


SHARING LOCAL AND SCIENTIFIC KNOWLEDGE AS A TOOL TO CO-CONSTRUCT A RESILIENCE STRATEGY IN A COASTAL COMMUNITY.

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Coastal CURA People in places, Halifax, June 2011

Context

- The resilience of a community facing environmental changes is based partly on an accurate knowledge of the situation.



Shippagan, Dec. 2010. Photo Roger Lanteigne.

Context

- Time series describing environmental changes.
- Local knowledge (LK): often the only source of information.
- LK is a necessary link between human interventions and the preservation of ecosystems Kimmerer (2000);Teka & Vogt (2010)
- Scholars have to recognize the value of local knowledge (Rodríguez & Vergara-Tenorio (2010))



They need convincing reasons to do so!

- The reliability of LK as a source of information has to be assessed.
- Few studies have been concerned with the validation of LK in relation with environmental issues
 - ▣ Gray & Morant (2003): Burkina-Faso
 - ▣ Thiombiano (2011): Burkina-Faso.

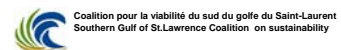
Aims of the study

Global aim: to create a synergy that would improve the resilience of a coastal collectivity.

Two of our specific aims are presented today:

- 1) to assess the accuracy of local knowledge
- 2) to identify environmental issues that the collectivity wishes to address in priority in order to improve its resilience.

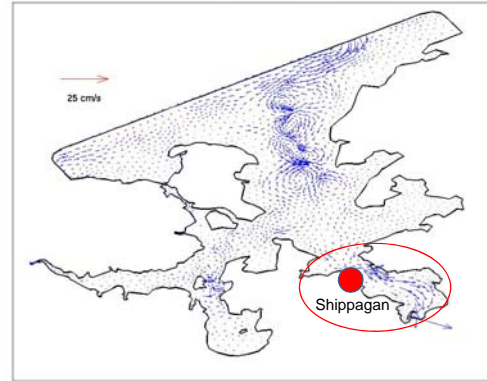
Our partners for this study



Location of the study



Residual velocity : southern boundary opened



Haigh, Clarke & Chassé 2004

Social research

- From July to October 2010: semi-directive interviews (19 people).
- Saturation of information was reached (Kvale 1996; Savoie-Zajc 2009).
- Duration of the interviews: 40 - 90 minutes.

□ 9 themes:

- climate change,
- sea level,
- shoreline erosion,
- aquatic pollution,
- drinking water resources,
- biodiversity,
- partnership for the protection of the environment,
- communication/ awareness in regard with environmental health,
- protection/ adaptation.



Miscou Island, Dec. 2010. Photo: Anne-Marie Lanteigne.

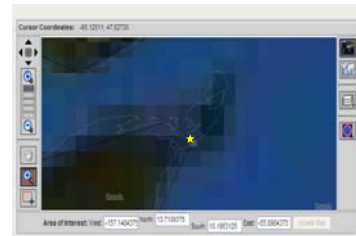
March 2011: focus group

- Validate and supplement the information.



Scientific data

- Satellite images (NASA)
- Statistics from Environment Canada, NGOs, etc.



April 2011: public consultation

- ▣ Presentation of the environmental changes (local knowledge and scientific data).
- ▣ Each of the 20 participants wrote down his/her 3 environmental priorities.
- ▣ Exchange and discussion



Environmental results



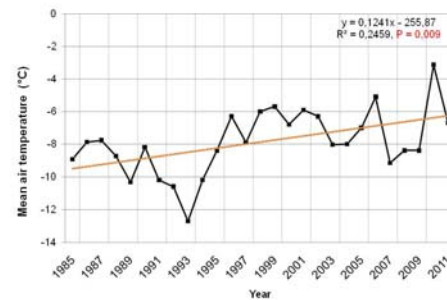
1. Climatic change

Local knowledge: milder winters (reference time ≈ 1970)

- | | | |
|--|---|--|
| *Warmer air temperature
* Less snow | *Later freezing

*Earlier melting | *Shorter duration of ice cover
↓
Increased coastal erosion |
|--|---|--|

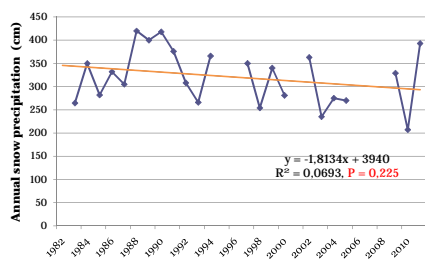
Local knowledge (LK): « Warmer air temperature in winter »
Scientific data (SD): a 3°C rise during the last 25 years.



