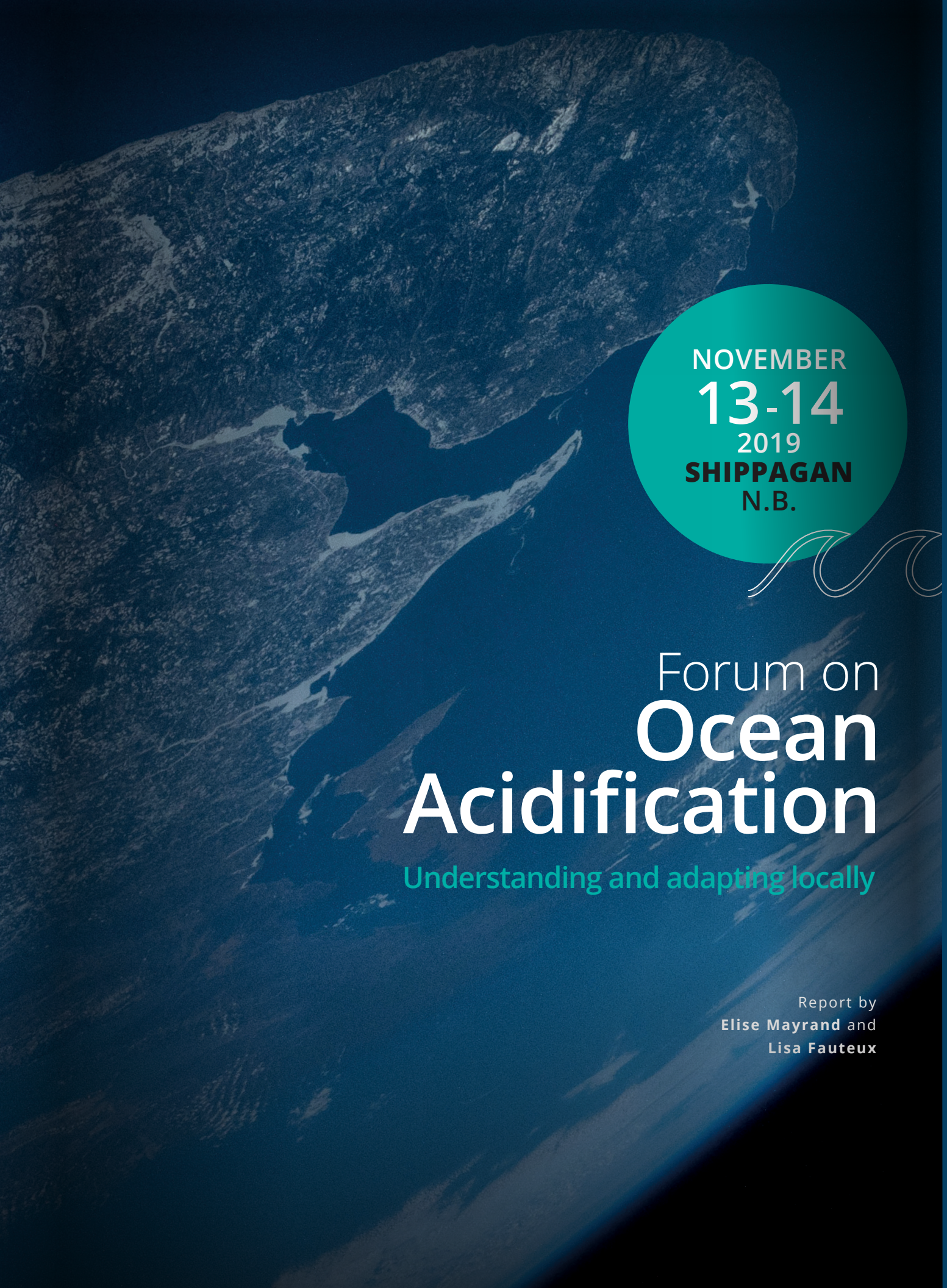


NOVEMBER
13-14
2019
SHIPPAGAN
N.B.

Forum on Ocean Acidification

Understanding and adapting locally

Report by
Elise Mayrand and
Lisa Fauteux

Why and how did the Forum on Ocean Acidification come about?

A few years ago, damage caused to Pacific Oysters by ocean acidification drew the attention of Dr. Elise Mayrand of the Université de Moncton, Shippagan campus (UMCS). In 2016, after noting a near-total lack of knowledge concerning the situation in eastern New Brunswick, Dr. Mayrand undertook a research program aiming to describe the scope of this phenomenon in bays in New Brunswick and its repercussions on the Eastern Oyster. The idea to organize a forum on ocean acidification took form as Dr. Mayrand began exchanging information with other researchers and the data began to accumulate. The main motivation was to share the information collected, since few actors in the fisheries and aquaculture sector at that time were even aware of the problem.

