

**The Influence of Public Participation on Freshwater Management:
An Examination of the Regional Municipality of Waterloo, Canada's
Water Efficiency Master Plan Update**

By

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Abstract

Public participation is widely accepted as a necessary part of freshwater management and is seen as a way for the public to gain more agency in decision making processes. However, the tools used in creating public participatory programs can vary greatly depending on the context of the resource that is being managed.

This research demonstrates that the Regional Municipality of Waterloo in Ontario, Canada implemented a participatory program that focused on less interactive public participation approaches such as website postings, surveys and town hall meetings to update its Water Efficiency Master Plan. The use of a working committee allowed the Region to incorporate higher levels of interactions with the public. Nevertheless, the public participation approaches involved public input, critique, quantitative data and feedback that helped shape and influence the Water Efficiency Master Plan Update and water efficiency management in the Regional Municipality of Waterloo.

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Finally, I would like to thank my mother, father, brother, grandmothers and friends for their constant motivation and love while I was completing this thesis.

Dedication

I dedicate this thesis in loving memory of my grandfathers:
Gordon "Red" "Poppa" Collinson and Albert "Bud" "Gramps" Street.



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List of Acronyms

IAP2 – International Association of Public Participation

ICI – Industrial, Commercial and Industrial

RMOW – Regional Municipality of Waterloo

WEAC – Water Efficiency Advisory Committee

WEMP – Water Efficiency Master Plan

(I) – Information available from the creation of the WEMP Update

(O) – Observations of WEAC meetings

(Ss) – Survey with public (not WEAC)

(Sp) – Survey with proponents

(Sw) – Survey with WEAC members

Chapter 1: Thesis Introduction

1.1 Setting the Research Context

Today, public participation is accepted as an essential component for resource management (Webler and Tuler, 2002). There are many factors that inspire stakeholders to participate in resource management planning and implementation, however with the rise in health, environmental and economic concerns, public participation has become a key mechanism for creating new resource management plans. Involving the public is a way for populations to have a greater influence on decisions that will affect them. A holistic good understanding of context is critical in initiating public participation processes in resource management. Criteria that would influence the amount and type of public participation involved with a management plan include: the different stakeholders involved, the history of cooperation between the stakeholders, the power relations involved with a situation, the political nature of the issue, and the resource being managed (Mitchell, 2002).

Public participation in the management of freshwater resources is important because this resource is critical for many human needs including: health, quality of life, recreation, the economy and to natural systems. (de Villiers, 2002). Clean water is an important element underpinning a healthy working population and while the Canadian population may assume a quality water supply is readily available, recent events such as the drinking water contamination that occurred in Walkerton, Ontario and water use restrictions in Southern Ontario have pushed water issues into the public eye. Water is an important resource for economies and is estimated that water

makes a measurable contribution to the Canadian economy of between 7.5 and 23 billion dollars annually (Dearden and Mitchell, 2005).

In addition to human systems relying on water, these systems also impact the function of ecosystems. In Canada, “scarcity of supply, wasteful use, pollution, climate change and other factors combine to increase stress on aquatic ecosystems” (Brandes *et al*, 2005: ii). The bi-directional relationship between water and human systems is well documented and represents a key challenge for water resource planning. Freshwater might be the most important resource that we have available to use and public participation provides the opportunity for water managers to gather input from the public and provides the public with the opportunity to influence how water is managed.

1.2 Purpose and Project Scope

Public participation and the management of freshwater are both vast topics with many different paths to research. This thesis research is situated where these two topics intersect. The primary goal of this thesis is to assess *how public participation approaches can influence freshwater resource management*. Water resource planning does not occur in a vacuum, it is heavily influenced by particular contexts (Mitchell, 2002 and IAP2, 2006). This research sets general public participation and water management issues within a case study of the participatory processes that were implemented in the creation of the Regional Municipality of Waterloo’s updated Water Efficiency Master Plan (WEMP).