Mean winter air temperature for January, February, and March calculated from data collected at the Shippagan or Caraquet meteorological stations by Environment Canada.

LK: « Less snow »

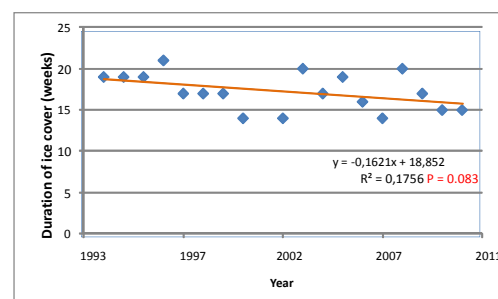
SD: no significant decrease since 1982



Annual snow precipitation (cm) at the Shippagan or Caraquet stations (Environment Canada).

LK: « shorter duration of ice cover »

SD: duration of ice cover tends to be shorter since 1993



Duration of ice cover on the Bay of Shippagan, computed from data by Environnement Canada, NOAA

2. Sea level

Local knowledge: sea level rise

*Higher spring tides
& more frequent storm surges



Damages to roads and houses
(Feb 2000 & Dec 2010)

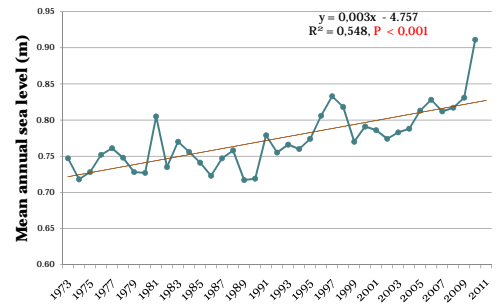
*Higher mean sea level



Water closer to houses

LK: «higher mean sea level»

SD: Mean sea level rose significantly: 10 cm since 1973.



From data registered at the Lower Escuminac sea level gauge, MPO

3. Pollution

Local knowledge: indicators of eutrophication

*Sea lettuce more abundant
*Bad smell

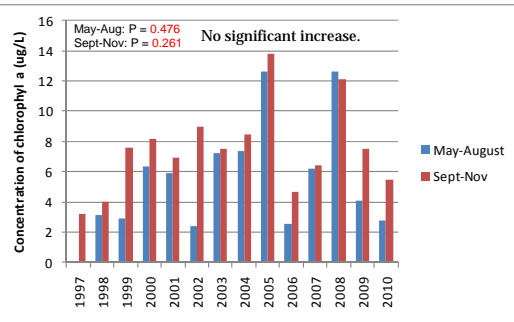


* First signs of eutrophication



Shippagan June 2011. Photo: Elise Mayrand

SD: Concentration of chlorophyll a as an indicator of eutrophication.



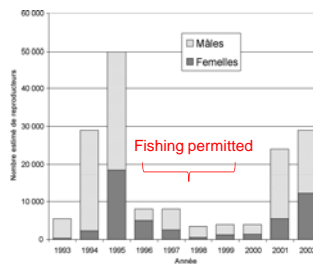
Computed for the Bay of Shippagan with data from NASA

4. Biodiversity

- LK: « ↑ striped bass ».
- SD: ↑ striped bass



Photo U.S. Fish and Wildlife



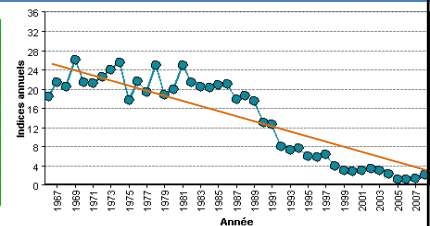
(Douglas *et al.*, 2003).

LK: « Diminution of swallow population »

SD: Diminution of the barn swallow (*Hirundo rustica*) pop. in NB.

