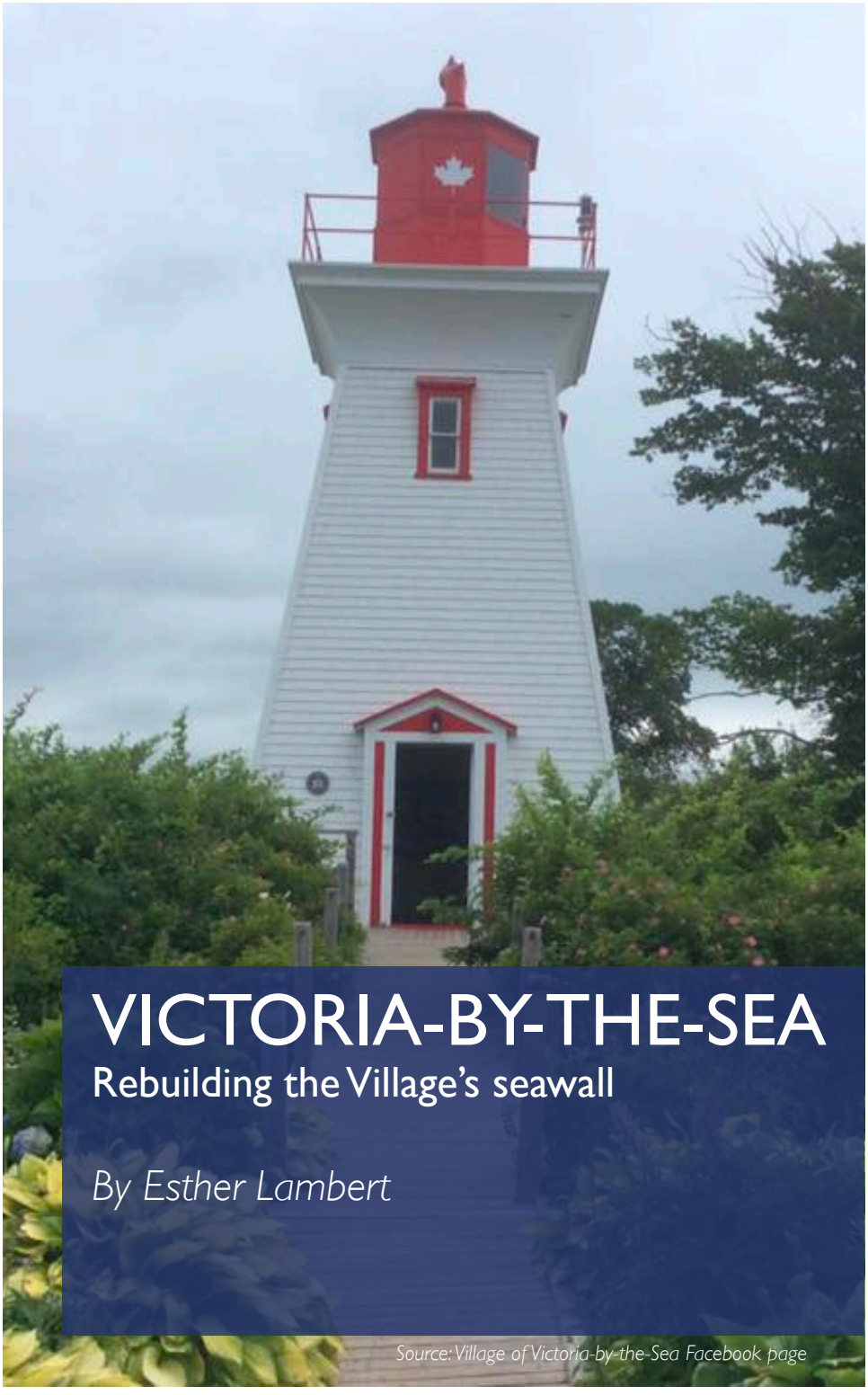

VICTORIA-BY-THE-SEA

Rebuilding the Village's seawall

By Esther Lambert

Source: Village of Victoria-by-the-Sea Facebook page

THE SCIENCE

Coastal communities across Canada continue to face the threat of sea-level rise and storm surges that place coastlines and developments at risk from flooding and inundation. This trend is expected for most of Atlantic and Pacific Canada and is further exacerbated by a gradual decrease in sea ice, which protects the coastline during storm surges; otherwise, erosion occurs. The combination of a full moon and a high tide accompanied by onshore winds carried by storms constitutes a high risk for coastal flooding and erosion.

