7 Initial Data Gaps and Deficiencies

Data gaps and deficiencies were identified during the course of the data collection exercise, and during consultation with the public, agencies and First Nations. Gaps and deficiencies are grouped below by major heading.

7.1 Natural Environment

Critical habitat areas for lake trout and walleye were identified from MNR District files. Available information has been summarized to document the effects of current water management practices (seasonal drawdowns) on lake trout spawning, and to a lesser extent, walleye spawning. Pike and muskellunge spawning areas are also identified. However, there are still a number of deficiencies that affect our ability to understand the effects of current water management strategies on fish and wildlife populations. They are as follows:

- Lake trout spawning bed exposure and potential for exposure of egg and/or fry to freezing/drying and associated mortality. Present information for Lake of Bays suggests that approximately 10% mortality associated with the present 0.76 m winter drawdown. No comparable information is available for McCraney Lake, Huntsville lakes, Mary Lake, Kawagama Lake, Skeleton Lake, Lake Rosseau and Lake Muskoka on the effect of the winter drawdown.

- Walleye use of and spawning success at the following areas, some of which have been the target of previous habitat improvement projects:
  - Bala Reach downstream of Bala dams
  - Lake Vernon downstream of Fox Lake dam
  - Indian River/Lake Muskoka downstream of Port Carling dam
  - Extent of walleye spawning activity below the Go Home Lake dams.

- Walleye spawning sites at Moon River and South Falls in terms of consistent and adequate flow characteristics.

- Fish community (composition and abundance) in various river reaches and lakes:
  - South Branch from Baysville dam to Hanna Chute dam
  - North Branch from Mary Lake to Bracebridge
  - Musquash River from Ragged Rapids to Go Home Lake
  - Moon River below Moon dam
  - Kawagama Lake – species other than lake trout
  - Lake Sturgeon presence and use of spawning habitat below Moon Falls.

- Matthias Falls head pond - aquatic habitat and fish community information.

- Baseflow below dams - present information is insufficient to determine whether existing releases provide suitable habitat conditions for aquatic and other riverine/riparian species (i.e., brook trout habitat in Big East River downstream of McCraney Lake dam.)

- Littoral Zone Wetted Habitat/Habitat Quality – there is no information on the quality or quantity of wetted habitat in riverine reaches during minimum and other seasonal flow periods. It has been suggested that habitat quality is degraded in some reaches (i.e., South Branch near Fraserburg).

- Wetland Communities – while only one provincially significant wetland (Big East River delta complex) has been identified as being within the influence of water management activities, numerous smaller wetlands exist throughout the watershed lakes and river system. Information regarding the status and ecological importance (fish spawning, wildlife habitat, effect of current management practices) of these smaller wetlands and potential effects of water level management is lacking.

- Atlantic Coastal Plain Flora - Atlantic Coastal Plain Flora is designated as a rare to uncommon (S3) vegetation community type in Ontario, and is very rare on a global scale. Representative populations of this vegetation community exist in several locations in the lower watershed of the Muskoka River (i.e., Moon and Musquash Rivers, from Bala to Georgian Bay). Specific sites include the Musquash River Candidate Life Science ANSI and the Gray Rapids Life Science Site. These communities exist on sand/peat shorelines and depend on fluctuating water levels and periodic flooding to prevent shrub growth. Stabilized water levels are a potential threat to these communities. Current water level fluctuations need to be documented at these rare vegetation communities.

- Loons, amphibians and other wildlife species – information is generally lacking on the effects of current water management activities on wildlife species that make extensive use of the water/land interface. Loon populations in Smoke Lake have been studied, but information is lacking on populations on other lakes. Amphibian, reptile and bird/mammal population (species and abundance) information is lacking throughout the watershed.

7.2 Socioeconomic Environment

The following gaps in socioeconomic information were noted upon completion of the background data collection process.

7.2.1 Public Safety

Water Quality Information

A number of comments were received concerning water quality in specific reaches of the river. Historically, the Ministry of Environment (MOE) collected and provided this information to other resource agencies and watershed users, but discontinued this activity after 1995. Available information for the river system was summarized in Section 3.1.11, and indicated that water quality was generally good, although high nutrient levels were present at the South Branch monitoring stations in 1992. The collection of additional data would determine whether water quality has degraded or is within historical limits.

Range of Short-Term Fluctuations/Extremes

Extreme high levels can result in public safety concerns (flooding, restricted access, etc), while extreme low levels may create navigational or other hazards. The historical range of these flood/drought events for lakes and rivers should be defined.

7.2.2 Property

Shoreline Infrastructure Information

Information on the number of docks and boathouses is available for some of the major lakes within the watershed (Table 4.5), and provides an indication of the amount of development on those water bodies. What is more important from the water management perspective is the potential for water level changes relative to existing structures. Preliminary investigations of shoreline infrastructure were undertaken in Kawagama Lake and Lake of Bays during the summer of 2002 to determine the amount of freeboard (distance) between the top of existing structures and the normal summer water level. This information is vital to the development of future water management options.

