

Major Floods

Abstract

Floods are part of the natural hydrological cycle (the seasonal fluctuation of water levels) and occur along rivers and streams somewhere in Canada every year. Flooding is a common natural hazard that has caused 260 known disasters since 1900, resulting in the loss of 235 lives and 8.7 billion dollars in damage.

Most flooding in Canada is caused by weather-related mechanisms, specifically runoff from snowmelt, storm rainfall, rainfall on snow and the obstruction of flow in rivers and streams by ice jams. Floods can also be caused by the formation and failure of natural dams, but this occurs far less frequently than weather-related flooding and is usually more localized. Floods from natural dams result from the blockage of drainage by landslides, glaciers and moraines, and, at a much smaller-scale, by snow and beaver dams.

Flooding causes loss of life and damages property. Water-damaged buildings can cause significant health problems to building occupants for years after the flood because of fungi growing within the walls and building contents. The damaging effects of flooding can be reduced by identifying and carefully managing lands that are prone to flooding. Many urban areas located on such lands are protected by flood-control structures, such as dykes.

Definitions of underlined terms

Dyke: Long wall or embankment built to prevent flooding.

Moraine: Ridge made of the accumulations of till and constructed by direct action of the glacier.

Map Sources

Major Floods, 1902 - 2005

Flood disaster events are classed by the extent of their effects. Local Effect disasters have affected a relatively small area. The location represents the approximate center of the affected area. Regional Effect disasters have affected large areas. The location refers to an approximate center, but not the extent, of the effects. Canadian Disaster Database (2005), Public Safety and Emergency Preparedness Canada.

References

Andrews, Jeanne (ed.). 1993. Flooding: Canada Water Book. Cat. No. En37-96/1993E. Ottawa: Ecosystem Sciences and Evaluation Directorate, Economics and Conservation Branch, Environment Canada.

http://www.ec.gc.ca/water/en/manage/floodgen/e_floods.htm

Ashmore, P. and M. Church. 2001. The Impact of Climate Change on Rivers and River Processes in Canada. Geological Survey of Canada Bulletin 555. Ottawa: Natural Resources Canada.

Brooks, G.R., Evans, S.G. and Clague, J.J. 2001. A Synthesis of Natural Geological Hazards in Canada. (G.R. Brooks, editor): Geological Survey of Canada Bulletin 548.

Clague, J.J. and Evans, S.G. 1994. Formation and Failure of Natural Dams in the Canadian Cordillera. Geological Survey of Canada Bulletin 464.

Related Web sites (1999 – 2009)

Federal Government

Environment Canada. Flooding Events in Canada. Quebec

<http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=C0122DA3-1>

The following link provides summaries of floods in southern Quebec in 1974, Montréal 1987, and the problems with ice jamming along the St. Lawrence River.

Environment Canada. Freshwater Website. Flood Damage Reduction Program

http://www.ec.gc.ca/water/en/manage/flood/e_agree.htm

The Flood Damage Reduction Program, undertaken jointly with the provinces, consists of identifying, mapping and designating flood risk areas, and then applying policies to discourage future flood prone development in those areas.

Environment Canada. Freshwater Website. The Management of Water. Floods

<http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=DF9EE875-1>

A substantial amount of the information in the Floods section of the Freshwater Web site is taken from the following publication: Canada Water Book on Flooding. 1993. Jeanne Andrews (ed.). Environment Canada. Ottawa, Ontario.

Government of Canada. Public Safety

<http://www.safecanada.ca/>

The Public Safety Portal is your one-window entry to all public safety information from the Government of Canada.

Library and Archives Canada. Saguenay Floods 1996: SOS ! Canadian Disasters

<http://www.collectionscanada.gc.ca/sos/002028-1300-e.html>

Summaries of the 1996 Saguenay floods and images of the flood damage, including breached dams, can be found at this website.