The organizing committee met for the first time on January 30, 2018. It was made up of Elise Mayrand and Sébastien Plante (UMCS), Lisa Fauteux (executive director of Verts Rivages), Martin Mallet (co-owner of the oyster farming operation L'Étang Ruisseau Bar Ltée) and Sylvio Doiron (New Brunswick Department of Agriculture, Aquaculture and Fisheries). Following Sylvio's retirement, Marie-Josée Maillet from the same department took his place.

The committee members began by setting the objectives they wanted to achieve through the forum. Evidently, raising awareness about ocean acidification among aquaculturists, fishers, managers, researchers and the general public was identified as a target. However, the committee defined two additional objectives with the goal of going further than simply providing information. First, it wanted to create a meeting place to facilitate the sharing of experiences, promote cooperation among actors coming from various domains (research, industry, management) and guide stakeholders in moving from thought to action. Second, it wanted to provide a platform for the next generation so that young people could share directly with adults their concerns about the environment as well as their ideas for potential solutions for upholding their right to inherit a healthy planet.

The committee developed a number of activities around these objectives. On October 24, 2019, at the Université de Moncton, Shippagan campus, we hosted 18 high-school students from École Marie-Esther in Shippagan with a view to documenting their concerns and priorities in relation to their generation's environmental future. The forum was launched on November 13, 2019, in the form of a public engagement session on the state of health of our oceans and coastal waters facilitated by Elise Mayrand. Some 50 or more people attended this session, which was covered by a journalist from *L'Acadie Nouvelle*. The following day, November 14, was then devoted to scientific presentations in the morning followed by a "marché des idées et des actions" [breakout discussion event] in the afternoon. After the presentations, two student spokespersons from École Marie-Esther stepped forward to provide an overview of the concerns and ideas for solutions that had come out of the exercise on October 24. The dozens of participants in this event came from the fisheries and aquaculture sector, various departments, environmental organizations, and teaching and research institutions. The forum program and the article by David Caron from *L'Acadie Nouvelle* are appended to this document.

Key ideas from scientific presentations

Each of the four guest speakers shared the key ideas from their presentation in the form of "tweets," which are reproduced below following the program order.

Ocean acidification: The problem and some solutions

Elise Mayrand, *Professor, Université de Moncton, Shippagan campus*

- At this time, pH levels are generally within acceptable limits for marine life along New Brunswick's eastern coast, but we have noted a number of episodes where pH has remained at potentially problematic levels for marine organisms for periods of about 10 days.
- Because of the CO_2 already accumulated in the atmosphere, acidification is set to intensify over the next several decades, potentially leading to more frequent acidification episodes affecting a greater number of marine species.
- There are steps we can take to limit the acidification process in the future and accelerate a return to normal.
- The more quickly and decisively we act, the more effectively we can limit negative impact on our ecosystems and on human quality of life.

Overview of the effects of climate change in the Gulf of St. Lawrence

Joël Chassé, *Scientific Researcher, Fisheries and Oceans Canada*

- Surface water in the Gulf of St. Lawrence (GSL) is currently warming at an average rate of 0.8°C per 100 years.
- The sea level is rising continuously at a rate of 2 to 4 mm per year.
- Ice cover in the GSL has decreased steadily since the 1990s, and this phenomenon will continue over the long term.
- Zones of highly corrosive bottom waters persist in the GSL, notably where the water is hypoxic.
- The decline in pH in the St. Lawrence maritime estuary has accelerated during the last 10 years, with the pH dropping to as low as 7.5.
- The water in the St. Lawrence maritime estuary has become oversaturated with both aragonite and calcite.
- Laboratory studies have shown that a number of shelled species are exhibiting reduced calcification and survival in conditions similar to those observed in the St. Lawrence Estuary.
- A multidisciplinary effort is required to quantify the impact of corrosive waters on marine fauna as well as on ecosystem structure and function in the GSL.

