as Pointe-du-Chene where resources are limited. As is the case for most of rural New Brunswick, this small community has no elected representative. Rather, the area is part of a Local Service District and a local committee of volunteers has a consultation role and can make recommendations to the Minister of Local Government. Thus there is little power locally on the decisions relating to how tax dollars are spent. Governance, as well as available resources and social norms can be important constraints to adaptation efforts.

Also, adaptation options chosen in different areas are not necessarily the options that would most effectively reduce risks or losses associated with impacts (IPCC 2001). Retreat for example is not often viewed as a possible solution because of values and other factors. There is thus a need for more education and awareness of different available options.

The work towards a community plan in adaptation is a means for the community to approach elected government bodies with a concise and informed view of issues the community wants to address to limit climate change impacts and how it wants to do it. This is critical in helping to secure financial support.

The work towards a community plan on adaptation for Pointe-du-Chene had the following objectives:

- Identify citizens' concerns regarding climate change and sea-level rise impacts locally
- Examine all adaptation options according to best available information
- Ensure considerations of costs & benefits and social and environmental impacts in decision making
- Encourage decisions considering recent scientific information on climate change and sea-level rise
- Ensure that recommendations are from the community

During the work leading to the plan, researchers have assisted the community in ensuring all adaptation options and issues were examined in search of a sustainable solution. Social and environmental impacts of possible adaptation scenarios have also been part of the considerations, although part of the

costing of selected options will be addressed in more detail later in the process. Although researchers have accompanied and assisted the community members in their efforts, it is important to recognize that the options selected represent the views of community participants and not those of the researchers.

4. Community engagement process:

4.1. Information sessions

Starting in 2005, presentations on climate change were held in the community in the course of The New Brunswick Sea-Level Rise Study coordinated by Environment Canada. First, presentations focussed on sea-level rise and storm surge events. In a second phase started in 2006 thanks to funding by the Environmental Trust Fund of New Brunswick, presentations on broader aspects of climate change and adaptation considerations were held. These presentations were held thanks to participation from researchers from the New Brunswick Departments of Natural Resources and Environment, Environment Canada, the Canadian Wildlife Service and the Université de Moncton.

The purpose of these information sessions was to ensure that future decisions regarding adaptation to be made by the community would be based on the most recent and sound scientific information. Also, presentations emphasised the various adaptation options (retreat, accommodation and retreat) as well as social and environmental impacts related to various options.

4.2. Focus group discussions

Following the information sessions, two group discussions were held in the community. These meetings were held with a restricted audience of 10-15 people in order to:

- assist the community in designing its own plan for long term adaptation;
- identify existing knowledge and gaps to help in decision making;
- identify human resources that could be of help in implementing the options;
- prepare the selected options for a costing exercise to be held in the spring of 2007.

One important element of the group discussion was a mapping exercise (Photo 2). During this activity, participants were asked to locate on a map of the community the impacts that have occurred in the past. This served as a starting point for a discussion on adaptation priorities.

4.3. Building the preliminary plan: Adaptation options

The preliminary plan is a result of the presentations and discussions within the community realised in steps 1 and 2. The adaptation options envisioned by the community and the rationale behind them which are the core of this document are presented in section 5.

