11.0 Sustaining Water Resources

11.1 INTRODUCTION

The Shoal Lake watershed can be considered rather unique in terms of its hydrologic and hydraulic character. Water-resource development decisions made in the late 1880s and the first quarter of the 20th century transformed the watershed from one that contributed relatively small but continuous annual outflows to Lake of the Woods to one that depends on the larger lake for maintaining water levels and sustaining existing uses.

There are no pending developments that would significantly alter the current hydrologic-hydraulic regime in the near future. Over the longer term, however, growth-related increases in Winnipeg's water needs, together with the possibility that climate change may reduce available flows in the Rainy River–Lake of the Woods–Winnipeg River system, suggest that some further alteration of Shoal Lake levels and water exchange at Ash Rapids may occur. Prior knowledge of the possible implications of these changes for both in-lake and extractive water uses will allow governments and stakeholders to formulate and implement adaptive measures as required.

11.2 GOAL, OBJECTIVE AND MANAGEMENT STRATEGIES

Goal

The allocation and use of the water resources of the Shoal Lake watershed, and the management of lake levels and stream flows, involve and respect the integrated consideration of the:

- *available supplies;*
- *needs of both extractive and in-stream/in-lake users and uses;*
- *maintenance of ecological integrity; and*
- *physical and jurisdictional connections to water resource management on the broader Rainy River–Lake of the Woods system.*

Objective

▶ *To allocate, use, conserve, manage and protect the water resources of the watershed in a manner that achieves a sustainable balance among available supply, ecological integrity and the needs of in-stream/in-lake and extractive uses.*

Management Strategies

- *Promote incorporation of wise use and conservation requirements and guidelines, as contained in the 1994 Canadian Council of Ministers of the Environment (CCME) "National Action Plan to Encourage Municipal Water Use Efficiency", in the management of all existing and new extractive water uses.*

- *Promote coordination in the management of water levels and flows within the watershed and, where practicable, within the broader Lake of the Woods drainage system, in a manner that recognizes both the bounds of ecological sustainability and the equitable accommodation of the needs, interests and entitlements of all watershed stakeholders.*

11.3 WATER CONSERVATION AND WATER USE EFFICIENCY

Over the last decade, Canadian governments, industries and the general public have become increasingly aware of the needs and benefits in the conservation and efficient use of water. Local shortages, the competition between extractive and in-stream uses, and escalating direct and indirect (e.g. wastewater treatment) costs in supplying and using water have provided incentives for change.

A variety of measures including some or all of the following: universal water-metering; more water-efficient fixtures; improved manufacturing processes; leakage correction programs; and conservation-oriented pricing strategies, are in use in many communities to reduce demand and waste. Changes in practices are fostered and assisted through government regulations, consumer education, subsidized retrofit programs, and the removal of capital infrastructure grants to municipalities for unwarranted water-system expansion.

Shoal Lake water usage is dominated by the Winnipeg water-supply diversion. While the City has reduced water demand and total water pumpage (20% reduction) since the late 1980s, long-term population and economic growth is likely to cause water demand and usage to increase proportionately in future years. On a shorter-term basis, dry years can significantly increase lawn watering and other seasonal outdoor water demands.

Recommendations

WS-1 *Existing water conservation and water-use efficiency actions of the City of Winnipeg should be assessed against the recommendations of the Canadian Council of Ministers of the Environment (CCME) "National Action Plan". Measures that would further reduce water demand and water use in all customer sectors should be identified and promoted.*

WS-2 *An assessment of water-use efficiency practices within the Falcon Lake and First Nations communities should be undertaken, and practicable measures to reduce usage and waste implemented.*

WS-3 *Given the lake-level and water-balance interdependence between Shoal Lake and Lake of the Woods, the Working Group also encourages promotion and implementation of water conservation and water-use efficiency measures among communities, businesses and landowners drawing waters from the Rainy River–Lake of the Woods system.*

11.4 WATER DIVERSIONS AND BULK REMOVALS

The Working Group heard concerns expressed regarding the impact of existing and increased water withdrawals on the water levels, water uses and the ecology of Shoal Lake. The TetrES water balance analysis indicated that the current Winnipeg water withdrawals, on average, exceed the natural water renewal capacity of Shoal Lake some 50% of the time. The consultant's analysis also concluded that Shoal Lake water levels are largely controlled by water-level operations of the Lake of the Woods Control Board and are not significantly impacted by the city's current water takings. The International Joint Commission's (IJC) 1914 authorization of the Winnipeg water diversion provides for this excess demand to be sustained by inflows from Lake of the Woods.

The 1913 Order in Council (OIC) of the Ontario legislature authorizes the City to withdraw a maximum of 100 million gallons per day (MG/d) (455 million litres per day (ML/d)) or about double the current average rate of withdrawal. Notwithstanding this authorization, the existing aqueduct size and design limits withdrawals to about 85 MG/d (386 ML/d).

