

*A Study of the Past, Present  
and Future of Water  
Management on the Trent-  
Severn Waterway National  
Historic Site of Canada*

*Other Water Management  
Organizations*

*Prepared for:  
Parks Canada Agency*

*By:*



May 31, 2007

*A Study of the Past, Present and  
Future of Water Management on the  
Trent-Severn Waterway National  
Historic Site of Canada*

*Other Water Management Organizations*

May 2007

Prepared for:  
Parks Canada Agency

Prepared by:



**ecoplans**  
Limited

100-72 Victoria Street South, Kitchener, ON N2G 4Y9  
phone: (519)741-8850 fax: (519)741-8884  
email: [ecoplans@ecoplans.com](mailto:ecoplans@ecoplans.com)

## Table of Contents

|   |           |
|---|-----------|
| <b>Acknowledgements</b> .....                     | <b>iv</b> |
| <b>1.0 Introduction</b> .....                     | <b>1</b>  |
| <b>2.0 Purpose</b> .....                          | <b>2</b>  |
| <b>3.0 Approach and Methodology</b> .....         | <b>2</b>  |
| <b>4.0 Findings</b> .....                         | <b>3</b>  |
| 4.1 Lake of the Woods Control Board (LWCB).....   | 3         |
| 4.1.1 Jurisdiction .....                          | 3         |
| 4.1.2 Organizational structure .....              | 3         |
| 4.1.3 Source of the water management mandate..... | 5         |
| 4.1.4 Accommodating stakeholder interests .....   | 5         |
| 4.1.5 Communications and outreach.....            | 7         |
| 4.1.6 Water flow/level decision-making .....      | 8         |
| 4.1.7 Balancing conflicting interests .....       | 9         |
| 4.1.8 Conflict resolution .....                   | 10        |
| 4.1.9 Decision support tools .....                | 10        |
| 4.1.10 Potential improvement opportunities .....  | 10        |
| 4.1.11 Other activities of note .....             | 11        |
| 4.2 New York State Canal Corporation (NYSCC)..... | 11        |
| 4.2.1 Jurisdiction .....                          | 11        |
| 4.2.2 Organizational structure .....              | 11        |
| 4.2.3 Source of water management mandate .....    | 11        |
| 4.2.4 Accommodating stakeholder interests .....   | 12        |
| 4.2.5 Communications and outreach.....            | 12        |
| 4.2.6 Water flow/level decision making .....      | 12        |
| 4.2.7 Balancing conflicting interests .....       | 13        |
| 4.2.8 Conflict resolution .....                   | 13        |
| 4.2.9 Decision support tools .....                | 14        |
| 4.2.10 Potential improvement opportunities .....  | 14        |
| 4.2.11 Other activities of note .....             | 14        |
| 4.3 Ontario Power Generation (OPG) .....          | 15        |
| 4.3.1 Jurisdiction .....                          | 15        |
| 4.3.2 Organizational structure .....              | 15        |
| 4.3.3 Source of water management mandate .....    | 15        |
| 4.3.4 Accommodating stakeholder interests .....   | 16        |
| 4.3.5 Communications and outreach.....            | 16        |
| 4.3.6 Water flow/level decision making .....      | 17        |
| 4.3.7 Balancing conflicting interests.....        | 17        |

---

|            |  |           |
|------------|--|-----------|
| 4.3.8      | Conflict resolution .....                            | 17        |
| 4.3.9      | Decision support tools .....                         | 17        |
| 4.3.10     | Potential improvement opportunities .....            | 18        |
| 4.3.11     | Other activities of note .....                       | 18        |
| 4.4        | Ottawa River Regulation Planning Board (ORRPB) ..... | 18        |
| 4.4.1      | Jurisdiction .....                                   | 18        |
| 4.4.2      | Organizational structure .....                       | 19        |
| 4.4.3      | Source of water management mandate .....             | 20        |
| 4.4.4      | Accommodating stakeholder interests .....            | 20        |
| 4.4.5      | Communications and outreach .....                    | 20        |
| 4.4.6      | Water flow/level decision-making .....               | 20        |
| 4.4.7      | Balancing conflicting interests .....                | 21        |
| 4.4.8      | Conflict resolution .....                            | 21        |
| 4.4.9      | Decision support tools .....                         | 21        |
| 4.4.10     | Potential improvement opportunities .....            | 22        |
| 4.4.11     | Other activities of note .....                       | 22        |
| 4.5        | Tennessee Valley Authority (TVA) .....               | 22        |
| 4.5.1      | Jurisdiction .....                                   | 22        |
| 4.5.2      | Organizational structure .....                       | 22        |
| 4.5.3      | Source of water management mandate .....             | 23        |
| 4.5.4      | Accommodating stakeholder interests .....            | 23        |
| 4.5.5      | Communications and outreach .....                    | 23        |
| 4.5.6      | Water flow/level decision-making .....               | 24        |
| 4.5.7      | Balancing conflicting interests .....                | 24        |
| 4.5.8      | Conflict resolution .....                            | 25        |
| 4.5.9      | Decision support tools .....                         | 25        |
| 4.5.10     | Potential improvement opportunities .....            | 25        |
| 4.5.11     | Other activities of note .....                       | 25        |
| 4.6        | Rideau Canal .....                                   | 25        |
| 4.6.1      | Jurisdiction .....                                   | 25        |
| 4.6.2      | Organizational structure .....                       | 26        |
| 4.6.3      | Source of water management mandate .....             | 26        |
| 4.6.4      | Accommodating stakeholder interests .....            | 26        |
| 4.6.5      | Communications and outreach .....                    | 27        |
| 4.6.6      | Water flow/level decision-making .....               | 28        |
| 4.6.7      | Balancing conflicting interests .....                | 29        |
| 4.6.8      | Conflict resolution .....                            | 29        |
| 4.6.9      | Decision support tools .....                         | 29        |
| 4.6.10     | Potential improvement opportunities .....            | 30        |
| 4.6.11     | Other activities of note .....                       | 30        |
| <b>5.0</b> | <b>General Conclusions on Keys to Success.....</b>   | <b>30</b> |
| 5.1        | Jurisdiction .....                                   | 30        |

---

|                        |  |           |
|------------------------|--|-----------|
| 5.2                    | Organizational Structure .....           | 30        |
| 5.3                    | Source of Water Management Mandate.....  | 32        |
| 5.4                    | Accommodating Stakeholder Interests..... | 32        |
| 5.5                    | Communications and Outreach.....         | 34        |
| 5.6                    | Water Flow/level Decision-making.....    | 35        |
| 5.7                    | Balancing Conflicting Interests .....    | 36        |
| 5.8                    | Conflict Resolution.....                 | 36        |
| 5.9                    | Decision Support Tools.....              | 37        |
| <b>References.....</b> |  | <b>40</b> |

**List of Figures**

|   |   |
|---|---|
| Figure 1-1 Watershed of the Trent-Severn Waterway ..... | 1 |
| Figure 4-1 Example of public notice used by LWCB .....  | 8 |

**List of Tables**

|   |    |
|---|----|
| Table 4-1 Stakeholder interests related to the Lake of the Woods Control Board..... | 5  |
| Table 4-2 Specific interests recognized by the LWCB .....                           | 6  |
| Table 5-1 Summary of water management organizations.....                            | 39 |

## **Acknowledgements**

Ecoplans Limited is grateful to many people who contributed to the success of this project. We wish to specifically the following people who took the time to speak with us about their operations:

- Rick Walden and Rick Cousins – Lake of the Woods Control Board
- Howard Goebel – New York State Canal Corporation
- Dave Servos – Ontario Power Generations
- Fergus McLaughlin – Ottawa River Regulating Committee
- Dave Ballinger and Kerry McGonegal – Rideau Canal National Historic Sites of Canada
- Charles Bach – Tennessee Valley Authority
- Jack Alexander, Mike Jamieson, and Dave Ness – Trent-Severn Waterway National Historic Sites of Canada

## 1.0 Introduction

The Trent-Severn Waterway National Historic Site of Canada (TSW or “the Waterway”) is a 386 km navigable waterway that runs through inland waters of central Ontario from Trenton on Lake Ontario to Port Severn on Georgian Bay. The main channel of the Waterway follows the course of the Trent, Otonabee, and Severn Rivers, their associated lakes and artificial canal cuts. There are numerous secondary channels that permit navigation into Stony, Scugog and other lakes. Trans-navigation is facilitated by an array of single lock chamber, flight and lift locks as well as a large-scale marine railway.

While only a small fraction of the Waterway is a human-constructed system, navigational draughts and water flows are maintained by human intervention by drawing water from two watersheds, the areas of which cover more than 18,000 square kilometres including approximately 4,500 km<sup>2</sup> in the reservoir lakes area north of the main system. The two watersheds (Figure 1-1), the Trent and Severn, are located primarily north of the main route of the navigation channel and drain into the main river systems.



**Figure 1-1 Watershed of the Trent-Severn Waterway**  
(Source: Parks Canada)

Water on the TSW is regulated and apportioned using the primacy of marine navigation on the main channel of the Waterway as the overarching principle. Other water uses are accommodated provided the navigation objectives are met. These other interests include hydro-electric

generation, natural habitat for various aquatic and land based animals, potable water supply, recreation and for the use and enjoyment of shoreline residents, all the while providing for flood mitigation.

## **2.0 Purpose**

The purpose of this report is to document how other jurisdictions within North America where water management conditions are similar, manage their systems. The project specifically examines their governance structures.

The following water management agencies were consulted:

- Lake of the Woods Control Board
- New York State Canals
- Ontario Power Generation
- Ottawa River Regulating Committee
- Rideau Canal
- Tennessee Valley Authority

## **3.0 Approach and Methodology**

Managers of other water management agencies were identified and contacted to obtain answers to the following questions:

1. *What is the area under your jurisdiction?*
2. *How many lakes/major rivers are under your control?*
3. *What is the nature of your organization (e.g. Board driven, independent commission, governmental)?*
4. *What is the source of the water management mandate? (e.g. legislation, policy).*
5. *Which of the following stakeholder interests do you attempt to accommodate:*
  - a. *Cottagers*
  - b. *Permanent residents*
  - c. *Municipalities*
  - d. *Commercial*
  - e. *First Nations*
  - f. *Ecological interests*
  - g. *Hydro power generation*
  - h. *Specialty recreation*
  - i. *Boating (navigation)*
6. *Which, if any, of the above interests take(s) precedence?*
7. *How well do your stakeholders understand your role and obligations with respect to water management? Do you have an education/outreach program? If so please describe.*
8. *How are your water flow/level decisions made? (e.g. Unilateral, consultative, joint decision-making)*
9. *How do you balance conflicting interests?*

10. What level of stakeholder conflict do you experience?
11. What is your conflict resolution mechanism? How effective is it?
12. What would you do differently if you could with respect to governance, conflict resolution etc.?

Where relevant, websites were examined to obtain information and determine how the authorities interact with stakeholders through the worldwide web. This also helped to prepare the project Team for the subsequent telephone interviews. The findings reported below used, to the extent possible the words of those interviewed, the content of websites and public reports in order to truly reflect the views and positions of the organizations.

## 4.0 Findings

### 4.1 Lake of the Woods Control Board (LWCB)

#### 4.1.1 Jurisdiction

The LWCB is responsible for the regulation of levels of the Lake of the Woods and Lac Seul and flows in the Winnipeg and English Rivers downstream of these lakes (Lake of the Woods Control Board, 2007).

