

# GETTING STARTED WITH MONITORING COASTAL CHANGES

A guide to implementing community-based monitoring of coastal erosion and accretion



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## Introduction

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Coastal Change is a natural process that has shaped our communities since the beginning of time. Our beaches and rugged coastlines change when powerful waves and wind move looser rock and soil from one area to another. Erosion is the loss of land features (soil, vegetation, rock). It occurs when geological structures are removed from the main body of land creating what is known as sediment. Accumulation, also known as accretion, is an increase or building of features (beaches, sand bars – a gain in land) that occurs when the sediment accumulates in an area and adds geological structure to the main body of land.

Depending on the characteristics of the coastline in your community, its elevation, the slope and composition, its exposure to wind and waves, and presence of infrastructure, your community coastline may be vulnerable to more or less coastal change. You may live in an area, like Souris, Prince Edward Island, where meters of land are lost after every storm or you may be in a location, like Cape Pelé, New Brunswick, where the size of your beach decreases or increases depending on the sediment it receives from farther away.

In either case, you may need to keep a close eye on changes to your shoreline if your community is to understand and adapt to these changes. Indeed, coastal change can create both opportunities and problems for your community. Erosion may render coastal infrastructure and properties more vulnerable to future storm surges and flooding, while the loss of beach can be an economic burden in maintaining a major tourist attraction. Local residents may be building walls to protect their properties, which may affect neighbouring residents and alter natural habitat that otherwise produces environmental benefits to the community. Natural coastal habitats, like salt water wetlands, may be losing ground to the sea thereby affecting your community's available natural protection.

If you are concerned about coastal change in your community, and the actions people take to mitigate erosion to their individual property, this kit is for you. The first approach to dealing with coastal change is to understand the type and rate of natural changes that occur in your community. By monitoring your coastline regularly and after storm events, you can determine which areas are most vulnerable, and which areas are least vulnerable, and which areas are gaining and which are losing land. You may also be able to identify if existing infrastructure is contributing to increasing or decreasing your vulnerability to coastal change. You may discover that in some areas of your community, land is eroding at a constant rate in other cases as large episodic changes. This can help with planning and determining what type of development should occur or not occur in specific areas.

The objective of this kit is to encourage and help communities monitor coastal changes in their area of interest. It is called community-based monitoring. This kit provides you with step by step recommendations on how to get started and how to carry-out such an activity. With more communities doing community-based monitoring of coastal change, the higher the local awareness and the greater chances that local decision-makers will include this information in their development and emergency preparedness plans.

The kit is divided into four sections: Partnership, Methodology, Education and Evaluation. These sections will provide recommendations and instructions as to how you can start a local group to do coastal change monitoring. Our intent is to encourage groups to work with their communities and not in isolation. A collaborative approach that includes members of your community's decision-making structure will increase the acceptance of the information collected and facilitate the support of partners. This approach is more time consuming and requires more preparation than simply choosing to go out in the field and monitor with a small group. However, it should in the long-term provide more direct results for safeguarding your community to coastal change.

## Partnership

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The time has come! You are concerned about coastal erosion and you want to start doing something about it. Working alone can be very energy and resource consuming. You need to find partners. Here is where to start.

- Seek out local groups or associations (watershed, fish and wildlife, sustainable development, habitat stewardship, and so on).
- Approach them with your ideas and concerns. Share examples of how other communities are monitoring coastal change.
- Approach your local leaders (municipal council, mayor, district president, industry leader) for support and endorsement of the coastal monitoring.
- Talk to nearby universities and colleges that might have a coastal ecology or land surveying program. Also check with your local branch of the provincial Department of Environment or Natural Resources to find out about any existing monitoring programs in your area.
- Determine with them how your approach and objectives may work with theirs and how the community may benefit from this type of initiative.
- Determine the objectives, locations, and needs of the monitoring (see methodology) with partners (local group and leaders).

- Approach local land owners and solicit their partnership and support.
- Develop a plan of action to provide for long-term coastal change monitoring (to be integrated in the objectives, time-lines, locations, organisational tasks).

Searching the Internet for information can be a good way for you to find out what networks exist around coastal change monitoring. Key words to search are: coastal erosion, coastal accretion, environmental monitoring, and community-base monitoring.