The City recently examined the potential impact on the Shoal Lake water balance, and on flows through Ash Rapids, that would result from increasing its water taking up to the level of the aqueduct capacity and to the level of the Ontario OIC authorization. This study indicated that the frequency, duration and net quantity of inflows from Lake of the Woods at Ash Rapids would increase but that impacts on Shoal Lake water levels may be limited to certain times of the year.

When compared to the long-term average (1964 to 1997) conditions, the predicted water-level impacts resulting from increased water-withdrawal rates of 386 ML/d and 455 ML/d were a lowering of the Shoal Lake wintertime (December to mid April) water level by up to 0.07 m and 0.1 m, respectively. For a dry year, such as was observed in 1988, the lake's water level is predicted to decline by as much as 0.3 m if the City's water withdrawal was increased to and maintained at the maximum authorized taking. Implications for the lake's ecology and for other water uses were not determined, although it was concluded that a larger inflow of Lake of the Woods water might have a beneficial impact because of that lake's lower phosphorus and chlorophyll "a" levels.

In May 1999, Ontario enacted regulation O. Reg. 285/99 under the Ontario *Water Resources Act* that would appear to prohibit transfers (diversions or bulk removals) of water from Shoal Lake to any point outside Ontario or to any point in Ontario outside the Nelson River drainage basin. The existing water-taking approval granted by Order in Council to the Greater Winnipeg Water District is exempted from the regulation. Small-scale transfers of water in containers of no more than 20 L in volume, e.g. as might be associated with a bottled-water operation, are also exempted.

Recommendation

WS-4 *Data obtained through monitoring programs should be periodically evaluated to monitor what, if any, influence Winnipeg water withdrawals may be having on water levels and water uses of Shoal Lake, over and above the ongoing influences of Lake of the Woods water level regulation and fluctuations. The water balance and lakeshore capacity models should be used to assist in the determination of any longer-term impacts.*

11.5 POTENTIAL IMPACTS OF CLIMATE CHANGE

As discussed in Chapter 7, modeling results from a recent U.S. national study of climate change and variability indicate that the frequency, intensity and duration of wet and dry weather is expected to increase in coming years in many parts of North America including within the Souris, Red, and Rainy River basins. The study further indicated that average annual basin runoff in the region could fall significantly within the next 30 years as evaporation processes outweighed net increases in precipitation.

Researchers generally agree that further data collection, along with enhancement of available climate change models, is needed to improve confidence in the accuracy of current projections. Increased variability, along with a trend toward long-term net annual decrease in flows entering Lake of the Woods, might eventually require reconsideration of the existing water-level operating rules. This could potentially involve alteration in the range (maximum and minimum) of seasonal water levels that would be permitted. This in turn would impact on water exchange at

Ash Rapids and on water levels in Shoal Lake. It would therefore be essential that Shoal Lake interests (e.g. water supply, fisheries, recreation, navigation and shoreline protection) be properly assessed in the decision-making process.

Recommendation

WS-5 *Governments and other watershed stakeholders should keep abreast of climate change issues and projections and of their potential implications for Shoal Lake watershed interests. In the interest of efficiency and coordinated responses, monitoring of climate change research should be carried out in cooperation with the Lake of the Woods Control Board.*

11.6 COORDINATION WITH LAKE OF THE WOODS CONTROL BOARD

The water level and water flow control mandate and operating directions of the Lake of the Woods Control Board (LWCB) are critical determinants of average water levels and level variability in Shoal Lake. It is important therefore that the Shoal Lake watershed partners offer the LWCB a coordinated and balanced picture of the watershed interests relating to water levels.

Recommendations

WS-6 *The Shoal Lake Watershed Management Plan should be formally submitted to the Lake of the Woods Control Board for their information and use in carrying out their water management responsibilities in a manner that appropriately considers the collective interests of Shoal Lake stakeholders.*

WS-7 *Shoal Lake stakeholders should seek to coordinate and integrate their interests and expectations in water level and water flow management, and should communicate those interests to, and work with, the Lake of the Woods Control Board on a continuing and shared basis.*

11.7 ENHANCED MONITORING

The Water Study identified a number of deficiencies in the existing information base that hinder a fuller understanding of water availability, water budget and water exchange within the watershed. Recommendations to address these deficiencies were included in the study report.

Recommendations

WS-8 *The following recommendations arose out of the Water Study:*

- *Streamflow gauges should be established on both the Falcon River and Powawassan Creek, giving proper attention to the inherent difficulties in locating and operating gauges in such low-gradient streams;*
- *A system of recording-water-level gauges should be established on either side of Ash Rapids and on Shoal, Falcon and High lakes; and*
- *Existing bathymetric (depth) data and mapping should be expanded on Shoal, Falcon and High lakes.*

The timing and full extent of their implementation should be periodically assessed in the context of data needs associated with future applications of the water-quality and -quantity models.