#### 4.1.2 Organizational structure

The LWCB is a Canadian board consisting of four members, each with an alternate, who represent Canada (one member), Ontario (two members) and Manitoba (one member). Appointments are made by Orders-in-Council of the appropriate government and each appointee is required to be a Professional Engineer. Each Member reports to the government department that recommended his (her) appointment to the Board; for Canada appointees, it is Environment Canada; for Ontario, it is the Ministry of Natural Resources; and for Manitoba, it is Manitoba Water Stewardship. The Board appointees are technical, not political. The Board operates with a high degree of independence (Lake of the Woods Control Board. 2007).



In addition to its Mission, Guidelines and Goals statement, the Board has developed several other documents to guide and direct its operations.

First, the Board has a set of Bylaws that, after identifying a number of key documents and terms, proceed to formally define the Board's regulating objectives, its makeup, its meeting requirements, its administrative and financial procedures, and its Secretariat. The Bylaws also define the process for consultation with First Nations, the rights and responsibilities of recognized

---

Specific Interest Groups and Resource Agencies, and the roles of the Board Chair and Executive Engineer.

Second, the Board has a set of Rules and Procedures pertaining to its Secretariat, that address the operations and housing of the Secretariat within Environment Canada, and the financial and personnel administration of the Secretariat.

Finally, the Board has a set of Policies, that address the operation of hydraulic generating stations and dams under the Board's jurisdiction, the issuing of public information and advisories, and the requirements for water flow and level data at flow control facilities.

The Bylaws were written by a committee of the Alternates to the Board. The operation of the Board is much less formal than what is implied by the Bylaws (R. Cousins, pers. comm.). The operation of the board is funded by the 3 governments that are party to the agreement and the funding arrangement is set out in a formal Tri-partite Agreement. The Federal government, through Environment Canada, provides front-end funding to the Board and recovers the appropriate contributions from Ontario and Manitoba.

It is reported that a four person Board is manageable (R. Cousins, pers. comm.). The members have a broad background making the balancing of multiple interests easier. Having representatives from water power generation companies can sometimes create a public perception problem although the representatives are there for their technical expertise and not representing their home organizations (R. Cousins, pers. comm.).

Grand Council Treaty #3, the political territorial organization for 28 First Nations in the Treaty #3 area, was recognized by the Board as a "Specific Interest Group" in 1980. Since then, based on the affirmation of Aboriginal and Treaty Rights in the Canadian Constitution (Lake of the Woods Control Board, 2007), the governments of Canada, Ontario and Manitoba have moved towards greater recognition of, and new relationships with, First Nations. Accordingly, and after discussions between staff of the Board and Grand Council Treaty #3 in 2005, the Board decided no longer to consider Grand Council Treaty #3 as a Specific Interest Group but instead to seek interaction with First Nations in their own right.

The Board encourages the participation of First Nation Advisors, appointed by Grand Council Treaty #3 and individual First Nations, at its Regulation Meetings. The Board has also committed to seek a separate meeting annually with Chiefs or staff representing Grand Council Treaty #3.

To date, no First Nation Advisors have been appointed by the Grand Council or individual First Nations. The Board's Secretariat provides information to, and maintains periodic contact with, the Grand Council Treaty #3 office.

### 4.1.3 Source of the water management mandate

The Board's authority is defined by concurrent Canada/Ontario/Manitoba legislation (The Lake of the Woods Control Board Act; -1921, 1922, 1958) and is further mandated by a Canada-United States of America Treaty (Convention and Protocol for Regulating the Level of the Lake of the Woods, 1925), necessary since Lake of the Woods is an international boundary water. This treaty also created a second board, the International Lake of the Woods Control Board (ILWCB). While Lake of the Woods is normally regulated solely by the LWCB, the outflow from the lake is subject to the approval of the ILWCB whenever the level of the lake rises above or falls below certain elevations specified in the treaty (Lake of the Woods Control Board. 2007).

The Regulatory Strategies are documented and published. This helps to establish the public's expectation of how water will be managed within the basin.

The Lake of the Woods is managed for "the most advantageous use". No one interest takes priority. The priority can change depending upon the situation. For example during the 2003 black out, power production took precedence.

In Lac Seul, the priority has been hydro-electric power generation. In recent years fisheries has been taking a higher priority.

### 4.1.4 Accommodating stakeholder interests

People with many diverse interests use the basin. While some hold differing or even conflicting views of what constitutes an ideal water level or flow regime, others may share concerns and viewpoints. Table 4-1 identifies the different interests.

**Table 4-1 Stakeholder interests related to the Lake of the Woods Control Board**

| ORGANIZATION/INTEREST | REPRESENTATION  |
|-----------------------|---|
| Canadian Government   | Has one representative on the Board.  |
| First Nations         | The level of involvement is not as extensive as the Board would like. The Board is in discussions with Grand Council Treaty #3 to increase their involvement. |
| Provincial Government | Two representatives from Ontario and one from Manitoba are on the Board.  |
| Municipalities        | Winnipeg is a recognized Special Interest Group. Other municipalities are also represented.   |
| Cottagers             | There is a cottage association as a recognized Special Interest Group.  |
| Permanent residents   | There is a property owners' association as a recognized Special Interest Group. 1-2 public meetings are held each year.                                       |
| Commercial            | Tourist outfitting, wild rice harvesting, local industry, commercial fishing are involved. A tourist camp is a  |

| ORGANIZATION/INTEREST  | REPRESENTATION   |
|------------------------|--|
|                        | recognized Special Interest Group. There is no commercial fishing representation at the meetings. The Board relies on MNR to provide this input. |
| Ecological interests   | There are no ENGOs represented. The Board relies on the government agency representatives to provide the ecological context.                     |
| Hydro power generation | Electric power production both within and outside the basin are recognized Special Interest Group.   |
| Specialty recreation   | Kayak club is represented as an interest group.  |
| Boating (navigation)   | Represented through property owners not a formal Power Squadron.   |

The following groups (Table 4-2) have been recognized by the LWCB as specific interests and authorized to send representatives to LWCB Regulation Meetings in order to present their views. The Board's Secretariat consults the interest group representatives as appropriate between meetings. The "Statements" given below were provided by the interest group representatives and have been taken from the LWCB website. The LWCB has a formal application procedure for organizations to become "Interested Parties".

**Table 4-2 Specific interests recognized by the LWCB**

| INTEREST GROUP   | STATEMENT OF INTEREST   |
|--|---|
| <i>Abitibi-Consolidated Inc. - Kenora Division</i>       | No statement provided.  |
| <i>City of Winnipeg</i>                                  | Shoal Lake <u>supplies water</u> to the City of Winnipeg's population of more than 630,000 people. Because Shoal Lake is hydraulically connected to Lake of the Woods by Ash Rapids, water levels in Shoal Lake are directly influenced by Lake of the Woods water levels. Lake of the Woods regulation decisions therefore directly impact water supply conditions in Shoal Lake.  |
| <i>Ear Falls - Perrault Falls Outfitters Association</i> | The EFPFOA is a non-profit association representing the interests of the tourist industry in the Ear Falls - Perrault Falls area. With respect to the LWCB, our main concern is maintaining adequate water levels to sustain a <u>healthy fishery</u> .   |
| <i>Lac Seul Advisory Committee</i>                       | The Lac Seul Advisory Committee (LSAC) is a public advisory group that was established in 1989 by the Sioux Lookout District Manager of the Ontario Ministry of Natural Resources to provide advice to the District Manager <u>to maintain and/or enhance the sustainability of the natural resources of Lac Seul</u> and the implementation of the Lac Seul (lake) Management Plan. The 15 members on the Committee represent tourism associations, local anglers, the forest industry, the Municipalities of Sioux Lookout, Dryden and Ear Falls and the Lac Seul First Nation. |

| INTEREST GROUP  | STATEMENT OF INTEREST  |
|---|--|
| <i>Lake of the Woods District Property Owners Association</i> | The LOWDPOA is a non-profit association, founded in the mid 1950's. It <u>represents the interests of property owners</u> , from the south end of Lake of the Woods (Rainy River/Nestor Falls), north, and north down the Winnipeg River from Kenora, past Minaki. The membership is made up primarily of seasonal residents (cottagers). The Association has a paid membership of in excess of 4,000 property owners, making it the largest single cottage association in Canada. It is operated by a Board of elected volunteers, who are assisted in their work by a paid Executive Director. |
| <i>Manitoba Hydro</i>   | Manitoba Hydro is a provincial Crown Corporation that provides electric energy and natural gas services to the citizens of Manitoba. Nearly all the electricity generated by Manitoba Hydro is from self renewable water power. Approximately 75% of the electricity generated is from five hydro stations on the Nelson River and the remainder is from nine hydro stations on the Winnipeg, Saskatchewan and Laurie Rivers and three thermal stations. <u>Manitoba Hydro has six generation stations on the Winnipeg River which provide approximately 15% of the electricity generated.</u>   |
| <i>North Western Ontario Tourism Association</i>              | No interest statement is published on the website but encourage protection of the fishery – particularly the spring walleye spawning.  |
| <i>Ontario Power Generation</i>                               | OPG is an Ontario-based <u>electricity generation</u> company whose principal business is the generation and sale of electricity in Ontario and to interconnected markets. Our focus is on the risk-managed production and sale of electricity from our competitive generation assets, while operating in a safe, open and environmentally responsible manner.   |
| <i>Pakwash Camp Owners Association</i>                        | No statement provided.   |
| <i>Sioux Lookout Hudson Tourism Association</i>               | No statement provided.   |
| <i>Whiteshell Cottage Association</i>                         | The WCA, founded in 1951, is a non-profit organization. It operates as a board with elected volunteers, <u>representing cottage owners</u> in the Whiteshell Provincial Park. Its main purpose is to ensure that all relevant information is communicated to its membership.   |

#### 4.1.5 Communications and outreach

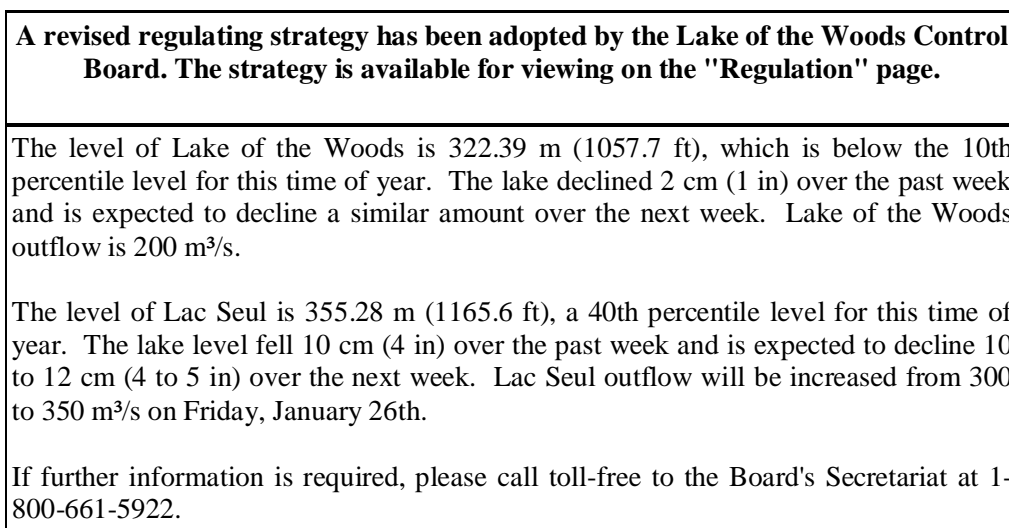
The LWCB staff feels that stakeholders have a good understanding of its roles and obligations. This has been improved by the two-way communications and involvement of interest groups. Relationships with stakeholders have also improved through a better communications strategy.