The public participatory approaches used in the creation of the WEMP Update set boundaries within public participation and freshwater research and focuses on *assessing how the public participation approaches that were implemented during the creation of The Region of Waterloo's Water Efficiency Master Plan (WEMP) Update influenced the Region's water resource management planning.*

This thesis topic is strongly based in human geography, the involvement of human agency and its role in resource management decision making processes. It is also important to include physical geography concepts including different aspects of groundwater and the hydrological cycle.

1.3 Research Boundaries

Water resources planning is a highly complex and dynamic process in any context. Four aspects of water resources planning are of particular interest to this research and the WEMP case study, and these four themes effectively establish the boundaries for this research.

Participatory approaches: This thesis examines the different participatory approaches in two contexts. It commences with a review and appraisal of public participation approaches and then moves onto a consideration of public participation approaches that were used in creating the WEMP including surveys, small focus group meetings, town hall meetings and advisory committees. Each of these approaches were assessed on their own merits and as a package by using material created for public participation practitioners.

Water management: There are many methods used to manage freshwater for human consumption such as water treatment, purification and water supply. Water efficiency planning and implementation of water conservation technologies are two common methods that water managers use to improve the water supply in North America. Water efficiency uses a number of conservation mechanisms to help the public reduce the amount of water they use. The main goal of the participatory processes implemented in creating the WEMP Update was to gauge which water efficiency measures were best suited for the Region of Waterloo.

Timeframe: The Master Plan was adopted by the Regional Council in mid 2006 and implemented in January 2007. This research is focused on events leading up to the adoption of the Update including looking at the original WEMP implemented in 1998. This research also looks at the Region's future water needs and how the Region plans to meet these needs. Specifically, if actions taken today through water efficiency measures implemented by the WEMP can reduce the need for future water exploration and infrastructure investment.

Geographical location: The physical location of this research is the Regional Municipality of Waterloo in Southern Ontario, Canada. Securing a stable water source is important to the Waterloo Region because it is home to a growing population and economy. Primary concerns for the region are: (1) potential water scarcity and (2) over-usage of water during periods of peak consumption.

1.4 Assessment of Public Participation Used in the Creation of WEMP

The over-arching research thrusts presented in section 1.2 and 1.3 is further developed to address a set of sub-questions that will guide the development and implementation of the research framework (see table 1). These secondary questions draw heavily from Abelson et al (2003). Water is a key component to this research and moving beyond public participation, some of the analysis also reviewed how water and water efficiency affected the process and amount of participation and the importance of water efficiency in the Region of Waterloo's future water plans.

Table 1.1: List of primary and secondary research questions

Primary research question

To assess how the public participation approaches that were implemented during the creation of The Region of Waterloo's Water Efficiency Master Plan (WEMP) Update influenced the Region's water resource management planning.

Secondary research questions

- 1) Who determines which P2 approaches are used?
- 2) Why were some approaches of P2 used over other ones?
- 3) When in the decision-making process was public participation sought?
- 4) How much time was given to public participation?
- 5) Was there mutual respect of other people's concerns?
- 6) How did water and water efficiency influence participation?
- 7) Can efficiency brought on by public participation relieve the need for other new water source projects

The assessment is broadened into four sections: (1) the types of public participation used in the 2007 WEMP Update, (2) how public participation was used, (3) overall assessment of the public participation used and (4) looking at public participation, used in the WEMP updating process in a broader context. By categorizing the assessment it will be possible to measure how successful the public

participation public participation approaches were in influencing the creation of the WEMP.

1.5 Structure of the thesis

This thesis is broken into 7 chapters. Chapter 1 outlines the major research question and the secondary questions that will be discussed. It sets out the goals and objectives for the thesis, provides context and stresses the importance of the research. The second chapter details the research framework that was used to complete the research for this thesis. Chapter 3 describes the theory that influences implementing public participation in resource management processes. Chapter 4 outlines how humans are influence freshwater quality and quantity and how water management through efficiency has the potential to reduce the need for water. Chapter 5 is an overview of the main case study for the research it outlines information on the Regional Municipality of Waterloo and its recently updated to the Water Efficiency Master Plan (WEMP). It shows the WEMP as one way the Regional government is working with its stakeholders to reduce the amount of water used, especially during periods of peak water usage. The assessment chapter (chapter 6) is informed by all of the other chapters. This chapter details the participatory approaches that were used in creating the WEMP and assesses them in terms of theory presented in chapters 3, 4 and 5. The final chapter (chapter 7) is a reflection on the assessment outlining key findings from the research. It is a broader look at issues of water management and public participation that moves beyond the case study to reflect on the need for future research to further understand how public participation can influence water resource management.