Economic importance of the fisheries and aquaculture industry in New Brunswick

Maurice Beaudin, *Professor, Université de Moncton, Shippagan campus*

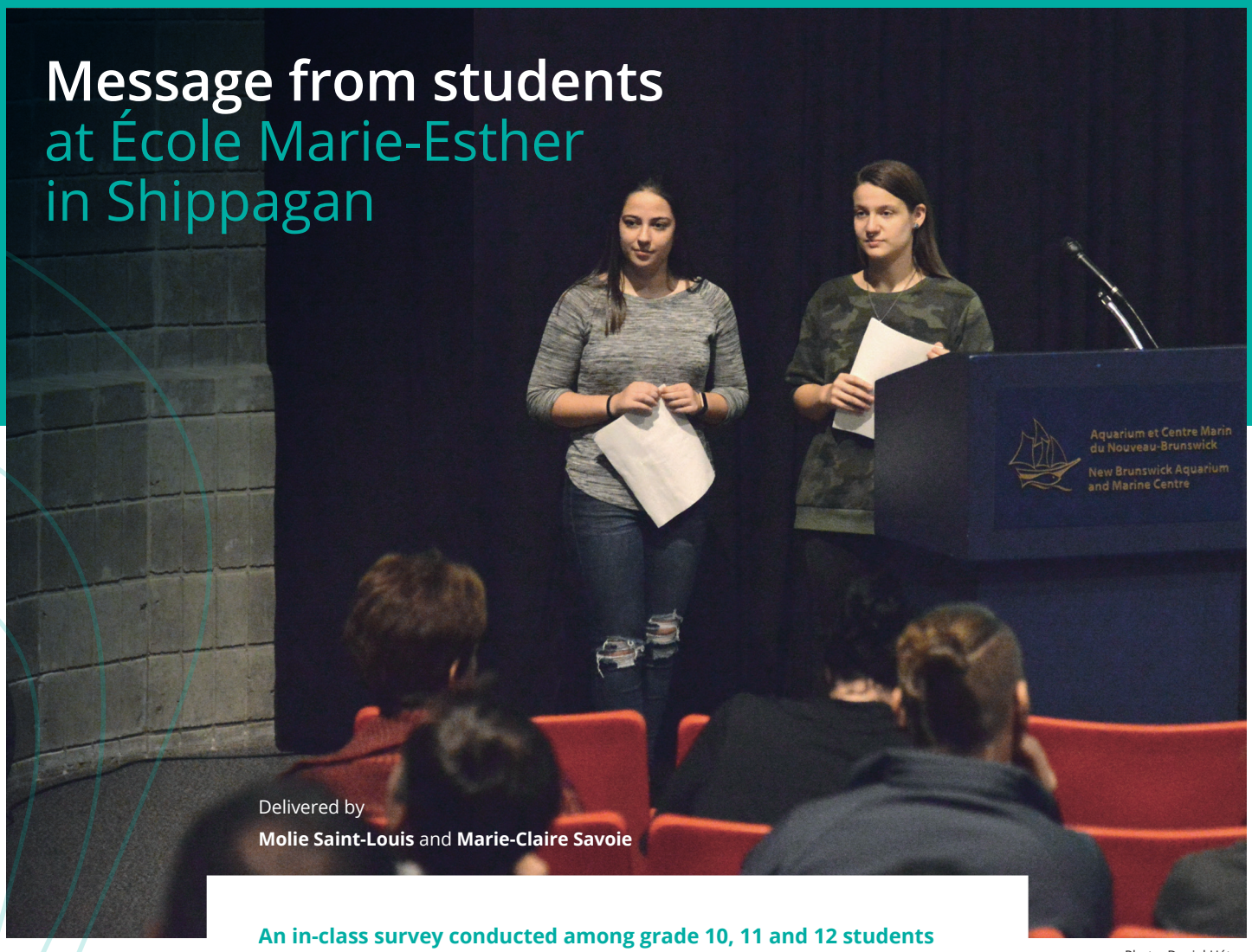
- The fished area of Eastern Canada is home to about 100 different stocks of fish, molluscs, crustaceans and marine mammals, only a third of which are found in zones classified as “healthy.”
- 16,500 fishers on 15,000 boats landing at more than 500 commercial fishing harbours and delivering their fish to 300 companies and processing plants.
- More than 600,000 metric tonnes landed with a commercial value of $3.4 billion.
- $5.5 billion in exports, including $3.9 billion in value-added products.
- 54,400 jobs directly linked to the industry, which creates another 33,863 indirect and induced jobs!
- $1.8 billion in employment income plus another $990 million in indirect and induced income.
- A vital role in the majority of coastal communities, representing 20%–30% of all jobs and providing access to Employment Insurance.

Perspectives of an oyster hatchery and farm on ocean and coastal acidification: Research, engagement, and mitigation

Meredith White, *Mook Sea Farm, Maine, USA*

- Ocean and coastal acidification have severe impacts on larval bivalve development, but can be easily and effectively overcome in hatcheries by buffering water.
- Seed and market oysters may be more resilient to ocean and coastal acidification than larvae.
- We must engage with policy makers to develop strategies to reduce our countries’ carbon footprints and ensure a future for shellfish aquaculture.
- Expansion of hatchery operations can lead to industry resiliency and business opportunities.