There is no information package for new property owners to inform them of the potential implications of water management on their property. The LWCB does review severance applications.

At least one **public open house or public meeting** is held each year, with more added when basin conditions warrant. In addition, the Board and/or its Secretariat endeavours to participate in events or meetings sponsored by others. An open house format is used to encourage greater dialogue and discourage grandstanding.

Information is provided to the public on a regular basis through the website and publications. Continuing efforts are made to inform the public about the range of water levels to be expected, shoreline risks, variability of conditions and limitations to achieving desirable water level conditions. Staff will also speak at annual meetings of property owners' associations. A 1-800 number has also helped improve communications.

Having a long term water management strategy documented and published, works well (R. Cousins, pers. comm.). This strategy is reviewed and adjusted periodically and the public is advised accordingly. Special Notices, such as the one illustrated in Figure 4-1, are given on the website.



**Figure 4-1 Example of public notice used by LWCB**  
(Source: Lake of the Woods Control Board, 2007)

#### 4.1.6 Water flow/level decision-making

Regulatory strategies are adopted and published. These strategies are approved by the Board. Approval of the International Lake of the Woods Control Board is sought for regulation actions whenever the water level of Lake of the Woods is above elevation 323.39 m (1,061.0 ft) or below elevation 321.87 m (1,056.0 ft).

The Secretariat monitors water conditions and proposes a regulatory strategy to the Board. The strategy is discussed, modified as appropriate, and then voted on by the Board. The Board tries to rule by consensus and can have major influences on the Strategy. The approved regulation strategy is implemented by the Board's Secretariat (by varying outflows as required). The Ontario Ministries of Natural Resources (OMNR) and the Environment (OMOE) have been asked to make available to the LWCB, appropriate staff to provide expert advice on affected resources. Other personnel from these agencies and, on occasion, from other agencies, are contacted as necessary for technical advice.

If an issue arises between Board meetings, a conference call can be held to deal with emergencies.

#### **4.1.7 Balancing conflicting interests**

Balancing the various interests is difficult. The Board tries to assess the greatest overall good. The Board relies on spokespersons for the various interests to provide information on the benefits and disbenefits, of a range of water levels and flows to each interest. To facilitate this process, the Board seeks input from First Nations, a number of specific interest groups that the Board has formally recognized, and government resource agencies.

The Board and/or its Secretariat consult with First Nations advisors, specific interest group representatives and resource agency advisors at regulation meetings. These meetings are held within the basin at least three times per year and at other times whenever the regulation strategy is being set. Information from First Nations, interest groups, resource advisors, and the general public regarding desirable levels and flows in the various seasons, and relative impacts of undesirable conditions, is collected, documented, and periodically updated.

When two or more interests have differing requirements, the Board may select a compromise strategy that, while it does not completely satisfy any interest, causes the minimum loss or damage to the interests overall.

When critical conditions exist for an interest, the Board may select the regulation strategy that best satisfies that interest.

Ecological issues are recognized. Fisheries get high consideration when making decisions. Some issues are accommodated well and others are more difficult to accommodate. The flooding of loon nests is an example. The Canadian Wildlife Service carried out an investigation of loon nest flooding. The problem was that water levels in the lakes and rivers were inversely proportional. In order to relieve flooding on the lakes, water needs to flow in the rivers creating flooding problems in the rivers. Conversely, to relieve flooding in the rivers, water had to be retained in the lakes thereby aggravating the flooding condition in the lakes. A decision was made that the impact of flooding on loon nesting activities was less in the rivers than in the lakes and, therefore,

lake flooding would be mitigated. The rationale for this decision was published in the regulatory strategy.

#### **4.1.8 Conflict resolution**

The Secretariat still receives a lot of criticism over water management decisions. Overall, the level of conflict is “not too bad” (R. Cousins, pers. comm.). The published regulatory strategy, website and communications strategy help to dispel anger. Conflicts are dealt with through discussions.

Having the various stakeholder interests around the table has helped foster mutual understanding and cooperation.

#### **4.1.9 Decision support tools**

The LWCB has limited resources. All decisions are based on the most recent and extensive hydro-meteorological data and information available to the Board at the time.

Errors, omissions, and inconsistencies in the hydro-meteorological database for the basin are identified and corrected, wherever possible and practicable. New and alternate means of collecting hydro-meteorological data are adopted, and the range and extent of these data expanded, where feasible. Existing computer models and tools are maintained and enhanced where possible. Subject to resource limitations, new or alternate tools and models are periodically reviewed and adopted as appropriate to address the Board's operational needs, especially in the areas of lake and river simulation modelling and modelling related to inflow forecasting.

Simulation models are used to do “what if” scenarios. The waterway system is quite simple and, therefore, does not warrant a high degree of sophistication. The water balance model was developed by Acres International and works well. The model is not used all the time because the system is relatively simple to operate.

They have tried to create a rainfall runoff model but it is of little value.

Weather forecasts from all sources are monitored. These forecasts are of little help. They would like better weather forecasting. The Board funds a gauging network. It does not carry out snow surveys since the snowpack represents a small component of the lake refill water. It monitors what is done by others.

#### **4.1.10 Potential improvement opportunities**

The following desirable improvements were identified by the water management staff (R. Cousins, pers. comm.):

- Establish local public advisory committees.
- Interact more with other water managers to learn and share ideas.

- Hire a person to coordinate public relations efforts.

#### **4.1.11 Other activities of note**

The following activities of note were extracted from the organization's website, literature, or interview.

- To the best of its ability, the Board will monitor, and react, as appropriate, to activities and initiatives of others in the basin related or potentially related to water levels and flows.
- The Board will liaise and exchange information with, agencies and governments active in the basin. In particular, shoreline development plans will be evaluated, as well as activities or studies in the upper basin (Rainy and Namakan Lakes) which could potentially affect the downstream area. Comments or recommendations are provided as appropriate.

## **4.2 New York State Canal Corporation (NYSCC)**

### **4.2.1 Jurisdiction**

The NYSCC has oversight of all facets of the New York State Canal Corporation's Water Management Program. The canal system includes 535 miles (861 kilometres) of Canal, 57 navigation locks (with dams), 2 Finger Lakes (Cayuga & Oneida), Delta and Hinckley Reservoir, and approximately 30 smaller reservoirs. Many reservoirs, lakes, and rivers are not under NYSCC control (New York State Canals, 2007).

### **4.2.2 Organizational structure**

The New York State Canal Corporation is a subsidiary of the New York State Thruway Authority. State legislation transferred responsibility and day-to-day operations for the Canal System from the state Department of Transportation to the Thruway Authority in 1992.

The Corporation is a public authority that is funded through the Thruway Authority. Highway tolls help to fund the Canal operations and capital program. Because the Thruway Authority is a highway organization, the Canal Corporation sometimes has funding challenges.

The New York Thruway Authority is a public authority under the State government and is Board driven. The 7-member Board is made up of political appointees from a cross-section of groups. There are no water managers on the Board.

### **4.2.3 Source of water management mandate**

The mandate for the Corporation is derived from the New York State Constitution and New York State Canal Law.

---

#### **4.2.4 Accommodating stakeholder interests**

The primary focus of the water management activities is navigation as set out in the legislation. Other stakeholder interests are given little consideration when making water management decisions.

Environmental considerations are taken into account for some programs such as dredging. When planning dredging operations, consideration is given to fisheries spawning windows, water quality windows, and dredgate disposal requirements.

#### **4.2.5 Communications and outreach**

The NYSCC has very little communication with the various stakeholders. It appears that stakeholders expect the Corporation to be a clearinghouse for all of their needs, but that is not the case.

Water management decisions are communicated to stakeholders through the website, which is updated daily with water levels information. The website also includes graphics of the major reservoir levels updated weekly. A 1-800 telephone number is also available for accessing the Corporation.

In 2005, a “Canal Connections Tour” was held with Canal stakeholders to discuss a variety of Canal-related issues, including water management. This tour included meeting with over 2,000 stakeholders, including federal, state and local elected officials and not-for-profit groups. A community relations expert was hired to help with the tour. These meetings were well attended. People understand that the Canal Corporation manages a water system but do not understand why they can not do more to address their specific interests. The meetings helped people to become more aware of the Canal operations.

People tend to become concerned during a specific event but then lose interest once the event abates. The Canal does not have any advance public notice of changes to the system.

#### **4.2.6 Water flow/level decision making**

The Corporation operates with a Board, Executive Committee, and technical staff. The Board does not set policies but does make funding decisions. The Executive makes capital improvement decisions. The water management decisions are made by the Water Management Engineer.

The system has two types of reservoirs – those over which the Corporation has control and those operated by others. Not having control over some reservoirs can cause operation problems for the Corporation particularly in the area of coordination. The Corporation is trying to resolve this issue through legislation.

The reservoirs tend to be operated within 3 water level settings – summer levels, non-navigation levels and the navigation season levels. Water levels are controlled using pneumatic flash boards instead of stoplogs.

The Canal has rule curves for some but not all of the reservoirs. These rule curves do not take fisheries issues into account. Following rule curves can adversely affect stakeholders and the water managers sometimes deviate from the rule curve to mitigate adverse impacts. The water managers would like to have rule curves for every lake. Most reservoirs have desired summer and winter levels and drawdown is carried out to meet these. One reservoir has rules to meet navigation and hydro levels.

The rule curves have minimum release flows for fisheries and pollutant assimilation. The water managers would like to do a study of each sub-watershed to establish theoretical rule curves and then link them.

The Corporation receives concerns from people living on the reservoirs over water level fluctuations. Although the Corporation has the legal authority to regulate the reservoirs, the local politicians do not necessarily recognize this authority. These concerns are being handled through education and outreach. In some areas, local agreements have been struck that now handcuff the operators (H. Goebel, pers. comm.). Apparently, it is very difficult to reverse and fix the problems caused by these agreements because people have become used to having them in place. Some local gate operators have assumed too much autonomy and they can make decisions that affect the system. The managers hope to change this situation.

Water management decisions are implemented by operational staff. The operation is fully staffed through winter. The staff is in constant touch on a 24 hour / 7 day a week basis through the use of Blackberry devices. During weekends in the non-navigation period, rovers are used to make water level adjustments.

The Corporation is developing trigger points for making water management decisions to address some staffing challenges.

#### **4.2.7 Balancing conflicting interests**

The NYSCC manages water for the primary purpose of navigation. To the extent that this may benefit other stakeholders, it is only coincidental. Much of the decision-making is based on operational “Rule Curves” for the reservoirs and minimum and maximum navigation pools along the canal.

#### **4.2.8 Conflict resolution**

Many issues are resolved through discussions. Some issues go to court to be resolved. The Corporation has not lost many lawsuits because of sound legislative grounding. Good

communications helps stakeholders to understand the limitations of the system and, therefore, heads off potential conflicts.

#### **4.2.9 Decision support tools**

The Corporation is building a computer model that still needs improvements. Corporation staff claims that water management decision-making is a combination of technical know-how and gut feel. More real time gauging data are needed along with the ability to make remote adjustments.