## Methodology

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The methodology you choose depends on what resources are available to you and by what you hope to accomplish for your community (how you plan to use the results, what your partners may need, and so on). Here are recommended steps for choosing your methodology:

1. Identify the reason(s) you seek information on shoreline change or sediment transport.
2. Identify what information you wish to collect (erosion rate, direction of sediment movement, or coastal profile).
3. Determine how this information will be used (data to be shared with community leaders, results to inform local development, results to inform land owners on risk level, and so on). This will inform what methodology will best meet your needs.
4. Determine the methodology best capable of achieving this goals. Available methodologies that are being used by community groups include:
  - Measuring rate of erosion with tape measure from permanent stakes
  - Beach profiling with land surveying equipment
  - Aerial photography through time
  - Video or still Camera

It is strongly recommended to supplement the actual monitoring of coastal changes with photo evidence and/or GPS coordinates. According to a recent survey of Coalition-SGSL members doing coastal erosion monitoring, the preferred method of monitoring for community groups is to measure the rate of erosion with a tape measurer and permanent stakes. You can find a short description of each methodology at Appendix A. More information can be found on the Internet and on the Coalition-SGSL's website

at <http://www.coalition-sgsl.ca/cemep.org>).

5. Establish the partnerships and the resources needed to carry-out the monitoring and the education activities. Items to consider:
  - Tools (collecting, recording and storing the data)
  - Travel to and accessibility of monitoring sites
  - Insurance
  - Volunteers or personnel needed
  - Permissions to access properties
6. Determine your capacity to monitor coastal change (number of sites you can do, frequency of visits to site).
7. Select locations for monitoring activities.
8. Develop a work-plan to implement the monitoring:
  - Establish plan (timeline, schedules, leadership) – especially after storms
  - Secure access to location (gain land-owner support)
  - Secure equipment and transportation
  - Recruit volunteers
  - Develop standard forms and methodology to store and analyse field data
  - Do monitoring
  - Do the data analysis (it may be useful to have standard terminology for those recording the field information)
  - Follow-up with land-owner
  - Follow-up with community
9. Develop a plan for analysing the data, and for storing over the long term. Figure how who will have access to the data you collect.
10. Develop a communication plan with your partners (how will you inform the community of the results).

## Education

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Your interest in conducting coastal change monitoring was surely sparked from a desire to do something for yourself and your community. As such, education is a crucial component of seeing your community adapt to the changes along your coastline. Educating your community must be a component of your coastal change monitoring efforts if it is to have impact in your community. Here are some suggestions on how to integrate alongside a community-based coastal change monitoring program:

- Determine your educational objectives.
- Choose your audience.
- Determine the message you want to convey.
- Choose the right supporting method or activities for you and your audience (photo contest, traditional walks, student summer program, tours of erosion sites (walk, bike rides, boat tours, bus tours), in-class presentations, brochures, community presentations or forums, etc).
- Determine your needs and assets in human and financial resources.
- Establish partnerships to carry-out the educational activities (here new partnerships may be possible with schools, developers, neighbourhood associations, etc).
- Integrate the chosen method in your work-plan and add educational activities to your schedules.

It may be determined by your group of partners that for your community education about coastal changes (erosion and accretion) may need to occur before the community becomes involved in monitoring. To help you with education, you should first look to your partners, especially if these include provincial or regional groups and scientists, and then also on the Internet. As well, a prepared presentation with guiding document can be found in the attached folder at the end of this kit. The presentation is targeted to community leaders to explain the benefits of community-based coastal change monitoring and habitat stewardship. We recommend customising this presentation for your needs; it may suit you best after a few years of monitoring.

## Evaluation

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In any project, it is important to be able to evaluate if you are accomplishing your objectives. This does not need to occur on a frequent basis, but often enough for you and your partners to figure out if your approach is working and make the necessary changes to ensure it is even more successful. Include in your work plan:

- An evaluation of the program and its characteristics.
- A follow-up schedule with land owners and partners.
- Ways to sustain the program (securing volunteer needs, link in with local government initiatives, ensuring the program continually seeks to provide for the community, etc.).

## Conclusion

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We hope this kit will help you in getting started on coastal change monitoring and education. You will find more information in the adjoined worksheet examples. These may help move your efforts forward. We invite you to visit the Coalition-SGSL's website ([www.coalition-sgsl.ca](http://www.coalition-sgsl.ca)) for more resources about coastal erosion, and coastal change monitoring and adaptation. The Coastal Erosion Volunteer Group of the Coalition-SGSL meets on a regular basis to help share experiences and information about on going developments on the issue in the Southern Gulf of St. Lawrence region. Meeting dates can be viewed on the group's webpage [http://www.coalition-sgsl.ca/groups\\_erosion.php](http://www.coalition-sgsl.ca/groups_erosion.php). We invite every person or group that uses this kit to join the group, to maintain access to resources and contacts.