Message from students at École Marie-Esther in Shippagan



Delivered by
Molie Saint-Louis and **Marie-Claire Savoie**

Photo: Daniel Hétu

An in-class survey conducted among grade 10, 11 and 12 students at École Marie-Esther in Shippagan revealed that the students were especially concerned about plastic pollution and the effects of climate change.

On October 24, 2019, 18 students from the targeted classes came to the Shippagan campus to share their thoughts on these two topics along with a third topic, marine environmental health. The students were encouraged to express their concerns in relation to each topic and to reflect on solutions they would like to see implemented. The following text is taken from the presentation made by the students' two spokespersons following the scientific presentations. Their words had strong impact on the audience, made up entirely of adults.

Topic 1

Plastic pollution

Our concerns:

There's too much garbage—it doesn't look nice and it's bad for the ecosystem. There's too much plastic in the oceans, which shows that people just don't care! Plastic is made from petroleum, and so it's bad for people's health.

Solutions we propose:

- Stop producing.
- Provide better access to bulk products.
- More reusable containers: bags, straws, cups, mugs, bottles. Give them to people that don't have them.
- Laws against overpackaging.
- Use social media to share the message (make it normal).
- Refuse to use plastic items.
- Pay to use plastic.
- The municipality should give out reusable bags.
- Schools should stop selling bottled water (make sure the water fountains are working).
- Compostable materials instead of plastic.
- Use shocking images to raise people's awareness.
- More information.
- Regular clean-up events.

Topic 2

The marine environment

Our concerns:

- Garbage.
- Loss of species (death or migration to other habitats).
- Disruption of the ecosystem.
- Fear of no longer having a marine environment to enjoy and make use of.
- Overfishing.
- Loss of fishery jobs and other jobs.

Solutions we propose:

- Create a long-term government program to clean up the beaches and oceans, which would also create jobs. Not just activities like Clean Your Shore.
- Put laws in place for fishers or enforce existing laws more strictly.

Topic 3

Effects of climate change

Our concerns:

- We're afraid of what things will be like 10 years from now and for our children's future.
- Natural disasters are becoming too frequent, glacier melt is causing problems, and we are losing our oxygen due to deforestation.
- There are also imbalances affecting species and the movement of animals. Animals are losing their habitats, and the situation of polar bears is disturbing.
- The Irvings need to make an effort—New Brunswick does not belong to them!

Solutions we propose:

- Don't just demonstrate—take real action.
- Change the way we think and act to reduce waste and consume less, use energy responsibly, use less paper in our schools and improve access to public transportation.
- Find new ways to produce energy naturally.
- Make renewable energies more affordable and raise the price of non-renewable energies.
- More hydraulic, hydroelectric, wind and solar power, and electric cars at lower prices.
- We want the people at the top (the people holding the power) to wake up and find more eco-friendly solutions for factories.
- Form committees for managing and cleaning up waste and reducing pollution.
- Offer incentives and compensation for clean-up actions.
- Adopt laws applicable to construction (to make the industry more eco-friendly).

Photo : UMCS

Breakout
discussion groups

Following the scientific presentations and student presentation, the participants broke out into discussion groups to explore the priority topics identified for the forum. People were invited to move freely among the various groups, but one person in each group was responsible for documenting ideas and actions. The following text was prepared to reflect the outcomes of this activity while also seeking to consolidate certain information and refine or expand on certain points that might otherwise be unclear for readers of this report. It is not a word-for-word transcription.

Topic 1

Adaptation measures

The participants in this discussion group were of the opinion that enough evidence-based data exists to demonstrate the global scale of the problem affecting our oceans and to show that the preservation and restoration of marine ecosystem health would help to reduce the vulnerability of coastal communities. In their view, data collection strategies at the regional level remain essential nevertheless, to monitor the situation as well as to model future changes and inform adaptation and mitigation efforts. They deemed the collection of data on acidification levels in the coastal waters of New Brunswick to be a priority since many communities depend on these waters for fishing and aquaculture. This is a major challenge in terms of preserving the vitality of coastal communities and giving them the capacity to grasp the issue and take action. With effective information and support, communities can become local action hubs, and their mobilization and actions can have a positive influence on the greater community. The resilience of the hardest-hit communities, which nonetheless find empowerment through their adaptation and mitigation actions, makes them beacons of progress helping to motivate the movement as a whole.