Water management staff has the following resources available:

- Daily stage levels at all locks and gate positions.
- Calculated theoretical discharges.
- Real time stream flow gauges.
- Some real time stage gauging.
- A number of manually read gauges.
- Bi-weekly snow surveys. (They used to have one person doing snow surveys.)
- National weather service forecasts.

The data that are received are put into a database daily. There is still a large gap in real time data – particularly stream flow data. The lack of sufficient money is the main obstacle to acquiring adequate data. Some of the data gathering network is shared with the US Geological Survey and some hydro-power developers. There are some funding agreements in place.

#### **4.2.10 Potential improvement opportunities**

The staff feels that the decision-making structure works reasonably well. The following are improvement that the water management staff would make if they could:

- Develop better ways to convey information to stakeholders.
- Improve stakeholder understanding of water management limitations in the system.
- Have better real-time data and more ability to manage system remotely.
- Develop a robust hydrodynamic model that would allow the organization to do sensitivity analysis.
- Develop a pro-active public participation program.
- Hold sub-basin level public meetings to address issues annually.
- Build more partnerships and a team attitude.

#### **4.2.11 Other activities of note**

None were identified.

## 4.3 Ontario Power Generation (OPG)

### 4.3.1 Jurisdiction

The area managed is bounded by Sudbury to North Bay east to the Mississippi River and then south to the Rideau, Trent, and Otonabee Rivers, west to Muskoka, Musquash and Severn Rivers and then west to the Beaver River at Lake Eugenia. The area includes 10 lakes, 11 rivers, 26 generating plants, and 63 water control structures (D. Servos, pers. Comm.).

### 4.3.2 Organizational structure

OPG is incorporated and is headed by a CEO and a Board. The Board has little involvement with water management.

### 4.3.3 Source of water management mandate

The operating mandate is derived from both policy and legislation. The primary mandate is to generate electricity as cost effectively as possible. To do this, OPG has legal Licences of Occupations and Lease Agreements that provide them with the rights to manage the water for hydro-electric generation purposes. These licences and agreements tend to have conditions governing how water will be managed. Water management policies are prescribed in operating policies.

The Province of Ontario has established *Water Management Planning Guidelines for Waterpower* under the *Lakes and Rivers Improvement Act*. The goal of these guidelines is “to contribute to the environmental, social, and economic well-being of the people of Ontario through the sustainable development of waterpower resources and to manage these for the benefit of present and future generations” (MNR, 2002). OPG has developed management plans for the watersheds they manage in accordance with these guidelines. The planning process is extensive, comprehensive, and inclusive of stakeholder interests.

The Water Management Plan is approved by the Ministry of Natural Resources through the Regional Director and is the ultimate operating document for OPG. This plan is renewable after 10 years but is a living document. It may be amended from time to time as required.

Under the plan there two key committees established.

**Steering Committee** – This committee is made up of OPG, First Nations, a member of the Public Advisory Committee, Department of Fisheries and Oceans, and the Ministry of Natural Resources. They make decisions that direct the operating policy and give staff operating instructions. The Steering Committee operates on the basis of consensus.

**Standing Advisory Committee** – This committee consists of members of the public and stakeholder representatives. It meets annually and receives public and stakeholder concerns and relays these to Steering Committee. This committee provides advice to the Steering Committee.

---

#### **4.3.4 Accommodating stakeholder interests**

OPG historically has worked hard to ensure that operations have as minimal an impact on all interests as possible given the need to generate clean, sustainable electricity.

The Management Plan development process was important in bringing the parties together and building understanding and trust. Preparing the plan was a challenge. OPG needed to build trust and understanding and a good working relationship before progress could be made. Now that trust has been established, the process will be easier next time around.

The planning process fleshed out the operating details in a public forum so the risk going forward is minimal. An advantage of the planning process is that the public is very well educated about the water management process. The Steering Committee operates on the basis of consensus.

Within legal operating parameters, all stakeholder interests are considered when making water management plans and making decisions. Flooding and public safety is the number one priority.

There is a good cross-section of interests brought forward by the public and agencies. OPG adjusted its approach from one of ideal power optimization to one that includes other objectives. Aquatic ecosystem health and other stakeholder interests are all considered when making water management decisions. Power generation is maximized within those parameters. Public safety is the number one issue. Concerns include flood mitigation (winter drawdown) and the potential risk of high flows in rivers. Navigation levels need to be maintained where written into the plan.

Lake Trout are specifically addressed in some areas by limiting the variation in water levels between October and April. As well, minimal flows in some areas are maintained for Walleye spawning. Specific policies for loon nesting are hard to build into a plan because loons nest at a time of the year when water levels tend to be volatile.

There are some specific agreements with stakeholders, but these are casual agreements that lead back to administrative instructional documents and the standing operating procedures.

#### **4.3.5 Communications and outreach**

People have a misconception of how water is managed and it is more complicated than they expect. OPG's water manager spends a great deal of time working with stakeholders through meetings and phone conversations.

The water management planning process was an excellent venue for getting the public involved at a very detailed level as it relates to water management. The planning process helped to create a positive relationship with stakeholders.

On certain sensitive watersheds, OPG holds strategic weekly conference calls with key stakeholders to discuss water management decisions. These are to discuss what OPG is doing and why.

OPG also has an ongoing public waterway safety program in schools and other venues to talk about waterway safety and water management. The water manager has the names of all key stakeholders as contacts on most lakes and riverine areas.

The OPG website does not contain real time data.

#### **4.3.6 Water flow/level decision making**

OPG operates its systems within established operating ranges rather than rule curves. They feel that rule curves create too much of a reactionary approach. Decisions around where to operate within the range are based on what is anticipated for water in the future. In this way, they can allow the system to operate more smoothly and can prepare for future wet or dry periods. Water management decisions are made by the water manager following the rules set out through the Water Management Plan as articulated in standard operating procedures.

#### **4.3.7 Balancing conflicting interests**

At OPG the key mandates drive the decisions that are made. The primary considerations are flood mitigation, recreational water levels, and efficient power generation. The preparation of the Water Management Plan helped to balance conflicting interests and build a level of rapport and trust that creates an atmosphere that is conducive to avoiding or resolving conflicts.

#### **4.3.8 Conflict resolution**

The most common source of conflict comes from the different needs and expectations of the lake people versus the river people. This tends to be limited because most people understand the different operational philosophy for lakes and rivers. The water management planning process brought the stakeholders together and gave them the chance to talk to each other and get to understand each others problems. Once the Plan is in place, conflicts are minimized through ongoing consultation with the public.

When there is a conflict or concern raised, it is usually resolved through a face-to-face visit or taking time on the phone to explain all the factors in the decisions being made. It is human nature to be focused on their own local issue and sometimes showing them the big picture helps them to understand better and accept what is happening in their local area. This openness and proactive consultation process is very effective in minimizing and resolving conflicts.

#### **4.3.9 Decision support tools**

Water management decisions are typically made using a combination of ambient conditions, operating directives, both policy and legal, and where appropriate, consultation.

OPG gathers weather, flow, and elevation data on a real time 24 hour / 7 day basis. These data are provided to the control room. Snow core information is collected in the winter. OPG finds that snow data are helpful but only makes up some of the information used. The water managers also gather information from other dam operators about changes they are making. All of this information is combined with historical statistical data to create a comprehensive database. This database is very valuable in conducting probability calculations and influencing real time decisions.

OPG does not use computer models since their system is not very complex. They use historical data and experience and operate more “by feel”.

#### 4.3.10 Potential improvement opportunities

The following are improvement that the water management staff would make if they could:

- “I would spend even more time with stakeholders. I have found that time spent with the public has been the best way to eliminate concerns.” (D. Servos, pers. comm.)

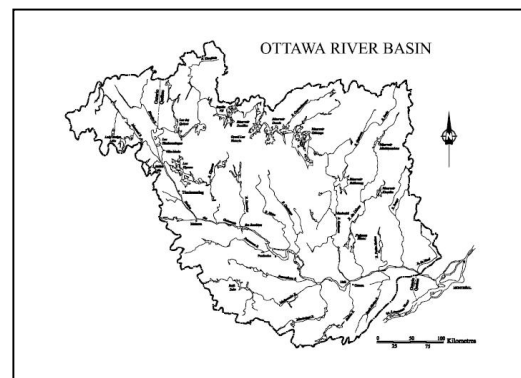
#### 4.3.11 Other activities of note

None were identified.

### 4.4 Ottawa River Regulation Planning Board (ORRPB)

#### 4.4.1 Jurisdiction

The Ottawa River is the largest tributary of the St. Lawrence River. Its basin is bounded on the north by the James Bay drainage basin, the east by the St. Maurice River basin, the west by the French River basin and the southern contiguous basins are drained by a series of small tributaries of the St. Lawrence River and Lake Ontario. The ORRPB are responsible for the principal reservoirs of the Ottawa River basin (Ottawa River Regulation Planning Board, 2007)



The total drainage area of the Ottawa basin is 146,000 km<sup>2</sup> representing approximately 11.2% of the total drainage area of the St. Lawrence River. For much of its length, the Ottawa River forms the boundary between the provinces of Ontario and Quebec.

The system has 13 principal reservoirs located mainly in the headwaters of the basin. These reservoirs have a total storage capacity of 14 billion cubic metres of water.

#### **4.4.2 Organizational structure**

The principal reservoirs of the Ottawa River basin are owned and operated by four separate agencies representing federal and provincial governments and two power utilities. Each of these operators has individual objectives to consider but each also realizes the need for some form of integrated management of the system to meet individual and common goals. This integration is accomplished through the Ottawa River Regulation Planning Board. The organizational structure includes the Ottawa River Regulation Planning Board (ORRPB), the Ottawa River Regulating Committee (ORRC) and the Ottawa River Regulation Secretariat (ORRS).

**ORRPB:** Board has 7 members including representatives from Transport Canada (Coast Guard), Environment Canada, Ministry of Natural Resources, plus the 4 Regulating Committee members. The Board is not involved in day-to-day operation of the reservoirs but is responsible for formulating regulation policies and criteria leading to the integrated management of the principal reservoirs of the Ottawa River basin. The Board is involved in communications among the representative agencies mainly at Board meetings. There is little, if any, internal communication involving the entire Board outside of the meetings.

**ORRC:** The Regulating Committee is responsible for formulating appropriate regulation and operational practices and procedures to ensure that operations of the principal reservoirs are carried out in accordance with the regulation policies and criteria adopted by the Board. The Regulating Committee is the main source of communications, coordination and cooperation among agencies that own and operate reservoirs and generating stations in the Ottawa River basin. Prior to the establishment of the ORRC, the agencies communicated on an ad hoc basis as necessary for the management of the system. The ORRC is made up of representatives from the dam operators, Public Works and Government Service Canada and Environment Quebec. The committee operates through consensus with a high degree of cooperation amongst the members.

**ORRS:** The Regulation Secretariat assists the Board and Regulating Committee in the performance of these duties and runs the water management models. The Secretariat does not make water management recommendations. All proposed adjustments to the system are made by the ORRC.

**International St. Lawrence River Board of Control:** Due to the importance of Ottawa River outflows to the operations of the International St. Lawrence River Board of Control (ISLRBC), there is a special effort made for constant liaison with that agency. Several member agencies of both the Board and Regulating Committee are represented on the ISLRBC and, in addition, there is frequent contact between the Secretariat and the Great Lakes Study Office in Cornwall, particularly during the spring freshet period.

