LIGHTHOUSENOW

2019-04-17

Fighting the rising tide

by Zack Metcalfe

The Atlantic Ocean is on the rise, and very soon the coastal communities of Nova Scotia will pay for it.

"Sea level rise is a core issue impacting our coastal communities," said Dr Anya Waite, an oceanographer and scientific director of the Ocean Frontier Institute, Halifax. "By 2100, the world's oceans are expected to rise another metre above current levels."

As the landlocked glaciers of Greenland, Antarctica and elsewhere melt in a warming climate, astounding sums of fresh water pour into swelling oceans. The oceans themselves warm in turn, and

according to the laws of thermodynamics, warm water must expand, swallowing still more shoreline. Since the dawn of the industrial revolution, global sea levels have risen over 30 centimetres.

When sea level rise conspires with high tides and the storm surges common to southeastern Nova Scotia, the result is flooding in oceanfront communities like Liverpool, Lunenburg and Mahone Bay, forcing municipal governments to look far beyond the four year election cycle, and confront the realities of a warming world.

According to Region of Queens Municipality Mayor David Dagley it was difficult for some of his colleagues to grasp the scale and seriousness of a changing ocean and its impact on Liverpool, until, that is, the winter of 2017-2018.

"We had several surge tides that winter which flooded the downtown parking lot and some of the businesses along it," he said. "Although we've had surge tides in that area since the 1960s, they've been infrequent and not nearly as severe as we've been experiencing in more recent years. Council quickly understood...that we needed to take action."

The parking lot in question empowers business owners and visitors alike to reach the community's economic centre, and the adjacent Centennial and Privateer parks host a suite of community events, such as the Privateer Days and the Canadian Axe Throwing Championship. Mayor Dagley described this slice of community as an "important economic driver for the municipality of Queens."

Last fall the municipality hired CBCL, an engineering and environmental design consultancy based in Halifax, to evaluate the risks of sea level rise as well as potential solutions. An interim report has since been produced, with a final report expected in coming months.

"It's projected, from the information we've received, that over the next 30 years we could see a 16 inch (40 centimetre) rise in sea levels here," said mayor Dagley.

The solutions being considered so far include the building of a sea wall, raising vulnerable areas of the shoreline, and the use of backflow preventers, which keep saltwater from contaminating district freshwater systems.

Similar infrastructural upgrades are being undertaken in Lunenburg, where the Tannery Road was damaged by surge tide flooding and considerable erosion. Not only are they repairing the structure and cribwork of this area, but they are raising it as well.

The town's 2014 Climate Change Action Plan already includes recommendations for the bolstering of buildings in identified problem areas, floodplain setbacks and the protection of the community's freshwater from saltwater incursions, but an updated document, entitled Project Lunenburg, is also being assembled by CBCL, intended to update their infrastructure planning documents as well as their Climate Change Action Plan.

Mahone Bay did things a little differently, first consulting the provincial Department of Environment and Dalhousie University, to have the risks to the community outlined before solutions were even broached.

The conclusion was that, in the next 50 years, Mahone Bay could be facing surge tides three-and-a-half metres above present sea levels, carrying saltwater as far up main street as the town hall, compromising the foundations of Edgewater Street from downtown north to Keddy Bridge and flooding properties along its length, including the three heritage churches for which Mahone Bay is known - Trinity United, St John's Lutheran and St James Anglican.

"This is what they used to call the 100 year storm," said Mahone Bay Mayor David Devenne, "but we seem to be getting it every five years now. They are going to get worse. All the modelling suggests that something needs to be done if we are to save the waterfront. These three churches are probably the key to tourism in Mahone Bay, and tourism is our number one business."

He and his council took these predictions to CBCL who proposed a solution inspired by similar work in Chesapeake Bay - a living shoreline. This involves the establishment of a wetland between the ocean and the present waterfront along Edgewater Street, defined by a gradual incline with dense vegetation, ending in a standard sea wall.

A living shoreline has the power to diffuse and disperse surge tides before they make contact with the community. This proposal has survived thorough community consultation and now awaits funding.

Who, in the end, is responsible for financing these solutions? This is a question Waite hears more and more from coastal residents, and given the enormous expenses involved, she has no easy answer.

In Liverpool, Dagley puts the costs of coastal adaptation well over $1 million, while Mahone Bay's living shoreline proposal will cost an estimated $3.5 million. Both communities have reached out to the provincial and federal governments for financial aid; Lunenburg has already secured some funding for ongoing infrastructural upgrades.

In Waite's opinion coastal communities would be better served if they brought their funding requests to government together. In this fashion, what government dollars do exist could go where they're most needed.

"I think we need to go through community after community almost like triage, identifying the most urgent situations and bringing those community groups into a conversation with government," she said. "This isn't a conversation we can have too soon."

In terms of mitigation, she endorses the living shoreline as proposed for Mahone Bay. But the most important mitigation measure, she said, on the municipal, provincial and national scale, is to quickly and dramatically reduce our emissions of carbon dioxide, slowing sea level rise and preserving our coastal communities long term. After all, if global warming continues unabated, no sea wall will be high enough.

"Whether you agree with a carbon tax or not, we need some way of slowing our carbon emissions," she said. "It sounds indirect, but we need to invest in solar power, wind power, to engage in all sorts of sustainable power options so we can slow down global warming."