



## Dams and flood management

December 2014

### The GRCA reservoir network

The GRCA operates seven dams and reservoirs that are vital to protecting the health and safety of watershed communities.

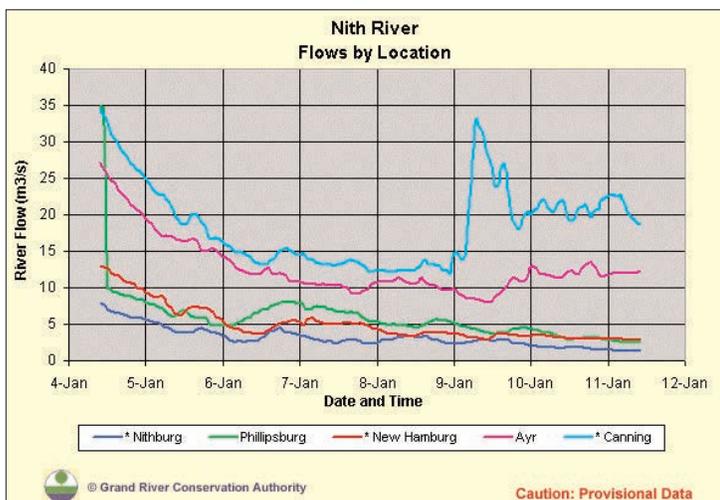
The dams were built between 1942 and 1976. In today's dollars it would cost \$1 billion or more to build them.

The reservoirs are managed to provide maximum flood storage when it is needed most – in the spring to handle the spring melt, and in the fall to deal with flooding caused by the remnants of tropical hurricanes. Water levels in the reservoirs are at their highest around June 1 and their lowest over the winter.

During high flow periods, water is held in the reservoirs, reducing the amount that goes downstream, lowering flood peaks.

The reservoirs can reduce peaks significantly. For example, during a major flood in December 2008 peaks were reduced between 35 and 75 per cent. Without the reservoirs, flood levels would have matched, or exceeded, the levels in May 1974, one of the biggest floods on record.

The water stored during the spring is released during the summer and fall to maintain minimum flows in the river system. This is critical to the operation of municipal drinking water systems that serve more than 500,000 residents in Waterloo Region, Brantford and Six Nations Territory, all



Data from river flow gauges and weather stations is posted on the GRCA website.



The reservoirs can cut flood peaks dramatically. This bridge in Cambridge would have been under water during December 2008 if the reservoirs had not been in place.

of which take some or all of their water from the Grand.

The release of water is also important to the operation of sewage treatment plants which require a minimum level of water in the waterway receiving the treated effluent in order to meet provincial environmental standards.

(The GRCA also owns more than 20 other smaller dams that are legacies of the early days of settlement. These are not part of the flood management system.)

### Dikes

Dike systems have been constructed in Kitchener (Bridgeport), Cambridge (Galt) and Brantford to protect those communities from major floods of the magnitude of the one caused by Hurricane Hazel in 1954. These dikes are owned and maintained by the GRCA.

Smaller dike systems or berms which provide a lower level of protection have been built in communities such as Drayton (Mapleton Township), Paris (County of Brant), New Hamburg (Wilmot Township) and Caledonia (Haldimand County). The GRCA does not own or maintain them.

### Weather monitoring and flood forecasting

The GRCA maintains an elaborate flood forecasting and warning system.

Weather reports from a variety of public and private services are monitored regularly to detect conditions that could cause flooding in the Grand River watershed.

The GRCA also collects a wealth of data about weather

and river conditions:

- 25 rainfall stations, four to measure snowfall and 25 temperature stations
- 69 real-time flow gauges measure changes in water levels
- Weather radar information is used to illustrate variation of rainfall across the watershed
- Snow surveys are conducted at 12 locations, twice a month in winter, to assess water content of the snow-pack
- Ice cover and the location of ice jams are monitored
- River Watches are conducted by GRCA staff as required
- Lake Erie is monitored to detect flooding caused by high lake levels.

The data from the rain and flow gauges is automatically relayed to the GRCA head office around the clock, every day of the year. It is also uploaded to the GRCA website for use by emergency officials and the public.

When it appears flooding is possible, weather data and the information collected by the GRCA can be entered into a computer model that can be used to forecast the timing, location and depth of floodwaters. The information is used to manage reservoir operations to control water levels downstream and to update forecasts and warnings.

## Flood warnings

When flooding is possible or about to occur, the GRCA issues flood messages to flood co-ordinators, emergency services and the public.

There are three types of messages:

● **Watershed Conditions Statement:** The GRCA is tracking weather conditions to assess the potential for flooding. Rivers, streams and ponds may be unsafe for recreational and other activity.

● **Flood Watch:** Flooding is possible. Municipalities and individuals should prepare.

● **Flood Warning:** Flooding is occurring or is about to occur. Municipalities and individuals should take action to deal with flood conditions. This may include road closures and evacuations. The warning may include forecasts of how high the water will rise and the time of the peak.

The GRCA works with police services throughout the watershed to ensure that flood warnings get from the GRCA to local flood co-ordinators and emergency officials.

In addition, the GRCA issues flood messages to the general public through media releases, the GRCA website, an e-mail subscription service and Twitter.

## Flood response

The primary responsibility for flood response rests with municipal governments.

Every municipality has named a flood co-ordinator who is responsible for leading the local response to flooding.

The GRCA works closely with flood co-ordinators to ensure they have the information they need in order to lead the flood response in their communities.