#### **4.4.3 Source of water management mandate**

The ORRPB, the ORRC and the ORRS were formed under the terms of the Canada-Quebec-Ontario Agreement Respecting Ottawa River Basin Regulation in 1983 (<http://www.ottawariver.ca/emain.htm>).

#### **4.4.4 Accommodating stakeholder interests**

The primary mandate is to manage for hydro-electric power generation. Therefore, the focus is on water quantity. Since 1950, the Ottawa River has become one of the great hydro-electric power generation rivers of Canada. In both Ontario and Quebec, the energy generated in the Ottawa River basin is an important part of the total production, particularly when compared with the cost of alternatives such as nuclear or fossil fuels. On average, the value of energy generated in the basin is about \$1 million per day.

Recreation and navigation are also taken into account but hydro-electric generation remains the primary consideration. Fisheries issues are not factored into the decision-making process although some constraints have been built into the model.

Generally, the people on the system are used to the drawdown characteristics. Occasionally, some stakeholders would like to have the drawdown configuration changed.

#### **4.4.5 Communications and outreach**

There has not been a formal communications or outreach program with stakeholders although the website includes a public brochure (<http://www.ottawariver.ca/emain.htm>) that describes such topics as flow regulation, basin characteristics, flood problems, searches for solutions, and reservoir operations. In an effort to tap into public concerns, Public Liaison Groups are being set up by the Ministry of Natural Resources and the power operators. These groups do not report to the Board. During emergencies, if necessary, a press release can be issued to make the public aware of unusual situations.

#### **4.4.6 Water flow/level decision-making**

The Secretariat has a number of models including an optimization model and can do “what if scenarios”. It has added most key constraints into the model and run the model daily. Each day people who own dams or are responsible for reservoirs make their declarations.

Each day, the Secretariat receives elevation, discharge and inflow data and declarations of elevations or discharges from the four agencies comprising the ORRC. The declarations of level or discharge are for the next ten days (Streamflow Synthesis and Reservoir Regulation or SSARR short-term) or the following 14 weeks (SSARR mid-term, Tuesdays only). The model results are posted online for access by the member agencies and other agencies that are affected by the water management decisions.

As water released from any reservoir will pass through all downstream reservoirs and hydro-electric generating stations, a high degree of inter-dependency exists, and mutual cooperation is required in order that the maximum overall benefit can be obtained.

During the freshet period, there is constant communication, coordination and cooperation between the agencies of the ORRC. Data are collected and transmitted and models are run on a daily basis, including weekends in critical periods. Various agencies communicate and coordinate their activities on a daily basis and there is at least one conference call each week involving all agencies and the Secretariat. During these conference calls, the situation is discussed and operating decisions may be made, particularly in critical situations. In short, there is a comprehensive attempt to ensure that all agencies are fully informed and are involved in coordinating operating decisions.

Outside the freshet period, there is less exchange of information and coordination of operating decisions. Data are collected and the model is run once per week. There are no conference calls scheduled and there is very little communication involving all the agencies. There is still constant contact among agencies involved in operating reservoirs and generating stations that have direct impact upon each other.

Generally, operators make decisions to fit their needs keeping in mind the implications for others.

Secretariat costs are cost shared between Ontario (MNR and OPG), Quebec (Environment Quebec and Quebec Hydro), and the Federal Government (50%).

Capital repairs are handled by the owners. There is, however, some cost sharing on infrastructure (gauging stations).

#### **4.4.7 Balancing conflicting interests**

There is no conflict in the ORRC because decision-making is done through consensus. The Regulating Committee and the Board make the system work. The system also works because the Secretariat does not tell anyone what to do. Rather, it acts as a resource.

#### **4.4.8 Conflict resolution**

There are very few conflicts because of the decision-making structure. Recently, they have had difficulties with some people who are affected by flooding because of changes in land use laws have allowed people to build in the floodplain. These issues are being addressed through discussions.

#### **4.4.9 Decision support tools**

Three computer models have been developed or adapted during the study of the Ottawa River Regulation Planning Committee and these have since been enhanced with the addition of more information and new techniques. The three models are:

- Natural Inflow Forecasting Model – computes the statistical distribution of expected runoff based on precipitation and temperature data.
- Streamflow Synthesis and Reservoir Regulation (SSARR) Routing Model - Based on a model developed by the US Army Corps of Engineers, this model uses outputs from the Inflow Model and the declaration of reservoir releases or elevations to forecast flows and levels at all points within the basin.
- Model for Ottawa River Regulation and Optimization (MORRO) - Used to guide regulation of the reservoirs to maximize energy production while minimizing flood damage.

A Risk Management Model is also used to estimate the frequency distribution of weekly peak discharges at critical points in the system and a picture of future flood potential.

Meteorological, snow and hydrometric data are also collected. These data enabled calibration of the inflow forecasting model (Hydro-Québec) and initialization of the MORRO and SSARR models (Secretariat).

#### **4.4.10 Potential improvement opportunities**

The following are improvement that the water management staff would make if they could:

- Generally the system is working so well, staff would not want to change anything.
- Would have all data go through the secretariat and therefore, it would have more information to respond to questions and media.

#### **4.4.11 Other activities of note**

None were reported.

### **4.5 Tennessee Valley Authority (TVA)**

#### **4.5.1 Jurisdiction**

The Tennessee Valley Authority manages some 47 reservoirs for the purposes of hydro-electric generation (TVA, 2007).

#### **4.5.2 Organizational structure**

The TVA is Power Generation Corporation established under US federal legislation. It is headed by a Chief Executive Officer (CEO) who reports to a 9 member Board of Directors.

The Board members come from a wide variety of backgrounds and are appointed by company president for 9-year term. There are no government representatives on the Board. The Directors do not represent any particular interest. The Board sets the strategic policy direction which is implemented by the CEO. The Board does not deal with water management decisions.

There are several divisions in the TVA including the Reservoir System Operation and Environment (RSOE) division. The RSOE manages water levels and flows for the TVA.

The operation is funded from power revenues.

#### **4.5.3 Source of water management mandate**

The TVA's mandate comes from legislation established in 1933. The legislation states that the TVA will address recreation, conservation, flood control, and electrical generation.

The TVA prepared an Environmental Impact Statement (EIA) following the National Environmental Policy Act (NEPA) Guidelines for its operations. This led to the preparation of a reservoir operation study that sets out the operating policies and how the system will be operated for integrated needs.

The EIS was approved by Board and this approval is documented in a Record of Decision.

#### **4.5.4 Accommodating stakeholder interests**

The TVA tries to balance all the interests of the stakeholders consistent with its operating policy.

Recently policies have been changed in response to changing needs. For example, they hold the reservoir levels up longer, set minimum flows, and began managing for flow during summer months.

Some operating considerations include:

- Provide water to meet all downstream needs.
- Have proscribed times to lower and raise reservoirs.
- Start to fill the reservoirs in mid March to catch the freshet.
- Follow rule curves based on ranges. It has used over 100 years of data to create the rule curves. The operating practice is to operate within the historical bands and critical extremes.
- The TVA tries to run peak flows for power. It has identified how to manage the river to get maximum benefits. These peaks are adjusted to accommodate other needs where necessary.

The Policy integrates the variety of interests as best it can. No one interest takes precedent. Constraints at certain time of the year, however, may have greater influence. Navigation does have higher priority when water is of concern. They maintain a 9 foot channel in the river so navigation is seldom an issue.

#### **4.5.5 Communications and outreach**

The TVA has held a number of meetings with stakeholders to explain the policy and practices. An Advisory Committee that represents stakeholders meets every couple of months and provides

recommendations. A particular meeting may focus on a specific issue. The issue is introduced and discussed. The committee will then consider the issue and bring back some recommendations at a later date. The TVA will consider these recommendations and may or may not implement them. Regardless of the decision, the reasons for not implementing them will be explained.

These issues are generally handled at staff level while the Board will become involved in big issues.

The TVA has no formal education or outreach program but does go out and make a lot of presentations. A list of key groups to talk to and meet with is maintained. When talks are given the TVA tries to emphasize the importance of the system to encourage people to see their local issue in the context of the overall system while being sympathetic to the local issues.

Advisories are provided if there are capital works that affect stakeholders. These can be up to a year in advance of the work to allow people to plan for the disruption and potential loss of water.

The TVA website (<http://www.tva.gov/>) is a general information website. It does, however, provide daily water release information.

#### **4.5.6 Water flow/level decision-making**

The TVA runs an optimization model. The model contains all constraints brought forward by stakeholders and accepted by the TVA. These constraints are addressed first when making water management decisions. Any water that is left over is used for power production.

The following are some of the operating considerations:

- A pulse of water is discharged every 4 hours to maintain water quality.
- Sufficient flows are maintained to keep habitat wet and dissolved oxygen (DO) levels up.
- The ecological constraints were identified with the regulators and levels, flows and DO levels were set in late 1980's.
- The TVA collects DO levels with continuous monitors.
- Network provides real time data – levels, flows, DO.
- No snow data are collected because they are irrelevant given their climate.
- Flow and level data go into model.
- Staff is on 24 hour, 7 day a week, all year round.

#### **4.5.7 Balancing conflicting interests**

Day-to-day operations are pretty well accepted by stakeholders and, therefore, there are not many conflicts. People have been educated and kept informed about the system so they generally understand the decisions that are made. Despite this, the TVA staff field a lot of stakeholder inquiries. The water management staff consists of 3 people. Most of the conflicts relate to major changes for capital projects.

#### **4.5.8 Conflict resolution**

The key to resolving conflicts is the Policy, which was put in place so people understand the operating rules. Most conflicts can be resolved by referring back to the policy. Communications is the other key aspect of conflict resolution. TVA personnel are available to meet with people to explain the rationale for decisions.

#### **4.5.9 Decision support tools**

The TVA has the following support tools:

- Weather forecast.
- Optimization model that is quite sophisticated and being adjusted all the time based on experience. The model works well as a support tool. Water management remains a combination of art and science.
- Plants are all automated.
- There is an early warning system for people on the water downstream of dams that is integrated into the plant. The plant cannot start to flow water until the early warning system sounds. If it fails to work, then the plant will not start. The warning system includes sirens and lights. There are also warning signs below the dams to explain the system. The Schedule of Releases is published on the TVA website. In some dangerous areas, police will inspect downstream before the dam is opened.
- Press releases and warnings are issued as needed.

#### **4.5.10 Potential improvement opportunities**

None were identified.

#### **4.5.11 Other activities of note**

None were identified.

### **4.6 Rideau Canal**

#### **4.6.1 Jurisdiction**

The Rideau system forms a continuous navigation link 198km in length, connecting Ottawa and St. Lawrence rivers. The system drains an overall area of 4,640 sq km, of which 3,730 sq km flows northward via the Rideau River to Ottawa (Rideau Watershed) and 910 sq km flows southward via the Cataraqui River to Kingston (Cataraqui Watershed). The Rideau watershed contains four main reservoir lakes, all of which are operated by the Rideau Canal. The Cataraqui watershed contains ten reservoirs, five of which (Newboro, Opinicon, Sand, Cranberry and Colonel By lakes) are on the navigation route and are regulated by the Rideau Canal. The Rideau generally has lower flows and smaller dams than the Trent-Severn Waterway.

