Floodplain Mapping Update Study

Frequently Asked Questions (FAQs)

Q. What is the purpose of this work and why is it being done now?

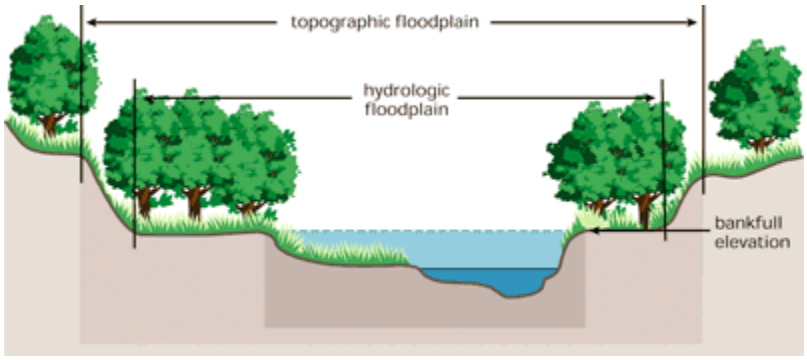
A. The Region of Durham has partnered with the Ganaraska Region Conservation Authority (GRCA) to update floodplain mapping for Lovekin, Bouchette Point and Port Granby Creeks, as well as the northwestern portion of the Ganaraska River watershed.

Updating the floodplain mapping is important as the current mapping is 46 years old. Floodplain mapping is critical to help identify areas that may be at risk of flooding during severe storms, to assist the community with emergency preparedness, and is also an important municipal land use planning tool.

Please click on this link for additional information on Floodplain Mapping.

Q. What is a floodplain?

A. A floodplain is an area of land near water bodies (rivers, lakes, etc.) that is often flooded when the water body is too full. Examples of floodplains include low lying lands that are flooded/inundated with water when a river spills over its banks or when lake levels rise due to storm surge, or significant precipitation. Floodplains are natural features that allow flow to spread across the landscape, limiting flooding and erosion potential.



Q. What is floodplain mapping?

A. Floodplain mapping is used to identify areas that may be susceptible to riverine or coastal flooding during large storm events. Floodplain mapping relies on supporting analysis, including hydrologic and hydraulic modelling. Hydrologic modelling predicts how much runoff will be generated by a rainfall event. Flows generated by the hydrologic model are then input into the hydraulic model to predict the peak flood depth, elevation, and velocity of flood flows. The flood elevation is mapped using topographic data (the natural features of the land) to show the limits of the floodplain and other critical information.

There are many different types of information that may be shown with floodplain maps. The most common form of floodplain mapping in Ontario is a Flood Hazard Map, which shows the limit of the regulated flood hazard in conjunction with natural features of the land, and human-made structures such as roads. This type of map is required for land use planning purposes. More detailed maps are typically developed to support emergency response planning.

Q. What is the regulated flood hazard?

A. In GRCA's jurisdiction, the regulated flood hazard is defined in provincial legislation by the greatest flood extent associated with either the:

- 1:100 year flood plain, which is the anticipated limit of flooding that has a 1% chance of occurrence or exceedance in any given year, or
- the floodplain associated with the Regional Storm, Hurricane Hazel, which is a defined rainfall event (285 mm rainfall over 48 hours), that resulted in the death of more than 80 Ontarians and left thousands homeless in October 1954 (see https://hurricanehazel.ca/)

B. **Does flood risk extend beyond the regulated flood hazard?**

A. While flood hazard mapping identifies the extent of the regulated floodplain associated with riverine or coastal flooding, it does not identify the full extent of flood risk. Flooding may be experienced outside of the defined riverine and coastal flood hazard for a variety of reasons, including occurrence of extreme rainfall events (which are greater than the regulatory standard), formation of significant ice or debris jams and large beaver dams, major channel adjustments, or due to other flooding mechanisms such as overland flooding caused by rainfall that exceeds the capacity of local drainage systems, sewer backup, seepage, etc.

Q. Will new floodplain mapping studies change regulated flood plain limits?

A. Technological advances, such as the use of LiDAR (Light Detection and Ranging) allow capture of highly detailed topographic data, which better describes the natural land features. LiDAR is a surveying method that measures distance to a target by illuminating the target with pulsed laser light and measuring the reflected pulses with a sensor. The combination of technological advances and more sophisticated software can better predict the path and nature of a flood. This will result in a more accurate flood hazard limit for regulatory purposes.

Additional information regarding LiDAR data can be found here.

Q. What data is used to update flood plain mapping?

A. The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) has acquired LiDAR data within Clarington (between 2016 and 2018) which provides highly detailed and accurate surface elevations. LiDAR data will be used to create a digital elevation model (DEM) to update computer models required to support flood plain mapping. These include:

- hydrologic models (which determine overland and groundwater flows associated with a rainfall event); and
- hydraulic models (which determine flood elevations and velocities associated with a specified flow).

The extent of the flooding will then be mapped using the LiDAR data. Use of the LiDAR data in conjunction with modern software and analytic tools will provide a more accurate prediction and understanding of flood risk.

Field surveys of roads, driveways, culverts, bridges and creek channels will confirm the size of the features and will assist in determining hydraulic flow capacity of these elements.

Where available, stream flow gauges, precipitation gauges, and records from past flood events will be used to calibrate or 'ground truth' the models. Other key data that will be relied upon includes soils mapping, orthophotos, local official plans, and past engineering reports.

Q. Why is this surveying field work required?

A. The GRCA survey efforts are required for a number of reasons:

- Specific elevations and dimensions of road crests/profiles, bridges, culverts, weirs and channels are needed to accurately represent these features in the models. While LiDAR data is very helpful in providing elevations of the tops of these features, it does not provide information for structure dimensions.
- The survey work will allow GRCA to update information for any culverts and bridges that have been enlarged or replaced since the original 1977 study, thus reflecting this information on the updated mapping.
- Channel survey efforts are needed to confirm channel dimensions (width, depth, bottom elevations, etc.) to confirm flow capacities. The terrestrial LiDAR that was flown by OMAFRA does not penetrate below the water surface so this data must be surveyed on site.
- Survey efforts are needed for ground-truthing to ensure that the LiDAR data and DEM match at points surveyed in the field. This confirms that the data satisfies the accuracy requirements for the purpose of modelling and updating the flood plain mapping.

Q. What standard will be followed?

A. Analysis and mapping will be undertaken in a manner consistent with the Ontario Ministry of Natural Resources and Forestry's (MNRF) Technical Guide – River and Stream Systems: Flooding Hazard Limit (2002). This guideline sets out provincial expectations on analysis approaches applied in mapping the regulated flood hazard. The MNRF guideline is used by all Conservation Authorities undertaking flood hazard mapping. Other guidelines and standard industry approaches will also be considered, including Natural Resources Canada and Public Safety Canada's Federal Floodplain Mapping Guidelines Series, and Environmental Water Resources Group Ltd. et. al.'s Technical Guidelines for Flood Hazard Mapping (2017), which was developed in partnership with six Greater Golden Horseshoe Conservation Authorities.