According to the participants, a data collection and communication strategy designed and developed to promote dialogue among all actors (managers, scientists, industries and surrounding communities) would help in:

- **Growing our knowledge about the environment and the spatial variability of acidification levels**
- **Targeting problem zones and identifying effective local solutions**
- **Mobilizing communities.**

This makes it critical to subsidize new and existing research structures with a view to implementing a monitoring strategy to document the spatiotemporal variability of acidification levels in New Brunswick's coastal waters. Parameters should include pH, temperature, salinity, dissolved CO_2 concentration, chlorophyll concentration as an indicator of ecosystem health and the concentration of bacteria serving as a source of metabolic CO_2. A list of sites of interest and particularly sensitive ecosystems needs to be established so that priorities can be identified for environmental monitoring and restoration efforts.

According to the participants, the industry and communities also need to be mobilized via a public consultation process so that all parties can play a role in the adoption of mitigation measures. We have to develop innovative technologies, for example, to help the aquaculture and fisheries industries cope more effectively with the new environmental conditions.

Topic 2

Ways to mobilize decision makers in the implementation of solutions for reducing CO_2 emissions?

The participants thought that reducing CO_2 emissions should be a federal priority. To make progress in this regard, elected officials with legislative power need to understand the importance and urgency of adopting appropriate laws and policies. They also need to be equipped with the tools they need to do so. Elected officials in this discussion group said that they understood the importance of this issue but acknowledged that they had not always had the necessary time or facts to make knowledgeable and convincing arguments. One participant suggested that government and business should ideally incorporate into their operating approach a component supporting individual entities (e.g. sectors, departments, agencies) in developing and implementing adaptation and mitigation solutions. For example, each department should define approaches for reducing its own CO_2 emissions.

The discussion participants consequently proposed having an environmental organization (such as the New Brunswick Environmental Network) begin collaborating with interested officials. This organization would draft briefing notes on topics related to the reduction of CO_2 emissions in order to provide the officials sound, scientifically founded arguments for defending environmental values in the legislature or parliament. These documents would also be made publicly available. The organization would thus be acting as a voice for citizens concerned about climate change and ocean acidification to assist officials with amending, abolishing or adopting laws to reduce CO_2 emissions or, at the very least, to begin moving toward this goal. It could propose management approaches, for example, to the Regional Service Commission and the Forum des maires de la Péninsule acadienne, which could then be presented to provincial and federal officials.

... to compare the costs of inaction to the costs associated with implementing mitigation and adaptation...

Photo: Daniel Hétu

In addition to scientific and environmental considerations, a powerful strategy for gaining the buy-in of decision makers would be to compare the costs of inaction to the costs associated with implementing mitigation and adaptation measures in terms of investment, financial losses, and jobs lost and gained. A coalition among the practice groups involved (fishers, farmers, peat and tourism industries, etc.) could help inform the thought process in terms of the environmental issues affecting them and the potential negative economic impact on them of climate change and ocean acidification, in order to help decision makers understand the urgency of reducing CO_2 emissions.

The participants raised the idea that the legislative framework and administrative actions need to be mutually supportive to promote the adoption of environmentally responsible decisions. They discussed ways in which political structures could help increase public awareness and promote empowerment, encourage citizens to take action and guide them through the ecological transition.

Topic 3

Awareness

This discussion was initiated with a very simple question: How do we roll out the concept of ocean acidification to the general public? For people with a science background, it is relatively easy to understand the main principles behind ocean acidification, but for most people, grasping the concept of pH as a logarithmic scale would pose a significant challenge.

We are constantly bombarded by information of every type in both conventional and social media, and it is often not easy to separate the true information from the false. One discussion group participant suggested developing radio capsules along the lines of "Did you know…?" or "Ask a scientist!" in which a designated expert could explore various environmental issues in simple language.

The discussion group members observed that despite awareness-raising efforts, people do not generally worry about issues that may not become a problem for another 10 or 20 years. As a result, it is important to find approaches to talking about the impact of ocean acidification (or any other environmental issue) that reach people in a more direct way. It was suggested that the Maritime Fishermen's Union could hold information sessions, presenting key information in a condensed manner, specifically for its members to educate them about various environmental issues.

… people do not generally worry about issues that may not become a problem for another 10 or 20 years.

Lastly, the participants agreed that information and knowledge sharing are essential but were concerned that if the general public is not willing to make certain lifestyle changes, no real action will be taken. They noted that lifestyles are generally passed down from generation to generation. Are certain people willing to trade in their big truck for a smaller vehicle that generates less pollution, or, better yet, for a hybrid or electric vehicle? Regardless, New Brunswick is behind other provinces, like Quebec, when it comes to offering incentives to support the transition to electric vehicles. One deterrent may be the cost of electricity, which is higher in New Brunswick than in Quebec. One solution for reducing the number of large, high-pollution vehicles would be for each municipality to maintain a "community" pick-up truck for people to rent when they need to transport heavy or dirty items.

