

Caldwell First Nation

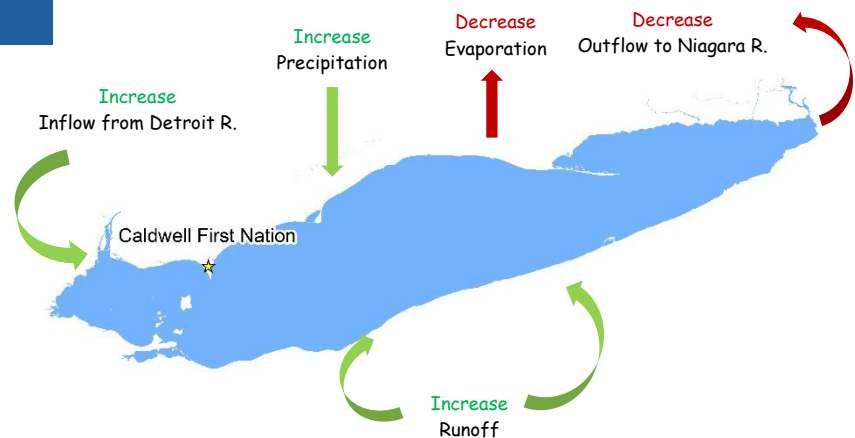
Flood Risk Mapping

Flooding is a natural occurrence with an ability to shape the landscape.

The traditional lands of Caldwell First Nation include Point Pelee, a flat, low lying peninsula extending into Lake Erie. Much of this area is located below the long-term average water level for Lake Erie. Because of this, historically, Point Pelee was comprised of a large wetland complex, frequently inundated with water from the lake. Through much of 1800s, efforts were made to convert much of the Point Pelee land area to agricultural lands, through the development of a network of drainage canals and protective berms.

Flooding can be a result of a wide range of processes. However, as a result of a changing global climate, Canadian communities are facing greater uncertainty surrounding flooding. Caldwell First Nation's location on Point Pelee, exposes its lands to increased flood risk given its low level relative to nearby Lake Erie. Lands bordering Lake Erie as well as Hillman Marsh, have historically experienced flooding, as a result of high waves breaching protective berms, and the spring melt overwhelming the existing drainage system.

Factors Driving Lake Level



Climate change presents an increased level of uncertainty for Caldwell First Nation and the risk flooding.

This uncertainty is a result of the complexity which drives the two primary sources of flooding in Caldwell:

- **Overland Flooding** from Lake Erie, as a result of high water
- **Flash Flooding** due to severe or prolonged precipitation events.

Climate change increases the uncertainty of flooding in Caldwell First Nation by:



- **Increasing Air Temperature**, which will increase the amount of evaporation, lowering the level of Lake Erie
- **Increasing Precipitation**, especially its localized intensity, may increase water levels and flood events.

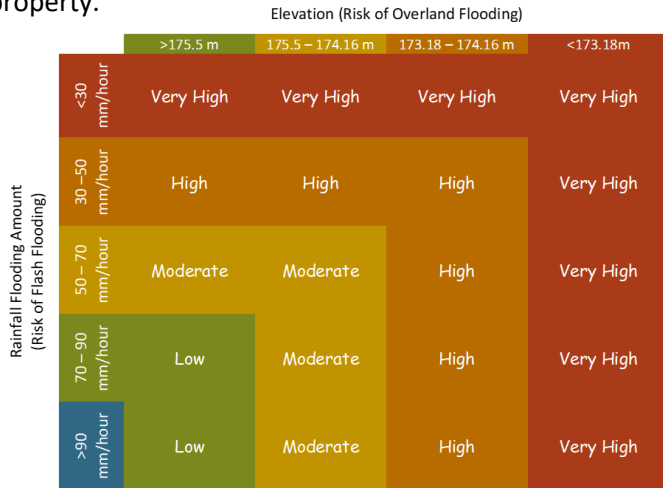
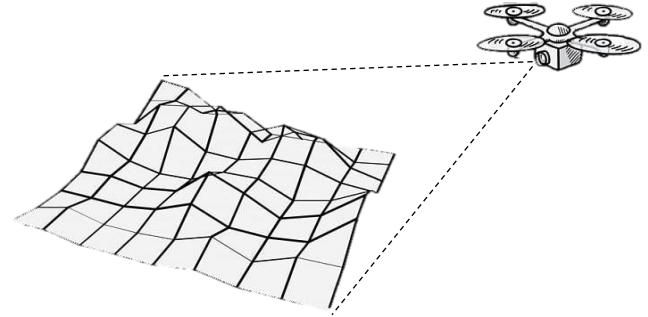
It is the goal of this project to understand the risk of flooding associated with the properties of Caldwell First Nation