Shoreline Erosion

Shoreline erosion is known to occur at specific sites on various lakes/river reaches (Kawagama Lake, Lake of Bays, Fox Lake, Big East River at Arrowhead Provincial Park). The extent and potential causes are not known.

Ice Damage

While ice damage is occasionally reported to MNR, the present operating regime appears to minimize ice related damage to boathouses, docks and shorewalls. Additional information would be required if changes to existing operational levels are proposed.

Floodplain Mapping

Detailed floodplain mapping is present for only the Town of Bracebridge (18 km section from Lake Muskoka to above Wilson Falls) and Huntsville at the River Cove subdivision (Big East River and 4 km of Lake Vernon shoreline). The Town of Bracebridge identified regulatory flood limits on specific portions of the North and South Branch Muskoka River. No mapping is available for other communities/river reaches/lakes to identify areas at risk.

7.2.3 Navigation

Water Levels

Minimum water levels have been established in areas subject to commercial navigation (tour boats, etc). No similar information is available for areas that are used for recreational boating.

7.2.4 Economic (Tourism/Recreation/Waterpower)

Aesthetics of Falls and Chutes

The aesthetic value of Muskoka River falls and chutes is considerable, but is a highly subjective value. Information (photographs) on the various feature at different seasonal flow rates would assist in future evaluations.

Bait Fish Harvesting and Traplines

Bait fish harvesters and trappers are required to report their catches to MNR, but are not required to report by water body or location within the river system. As many of these species utilize shallow water areas, they are potentially susceptible to changes in water management activities. Contact

with individual harvesters (bait fish and trappers) would be required to obtain site-specific information.

7.2.5 Miscellaneous Socioeconomic Issues

Communication Practices

Information on current 'best practices' for public consultation would assist with the development of the next phase program. The identification of opportunities and timeframes to integrate information releases with existing lake or cottage association mailouts or news releases could potentially improve communication practices.

Climate Change

What will be the impact of climate change on the Muskoka River watershed, and are there strategies in place to respond to those changes? While it was recognized that climate change may affect the amount of rainfall and hence river flows, present information is not definitive in terms of the potential for a long term increase or decrease. The primary expectation from climate change is enhanced variability/extremes.

7.3 Engineering/Operational

Engineering data gaps were identified which would affect the ability to establish current and future operational scenarios:

- **Dam Operation Costs -** Dam operation and maintenance consume staff time, resources and capital for both MNR and waterpower producers. These costs should be separated from other operational or production costs and used as a basis for future comparison.

- **The Acres Reservoir Simulation Program (ARSP)** was set up and calibrated to simulate the existing water management activities (resultant flows and water levels) within the Muskoka River system. The results of the base case run indicate that good agreement was obtained between historical flow and level data and the simulation model output (see A&A, 2003a).

  The ARSP model uses daily hydrology data to model inflow into the North, South, and Main Muskoka River branches, and to model local inflow between respective dams. The 31-yr long, daily hydrology record derived for the Muskoka system is the most important data parameter as all operational

decisions are based on the quantity of water entering the system. The model also uses weekly rule curve data to represent operations of dams, and weekly flow constraints to represent demands for water. Based on the weekly operational data and daily hydrology, the model can adequately predict medium to long term water levels and flows in the system. For the purposes of the WMP, it is vital to model long-term flow patterns that capture flows ranging from extreme floods to extreme drought events. Therefore, a daily time step is considered appropriate and practical since many years of data are typically required to represent the hydrologic cycle of the river system.

While these longer-term water level fluctuations (days, weeks, seasons) are of interest to area residents, concern has also been expressed about shorter-term fluctuations within the 24-hour time period. It is important to note that the model presently developed for the Muskoka River system cannot analyze the shorter-term effects of hourly dam or power plant operations as it is based on daily data. The ARSP model is however capable of performing hourly flow simulation if a sufficient amount of detailed hourly data is provided. This would then require the collection and analysis of hourly flow and operational (water level) data.

- **Flow and Flood Forecasting -** There is presently no tool available to accurately predict flow and flood levels in a timely manner. A flow/flood forecast model could increase decision-making capability with respect to dam operations.

- **Water Power Development Opportunities -** The existing waterpower facilities on the Muskoka River have 28.3 MW of installed capacity. Opportunities for further development have been identified at a number of the current damsites. Upgrades to existing facilities could increase power output in some instances. The Bala North site has recently been released by MNR for development under the Renewable Energy Program.

7.4 Issues Beyond the Scope of the Water Management Plan

The WMP planning process is being undertaken to evaluate the adequacy of Muskoka River flows and water levels to provide opportunities for multiple use of the water resource (i.e., tourism, recreational activities, power production, maintenance and protection of natural resource values, flood passage, and other uses) in a balanced fashion. The issues that are beyond the scope of this water management planning process include:

- those related to land use practices such as shoreline development, road construction, etc, and their impact on water quality (unless it is related to inadequate flow as well)

- the impact of recreational fishing on fish communities

- hydropower development approvals (unless proposed as a WMP operational strategy).