Photo 2: Mapping exercise in a coastal community

4.4. Validation

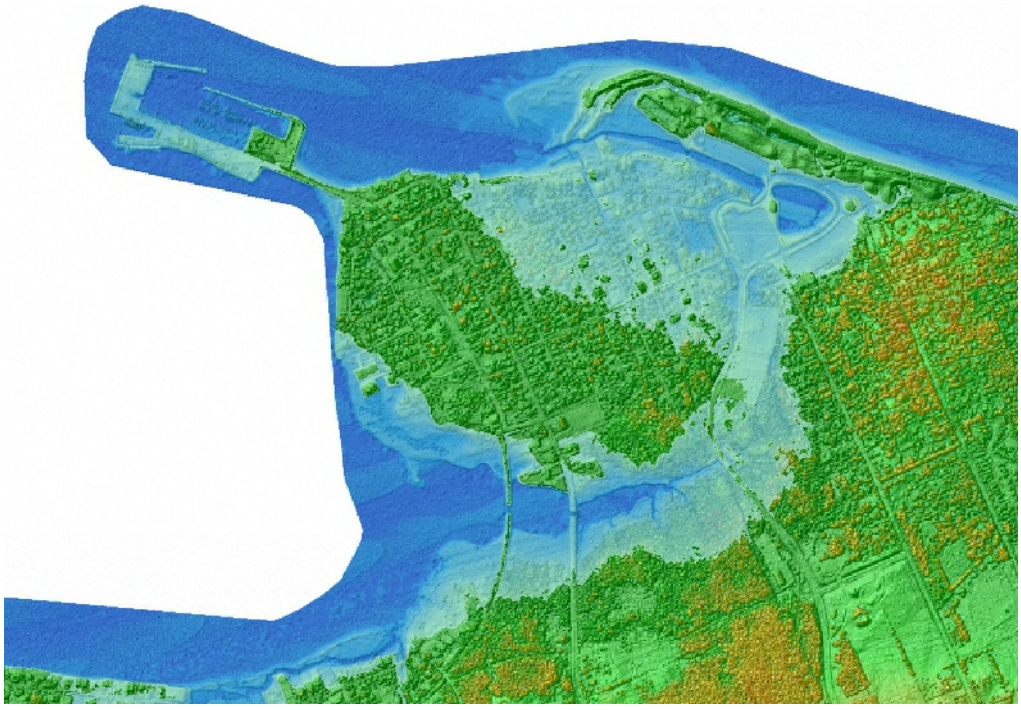
Because it is essential that the plan be a result of community efforts, the present document is to be presented to community participants in January 2007 for validation. The validation is an exercise where components of the plan are discussed and commented upon with a community group to ensure it reflects the community's views.

4.5 Costing of selected options

Because most of the adaptation options envisioned will require considerable financial input, a final decision in terms of options selected can not be made without a careful consideration of costs involved. Costing the options is an elaborate process since it is comprised of many elements

Table 1: Activities held in Pointe-du-Chene

Activity	Objectives & topics	Number of participants	Date
Information session	Climate change, sea-level rise	42	October 11 2005
Information session	Climate change, sea-level rise	8	October 19 2005
Public presentation	Elements of adaptation	31	September 25 2006
Public presentation	Adaptation and impacts	33	October 2 2006
Group discussion	Mapping and options	16	October 23 2006
Group discussion 2	Mapping and options	12	November 20 2006
Validation	Validation of plan		January 2007



Map 1: Map of the Pointe-du-Chene area as developed using LIDAR technology. The areas in light blue represent flooded areas during the January 2000 storm (2.0 meters above normal sea-level)

5. Results from Focus Group discussions

5.1. The community plan for adaptation: options and priorities

5.1.1. Securing access to the community via elevation of main Bridge

The bridge on Pte-du-Chene road constitutes the main access to the community. A secondary access is available through Parlee Beach Park on Bridges street. Both accesses are flooded during extreme high tides and storm surge events blocking off access to vehicles. In a storm surges scenario such as January 2000, the community is completely blocked off which present very serious health and safety issues (access to emergency services).

Consequently, a new Bridge with elevated approaches needs to be built. This is viewed by the community a very urgent matter and a priority in terms of adaptation.

5.1.2. Containment of flood waters:

Because of damages occurring due to flooding of parts of the community during storm surges, community members perceive the need to prevent penetration of flood waters. Flooding not only poses threats because of limited access, but also poses health risks with the contamination of surface and ground waters because of flooding of lift stations in the area and dispersal of raw sewage.

