



CANADA: FLOOD MANAGEMENT IN THE RED RIVER BASIN, MANITOBA

1. **Location of the study:** Canada
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3. **Brief description of flood management practice**

Situated in the geographic centre of North America, the Red River originates in Minnesota (USA) and flows north. Its basin, which is remarkably flat, covers 116,500 km², of which nearly 103,600 km² are in the USA. The Red River floodplain has natural levees at points both on the main stem and on some tributaries. Because of the flat terrain, when the river overflows these levees the water can spread out over enormous distances without stopping or pooling, exacerbating flood conditions. During major floods, the entire valley becomes the floodplain.

In Manitoba, almost 90 percent of the residents of the basin live in urban centres. Metropolitan Winnipeg holds 670,000 people, and another 50,000 live along the Red River north and south of the city. The Red River valley is a highly productive agricultural area.

History shows that the basin floods regularly. A flood in 1826 was the largest one on record. The 1950 flood was classified as a great Canadian natural disaster. All towns in the upper valley had to evacuate, and over 10,000 homes were flooded in Winnipeg and 100,000 people evacuated. Finally, the 1997 flood was the highest recorded last century.

The 1950 flood prompted government to search for ways to mitigate the flood hazard. The first large-scale water control structure was a boulevard dyke system constructed in the greater Winnipeg area. Subsequent floods in 1956 served as impetus for the Provincial Government to take steps in development of a more long-term flood damage reduction plan for Manitoba. The comprehensive flood control system finally adopted and constructed from 1962-72 included an extensive plan to divert water around the city of Winnipeg (floodway, diversion, reservoir and dyke systems).

To maximize the efficiency of existing structural measures and reduce damages in vulnerable areas, a number of non-structural measures are also applied, namely: flood fighting, forecasting and warning, post-flood recovery, land use regulation and mapping, and flood-proofing.

Since 1953, the evolution of federal-provincial policy on flood damage reduction has been based on the three major acts of federal legislation related to the topic: the Canada Water Conservation Assistance Act (1953); the Canada Water Act (1970); and the Flood Damage Reduction Program (1975)². These have been responsible for influencing the nature of federal-provincial agreements and activities for flood damage reduction.

Key institutions with regard to their flood mandate are the Manitoba Conservation - Water Resources Branch, primarily responsible for flood planning and management. For floods in the Red River Basin the Department's Central Region carries out the delivery of flood related services. The Branch administers flood management activities such as forecasting, operation of flood control works, monitoring of flows/levels, and dissemination of information. The Manitoba Emergency Measures

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² Umbrella agreement still in effect



Organization (EMO) works with and coordinates federal government's involvement/contribution (including financial) during natural disasters such as floods.

4. Key issues

It is evident that without the current flood control system protecting the city of Winnipeg, losses from floods since the late 1960's would be much greater in magnitude.

Solving the flood damage reduction problems of the Red River basin, while concurrently protecting and enhancing the floodplain environment, requires full use of all the structural and non-structural methods available. No one approach can solve all the problems by itself. Whether the challenge is protection of an individual, a community, or the basin as a whole, all approaches to damage reduction should be considered and integrated into the solutions.

Nonstructural measures of all types – those related to emergency preparation, flood recovery, land use regulation, flood proofing, etc., all offer additional protection when carefully applied, and are vitally important at the individual and community level. They must therefore be given priority both by government and the public.

Of the non-structural flood damage reduction measures, land use regulation warrants particular attention. This requires enforcement by authorities and consistent application of land use regulation by municipal governments.

Because of the recent flood (1997), authorities are putting considerable effort into flood management activities. Cooperation and exchange of information between departments and different levels of government should lead to a rigorous analysis of which strategies warrant the input of financial and human resources in future.

5. Relevance to the concept of IFM

The study covers the following aspects of IFM to varying extents:

Water cycle as a whole

Aspect 6 - Effective use of floodwater by maximizing positive aspects of floods

Integration of land and water management

Aspect 2 - Land and water management

Aspect 3 - Laws and regulations for flood and water management

Aspect 12 - Multi-functional solutions (engineered wetlands, water quality treatment, flood alleviation)

Integrated river basin management approach to flood management

Best mix of strategies

Aspect 10 - Best mix of structural and non-structural measures

Participatory approach

Aspect 5 - Stakeholder involvement in decision-making

Aspect 7 - Community-based approach

Aspect 9 – Effective linkage between existing institutions



Integrated hazards impact mitigation

Aspect 1 - Cross-sectoral integration of disaster management strategies
Flood plain maps and zoning
Early warnings and forecasts
Aspect 11 - Free and open exchange of data

6. Comments

- (i) Potential strong points of the case study
 - Detailed description of the methods applied, both structural (floodway, diversion, reservoir and dyke systems) and non-structural (flood fighting, forecasting and warning, post-flood recovery, land use regulation and mapping, and proofing).
 - A series of laws and regulations for flood management
- (ii) Potential for practices mentioned to be transferred/applied to other regions with geophysical and socio-economic characteristics)

The long history of flood control work in the Red River basin provides a wealth of information and lessons that can be replicated to transfer experience to other countries with similar conditions