Chapter 2: Methodology

This research reviews the social processes implemented in public participation and how these processes can influence the management of freshwater resources. Water efficiency plans can help secure water for future populations, economic growth and environmental sustainability. These plans are socially constructed with the help of quantitative water usage data and from qualitative data that is collected through public participatory approaches. This thesis research uses qualitative research methods that aim “to understand a particular social situation, event, group or interaction” (Cresswell, 2003: 198). This qualitative data research allows different approaches to gather information and gain insight into the social interactions that occurred during the public participation component to the creation of the Water Efficiency Master Plan in the Waterloo Region and how these interactions were able to influence water management planning in the Region.

2.1 Research Framework

The four basic steps in the research framework, as presented in Figure 2.1, involve: (1) Conceptualizing the research, (2) Collaboration with the water management communities involved with WEMP, (3) In-situ research involving a variety of methods to collect data, and (4) Major findings including a case study assessment and reflection. This chapter follows the research framework, with short descriptions of each major step in the framework and the links amongst the steps.

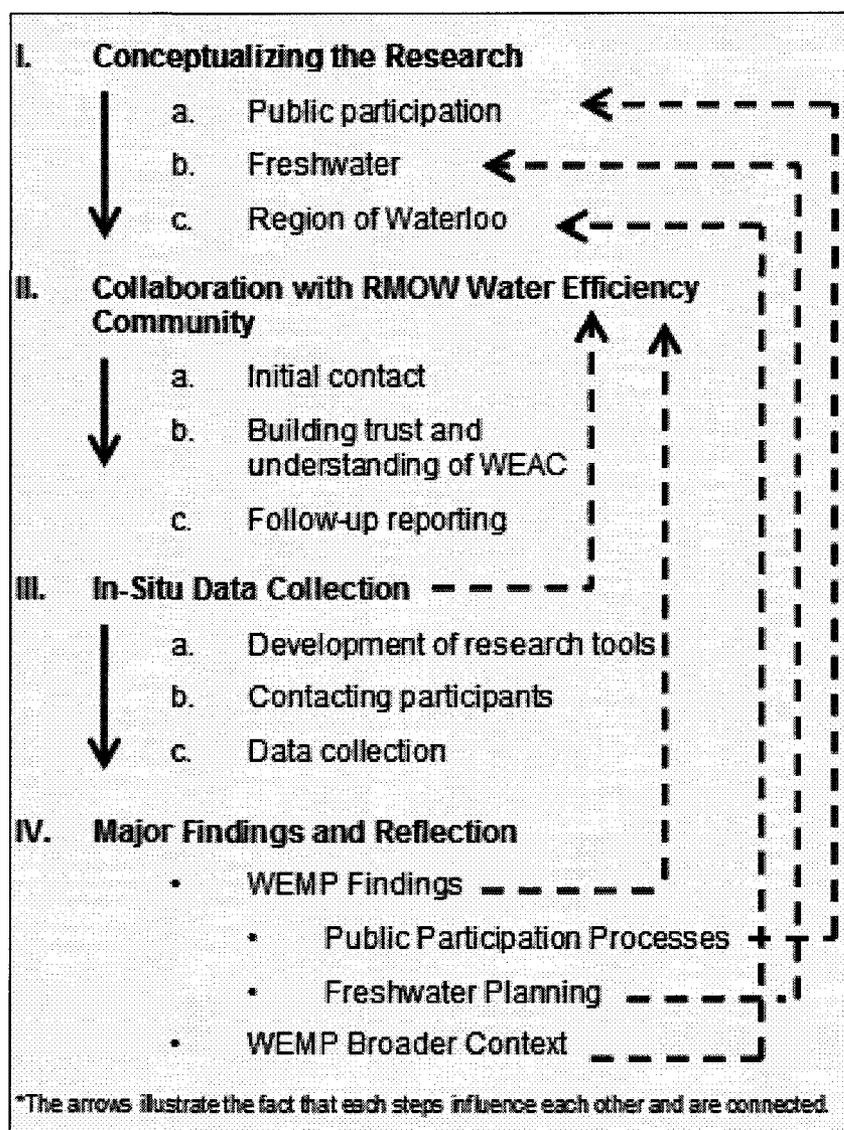


Figure 2.1: Outline of research framework.

In designing this research framework, a number of assumptions were made. The first assumption is that knowledge is socially constructed and therefore the research employs techniques to gain an understanding of the various reasons people participated (Cresswell, 2003). Another assumption is that as the researcher, I placed my own personally constructed knowledge and understanding of the situation into the open-ended and conversational-like interviews and committee observations. Although

every attempt was made to act with neutrality, there are cultural norms and personal history that influenced how I asked questions, interpreted committee meetings and research, which has become the case with contemporary social science research (Cresswell, 2003; Legard and Ward, 2003) . By acknowledging these existing presuppositions, this research attempted to minimize their impacts.

2.1.1 Conceptualizing the Research (Step 1)

The conceptualization of this research involved a number of different steps including reviewing documents for case study research set-up. It was important to obtain a greater understanding of the three main subjects for my research: (a) public participation and (b) freshwater management which is the main focus of the case study in the (c) RMOW. This involved reviewing literature, case studies, government documents and other information from the private and non-profit sector on public participation and freshwater resource management. Once it was decided to use a case study, it was equally important to gather the needed background information on the case study in reference to public participation and freshwater management.