## **4.6.2 Organizational structure**

The water management decisions are made by the Water Management Engineer who has oversight of the entire system. The decisions are communicated to the Sector Supervisors who do flow adjustments in their specific areas. The Sector Supervisors also deal with the power companies.

The sectors are managed differently due to the nature of the system; the northern sector focuses on flows, while the central and southern sectors manage to levels. In non-navigation season, the sector supervisors manage the system. During the navigation season, the lock operators regulate the levels on the reach above their locks on a daily basis.

## **4.6.3 Source of water management mandate**

The mandate is derived from a similar legislative and policy context as the Trent-Severn Waterway. Specifically the legislation is:

- 1827 Rideau Canal Act
- 1867 British North America Act
- 1993 Orders-in-Council

## **4.6.4 Accommodating stakeholder interests**

Although the Rideau Canal was initially constructed for defence reasons and today the sole purpose of navigation, the Canal managers have recognized the requirement to satisfy a wide range of other water-based needs. These include:

- Navigation,
- Hydroelectric power,
- Municipal water supply and sewage disposal,
- Agricultural water supply needs,
- Recreational uses (boating, swimming, sport fishing, etc.),
- Year round development, and
- The natural environment.

In 1977, three main management problems were identified - flooding, water quality, and low lake levels. The outcome was a set of operating procedures for the major reservoirs and river reaches throughout the system, a runoff forecasting technique, and a number of civil works.

The Rideau managers recognized that its operating procedures were having a direct effect on the natural environment of the watershed and on the enjoyment of an ever increasing number of individual property owners and visitors to the Canal corridor. A Water Management Study was commissioned in 1994 due to a notable evolution in public attitudes and awareness of environmental and social issues since the 1977 study. The primary purpose of the study was to examine the environmental appropriateness of the policies and procedures and identify operational improvements.

A simulation model was developed which determines water levels and flow releases throughout the system on a year round basis, and operating policies were modified to meet fishery and recreational needs.

Water management issues were identified through a series of discussions with other agencies active in the two watersheds (Conservation Authorities, MNR, hydroelectric companies, MOE, and local municipalities that rely of the Canal for their water supply). In addition public meetings were held throughout the Canal corridor. Questionnaires were also distributed to various cottage associations and individuals. Through this process, issues were identified in each of the major water use categories including navigation, hydroelectric generation, flood abatement, recreation, and the natural environment. By far, the two most mentioned issues were water quality and changes to operating procedures that had fish/wildlife concerns. A number of operating adjustments have been made to accommodate spring and fall spawners. Canal managers saw a significant improvement in public attitudes after the 1994 study and the resulting adjustments that were made in their operations.

Each lake is managed for the relevant fisheries. Canal managers try to maintain stable flows during Walleye spawning and stable levels during bass spawning. They also try to stabilize for Lake Trout spawning. The levels were adjusted in late fall to put more water on the spawning beds and then drawn down in February to accommodate the spring freshet and minimize flooding. The Rideau is working with local groups that are re-establishing spawning bed. No formal agreements have been established.

To limit the impact on beavers, the Rideau sets winter levels early enough so that beaver houses are neither flooded nor frozen out. Critical river reaches have been identified.

#### **4.6.5 Communications and outreach**

Starting in February, bi-monthly meetings are held with various agencies including two Conservation Authorities, a water power company, the City of Ottawa, MNR, Public Works and Government Services Canada, and recently a cottage association representative to review water management strategies. These meetings allow the exchange of information on snow surveys, fish spawning times, ice conditions, etc. This helps in making decisions on how much water to hold back or release to meet storage and flow requirements. This forum improves communications with cottage associations. The cottage representative on the committee writes information articles for cottage association newsletters, and receives input from cottage association members, which is brought to the committee table.

The Rideau also gets involved as a partner and key agency in watershed plans and lake management plans. This is done through the Conservation Authorities and cottage associations. On larger studies, the Rideau staff is on the steering committee and attends the public open houses that are part of the study. As well, the Rideau's water management practices had a large

impact on the issues within the plan and the final outcome of the plan. The Rideau uses these studies to inform people of the parameters and constraints of water management and the responsibility and liability that they bare if something goes wrong. As a partner in the process the Rideau feels a responsibility to adjust the water management regime where possible to address concerns over fish spawning and drawdown or re-filling periods. Participation in these studies has helped the Rideau to make better decisions from a water management perspective.

The Conservation Authorities have lake stewardship programs that involve all lake associations. The Rideau participates in these lake stewardship program meetings.

Notices are sent to canal users along with media releases related to spring closures, poor ice conditions, navigation, and notices to shipping.

There is no public outreach involvement as part of heritage presentation programs. During outreach programs the Rideau talks about the advantages of the system.

#### **4.6.6 Water flow/level decision-making**

The water management decisions lie with the Rideau Canal. The feeling is that you need control to be able to manage such a complex system. The water managers, however, take into account other interests when setting the water management regime.

The Rideau manages within a range of levels around identified rule curves. In some cases, the rule curve has been modified to accommodate ecological needs. Where this is the case, efforts are made to respect the ecological constraints. Where there is a choice between meeting navigation needs or ecological needs, however, the default will be to navigation. The Rideau has identified areas within the system that are flow driven (e.g., riverine sections) or level driven (e.g., lakes).

The system has 3 sector supervisors that make day-to-day adjustments to the system. The lock masters have some discretion to make adjustments within a small range for the reach immediately above their lock.

A number of agencies are responsible for water resource management within the Rideau Canal system, including:

- Ministry of Natural Resources (MNR) - responsible for the management and protection of the natural resources including fish, wildlife, and forest management.
- The Rideau Valley Conservation Authority (RVCA) and the Cataraqui River Conservation Authority (CRCA) - responsible to maintain and improve the quality of the basin environment through watershed planning, co-operative resource management and conservation awareness, including the operation of a flood forecasting and warning system.

- Ontario Ministry of the Environment (MOE) - has an interest in the Canal system because of the effect on water quality.
- City of Ottawa is involved due to their role in the Rideau River Ice Management program, which is required annually to limit potential flood damages in the city.
- Power Company

During the freshet, beginning in February, bi-monthly meetings are held with various agencies to gather information and make water management decisions.

Up-to-date water level/flow information along with precipitation (both rain/snowfall) is used to evaluate any proposed adjustments to the system.

During the navigation season, a flow sufficient to maintain a minimum 5 foot depth throughout the Canal is drawn from the reservoir lakes. The majority of this flow is necessary to compensate for evaporation and transpiration losses, which frequently exceeds any runoff from rainfall during the summer (e.g., Big Rideau Lake loses 1-2 cm daily).

Operating policies are imposed on the system by setting priorities on the various uses of the water, and by setting limits to indicate when one use becomes more important than another.

The Rideau is not making plans or carrying out any studies related to climate change.

#### **4.6.7 Balancing conflicting interests**

Since the 1994 study the Rideau Canal has had more extensive consultation with stakeholders and has been proactively considering other stakeholder interests when setting its water management regime. Navigation still takes precedence when all interests cannot be accommodated. Considerable effort has been made, however, to adjust the management regime where possible to address local issues.

#### **4.6.8 Conflict resolution**

There is no formal conflict resolution process in place. Some people with concerns will write directly to the Minister responsible for Parks Canada. The Rideau participates in the response to these concerns. Improved communications has raised stakeholder awareness of the limitations faced by the Rideau. It has also opened lines of communications that allows for issues resolution.

#### **4.6.9 Decision support tools**

The majority of this information is now gathered electronically on a daily basis from 21 gauging stations along the system. The Rideau owns 18 gauging stations, all of which are automated. They also take advantage of gauging stations owned by the Conservation Authorities and Environment Canada.

Snow surveys are conducted by the Rideau Canal every two weeks during February and March to determine the amount of runoff that can be expected during the spring runoff.

Most of the dams require manual adjustment. This tends not to be an issue since the dams are close and accessible. Two dams are run by contractors.

#### **4.6.10 Potential improvement opportunities**

None were identified.

#### **4.6.11 Other activities of note**

None were identified.

## **5.0 General Conclusions on Keys to Success**

### **5.1 Jurisdiction**

Successful water management organizations have their jurisdictional bounds clearly established in legislation and policy. The Rideau had an Order-in-Council passed by the Province of Ontario in 1993, clarifying the Rideau's jurisdiction over its lakes and rivers. The same was not done for the Trent-Severn Waterway.

### **5.2 Organizational Structure**

The organizations that were reviewed as part of this project had a variety of structures, with the water management decision-making ranging from a single decision-maker (e.g., NYSCC and Rideau Canal), to a technical group (e.g., Lake of the Woods Control Board, OPG and TVA), to a consensus body (e.g., Ottawa River Regulation Control Board).

The circumstances varied. The TVA, OPG and Ottawa River Regulating Committee are all mandated to produce power as their primary objective. The TVA and OPG are answerable to a Board of Directors that has other concerns beyond water management.

The New York State Canal manages for navigation and, therefore, is similar to the TSW – except that the TSW is not as singularly focused.

The LWCB, TVA, OPG and Rideau are similar to the Trent-Severn Waterway in that they have multiple stakeholder interests to take into account.

It is evident that it is easier to keep the water management decision-making with a single person or unit within the organization. In fact most organizations have a technical arm that runs the models and either makes or proposes water management adjustments. This seems to work well provided the decision-makers have sufficient experience and the right tools to make good decisions and they factor in multiple interests. Some organizations do not have control of all the

dams on their system and this complicates water management when a dam operator is able to make adjustments outside of the overall water management regime.

It was not clear that any of the organizations other than the Rideau had internal ecology groups similar to the TSW. Most organizations seemed to draw their ecological expertise from outside agencies.

The variation in organizational structure amongst organizations similar to the TSW tended to separate the technical analysis and decision-making, policy decision-making, and public conflict resolution functions. This is done for a number of reasons including:

- One person can not adequately handle all these activities;
- These tasks require different skill;
- The technical analysts should be able to operate within clear policies and not have to be encumbered by a lot of stakeholder complaints and interactions;
- The decision-makers should be in touch with all of the client groups (i.e., stakeholders) and have a mechanism for receiving comments from stakeholders and factoring these into decisions. The decisions should be taken within a policy framework that is clearly and publicly articulated for the organization. This policy framework needs to be flexible and adjusted for changing needs and circumstances. Any such changes, however, must take into account the implications for the system as a whole;
- The policy framework must be clearly articulated by a senior, multi-interest entity that is accountable to the stakeholders through some political or legislative framework. The Lake of the Woods Control Board's accountability is set out in its legislation and bylaws. The Board Members are government appointees and are, therefore, ultimately accountable to the government and through them the people. In the case of the TVA and OPG, the operating framework is set out through Management Plans. The OPG's Management Plan is governed by the Ministry of Natural Resources' Water Management Guidelines. The TVA plan is derived from its Environmental Impact Statement. In both cases, failure to comply has consequences. These successful models use an integrated water management approach that sets operating policies developed in consultation with stakeholders. These policies are multi-focused and inclusive to the extent possible. It appears that the TSW's fear is that public safety will be jeopardized if navigation is not of paramount consideration. Every water management entity interviewed for this project made public safety paramount. Having said that, they also recognized that water management can and must accommodate other interests in a proactive way; and
- Successful implementation of a comprehensive plan where responsibilities lie with a variety of jurisdictions requires each of the responsible jurisdictions to buy into the plan and participate by delivering those elements of the plan that fall within their jurisdiction. This is particularly important in large systems such as the Trent-Severn Waterway. The responsible jurisdictions need to be at the decision-making table. Organizations, such as the Lake of the Woods Control Board, have the key responsible agencies on the decision-

making committee. This makes them accountable for the decisions and responsible for implementing those aspects of the decision within their jurisdiction.