Mitigation strategies for ocean acidification

Photo: Pat Gauvin

The discussion started with the idea that all scientific presentations on environmental issues tend to lead to the same basic conclusion: people need to collectively change their way of life. It then moved on broadly to the issue of individual actions versus major government initiatives.

Some participants focused spontaneously on what people can or should be doing as individuals and on the fact that people can feel powerless at times. Issues raised included fishing boat motors that are more powerful than necessary for the industry, just like people driving around on land in big SUVs. Other participants discussed the fact that electronic devices have become disposable in the frantic race to always have the latest gadget. People need to use their common sense and sense of self-discipline. According to the participants in this discussion group, it is important for the government to put incentives and deterrents in place to promote the reduction of CO_2 emissions targeting both individuals and companies/industries, for example, in terms of taxes. The government could tax the use of transportation modes based on how much pollution their use generates. However, the importance was noted of adapting this approach to consider situations where people are forced to use higher-pollution transportation, for example, in areas where public transportation is more or less nonexistent. This makes it all the more important to develop alternative solutions. If taxes are raised on air travel, then people need to have access to another form of shared transportation that generates less pollution, such as the train.

Other participants focused on the fact that decisions generally need to be made "from the top down," since hundreds of thousands, or even millions, of people cannot be expected to spontaneously coordinate their actions without a government authority guiding and directing the change process. The social issue of smoking was cited as an example: if people had simply been asked to refrain from smoking in public places by running a liberal information campaign highlighting the harmful effects of secondary smoke on non-smokers, people would still be smoking in public places, since the ones who were willing to refrain from doing so would not see any point in taking action unless everyone did so as a group. This could only happen when governments made and enforced certain laws.

On the other hand, some participants raised the fact that there is currently a very active environmental movement holding demonstrations like the ones taking place in the fall of 2019 around the world to urge governments to take action.

The group also discussed the importance of government protection of broader ecosystems that serve as carbon sinks. Participants noted the need to restore marine and coastal ecosystems from the perspective of conservation, not just for economic reasons. These ecosystems will then be able to offset higher amounts of carbon.

In a series of informal exchanges, participants then discussed the usefulness of focusing on small-scale measures. Although the benefits may be real, this may also be helping to divert people's attention from high-pollution industries where systemic changes are urgently needed. It was noted that when it comes down to it, our entire society is focused on extraction, production, consumerism and capitalism, and what is required is a revolution in terms of rethinking and abandoning certain practices.

Conclusion

The organizing committee is pleased to have achieved all the objectives it had defined in relation to the Forum on Ocean Acidification. These objectives included moving beyond awareness raising and conversation to motivating people to take real action. It is consequently appropriate to end this report by describing the action plans that have been developed coming away from the forum.

The environmental organization Verts Rivages committed to identifying an entity willing to lead the management approach proposed in the discussion on topic 2 (Ways to mobilize decision makers in the implementation of solutions for reducing CO_2 emissions). This leader would play a critical role in directing efforts to improve the quality of the environment in general and of the marine environment in particular. It could work closely with the Regional Service Commissions and the Forum des maires to establish consistent approaches and actions in this regard.

A project led by Elise Mayrand (Université de Moncton, Shippagan campus) was recently approved for a grant from New Brunswick's Environmental Trust Fund for the 2020–2021 year. Among other things, this grant will enable collaboration with officials to supply briefing notes to them listing the main components of scientific arguments to assist them in arguing about environmental issues in the Legislature or Parliament.

The research centre Valorēs in Shippagan, New Brunswick, has begun the task of developing radio capsules to educate the public about environmental issues.

Discussions have been initiated among researchers from UMCS and Fisheries and Oceans Canada as well as development officers at the Université de Moncton concerning the feasibility of setting up a station to monitor physicochemical parameters in the coastal waters of the Acadian Peninsula. The participants in these discussions are currently developing an implementation and funding strategy.

If any other initiatives have been launched subsequent to the Forum on Ocean Acidification, we invite you to share the details with us by emailing vertsrivages@gmail.com.

The forum experience was rewarding in every respect. We gave a voice to the younger generation, consolidated the community and the various actors involved and created a framework for implementing tangible solutions. However, what would bring us even greater satisfaction would be to see our coastal environments become less vulnerable and our coastal communities more resilient over the coming years. To achieve this, we need leadership and sustained political commitment.

Photo: Daniel Hétu

Acknowledgements

The committee extends sincere thanks to the Government of New Brunswick for its financial support through the Environmental Trust Fund.

This event was also made possible through financial contributions from a number of businesses and institutions in New Brunswick, showing the importance to the community of the quality of the marine environment.

