An Overview of 2009 Spring Flooding in Manitoba
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Many areas of southern Manitoba experienced serious flooding in the spring of 2009 due to high river flows, major ice jams and ice-blocked drainage systems. This overview describes the size and extent of this flooding, its management and damage reduction and improvements that are recommended in light of the lessons learned.

Flood Size and Extent

The 2009 spring flood crest on the Red River was the second highest recorded since 1852 at most points in Manitoba (see chart below). Record high levels occurred where Netley Creek meets the Red River due to a major ice jam.
The Red River crest of 6.85 metres (22.5 feet) at James Avenue in Winnipeg was only 0.6 m (two ft) lower than in 1997, and was the second highest since floodway operations began in 1969. Without the major flood control works constructed since the Great Flood of 1950 (the Red River Floodway, Portage Diversion, and Shellmouth Dam), the 2009 flood crest in Winnipeg would have been 9.9 m (32.5 ft), 0.67 m (2.2 ft) higher than the 1950 crest.

Due to the extended duration of the 2009 flood, the total volume for the Red River at Selkirk, without flood control works, would have been the highest on record since 1852, even greater than in 1997.

The 2009 flood inundated 1,000 square kilometres (386 square miles) of agricultural land south of Winnipeg, compared to the 1,840 square kilometres (710.3 square miles) affected in 1997.

The high run-off and peak flows resulted in large part from record high soil moisture levels at freeze-up in 2008 and above average snowpack in the US portion of the Red River basin. Significant ground frost due to a cold winter also increased the run-off volume. River ice was strong and persistent due to a cold winter and a two-week cold spell in late March and early April. These unusual ice conditions raised river levels and increased ice jam risk and severity.

The Pembina River flood of 2009 was the greatest on record from Rock Lake to Windygates. The Souris River flood at Melita was the highest since 1999. The Fisher River flood crest was the fifth highest since records began in 1969, causing substantial damage to homes at Peguis First Nation.

Many lakes in the Interlake region such as the Shoal Lakes rose to record high levels during the spring of 2009. Rock Lake on the Pembina River also rose to a record high level. Lake Winnipeg’s level rose to 218 m (715.3 ft) by mid-June, above its regulated maximum level of 217.9 m (715 ft.)
The spring of 2009 also produced serious overland flooding in the Red River Valley, the southern Interlake and eastern Manitoba due to ice-blocked culverts, ditches and smaller watercourses. Ice blockages were unprecedented in their extent due to an early thaw followed by an extended period of sub-zero temperatures that froze initial snow melt run-off in the drains.

**Flood Management and Damage Reduction**

Operation of flood control works reduced the Red River crest in Winnipeg by 3.05 m (10 ft), preventing in the order of $10 billion of flood damages.

Ring dikes protecting 13 communities in the Red River Valley were partially closed and two were fully closed, preventing flood damages of about $700 million. Flood protection works for 1,730 individual homes, businesses and farmyards in the valley saved another $100 million in potential damages. The investments since 1997 on improved flood protection in the valley outside of Winnipeg were recovered several times over.

Management of the second highest flood in over 150 years was complicated greatly by an unprecedented challenge to flood control: the persistence of ice on the Red River as it neared its peak.

Unusually strong river ice affected the use of the floodway and caused ice jams within Winnipeg’s city limits and north of the city. This year’s strong ice cover was unique and had not been encountered previously. Typically, ice begins to move freely at the floodway inlet control structure when flows reach 35,000 to 40,000 cubic feet per second. However, in the spring of 2009, ice did not begin to move until flows were approximately 70,000 cubic feet per second or greater. In order to prevent imminent flooding in Winnipeg, it was necessary to make the unprecedented decision to operate the floodway with solid ice cover in place both at the inlet control structure and within the City of Winnipeg.

Managing the unpredictable ice jams became a major focus of the flood fighting effort:

- Two Amphibexes and three ice cutters were used to minimize the effects of ice jams. These efforts were demonstrably successful in preventing serious flooding within and in the vicinity of Selkirk, where the river level was 0.55 m (1.8 ft) lower than the record 2007 level.
- The use of 25.1 kilometres (15.6 miles) of water-filled Tiger Dam tubes and 7.6 kilometres (4.7 miles) of Aquadams helped communities dealing with sudden floods caused by ice jams or iced-up drainage culverts.
- Long-reach backhoes were used to prevent ice jams within the floodway channel.

