Rising Seas on the Coast: A Campbell River Case Study

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In March 2012, a king tide during a raging storm, with winds in excess of 100 km/hour, threw massive logs, rocks and gravel into a waterfront park in the heart of downtown Campbell River. The extensive damage to the popular park, waterfront walkway and parking lot demonstrated the risk of rising seas caused by climate change.

Although climate change had been an emerging part of the City of Campbell River's planning for several years, the impact of this storm elevated the priority for climate adaptation and sea level rise planning. The City's planning efforts began with a design concept for park repair that considered the impacts of sea level rise for future park development. This, in turn, led to a more comprehensive sea level rise analysis along Campbell River's 15 kilometers of urbanized shoreline and low-lying areas, including the estuary and downtown.

In 2017 a database was created that identified areas at risk of inundation due to sea level rise including land parcels, municipal infrastructure, roads, parks, and natural areas.

The City's analysis used:

- GIS data and LIDAR (Light Detection and Ranging Data)
- Aerial photos
- A coastal-survey that involved walking and photographing the entire coastline
- An analysis of local tidal, geological, and climate data
- Provincial sea level rise projections.

A high-level estimate of the value of land and assets at risk was determined using BC Assessment parcel data and by calculating the cost of City infrastructure. Costs were based on risk severity according to inundation extent/depth.

Although this was only a first high-level analysis, the figure was astounding. Approximately $700 million of infrastructure and property were at risk from inundation. This dollar figure doesn't even include the additional value of associated business disruption. The City's annual operating budget is $80 million, so the risk to community infrastructure, assets and property is substantial

With this initial data on hand, the City, Federation of Canadian Municipalities (FCM), and Union of British Columbia Municipalities (UBCM) partnered to fund the City's comprehensive sea level rise work. After a multi-year planning process, *Rising Seas - Sea Level Rise Action Plan* was adopted in February 2020.

Many lessons were learned by the work of other communities such as the Town of Qualicum Beach, City of Surrey, and City of Vancouver, municipalities that pioneered early work on sea level rise planning. Experienced consultants Northwest Hydraulic Consultants and Lanarc supported the City's technical analysis and community engagement for the plan.