In all cases, the elements of the decision-making process are:

1. Obtaining data and running models to understand what is happening in the system and forecast what will happen;
2. Having the experience with the system to understand the nuances of any decision;
3. Setting clear operating ranges that take into account the various objectives for each segment of the system;
4. Testing the soundness of water management decisions;
5. Communicating decisions and required actions to staff and other water management organizations that will make the necessary adjustments to the infrastructure;
6. Making the changes to the system; and
7. Monitoring the results of the changes and imputing these new data into the next cycle.

### **5.3 Source of Water Management Mandate**

Successful water management organizations have clearly articulated and documented mandates that are supported and promoted by senior management. These are usually tied to legislation and made readily available to the public.

Successful water management organizations have clearly articulated operating procedures that are tried and true. These usually have evolved over time based on experience, input from stakeholders, and adjustments to reduce conflicts. The more complicated the watershed and complex the stakeholder interests, the greater the importance for a clearly articulated legislative and policy framework. In Ontario, integrated water management plans are helping to set water management policies and procedures and bring the varied interests to the table. The process however, takes time and requires a commitment to hearing and responding to the interests that are brought forward. These operating policies and procedures must be publicly available.

### **5.4 Accommodating Stakeholder Interests**

The water management organizations that are experiencing minimal conflicts have a strong partnership attitude towards stakeholders. Generally, stakeholders focus on their particular area of the system and their self interest. If these interests are threatened without adequate explanation of the need to change water levels or flows, then conflicts arise.

Every water manager recognizes that these systems are complex and at the mercy of Mother Nature. Those that reach out to their stakeholders and make the effort to include and educate them, find that most people will also understand the challenges of operating a system that is influenced by climate, weather and seasons. Knowledge builds understanding and partnerships help to share the responsibility for the effects of water management decisions.

The organizations that seem to have fewer conflicts have one thing in common. They communicate well with their stakeholders and try to address their concerns in the decision-making process.

There were a number of concerns that were raised by the water management organizations interviewed. They mostly relate to water levels. The most common concerns raised were:

- **Navigation** – Concerns over navigation is fairly universal. This is both a safety and mobility concern. In those cases where navigation is required, it becomes the number one consideration. There tends to be no other objective that takes precedence over safe navigation. This does not mean that other issues are ignored. These other issues are accommodated to the extent possible while allowing for sufficient levels and flows to permit safe navigation.
- **Access** - Water levels are also important to commercial and private property owners along the systems. Sufficient depths are needed to permit access to commercial operations and access to the water system from the shoreline properties.
- **Flood mitigation** – This is also a key aspect of water level management for people living close to the system that must take precedence. Again this is a public safety issue. One concern that was raised by water managers was the problem of land use planning decisions allowing people to build within the flood plain. This is best handled by being proactive with land use planning agencies (e.g., municipalities) to identify flood prone areas and implement appropriate land use controls.
- **Fisheries** – The most significant aquatic concern that most water managers are asked to consider is fish spawning windows and migration routes. Fall spawners such as Lake Trout are potentially affected by fall-winter drawdown of reservoirs in preparation for spring freshets. Spring spawners such as Walleye require sufficient flows to provide oxygen and food to the eggs. Many organizations have worked with fishery interests to identify local water management objectives to address fisheries requirements. One operation (TVA) goes as far as establishing dissolved oxygen (DO) requirements, having continuous monitoring of DO and making flow adjustments to maintain sufficient DO levels in critical zones.
- **Wildlife** – Wildlife impacts were not a common theme but two aspects were raised relating to water levels. The first and most common concern was flooding of loon nests in the spring. The usual response was to try to establish and maintain stable levels during loon nesting periods. This is difficult given the volatility of water levels during the spring period. It is particularly challenging in riverine areas where the levels are driven by flows and are not easily maintained at constant levels. The second is the potential for freezing or flooding out of beaver and muskrat houses during the winter. Again it is a matter of establishing stable levels immediately before, during, and after freeze-up.
- **Water power generation** – All water management organizations have water power generation as a consideration. In many cases, it was the primary objective of the system. Where water power generation was the primary objective, it still did not take precedence over public safety issues such as flooding and safe navigation. In most cases, water

- management for power generation also factored in ecological considerations such as fisheries using an integrated water management approach.
- **Water quality** – This was an objective mentioned by many water managers, but did not have a significant affect on most water management regimes. Some, such as the TVA, provide water pulsing to maintain water quality in the system. Others simply maintain sufficient flow to provide for cleansing of the system.

In all cases successful water management organizations take a proactive and inclusive approach to dealing with stakeholder interests.

## 5.5 Communications and Outreach

Successful organizations minimize conflict by communicating with stakeholders through formal and informal outreach programs. The types of outreach/communications programs include:

- **Well maintained websites** – The best of these websites inform the stakeholders of the home organization, provides real time flow and water level information to allow stakeholders to plan their operations, provides forecasted changes to the system, and informs stakeholders about the complexity of water management.
- **Regular meetings with partners and stakeholders** – This provides an open two-way dialogue with those that help to implement the water management program (the partners) and those affected by the program (stakeholders). This open dialogue builds trust and understanding and spreads the responsibility for water management decisions to the partners.
- **Engaging of ENGOs** - Bring ENGOs to the table so they can advocate the complexity of the system. It helps to have ENGOs who tend to think more system wide to help buffer criticism from local interest groups that often are singularly focused.
- **Internal ombudsman** – This includes a guaranteed response time to respond to comments. The greatest source of criticism reported by water management organizations is from stakeholders who feel they are not being heard. Successful organizations respond quickly to inquiries with a response and an explanation. It is not expected that all requests can be adopted. When they aren't adopted, there should be an explanation. Wherever possible, efforts should be made to address valid concerns. This shows that the organization is listening and willing to adjust where it does not create larger problems elsewhere.
- **Advance notice** – It is important that stakeholders are given advance notice of major events within the system so that they can plan accordingly. Predictability is important. When the water management organization needs to make a major change to the system for infrastructure repairs then there should be a minimum of one year advanced warning to businesses and property owners.
- **Early warnings** – Early warnings are also important when there will be high or low water due to climate or weather events within the system. Successful organizations have a rapid early warning system through their website, the media, and email.

- **Receptive attitude** – Successful organizations look at stakeholders as a client group rather than adversaries and are proactive in seeking out and considering their concerns. This should not be surprising since many of the organizations are government run organizations that are expected to be answerable to the public.

## **5.6 Water Flow/level Decision-making**

Some guiding principles recognized in integrated water management strategies are:

- Comprehensive and integrated
- Proactive and predictable
- Responsive, flexible, and adaptive
- Consultative
- Fair
- Knowledge-based and science-based
- Timely and results oriented
- Accountable
- Clear and understandable
- Ecologically grounded
- Jurisdictionally integrated

These principles are embodied in the more successful water management organizations interviewed for this project.

To live up to these principles, organizations must have strong senior management commitment to the principles and an organizational structure that can deliver on the principles. There must be sufficiently trained staff to carry out the technical work as well as the communications/outreach program. Finally, there has to be sufficient human and financial resources to ensure that the program is delivered effectively and efficiently. This means enough manpower to make the necessary adjustments to the system throughout the year and be able to respond quickly to unforeseen events.

The systems are often large and complex. Many water managers indicated that effective management of these systems is both an art and a science. These systems often require minor tweaking to run effectively. If the organizations do not have enough resources or information throughout the year it is like tuning a violin while wearing boxing gloves. This results in coarse changes that create more sudden changes and volatility in the system than is desirable. These sudden changes then lead to a reactionary operation rather than a smooth proactive, managed system. It is this volatility and unpredictability that causes problems for stakeholders and creates conflict.

There needs to be partners in the decision-making process. The Ontario the Ministry of Natural Resources needs to help in meeting fisheries spawning windows. The Conservation Authorities

need to be at the table to ensure that all water management objectives are being met and to participate in data collection. The Canadian Coast Guard needs to be involved where decisions could affect navigation and boating safety. Municipalities also need to participate in the decision-making process to ensure that water levels and flows are sufficient to meet water and sewage needs and that land use decisions take into account flood zones.

## **5.7 Balancing Conflicting Interests**

The foregoing sections discuss the importance of bringing all of the interests to the table and maintaining an open and positive dialogue with stakeholders. It is not reasonable to expect that all conflicts can be avoided. There will always be people who have different agendas and objectives. These people will have to be dealt with through more formal avenues – perhaps even the courts. The goal should be to minimize conflict with the majority of interests through open and ongoing involvement.

## **5.8 Conflict Resolution**

Those that have public advisory groups and effective outreach programs, also have minimal conflicts. Many of these organizations, when asked what would they do to improve their operations said they would have more communications and outreach. There needs to be a formal and understood mechanism for raising concerns and having them addressed.

The following 9 principles of conflict resolution were obtained from the US Navy website on alternative dispute resolution (<http://adr.navy.mil/adr/principles.asp>).

### **1. Think Before Reacting**

The tendency in a conflict situation is to react immediately. After all, if we do not react we may lose our opportunity. In order to resolve conflict successfully it is important to think before we react--consider the options, weigh the possibilities. The same reaction is not appropriate for every conflict.

### **2. Listen Actively**

Listening is the most important part of communication. If we do not hear what the other parties are communicating, we can not resolve a conflict. Active listening means not only listening to what another person is saying with words, but also to what is said by intonation and body language. The active listening process also involves letting the speaker know that he or she has been heard. For example, "What I heard you say is....."

### **3. Assure a Fair Process**

The process for resolving a conflict is often as critical as the conflict itself. It is important to assure that the resolution method chosen as well as the process for affecting that method is fair to all parties to the conflict. Even the perception of unfairness can destroy the resolution.

#### **4. Attack the Problem**

Conflict is very emotional. When emotions are high it is much easier to begin attacking the person on the other side than it is to solve the problem. The only way conflicts get resolved is when we attack the problem and not each other. What is the problem that lies behind the emotion? What are the causes instead of the symptoms?

#### **5. Accept Responsibility**

Every conflict has many sides and there is enough responsibility for everyone. Attempting to place blame only creates resentment and anger that heightens any existing conflict. In order to resolve a conflict we must accept our share of the responsibility and eliminate the concept of blame.

#### **6. Use Direct Communication**

Say what we mean and mean what we say. Avoid hiding the ball by talking around a problem. The best way to accomplish this is to use "I-Messages". With an "I-Message" we express our own wants, needs or concerns to the listener. "I-Messages" are clear and non-threatening way of telling others what we want and how we feel. A "you-message" blames or criticizes the listener. It suggests that she or he is at fault.

#### **7. Look for Interests**

Positions are usually easy to understand because we are taught to verbalize what we want. If we are going to resolve conflict successfully, however, we must uncover why we want something and what is really important about the issue in conflict. Remember to look for the true interests of all the parties to the conflict.

#### **8. Focus on the Future**

In order to understand the conflict, it is important to understand the dynamics of the relationship including the history of the relationship. In order to resolve the conflict, however, we must focus on the future. What do we want to do differently tomorrow?

