

CLIMATE CHANGE ADAPTATION COST-BENEFIT ANALYSIS TOOL

1.0 BACKGROUND & PURPOSE

ACCESSIBLE ANALYSIS | SUPPORT DECISIONS | EVALUATE ADAPTATIONS

Municipalities in Newfoundland and Labrador need a simple way to explore coastal flood adaptation options. The **NLACBA tool** lets users define measures, estimate costs, and compare benefits before investing in detailed studies.

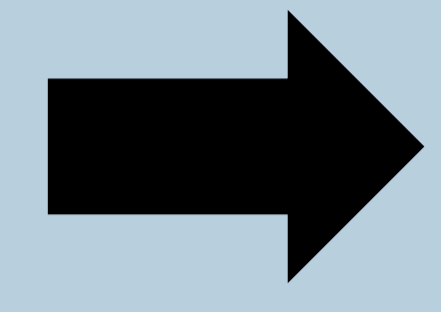


2.0 CBA TOOL OVERVIEW

- Spreadsheet-based tool for evaluating flood adaptation measures
- Developed for small municipalities in Newfoundland and Labrador
- Designed for high-level economic comparison of flood adaptation strategies

INPUTS

- ✓ Flood scenarios
- ✓ Infrastructure type
- ✓ Damage assumptions
- ✓ Economic parameters



OUTPUTS

- ✓ Estimated tool flood damages by return period
- ✓ Statistics on impacted infrastructure
- ✓ Economic metrics comparing adaptation options against the baseline "No Action" scenario

All analysis results and figures are presented in **xlsx** and **.docx** format



Learn more about the **NLACBA Tool**



<https://www.gov.nl.ca/eccc/adaptation-cost-benefit-analysis-tool/>

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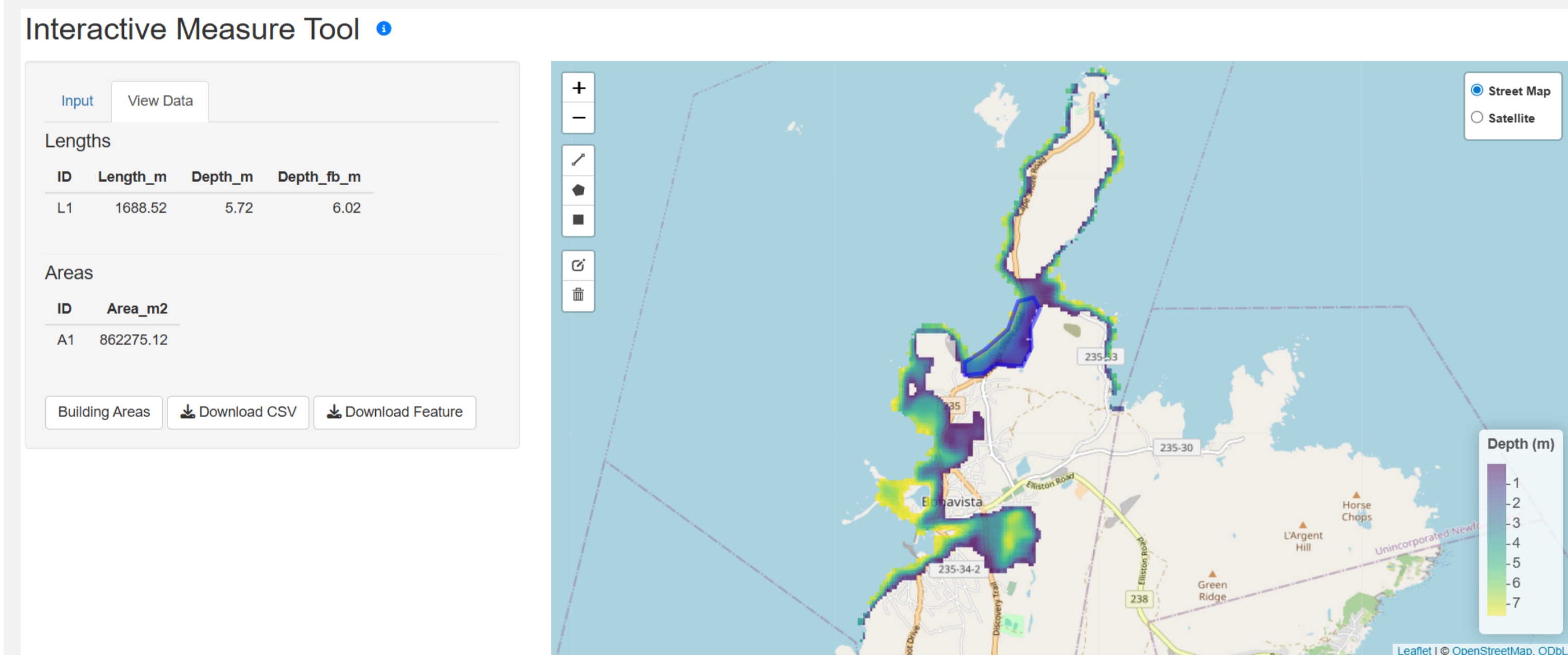
3.0 CBA TOOL FUNCTIONS