Seawalls can help to protect shorelines against coastal erosion and other processes, such as weathering and sediment transportation; however, their effectiveness is heightened when implemented together with other soft engineering approaches (example, wave-breaking reefs and sea hives) and green infrastructure. It is important to consider the types of materials and engineering design while taking other mitigating actions when planning to build or rebuild seawalls.

THE TRIGGER

Located along the south shore of Prince Edward Island between the larger communities of Charlottetown and Summerside, the Village of Victoria-by-the-Sea is a small community with a year-round population of 120, reaching the thousands in the summer months. Its economy is sustained by farming, fishing, and tourism. Being sheltered and located strategically, Victoria's harbour was an important seaport from the late 1800s to the early 1900s, trading with the West Indies, Europe, and ports along the east coast.

The community's aging cement seawall dated back to the 1960s. After the Lobster Hatchery Research Facility ended operations, there was no maintenance of the wall and it began to wash away gradually. Its deterioration continued as the community started to face sea-level rise, more intense and frequent winter storms, and extensive flooding along the coast during storm surges. During these storms, the water on the wharf is usually knee-deep. Residents' basements along Water Street, as well as restaurants and businesses along the wharf, frequently get flooded. The lowest lift pump is about 40 feet from the ocean and, if breached, there would be a serious sewage problem. In addition to the above-mentioned issues, boats are also being severely damaged when flooding extends over the wharf. Lastly, pack ice has been decreasing, resulting in less protection for the coastline and nearby structures. The community knew there was a problem, given the history of extensive flooding, and actions needed to be taken to better protect the municipality and its residents.

THE APPROACH

Rebuilding the seawall using large granite boulders required collaboration from local, provincial, and federal levels of government, as well as the private sector and civil society over many years. It took approximately 10 years from planning to completion of the project. The municipality discussed and planned replacement of the wall for years before taking action. This included identifying funding, as Victoria-by-the-Sea was

Figure 11: *Victoria-by-the-Sea rebuilt its seawall using large granite boulders. (Source: Village of Victoria-by-the-Sea Facebook page)*

unable to cover the entire cost of this large rehabilitation initiative. All jurisdictions provided funding and a private company imported the granite boulders from the mainland and lined them along the seawall. Some of the major actors included the local harbour authority, Emergency Measures Organization, and the Department of Fisheries and Oceans. The Village hired consulting engineers to design the new seawall, who looked at floodplain and sea-level rise maps to understand current and future risk. (UPEI Climate log has a tool that is used to visualize sea-level rise.) They also looked at sea-level rise analysis.

In planning this reconstruction, Victoria acknowledged that it would not solve all its coastal erosion and flooding problems, but it would be one step towards progressively adapting and attempting to stop further damage by using more resistant material in reconstruction.

As with other multi-jurisdictional infrastructure projects, there were a number of challenges. For instance, the Village had to buy privately owned land on the waterfront to complete the replacement of the seawall.

THE OUTCOME

Victoria's shoreline is now better protected, which also provides some protection for homes and businesses on and near the coastline. The concrete wall has been replaced with a permeable granite boulder seawall. Having a stronger, more reliable seawall has given the community time to address other ongoing issues, such as water mains and septic tanks behind the seawall. The collaboration process has inspired conversations about how to adapt to long-term sea-level rise. For instance, there is some dialogue about whether developments may need to be relocated away from the shoreline or rebuilt on stilts. The community was also inspired to invest more time in forging

partnerships with organizations working in the area of climate and adaptation who can be long-term project partners. The Village formed a partnership with the University of Prince Edward Island Climate Lab to install a weather station on the wharf. Wind speed, temperature, and barometric pressure are recorded. The station also has a tide gauge. These readings add to ongoing data collection and help to identify climate trends.

A WORD FROM VICTORIA-BY-THE-SEA

Eric Gilbert, Municipal Councillor for Victoria-by-the-Sea, explained that planning and executing a project of this size has taught this small community about the process of getting large-scale rehabilitation initiatives done. He also emphasized that it has been a great learning experience about the process of interacting with different levels of government. He looks forward to working with other municipalities and organizations on pilot projects and highlighted the importance of forming strong partnerships so that the voice of smaller communities can be amplified. His advice to other small communities is to start taking action immediately, even if all resources have not been identified, as these projects take time. "These projects will likely take a long time, will be expensive and possibly unpopular with part of the population, but the key to success is to partner with other organizations facing similar issues and to start building relationships and having conversations with universities, not-for-profits, environmental groups, and other levels of government," he said. He added that building relationships can help to build capacity through the sharing of information and resources.

Nevertheless, Mr. Gilbert reminded other communities that their small size also makes it relatively easy to identify all vulnerable groups and to assess the major climate risks. It also forces the municipality to use its limited resources efficiently.