Several residences north of Winnipeg were flooded due to sudden ice jams. The ice jam in the Breezy Point and St. Peters Road area raised the Red River about nine feet overnight, at up to two feet an hour, to record levels. The ice jam near Lockport raised the river about three feet in eight hours, close to the 1997 level.
Despite these tremendous challenges, damage claims under the Disaster Financial Assistance program are expected to total only $40 million this year, compared to $240 million in 1997 (see chart below).

![Total Disaster Financial Assistance Program Payouts for Spring Floods](chart)

Although it is a recognized hardship for those directly impacted, disruption to citizens and businesses was also significantly lower in 2009 than in comparable floods due to operation of flood control works and the enhanced protection provided by community ring dikes that were added and improved since 1997. In all, 2,800 Manitobans were evacuated from their homes during the 2009 flood, compared to 28,000 in 1997 and 100,000 in 1950. The number of homes damaged during 2009 flooding was also significantly less than in previous floods (see charts below). As in previous floods, the inundation of major highways, like Provincial Trunk Highway (PTH) # 75 and Provincial Road 200 (PR 200) affected transportation routes for about one month. However, detours were established to minimize the disruption of trade and commercial activity.

![Number of People Evacuated During Spring Floods](chart)
Overland flooding damages were substantially mitigated by the unprecedented deployment of 37 provincial steamer crews working to thaw culverts to keep them open.

Altogether, 250 provincial government staff helped with flood fighting. They were led by an incident command team that included senior officials from Manitoba Water Stewardship, Manitoba Infrastructure and Transportation, Manitoba Emergency Measures Organization (EMO) and several other provincial departments. Local governments and volunteers also played a significant role. Since 1997, emergency plans have been upgraded and improvements in flood control infrastructure and flood forecasting have been made. The result in 2009 was an enhanced capacity for communicating and responding to local emergency operations managers.

**Recommended Improvements**

While demonstrating the value of flood control and flood fighting improvements made since 1997, the experience of the 2009 flood also pointed to areas where further improvements can be made. The following work is underway or planned:

- Design work and benefit-cost analysis will begin shortly on improvements to the floodway inlet to allow greater flows into the floodway channel. This is expected to reduce river levels in Winnipeg during floods of lesser magnitude than that of 1997 (such as those of 2009 and 2006), and reduce flooding south of the floodway inlet in major floods.

- Buy-out programs have been established for residents of the Breezy Point (St. Andrews) and St. Peters Road (St. Clements) areas, to eliminate the future risk to residents and emergency responders from the sudden rise of the Red River due to unpredictable ice jams.
A detailed proposal for a cost-shared flood mitigation program has been proposed to the federal government that identifies the following initial provincial priorities:

- flood protection for communities and homes on Peguis and Fisher River First Nations, the Red River north of Winnipeg and other at-risk areas;
- enhanced ice jam mitigation;
- improvements to the City of Winnipeg’s secondary dike system, and to Winnipeg’s sewer system to mitigate the risk of basement flooding due to sewer back-up; and
- raising provincial roads to improve community access during a flood event, such as PTH 3 in the vicinity of Melita, sections of PTH 75 north and south of Morris, and, subject to thorough hydraulic impact assessments, other sections of PTH 75 (including at Morris), and sections of PTH 23, PR 201, PR 200 and PR 205.

- Ice mitigation methodologies will be further reviewed in light of the 2009 experience. Acquisition of additional ice mitigation equipment, including additional ice cutters, is proposed and the need for an additional Amphibex will be assessed.
- Discussions have been initiated with Indian and Northern Affairs Canada and First Nation leadership aimed at improving the emergency management capacity in First Nations, including hazard assessment, risk analysis, planning, preparedness, response and recovery.
- Improvements in training, facilities and equipment will be advanced to enhance the capacity to assist municipalities and further improve the effectiveness of flood emergency management.
- The floodway operation rules will undergo a public review as required under the terms of the floodway expansion project’s Environment Act licence. The review will be completed by July 2010 and will provide an opportunity for public input on how the rules can be improved.
- Improvements are planned to the floodway operations computer model to account for the influence of ice cover based on the 2009 experience, and to real time monitoring of the Red River flows in the area of the floodway inlet control structure and on local streams (such as La Salle River, Omands Creek, Truro Creek), that will enable more precise floodway operations.
- Improvements in flood forecasting tools and procedures are also planned, including improvements to hydrometric and climatological data networks.
- The Designated Flood Area regulation (under The Water Resources Administration Act) will be extended to points from Winnipeg to beyond Breezy Point in order to regulate and appropriately limit development in areas that are below the highest recorded flood level plus one foot.