#### **9. Options for Mutual Gain**

Look for ways to assure that we are all better off tomorrow than we are today. Our gain at the expense of someone else only prolongs conflict and prevents resolution.

Successful water management organizations have managers who are qualified in dispute resolutions techniques dealing with the concerned public and resolving conflicts. It is inappropriate to leave this task to over-worked, under-trained personnel who are so removed from the decision-making process that they cannot make the necessary changes to resolve the conflict.

### **5.9 Decision Support Tools**

“We can’t manage what we don’t measure.” Successful water management organizations need real-time data at their fingertips and sufficiently sophisticated computer models to help make

decisions. The simpler systems can be run with simple models. Most managers of more complicated systems have sophisticated models that they are fine tuning on an ongoing basis. It is important to be able to run “what if” scenarios to test out system changes or possible climatic conditions to help in forecasting and planning future water management tactics.

These models rely on good up-to-date and real time flow, level and snow data. A sufficient network of automated gauging stations is desirable. It is no longer acceptable to have these data gathered manually. These networks, of course, cost money. Many organizations partner with other agencies that also need flow and level data to cost share the data gathering and distribution network.

These data are often shared through the website where the public can also see the data and make their own decisions about infrastructure adjustments at their properties.

There are also information needs that come from other agencies. Water managers need to know when certain fish species have moved into spawning areas in order to know when to set levels or begin holding water levels for spawning windows. In Ontario this requires cooperation with the Ministry of Natural Resources.

Table 5-1 provides a summary of the characteristics of the water management organizations discussed in this report and the Trent-Severn Waterway.

Table 5-1 Summary of water management organizations.

|                                    | Lake of the Woods  | New York State Canal  | Ontario Power Generation  | Ottawa River   | Tennessee Valley Authority  | Rideau Canal   | Trent-Severn Waterway  |
|------------------------------------|--|---|---|--|---|--|--|
| <b>Organizational Structure</b>    | <ul style="list-style-type: none"> <li>Board of Government Reps</li> <li>Technical reps</li> <li>Secretariat</li> <li>Public Advisory Group</li> <li>Year round staff</li> </ul>                   | <ul style="list-style-type: none"> <li>Part of NY State Thruway Authority</li> <li>Board of appointees</li> <li>Water managers quite removed from Board</li> <li>Year round staff</li> </ul>  | <ul style="list-style-type: none"> <li>Headed by a Board</li> <li>Board has little involvement</li> <li>Operate under Water Management Plan</li> <li>Steering Committee</li> <li>Public Advisory Committee</li> </ul> | <ul style="list-style-type: none"> <li>Board</li> <li>Regulating Committee</li> <li>Secretariat</li> </ul>   | <ul style="list-style-type: none"> <li>Power generation company</li> <li>Board has little involvement</li> <li>Implemented by operating arm</li> <li>Year round staff</li> </ul>            | <ul style="list-style-type: none"> <li>Water Management Engineer makes decisions and implements through Sector Supervisors</li> </ul>  | <ul style="list-style-type: none"> <li>Water Management Engineer makes decisions and implements through Sector Supervisors</li> <li>Seasonal staff</li> </ul>  |
| <b>Source of Mandate</b>           | <ul style="list-style-type: none"> <li>Legislation</li> <li>By-laws</li> </ul>   | <ul style="list-style-type: none"> <li>Legislation</li> </ul>   | <ul style="list-style-type: none"> <li>OPG has licenses of Occupation and Lease Agreements</li> <li>Management Plans under Lakes &amp; Rivers Improvement Act.</li> </ul>   | <ul style="list-style-type: none"> <li>Canada-Quebec-Ontario Agreement Respecting Ottawa River Basin Regulation</li> </ul>   | <ul style="list-style-type: none"> <li>Legislation</li> <li>Environmental Impact Statement (Set out integrated management approach)</li> </ul>  | <ul style="list-style-type: none"> <li>Legislation and Orders-in - Council</li> </ul>  | <ul style="list-style-type: none"> <li>Federal legislation and Orders-in -Council</li> </ul>   |
| <b>Stakeholder Interests</b>       | <ul style="list-style-type: none"> <li>Manage for most advantageous use</li> <li>Embraced through advisory members to board</li> </ul>   | <ul style="list-style-type: none"> <li>Navigation only</li> <li>Other interests not a priority</li> <li>Rule Curves with minimal flows for fish &amp; water quality</li> </ul>  | <ul style="list-style-type: none"> <li>Management Plan takes into account all interests</li> <li>Standing advisory committee</li> </ul>   | <ul style="list-style-type: none"> <li>Primary focus is water power generation</li> <li>Recreation and navigation considered</li> <li>Some fish considerations in model</li> </ul>     | <ul style="list-style-type: none"> <li>Try to balance stakeholder interests</li> <li>Recreation, conservation, flood control &amp; power generation</li> </ul>                              | <ul style="list-style-type: none"> <li>Navigation is primary concern</li> <li>Work with agencies and stakeholders to include other interests</li> <li>Operating policies are inclusive</li> </ul>            | <ul style="list-style-type: none"> <li>Navigation is primary concern</li> <li>Some other considerations factored in.</li> </ul>  |
| <b>Communications and Outreach</b> | <ul style="list-style-type: none"> <li>Published strategy</li> <li>Website</li> <li>Public meetings</li> <li>Public advisory group</li> <li>Review land use plans</li> <li>1-800 number</li> </ul> | <ul style="list-style-type: none"> <li>Very little communications with stakeholders</li> <li>Website with water data</li> <li>"Canal Tour"</li> <li>1-800 number</li> </ul>   | <ul style="list-style-type: none"> <li>Considerable effort is put into stakeholder communications</li> <li>Management plan process builds trust and understanding</li> </ul>  | <ul style="list-style-type: none"> <li>No formal outreach</li> <li>Website</li> <li>Public liaison groups being set up by MNR &amp; operators</li> <li>Model results posted</li> </ul> | <ul style="list-style-type: none"> <li>Public meetings</li> <li>Bi-monthly stakeholder advisory committee</li> <li>Website</li> <li>Issue resolution mtgs</li> <li>Presentations</li> </ul> | <ul style="list-style-type: none"> <li>Bi-monthly freshet meetings</li> <li>Partnerships</li> <li>Involved with watershed and lake plans</li> <li>Articles/newsletters</li> <li>Public advisories</li> </ul> | <ul style="list-style-type: none"> <li>Website</li> <li>Most meetings are issue oriented</li> <li>Public advisories</li> <li>Occasional stakeholder workshops</li> <li>No formal outreach program</li> </ul> |
| <b>Decisions Making</b>            | <ul style="list-style-type: none"> <li>By technical Board</li> <li>Secretariat Support</li> </ul>  | <ul style="list-style-type: none"> <li>By water management engineer</li> <li>Use rule curves</li> <li>No control over some dams</li> </ul>  | <ul style="list-style-type: none"> <li>Decisions by steering committee</li> <li>Standard operating procedures</li> <li>Conference calls</li> </ul>  | <ul style="list-style-type: none"> <li>Use consensus approach</li> <li>Decisions by Regulatory Committee</li> <li>Secretariat gives data and support</li> </ul>                        | <ul style="list-style-type: none"> <li>Optimization model</li> <li>Stakeholder interests factored into model</li> </ul>   | <ul style="list-style-type: none"> <li>Decisions made by Water Management Engineer in consultation with other agencies.</li> <li>Lock operators manage local water levels</li> </ul>                         | <ul style="list-style-type: none"> <li>Decisions made by Water Management Engineer</li> <li>Operating rules included in water power agreements.</li> <li>Some fisheries agreements.</li> </ul>               |
| <b>Conflict Resolution</b>         | <ul style="list-style-type: none"> <li>Through discussions</li> <li>Outreach and communications reduce conflicts</li> </ul>  | <ul style="list-style-type: none"> <li>Discussion</li> <li>Some court litigation</li> <li>Legislation helps in litigation</li> </ul>  | <ul style="list-style-type: none"> <li>Conflicts limited through dialogue and Steering Committee</li> <li>Consensus decisions</li> <li>Rules are clear</li> </ul>   | <ul style="list-style-type: none"> <li>Consensus approach</li> </ul>   | <ul style="list-style-type: none"> <li>Conflicts minimized by education and dialogue</li> <li>Documented policies minimize conflict</li> </ul>  | <ul style="list-style-type: none"> <li>Conflicts reduced by consultation process</li> </ul>  | <ul style="list-style-type: none"> <li>High degree of stakeholder conflict</li> <li>No formal resolution mechanism other than appeal to Superintendent</li> </ul>  |
| <b>Decision Support</b>            | <ul style="list-style-type: none"> <li>Hydrometeorologic data</li> <li>Auto -gauging network</li> <li>Simulation model for what if scenarios</li> <li>Weather forecasts</li> </ul>                 | <ul style="list-style-type: none"> <li>Building a model</li> <li>Some auto gauging</li> <li>Snow surveys</li> <li>National weather service</li> </ul>   | <ul style="list-style-type: none"> <li>Data gather network</li> <li>Do not use computer models because systems are fairly simple</li> <li>Conference calls</li> <li>Comprehensive database</li> </ul>                 | <ul style="list-style-type: none"> <li>Inflow model</li> <li>Optimization model is used.</li> <li>Data gathering network</li> <li>Conference calls</li> </ul>                          | <ul style="list-style-type: none"> <li>Optimization model</li> <li>Automated data network</li> <li>Automated plants</li> <li>Weather forecasts</li> </ul>                                   | <ul style="list-style-type: none"> <li>Data network</li> <li>Simulation model</li> <li>Some auto gauges</li> <li>Partnerships</li> <li>Snow surveys</li> </ul>   | <ul style="list-style-type: none"> <li>Snow surveys</li> <li>Model for reservoir lakes</li> <li>Rule Curve for Kawartha Lakes</li> <li>Some auto gauges</li> </ul>   |
| <b>Possible Improvements</b>       | <ul style="list-style-type: none"> <li>Local public advisory groups</li> <li>Interact with other water managers</li> <li>Hire a public relations coordinator</li> </ul>                            | <ul style="list-style-type: none"> <li>Better communications with stakeholders</li> <li>Better data</li> <li>Better model</li> <li>Public meetings</li> <li>Partnerships</li> <li>More control over all dams</li> <li>More theoretical rule curves</li> </ul> | <ul style="list-style-type: none"> <li>More consultation</li> </ul>   | <ul style="list-style-type: none"> <li>Better data</li> <li>Centralized data collection and management</li> </ul>  |   |  |  |

## **References**

Gobel, H. 2006. Personal communications with Howard Goebel, New York State Canal Corporation.

Lake of the Woods Control Board. 2007. <http://www.lwcb.ca/>

MNR, 2002. [http://www.mnr.gov.on.ca/MNR/waterpower/WMPG\\_WaterpowerMa.pdf](http://www.mnr.gov.on.ca/MNR/waterpower/WMPG_WaterpowerMa.pdf)

New York State Canals. 2007. <http://www.nyscanals.gov/>

Ottawa River Regulation Planning Board. 2006. <http://www.ottawariver.ca/>

Servos, D. 2006. Personal communications with David G. Servos, OPG-Evergreen Energy, North Bay, ON

Tennessee Valley Authority (TVA). 2007. <http://www.tva.gov/>