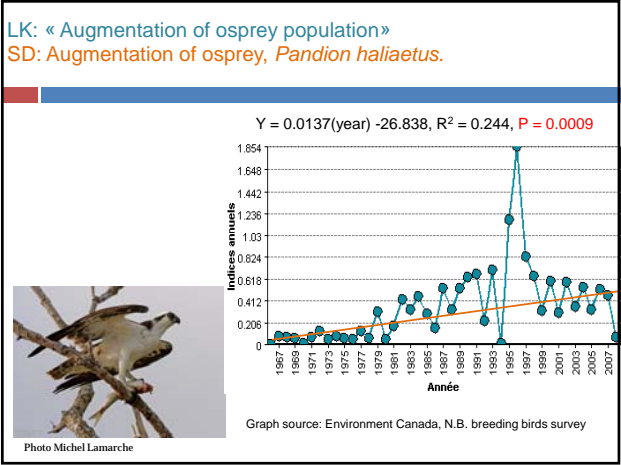


W. Lynch
Parcs Canada/Parcs Canada



Graph source: Environment Canada, N.B. breeding birds survey

$Y = -0.647(\text{year}) + 1300, R^2 = 0.829, P < 0.0001$




The accuracy of LK is demonstrated by our results.

	Relationship between LK and SD		
	Congruence	Divergence	No significant relationship
Winter air T	X		
Annual snow			X
Ice cover	X		
Sea level	X		
Eutrophication			X
Swallow	X		
Osprey	X		
Striped bass	X		

Individual identification of environmental priorities

Priorities	Number of participants (out of 16)
Amelioration of water quality in the bay of Shippagan	15
Awareness to environmental issues, public education	6
Adaptation to climatic changes	6
Reopening of shellfish zones	4
Control of invasive seaweeds	3
Promotion of recycling.	2
Promotion of bivalve aquaculture	2
Enforcement of environmental zoning	2
Control of chemical pollution in the Shippagan harbour	2
Identification of possible causes of toxic algae blooms	1
Promotion of responsible use of drinkable water	1
Diminution of energy consumption	1
Protection of biodiversity	1

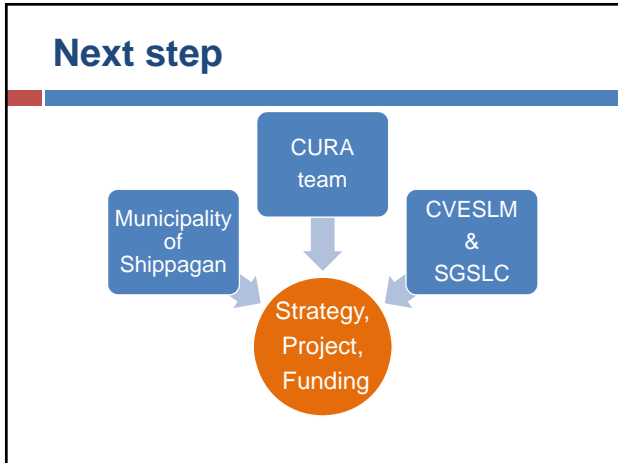
- Progress indicators (after the public consultation)
- Radio spots on environmental issues are being organized in collaboration with the local radio station.
 - An NGO agreed to lead an « action partnership » devoted to water quality in the bay.
 
 - One participant expressed his interest in working on water circulation in the bay.
 - We received a copy of a petition on an environmental issue presented to the municipality.
 - A project leader from the CZRI asked our collaboration on a project on coastline buffer zone.

Conclusion (classical approach)

1) LK accurately describes the environmental changes on the studied territory.

➔ Validation of LK as a source of information

- Conclusion (action-research)
- 2) Two key elements in starting up action partnerships:
- * Empowering the community
 - Validation of LK
 - Dialog
 - * People know that they can rely on our team.



Thanks to

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 CRSH-ARUC
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All the participants!
 Philippe Rousselle (student, UMCS)

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www.defisdescommunautescoastieres.org

Social Sciences and Humanities Research Council of Canada

 Conseil de recherches en sciences humaines du Canada



Précipitation en pluie

Augmentation significative pour le mois d'octobre.
 Il n'y a pas de changement significatif pour mai et juillet.