For this purpose, they propose dyke work at both water entry points with flood gates. First, a dyke would need to be built from Jarvis street and an elevation in back of the dunes at the western end of Parlee Beach. Property owners at both ends of the required structure have agreed on a legal agreement for the building of such a structure. The second entry point of flood waters occurs at the west end of the main bridge and there has been some engineering advice that points to the feasibility of using the old railway bridge dyke as a structure for flood control with the addition of a floodgate.

The community realizes that hard engineering solutions such as a dyke do little to reduce the vulnerability of the area on a long term, but nevertheless properties and infrastructure are valued highly and need immediate protection from flooding.

The community recognizes that high costs can be associated with such structures and **therefore recommends the realization of an engineering study to assess needs and costs associated.**

5.1.3. Ditch and pipe restoration or replacement

In the last decades, many of the existing drainage ditches have been progressively unfilled to accommodate development. The community recognises that this hinders the proper drainage of surface waters during heavy precipitations and recommends restoration of these ditches. The Church has already initiated some discussions with the Department of Transportation on the subject and these are to be pursued in the near future.

Also, many of the surface water drainage pipes in the peninsula are either blocked or damaged. It is recommended that repairs to these be initiated. A previous report done in 1990 gave some indication of the state of the drainage infrastructure and recommended…

5.1.4. A precautionary approach: prevention of future flooded properties:

The community recognizes that prevention is a far better approach to prevent climate change impacts in a low lying coastal community. For this purpose, they recognize the need of a coastal policy such as established by the province in 2002. Unfortunately, this policy was late in its implementation and many have build in flooding areas. Also, the community feels that the policy is not restrictive enough for an area such as Pointe-du-Chene. Members have expressed the need to establish stricter planning regulations than those incorporated in the policy. For example, the policy restricts building within 30 meters from the high water mark and buildings require a minimum of 2 meters in elevation above the high water mark. Both requirements are deemed to be insufficient to accommodate for storm surge event levels such as the January 2000 event. Participants have agreed that further discussion with the Beaubassin Planning Commission in this matter should be pursued in the near future.

5.1.5. Importance of human resources and links with government agencies:

-Some community discussion have focused on the need to reinforce the link with government representatives.

a- Since many of the options examined, can entail environmental impacts, the community feels it would be valuable to have a representative of the Minister of Environment (regional director) present at some of the meetings when such options are discussed.
b- Equally, since Parlee Beach Provincial Park is immediately adjacent to the community and some adaptation options would require park involvement, relations with Park officials are crucial. For example, the secondary access road to the community is via the Park road which needs to be closed when filled to capacity during the peak of the tourism season. This road is open after the season but there are discussions on the need to keep it free of snow during the winter. The park director should be invited to attend some community meetings when such options are discussed.

c- Some concerns over surface water contamination during flood events prompt the desire to discuss the issue of flooding of lift stations with Town of Shediac authorities to look at possible mitigation possibilities.

5.1.6. The need for education and awareness

Unfortunately, a simulation of crisis situation coordinated by Health Canada during the summer of 2006 revealed that even if the main bridge remained open to traffic, residents do not tend to leave the area during storm surges. Also, for those attempting to leave, visitors to the area wanting to witness waves and flooding block the access. This suggests that there is much to do in terms of education and awareness of emergency procedures in extreme events.

Adaptation Option	Costs	Adaptation type	Environmental Impacts
1. Bridge modifications	Medium	Accommodation	Low-medium
2. Dike and floodgates	Very high	Protection	High
3. Ditch and pipe restoration or replacement	Low	Accommodation	Low
4. Securing secondary access via park	Low	Accommodation	Low
5. Minimising lagoon or other sources of contamination	Medium-high	Accommodation	Low

Table 2: Summary of adaptation options as suggested by the community of Pointe-du-Chene

6. Conclusion

Through numerous presentations from researchers on various elements of climate change and adaptation and group discussions, participants from the Pointe-du-Chene community have selected options for adaptation to flooding and other impacts. The options chosen stem from the risk perception of the community following severe weather events such as storm surges.

The first option relates to raising the bridge and approaches in order to avoid flooding during surges. The height should be of an order of 2.5 to 3 meters above the normal high water mark.