While Point Pelee and Pelee Island have been the ancestral territory for the community of Caldwell First Nation for many generations, it has only been in recent years as a result of its settlement, that Caldwell First Nation has been able to acquire lands to be designated as a reserve. While the acquired lands continue to expand, much of it remains undeveloped. As a result, Caldwell First Nation is uniquely positioned in its ability to incorporate flood risk management into their plans for future development.

This project provides Caldwell First Nation with information on areas of high risk, allowing it protect its investments for future generations.

Elevation from each of the Caldwell First Nation properties was mapped using a high-resolution drone aircraft

In September 2019, a team from RiverLabs used remotely piloted aircraft (drones), to survey each of the Caldwell First Nations properties. Surface elevation with <1 cm resolution and vertical accuracy was collected, producing maps for each property.



Properties at low elevations, or that have large depressions are at greater risk

Using these maps and Geographical Information Systems (GIS) software, properties were assessed for the risk of flooding based on elevation (risk of overland flooding) and presence of puddling areas (risk of flash flooding). An overall assessment of flood was performed based on the interaction between both of these factors.

Assessment of Flood Risk

Property	Overland Risk	Flash Risk	Overall Risk
411 Robinson Road	Moderate	Very Low	Moderate
609 County Road 33	Moderate	Very Low	Moderate
592 County Road 33	Moderate	Very Low	Moderate
1611 Mersea Road E	Very High	Very Low	Very High
1615 Mersea Road E	Very High	Very Low	Very High
1833 Mersea Road E	Very High	Very Low	Very High
1905 Mersea Road D	Very High	Very Low	Very High
13 Mersea Road 19	Very High	Very Low	Very High
2018 Mersea Road B	Very High	Very Low	Very High
2038 Mersea Road B	Very High	Very Low	Very High
2009 Mersea Road B	High	Very Low	High
2017 Mersea Road B	High	Very Low	High
2020 Mersea Road 1	High	Very Low	High
1900 Mersea Road 1	High	Very Low	High
1837 Mersea Road 1	Moderate	Very Low	Moderate
215 Mersea Road 19	Low	Very Low	Low
216 Mersea Road 19	Low	Very Low	Low
217 Mersea Road 19	Low	Very Low	Low
220 Mersea Road 19	Low	Very Low	Low
230 Mersea Road 19	Low	Very Low	Low
2130 Mersea Road 2	Moderate	Low	Moderate
920 Bevel Line	Moderate	Very Low	Moderate
822 County Road 34	Low	Very Low	Low

Summary of Findings

The greatest challenge with flood management in the Pelee region, is its reliance on protective berms and active drainage network. Without this infrastructure many of the Caldwell First Nation properties would be at significant risk, as they are located below the long-term average level for Lake Erie.

Properties located in the southeast section of Point Pelee and those bordering the southern section of the Hillman Marsh are at greatest risk. Other properties, such as the Happy Snapper, are at risk of localized flooding from high Lake Erie levels, with portions of the property along the shoreline at greatest risk. Other properties such as 920 Bevel Line, 822 County Rd 34 and properties bordering the north side of Hillman Marsh, are at lower risk, due to their higher elevation.

Key Recommendations

- Continue to work with ERCA and other local authorities to ensure flood infrastructure is maintained for the future
- Incorporate passive water management into plans for development in low-lying areas (e.g., regrading, adding fill, low-impact development).
- Incorporate elevation mapping and local knowledge in development planning