The **CBA Tool Functions** supported by the tool include:

- Measure Tool
- Raster Editor Tool
- Spatial Data Viewer
- Create Study Boundary Tool
- Cost Estimator

3.1 Measure Tool

Allows users to directly measure the lengths and/or areas of potential protection measures and estimate the height that would be required of the structure.



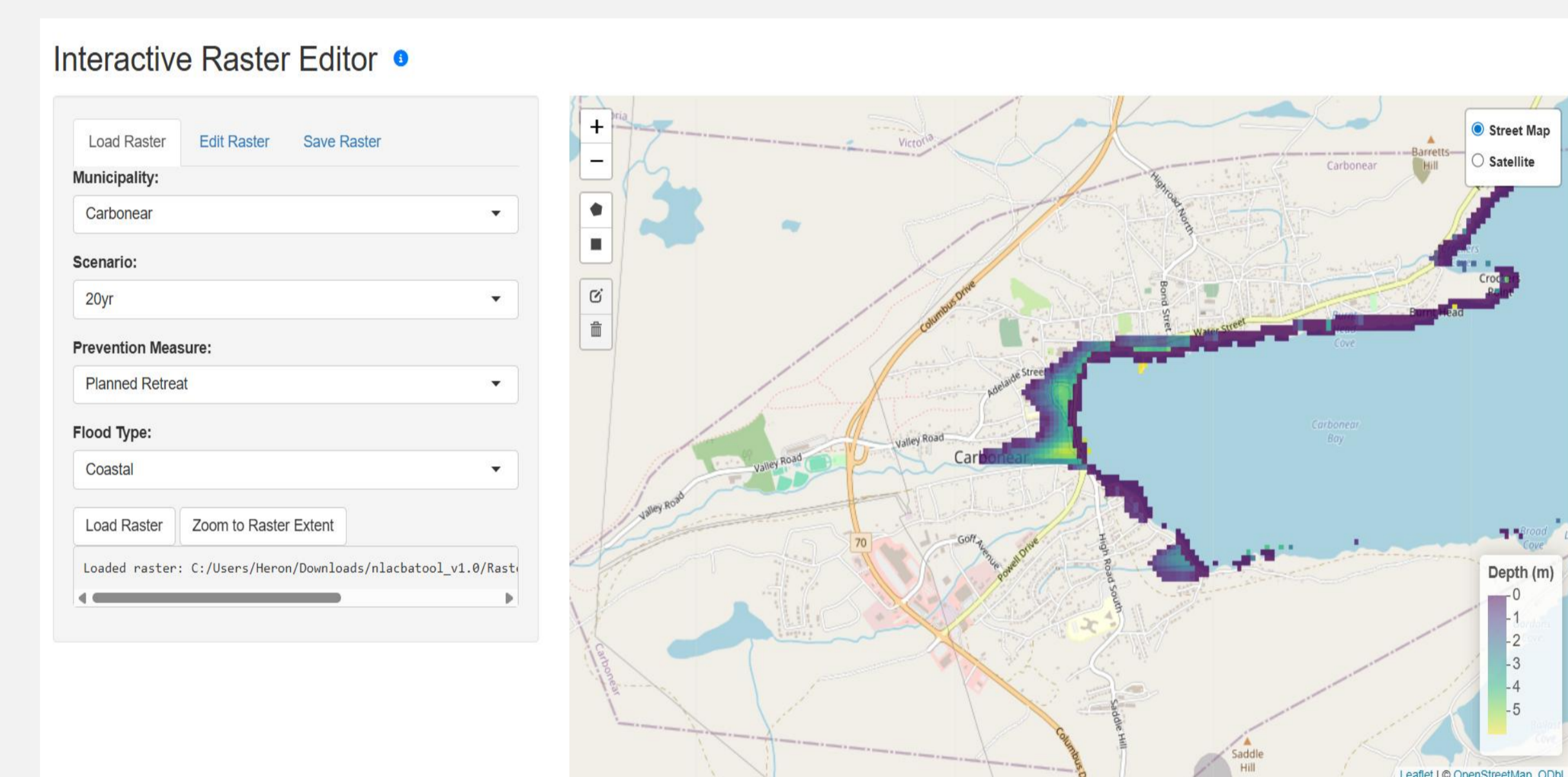
The measurements can be inputted into the **Cost Estimator** sheet in the **CBATool_Inputs.xlsx** to estimate the cost of the protection measure based on the structure selection and measurements.