## Appendix A

### Description of Methodologies

#### Measuring rate of erosion with tape measure from permanent stakes

This methodology is relatively strait forward and is mostly focused on measurement of cliff tops. The method consists of selecting known erosion areas and placing wooden or metal stakes near the coast's edge within a safe distance. Using a 30 meter measuring tape the community members walk to the side of the cliff towards the open water. The community groups makes transects this way. This transect is aligned using cord or the measuring tape and the stakes are set. The stakes are planted in a strait line 10 meters apart and from the edge of the cliff or lower water mark. This is for alignment. Then the measurements are taken from the stake closest to the edge. For some groups permanent metal rods are preferred. No more than three metal rods or stakes are placed. The information is recorded in a paper chart that the community group can easily use and understand. This method is simple, cheap, fast, easy to do for volunteers and can be a group outing. This measure can work with only two people. This method measures only erosion levels at a specific point.

#### Beach profiling with land surveying equipment

The beach profiling method involves using land surveying equipment to make a profile of the landscape vertically and horizontally. This information makes it possible to determine if an area has increased its sediment content, or if it has decreased. This method works best with a minimum of three people. Here again you align your transects using three metal rods along a strait line facing the ocean at the place where you want to measure. The metal rods can be spaced five meters apart. The measurements are taken at every meter between these rods and include recording the highest, lowest and central numbers on the emery stick. The emery stick is a telescopic 3 meter long poll that is numbered to permit the creation of the profile. The data must be collected in a field data sheet. It is important to transfer the data to a computer file, because it is necessary to use the data to do the calculations necessary to create the graphic which will produce the profile.

#### Aerial photography through time

Aerial photography is a more expensive method as it requires the use of a plane or helicopter to capture pictures of the coast. This method is most often used by governments or private companies. Aerial photography does not produce the level of detail that monitoring on the ground can, but it is very useful for monitoring changes through comparing photographs of the same area from different decades.

#### Video or still Camera

The video or still camera is a less expensive and less number heavy method. This method does not permit the recording of numbered data specific to rate of erosion or accretion of the land, but it does provide a means of observing coastal changes. This method requires setting up a still or video camera to a specific site. The video camera permits to record the data even if you are not present, and provide a visual image which is very useful for educational purposes. This method can be particularly useful to see the effect before, during and after a storm. It does present some logistical challenges, but if well organised these can be overcome.

## Appendix B - Worksheets

<b>Worksheet 1: Coastal Erosion Monitoring, Building the plan</b>			
Objective:	<b>We want to measure changes along our coast line because ....</b>		
Partners:	<b>Who should we approach to help us carry-out the</b>		
	Monitoring	Data Analysis and storage	Education
Results:	<b>How do we want to use the results to assist with community planning and adaptation?</b>		
<b>Worksheet last update:</b>			



<b>Worksheet 4: Coastal Erosion Monitoring, Plan of Actions</b>	
<b>Resources</b>	
What equipment is required?	
How do we travel to the sites?	
Do we purchase or borrow the equipment?	
Where do we store the equipment?	
How many sites can we sustain?	
<b>Timelines</b>	
When do we monitor?	
Do we monitor at each location at the same frequency?	
When and how do we analyse results?	
When and how do we share results with partners?	
When and how do we share results with the community?	
<b>Tasks</b>	
Who is responsible for purchasing or borrowing the equipment?	
Who is responsible for bringing the equipment?	
Who is responsible for storing and maintaining the equipment?	
Who is responsible for organising the volunteers?	
Who is responsible for collecting the field data?	
Who is responsible for analysing the data?	
Who is responsible for storing the data?	
Who is responsible for sharing the results or data with others?	
Who will secure permission to access the sites?	
<b>Worksheet last update:</b>	

<b>Worksheet 5: Coastal Erosion Monitoring, Education Plan</b>			
Objective (copy from worksheet 1)			
<b>Audience</b> (whom do we want to educate on this subject)	<b>Message</b> (what key message do we want to transmit to each audience type)	<b>Method</b> (what is the best tool we can use to communicate our message with each audience type)	<b>Partnerships</b> (who are the partners we need to involve to best reach our target audience, develop our message and the methods?)
Seasonal residents			
Year-round residents			
Developers			
Community planners			
Students and Teachers			
Real estate firms			
Government agencies			
Town Councillors			
Local associations			
<b>Communication Strategy (Plan)</b>  This is to create larger public awareness of the groups work.		How do we want to communicate our work to a larger audience?	Who will be responsible for preparing the communication material?
<b>Worksheet last update:</b>			