In this regard, we thank Shippagan Enterprises Ltd. and International Seafood and Bait Ltd. for their financial contribution, the Université de Moncton, Shippagan campus, for its financial and technical support, and Homarus Eco-centre and the Maritime Fishermen's Union for their financial support, participation in the forum and assistance in mobilizing the fishing community.

We are also grateful to the New Brunswick Aquarium and Marine Centre and Cielo Glamping Maritime for hosting the forum's various events and going above and beyond to ensure that the participants had a positive experience.

Thank you to Monique Gallant and Priscille Chiasson for helping to organize the environmental activities involving the students from École Marie-Esther and, most importantly, to all the students who took part. Special thanks to Molie Saint-Louis and Marie-Claire Savoie, who effectively conveyed the voice and concerns of their generation.

We greatly appreciated the work of Daniel Hétu, who served as the official event photographer.

The committee thanks the guest speakers at the forum—Elise Mayrand, Joël Chassé, Maurice Beaudin and Meredith White—for the generosity of their scientific contributions.

Finally, thank you to Alain Denault for preparing the summary report on the discussion of mitigation strategies for ocean acidification and to the many participants contributing to the success of the event.

Page layout: Mélanie Gionet / Design graphique

APPENDICE I

NOVEMBER
13-14
2019
SHIPPAGAN

Ocean Acidification Forum

TICKETS ON SALE
AT **EVENTBRITE.CA**

Understanding and adapting locally

5 à 7: Opening and session for the general public

November 13 — **The Hub at Cielo**, 232, chemin des Huîtres, Haut-Shippagan

5:00 p.m.	***Ocean acidification: A problem but also solutions (short version)*** Elise Mayrand, professor at the Université de Moncton, Shippagan campus Cash bar, appetizers offered.

Forum Translation services will be provided (tikets on sale at eventbrite.ca)

November 14 — **New Brunswick Aquarium and Marine Centre**, 100, rue de l'Aquarium, Shippagan

8:30 a.m.	**Welcome**
9:00 a.m. / 10:30 a.m.	**Session 1: Ocean acidification and climate change** ***Ocean acidification: A problem but also solutions (complete version).*** Elise Mayrand, Professor at the Université de Moncton, Shippagan campus ***Overview of the effects of climate change in the Gulf of Saint Lawrence*** Joël Chassé, Researcher at Fisheries and Oceans Canada
10:30 a.m. / 10:45 a.m.	**Break and exhibits**
10:45 a.m. / 12:15 p.m.	**Session 2: Socio-economic consequences of ocean acidification and possible adaptations** ***Economic importance of the fisheries and aquaculture industry in New Brunswick*** Maurice Beaudin, Professor at the Université de Moncton, Shippagan campus ***Perspectives of an oyster hatchery and farm on ocean and coastal acidification: Research, engagement, and mitigation*** Meredith White, Mook Sea Farm, Maine, USA ***The younger generation's vision of their environmental heritage*** Students from Marie-Esther high school, Shippagan
12:15 p.m. / 1:30 p.m.	**Lunch and exhibits** (Lasagna, Caesar salad, dessert, tea, coffee)
1:30 p.m. / 4:00 p.m.	**Session 3: Summary and open discussion** ***Brief summary of the morning's presentations and discussions*** Lisa Fauteux, Director of Verts Rivages **Marketplace of ideas and marketplace of actions:** What are the needs and priorities for managers, for the fisheries and aquaculture industry, for the community? What steps can we take to mitigate the acidification process, increase our capacity to adapt locally, and be innovative in terms of sustainable development? Snacks and coffee available ***Closing remarks*** Sid Ahmed Selouani, Vice-president of the Université de Moncton, Shippagan campus

For information :
vertsrivages@gmail.com

New Brunswick / Nouveau Brunswick
Université de Moncton Campus de Shippagan
Entreprises Shippagan Ltée Groupe de compagnies
ESL Marine Supplies Ltd.
DJ Marine

APPENDICE II

Les eaux côtières acadiennes menacées par l'acidification

Les eaux côtières du Nouveau-Brunswick ne sont pas invulnérables à l'acidification de l'océan, mais les conséquences de ce phénomène commencent seulement à être connues. Élise Mayrand, professeure de biologie à l'Université de Moncton, campus de Shippagan, est l'une des pionnières dans le domaine dans la province.

David **Caron**
david.caron@acadienouvelle.com
@dacadie87

Un forum sur l'acidification des océans a eu lieu à Shippagan mercredi et jeudi. L'objectif de l'événement était de présenter le phénomène et ses conséquences sur l'environnement et l'économie.

