

Niagara Region Climate Modeling Project

Climate Modeling Approach

The following two pages summarize a step-by-step approach that the team will use to conduct climate modeling work across Niagara Region. Figure 1 provides a summary of these steps. All work will be undertaken by OCC staff, with regular input provided by Niagara Region staff and stakeholders.

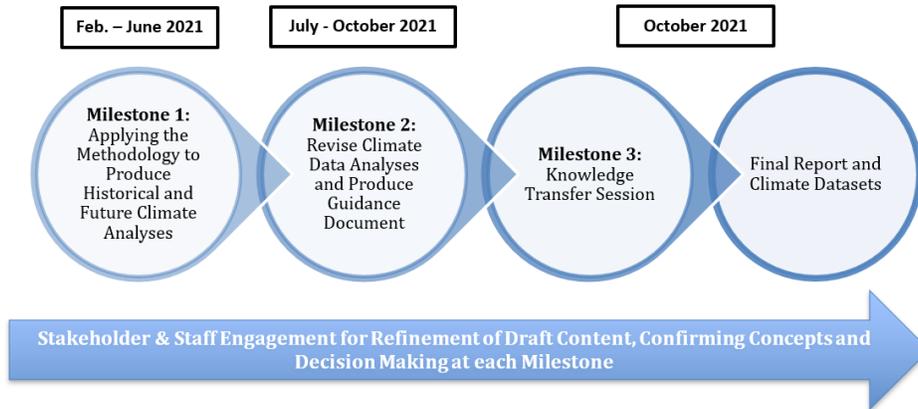


Figure 1: Overview of Climate Modeling Approach

Milestone 1: Apply the Selected Methodology to Produce Historical and Future Climate Analyses in Niagara (Feb. 15 – June 30)

1. Develop the methodology and proposed list of climate parameters to be used as part of the Niagara Region Climate Modeling Project
2. Present the proposed methodology and list of climate parameters to Niagara Region staff and stakeholders to confirm and validate the climate modeling approach at the April 9th Niagara Region Staff and Stakeholder Meeting
3. Obtain historical climate data from select EC Climate station across Niagara Region (either raw data or via CANGRD product)
4. Request future climate data time series from the NA-CORDEX portal of raw climate model outputs
 - a. Daily data; high emissions (RCP8.5) and moderate emissions scenario (RCP4.5)
 - b. Request for each grid cell relevant across the Region
5. Quality control data and ensure no gaps exist in what is received
6. Adjust historical climate model data with local Niagara climate observations (i.e., ensure modeler's bias correction is appropriate and if not, adjust)



7. Conduct historical trend analysis:
 - a. Confirm baseline period (e.g., 1971-2000)
 - b. Summarize climate parameters on a seasonal, annual basis for observed records over time and spatially across the Region
8. Validate future climate model data with local climate observations (i.e., bias correction)
9. Conduct future trend analysis:
 - a. Confirm medium- and long-term planning horizons for use in analysis (e.g., defining the 2050s, and 2080s)
 - b. Write codes and scripts to adapt existing and produce new climate parameters for use in Niagara Region; run scripts and analyze outputs
 - c. Determine anomalies in each climate parameters (comparing baseline with future periods)
 - d. Summarize climate parameters on a seasonal, annual basis in the medium- and long-term planning horizons (ensemble averages and percentiles to capture extremes)
10. Interpreting historical and future climate data analyses, produce the following for each climate parameter:
 - a. Spatial Maps across the Region;
 - b. Summary tables for data (e.g., Region-wide, north, central and south Niagara);
 - c. Time series of climate data for access by Niagara and stakeholders (format and # of parameters to be confirmed)
 - d. Accompanying impact scenarios that describe explicitly (but qualitatively) the influences of the following on the future climate trends determined in the Region:
 - i. Lake Ontario
 - ii. Lake Erie
 - iii. Niagara Escarpment
11. Conduct a *high-level* comparison between OCC study results and other municipal study results, including providing some potential reasoning for diverging results (where they exist) (e.g., Peel, York, Durham, etc.)
12. Research the impacts of the climate projections on key sectors within Niagara Region (e.g., natural systems, agriculture, wine production, etc.)
13. Present and circulate draft climate data analysis results to Niagara and its stakeholders

Milestone 2: Revise Climate Data Analyses and Produce Guidance Document (July 1 – Oct. 30)

1. Based on comments from Niagara and stakeholders, revise analyses, produce guidance document and complete additional project wrap-up.

Milestone 3: Knowledge Transfer Session (Oct. 1 – Oct. 30)

1. Provide a knowledge transfer session for Niagara Region staff and stakeholders to demonstrate the results of the climate projections, how the data can be used and how it can be applied in various initiatives.