3.2 Raster Editor Tool

Allows users adjust baseline flood rasters to reflect proposed adaptation measures.

Users can:

- Edit flood depths to represent measures (e.g., seawalls, berms, planned retreat, etc.)
- Apply depth changes within selected areas
- Set uniform depths in buffer zones
- Save each edited raster as a scenario for analysis



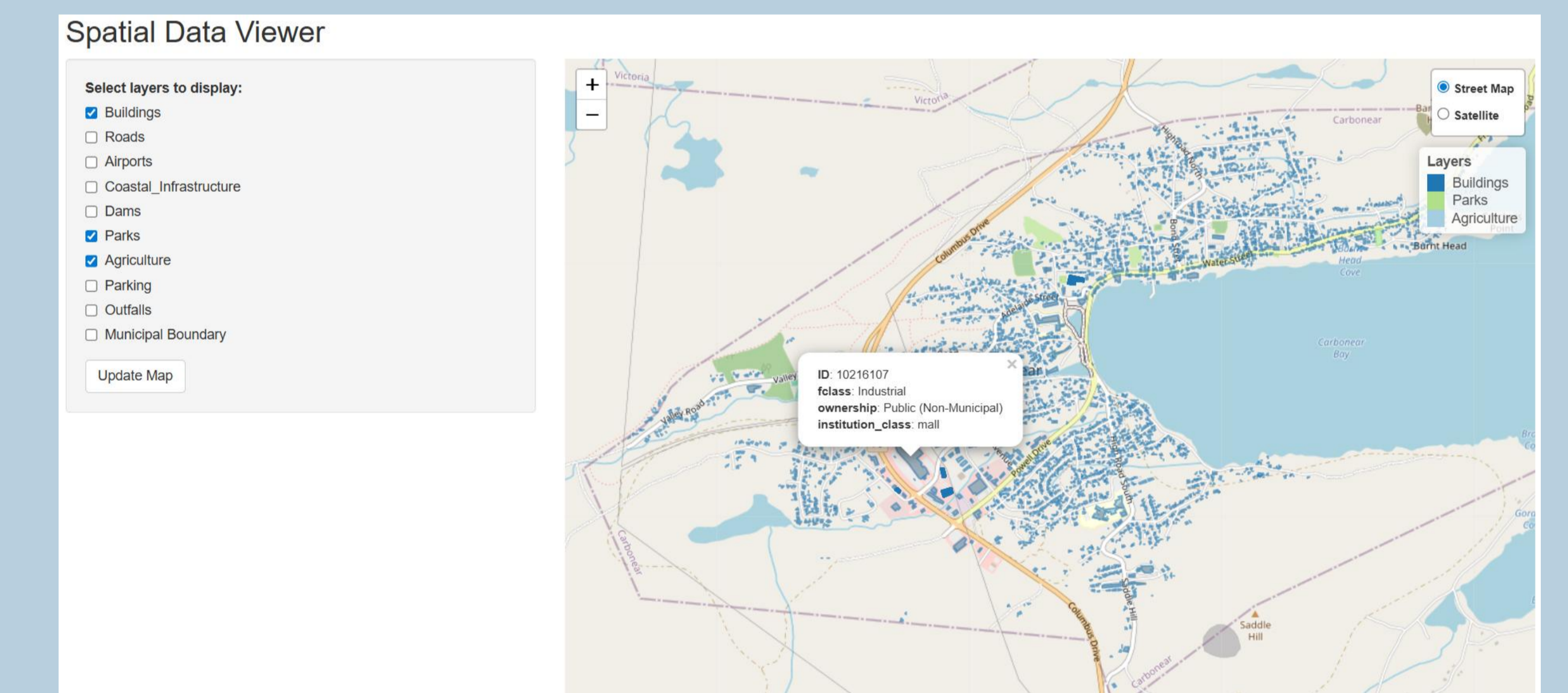
When the Raster Editor tool is selected and the CBATool.exe is run, the interactive interface loads in the default browser. Users select the **Municipality**, **Scenario** (20 year or 100 year), **Prevention Measure**, and **Flood Type** to load the baseline raster and make edits.

4.0 INTEGRATED TOOL PACKAGE

The tool was delivered as a **fully integrated ZIP package** with all components required for operation. This includes:

- DEMs
- Flood layers
- Vector data including Municipal boundaries
- R scripts and binaries
- Configuration files
- Processing tools

Additionally, the package includes **province-wide building and road layers**, and **coastal flood rasters** generated by Heron for each municipality.



The **Spatial Data Viewer** can be used to view the spatial data including buildings, parks and roads for a given municipality.

5.0 ECONOMIC ANALYSIS AND MAPPING

The **NLACBA_Report.docx** output report helps municipal decision-makers:

- Understand costs and benefits of different adaptation measures
- Prioritize investments that maximize benefits for the community

5.1 Components of the Report

- Municipality Description
- Infrastructure at Risk/Impact Inventory
- Summary of Adaptation Strategies and Associated Costs
- Summary of Cost Outputs
- Multiple figures displaying flood risks including critical services
- Summary of input parameters for reproducibility

5.2 Economic Integration

The damages from flood events and their probabilities are used to calculate the **Annual Average Damage (AAD)**, which is then projected over the design period to compute the **Net Present Value (NPV)**.

The summary metrics for each preventative measure are presented in the report in a table like this one →

The table provides a clear way to see if the designed measure has economic viability at an early stage.

Table 2: Economic Metrics (real \$CAD)

Preventative Measure	Annual Average Damage (millions)	Benefit-Cost Ratio	Net Present Value (millions)	Payback Period (years)
No Action*	\$25.45	NA	-311.30	NA
Planned Retreat	\$23.22	0.87	-315.38	14.06
Protection	\$3.78	7.42	-81.93	1.49

Preventative Measures shown in **red** are not economically beneficial and options in **green** are economically beneficial based on the Benefit-Cost Ratio.