Élise Mayrand a commencé à s'intéresser à l'acidification des océans, un phénomène causé par une augmentation du carbone dans l'atmosphère, il y a quelques années, après avoir lu des articles décrivant un problème de mortalité massive d'huîtres dans les écloseries sur la côte ouest des États-Unis et du Canada en 2005.

Au départ, les aquaculteurs ont soupçonné une infection bactérienne et ont pris des mesures pour tenter de régler la situation, mais sans résultats. Puisque la même situation s'est reproduite l'année suivante, un groupe d'ostréiculteurs a demandé au chercheur Burke Hales de l'Université de l'Oregon de faire des analyses. Il a constaté des concentrations de Co_2 et d'acidité très élevées.

Près du quart du dioxyde de carbone émis dans l'atmosphère se dissout dans les océans. Depuis la révolution industrielle du 19e siècle, la quantité de carbone émise dans l'atmosphère en raison de l'activité humaine continue de grimper.

En 1850, les océans affichaient en moyenne un ph de 8,2. En 2019, il avait baissé à 8,1. La différence semble minime, mais même les petites variations peuvent un impact majeur, souligne Élise Mayrand. Le ph est l'unité de mesure de l'acidification.

«En baissant d'une unité, le liquide devient 10 fois plus acide. En passant de 8 à 7, le liquide est 10 fois plus acide. De 8 à 6, il est 100 fois plus acide.»

Si rien ne change, le taux moyen de ph de l'océan baissera à 7,7 vers 2100.

«Chez les humains, le taux de ph dans le sang varie de 7,35 à 7,45. S'il descend de 0,2 unité, la personne entre en convulsion et peut tomber dans le coma. C'est pour dire que les petites variations ont un grand impact.»

Même si les êtres humains cessaient de produire du carbone cette semaine, l'acidification des océans se poursuivrait pendant plusieurs années avant que la situation se stabilise. L'alternative est cependant bien pire.

«Si on ne fait rien, on va voir une diminution rapide du ph dans les océans avec des valeurs d'environ 7,4. Ce serait dramatique.»

LA PÉNINSULE ACADIENNE

Pour mieux comprendre l'impact de l'acidification à l'échelle locale, Élise Mayrand s'est associée avec des partenaires pour mener des recherches dans la baie de Saint-Simon.

Des suivis ont aussi eu lieu dans les baies de Tracadie, de Caraquet et de Shippagan. Il y a de la production d'huîtres dans toutes ces eaux.

Il y a quelques années seulement, aucune donnée n'existait à ce sujet.

Dans la baie de Saint-Simon, les taux varient d'une saison à une autre. Durant l'été de 2017, les taux de ph dans ce cours d'eau ont varié entre 8,1 et 8,4. En hiver, il y a cependant eu deux épisodes d'environ 10 jours durant lesquels le taux de ph a chuté à 7,7.

«On se dit, ce n'est pas grave, c'est en hiver, mais les écloseries continuent de produire en hiver, donc ça peut être problématique.»

Les chercheurs ont beaucoup de pain sur la planche, avoue Mme Mayrand. L'impact de l'acidification sur plusieurs espèces marines n'est pas encore connu.

«Il nous manque de l'information. D'une autre part, ce ne sont pas toutes les espèces qui sont affectées de la même façon.»

«Les poissons se fient sur l'odorat et le goût pour naviguer dans leur environnement plus que sur leurs yeux. Des études ont démontré que les poissons dans les eaux acidifiés interprètent mal ce qu'ils détectent dans l'eau. S'ils détectent un prédateur, souvent ils vont rester sur place au lieu de se cacher ou ils confondent le prédateur pour une proie.» ■

La baie de Saint-Simon. Les taux de ph, une unité de mesure de l'acidification, varient selon les saisons dans ce cours d'eau. - Acadie Nouvelle: David Caron

«Ça va prendre du leadership»

La biologiste estime que les êtres humains détiennent les outils nécessaires pour renverser la vapeur. L'important est d'agir rapidement et efficacement.

L'histoire fourmille d'exemples de cas où les êtres humains ont adopté en grand nombre de nouvelles technologies en quelques années seulement, que ce soit les voitures, l'internet ou les téléphones intelligents. «Ça va prendre du leadership. Il faut demander aux élus, aux responsables politiques de mettre des moyens en place pour réduire la production de Co_2. Il faut aussi qu'ils subventionnent la recherche et le développement qui permettra de développer des technologies qui émettent moins de carbone.»

Des recherches démontrent aussi que certaines espèces commencent à s'adapter à l'acidification. Une équipe ayant travaillé sur les œufs de morue s'est rendu compte que les œufs fécondés par un mâle en particulier étaient beaucoup plus résistent à l'acidification. Ça veut dire que certaines espèces ont la capacité génétique de s'adapter.» - DC