The second option pertains to the need of a feasibility study which will look at costs and engineering aspects of a dyke at the two entry points for flood waters. The community recognises that such an option represents high costs and many potential environmental impacts, but feels it is the only way to address some of the health and safety issues.

Other selected options include restoration of drainage ditches and pipes, discussions with authorities for the water contamination issue and using better planning tools for prevention.

Retreat from the coast was not viewed as a suitable option. As states the IPCC, « One recommended approach to planning adaptation to sea-level rise and coastal change involves an estimation of the costs of protecting or abandoning developed properties » (IPCC, 2001, page 627). The discussions with participants have shown that such retreat is not viewed as an option partly because there are no vacant properties to relocate to in Pointe-du-Chene and the attachment to the area is very high.

Future steps:

Meetings held during the project has lead to the creation of a working group on the topic of adaptation in the community. This group is composed of members of the emergency committee who are John Strugnel, Gordon Tremble, Ian McPherson, Luke Dumont, Ernie Haché et Bill Murray. Others may be invited to join as necessary.

This plan is merely one step in the process of reducing risks related to climate change impacts in Pointe-du-Chene. Hopefully, this document will serve as a vision document which the community can present to different levels of government and other potential funding sources.

It is recommended by researchers that a more in depth costing exercise be realised with each option selected by the community to ensure decisions are based on cost effectiveness and looking at al aspects of costing including social and environmental costs, on a short term as much as medium and long term.

References:

Acoa, 2003. http://www.acoa.ca/f/media/press/press.shtml?2341

IPCC 2001. Intergovernmental panel on climate change, 2001. Working Group II: Impacts, Adaptation and Vulnerability, available on line : http://www.grida.no/climate/ipcc_tar/wg2/059.htm#134

Appendix A

Adaptation considerations

Options selected by community members and discussed during the plan process have been grouped in three categories according to general adaptation options as identified by the Intergovernmental Panel on Climate Change (IPCC, 1996). According to the general consensus, adaptation options can be grouped in three main categories: retreat, accommodation and protection.

Accommodation: making changes to allow or compensate for impacts. Raising houses on posts or higher basements or again raising ground level by infilling are accommodation examples.

Retreat: moving away from a potential impact. Moving buildings away from the waterfront for example is a means of retreat. This is seen as a form of prevention on the long term and thus can be very cost effective. Attachment to a property or view can explain why retreat is difficult to choose.

Protection: using hard or soft infrastructure such as metal or rock sea-walls to protect from some impacts such as erosion or flooding. Protection can be soft or “natural” looking such as beach nourishment and dune grass planting or “hard” such as rock walls common along the coast in this area. Both are used to limit erosion and offer a different degree of protection and require maintenance over a certain period of time.

Appendix B

Previous efforts towards adaptation undertaken by the Local Service District Committee and the Emergency Response Committee

B.1. Following the problems faced during the high storm surges of October and January 2000, and advice by experts and researchers, the community of Pointe-du-Chene formed a committee of volunteers which operates as a sub-committee to the Local Service District. Their mandate is to look at emergency preparedness in case of extreme events and approach governments for solutions to the flooding problems in the community.

The committee has designated the Community Center, which is located on higher grounds, as an emergency shelter. The center is equipped with provisions. The committee has also prepared a list of residents of low lying areas in order to contact them and follow up on the situation when flooding occurs.

This committee is a good example of a community taking ownership of a problem and finding solutions within their means.

B.2.

In the fall of 2006, a letter was prepared by some members of the LSD committee to inform the newly appointed Minister of Finances for the Province of New Brunswick and local MLA, the right honorable Victor Boudreau. This letter was to inform the Minister of the major preoccupations of the community in regards to flooding. It evoked the three most important adaptation options listed in section 4: securing access to the community via elevation of main bridge; the realization of an engineering study to assess needs and costs associated to a dyke to prevent flooding, and finally preoccupations with water contamination during flooding.