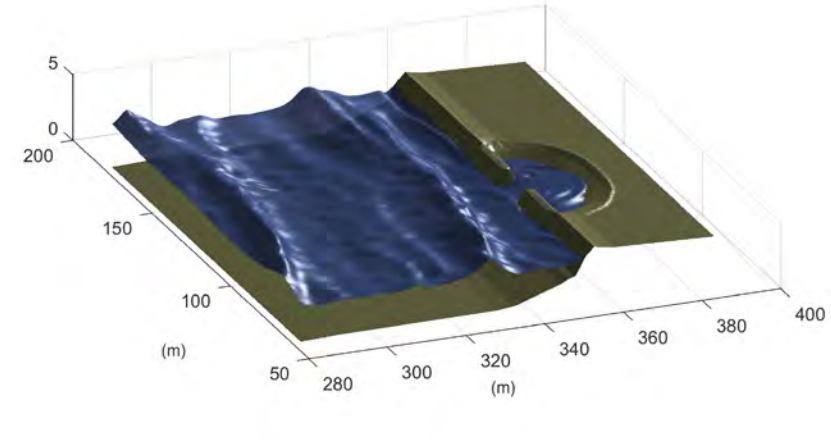

Fig. 1: A three-dimensional rendering of a sea level rise scenario

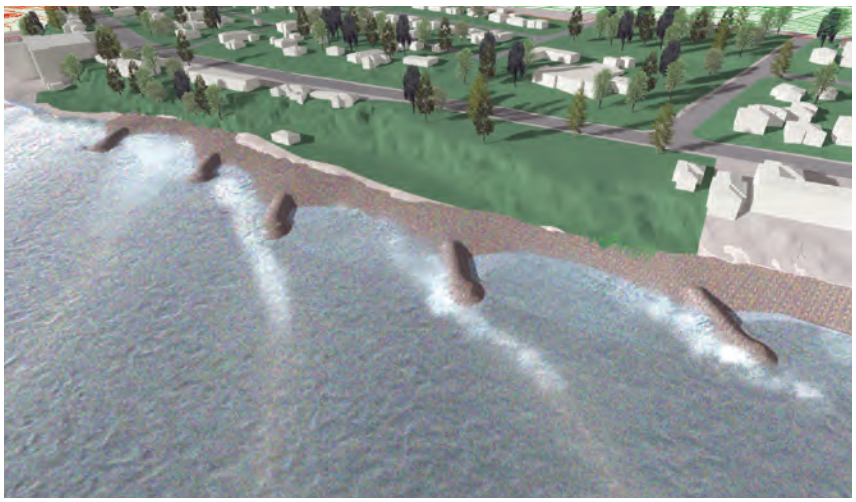

Fig. 2: 3D rendering showing the concept of embayments

Sea level rise is a global phenomenon that manifests differently in different places. In Campbell River, localized glacial rebound, where the land continues to rise following the last glacial period, is no longer keeping pace with sea level rise. After one metre of global sea level rise (forecast within 50 to 80 years), sea level in Campbell River will increase by 0.7m. Preparing now with adaptation measures built into today's construction will help meet flood risk faced in decades to come.

The *Sea Level Rise Action Plan* provides a suite of priority actions for the next 30 years including regulatory/policy tools, such as a floodplain bylaw and new development permit guidelines, future technical studies, considerations for capital works projects, capacity building and partnership recommendations.

The City's Capital Works Department has led the charge, with the first raised, multi-use pathway along recently-upgraded sections of Highway 19A. Along with raising sections of the seawalk, some newly-installed critical sewage infrastructure has been developed to accommodate short term flooding.

"Our infrastructure has the potential to last us for the next 50 to 75 years, and we know we will see the impacts of sea level rise during that time, so it's our responsibility to design and construct infrastructure that is capable of withstanding the impacts of sea level rise," says Jason Hartley, the City's Capital Works Manager.

Hartley was instrumental in engaging City Council and the City's senior leadership in the importance of planning for sea level rise, which helped initiate the *Rising Seas* project.

Among the aspects of *Rising Seas* that make the project unique are the combination of technical analysis and innovative public engagement. The community was involved throughout the process to consider the values and trade-offs associated with proposed adaptation measures, and to help define priorities. The project team also welcomed three co-op students who supported community outreach and plan development

To aid with public understanding, the plan includes three-dimensional renderings of various sea level rise scenarios (see Figure 1).

Recognizing that sea level rise will have the most significant impact on Campbell River's youth, the project team worked closely with the City's Youth Action Committee and developed a robust strategy to garner youth input. Co-op students took terrain models into local elementary schools, where they used hairdryers and ice

cubes to model glacial melt. They demonstrated how the rising water level began swamping settlements and destroying farmland. Youth outreach efforts also involved college and university students, and direct invites to student representatives at public consultation events.

The City has a Youth Engagement Policy that calls for at least 10 per cent of public input on City projects coming from youth. The project team found that the youth focused on solutions that promote ecological and human wellbeing, even when this represented a trade-off in terms of cost or flood protection efficacy.

The project team felt that youth engagement was critical to climate change planning, as young people did the least to cause climate change, but are the ones who will experience its impacts the most.

Another unique aspect of the plan is analysis of ecosystem impacts from sea level rise. Adaptation strategies to address this include a ground-breaking concept of creating embayments. Embayments are recesses in a coast line that create a bay to dissipate wave energy and create new intertidal ecological habitat to help counteract "coastal squeeze" (see figure 2).

Rising Seas has been recognized with a Sustainable Communities Award from FCM, an Environment Award from the Canadian Association of Municipal Administrators and an Honourable Mention in the Provincial Climate and Energy Action Awards.

Rising Seas charts a course for interventions, capital projects and considerations for new development along Campbell River's coastline. Action items will be integrated into the City's 2022-2031 Financial Plan and reviewed annually by the City's Environmental Advisory Committee to help solidify implementation efforts.

To check out the Rising Seas Plan **visit: www.campbellriver.ca** ■

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