Natural Resources Canada. Fraser River 1948 : Geoscape Vancouver

http://geoscape.nrcan.gc.ca/vancouver/flood_e.php

The last great flood of the Fraser River in the lower mainland of British Columbia occurred in 1948 and resulted in the evacuation of 9000 people. A very brief summary of this flood with several pictures can be found at this link.

Natural Resources Canada. Geological Survey of Canada. Flooding in the Saguenay Area, 1996

http://gsc.nrcan.gc.ca/floods/saguenay1996/index_e.php

Geomorphic effects and impacts from July 1996 severe flooding in the Saguenay area, Quebec

Natural Resources Canada. Geological Survey of Canada. Red River Flood 1997 : Geoscientific insights into the Red River and its flood problem in Manitoba

http://gsc.nrcan.gc.ca/floods/redriver/index_e.php

The Red River flood of 1997 was the largest Red River flood since 1852 and the third largest since the great flood of 1826. The greatest impact of the flooding in Manitoba was to small communities and isolated farms and residences located between Winnipeg and the Canada-USA border. Severe flooding in Winnipeg was prevented by the operations of the Red River Floodway, constructed in the 1960s to prevent the recurrence of a disaster similar to that caused by the 1950 flood. This links to geoscientific work undertaken in response to the flood disaster by Natural Resources Canada.

Natural Resources Canada. Geological Survey of Canada. Saguenay Floods 1996: Geomorphic effects and impacts from July 1996 severe flooding in the Saguenay area, Quebec

http://gsc.nrcan.gc.ca/floods/saguenay1996/index_e.php

The Saguenay floods involved the flooding of many rivers in southern Quebec in July 1996, but the worst flooding occurred in the general area of Chicoutimi-Lake St. Jean. This disaster is notable because of the breaching of a number of small dams. A post-disaster inquiry led to provincial legislation that improved the management and safety of small dams in Quebec.

Public Safety Canada. Is your family prepared?

<http://www.getprepared.gc.ca/index-eng.aspx>

Public Security and Emergency Preparedness Canada. Natural Disasters

http://www.safecanada.ca/link_e.asp?category=4&topic=181

On the Public Security and Emergency Preparedness Canada website, this site contains a comprehensive list of Canadian links for natural hazard information including floods. Many of the links are to provincial websites containing flood emergency preparedness and response information.

Provincial/Territorial Government

Manitoba Floodway Authority

<http://www.floodwayauthority.mb.ca/>



This link is the site of the Manitoba Floodway Authority which is tasked with managing the construction of the Red River Floodway expansion project.

Other

Hurricane Hazel 1954

<http://www.hurricanehazel.ca/>

The remnants of Hurricane Hazel struck southern Ontario in October, 1954, causing a major flood disaster that killed 81 people. This link provides an overview of the disaster as well as images from the flood. Also included is information on the post-disaster efforts to improve flood control and flood management along rivers in Ontario.

Institute for Catastrophic Loss Reduction

<http://www.iclr.org/>

Canada's property and casualty insurers founded the Institute in 1998. ICLR is a coordinated effort to reduce disaster losses involving member insurance companies, The University of Western Ontario and other partners.

Red River Flood 1997

http://en.wikipedia.org/wiki/Red_River_Flood_of_1997

This link leads to material that provides an overview of the 1997 Red River flood in both Canada and the USA.

United States Geological Survey (USGS). North Dakota Water Science Center. Red River Flood 1950

<http://nd.water.usgs.gov/photos/1950RedFlood/index.html>

The Red River flood of 1950 was a major Canadian flood disaster that resulted in 107 000 people being evacuated from Winnipeg (one-third of the city) and \$1.1 billion in damage costs (1999 dollars). This disaster led to the construction of the Red River Floodway in the 1960s which is Canada's best known and most successful engineered flood control structure. Since it became operational in 1968, Floodway operations have prevented damage costs in Winnipeg that far exceed the cost of Floodway construction. The following link is to a U.S. Geological Survey website that provides an overview of the 1950 flood in both Canada and the USA.