Public participation (a): It was important to concentrate the majority of the research on how public participation is applied in natural resource management. Beyond natural resource management, it was important to review resources that were not specific to any discipline but critical to public participation¹. This process involved analyzing the theories that influence public participation today, as well as looking at

¹ Some key resource include: Arnstien, 1969, IAP2, 2006, Glicken, 2000, and Innes and Booher 2004, with a full account of the literature consulted in Chapter 3.

the International Association of Public Participation (IAP2), which is an important international public participation organization currently implementing and advancing public participation theories.

Freshwater (b): This research used on freshwater management specifically water efficiency planning. It was important to first compare Canadian water within global water use and supply and then to review the importance of freshwater to the economy, health and the environment. This provided a context to why public participation is important in creating management plans.

Region of Waterloo: setting up a case study (c): A case study provides an opportunity to contextualize this research. Stake (1995) discusses the importance of case studies in that:

We study a case when it itself is of very special interest. We look for the details of interaction with its contexts. Case study is the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances” (Stake, 1995 pp.xi).

The case study in the context of this research looked at the complexities that are involved with using public participation in freshwater management.

Setting up the case study involved grounding the research in a location. Financial realities required a case study relatively close by and Southern Ontario was chosen for its proximity to Carleton University in Ottawa, Ontario. The public participation processes needed to be completed within the past 2 years. This timeline was important so that the research focused on a case study not still in progress and would therefore not change throughout the duration of my research project. It was

also important to keep a timeline within the past 2 years so that participants would have the events in their recent memory. Within these temporal and geographical criteria, a search was made of local government websites and asked contacts within government departments for more recent public participation activities related to freshwater management. In Ontario, many municipalities and regions are implementing public participatory processes in creating water efficiency plans and there were a few examples that fit the criteria, notably, York Region and Niagara Region. However, the Regional Municipality of Waterloo was selected because not only did it fit the criteria, but it is considered to be a good example, by those that create water efficiency plans, of the use of public participation in creating these plans.

The different participatory approaches that were used in the Region were examined including: surveys, focus groups and town hall meetings. Of particular interest was the use of a multi-stakeholder committee, the Water Efficiency Advisory Committee (WEAC), to provide advice and different perspectives to staff and decision makers in the Region. The creation of the WEMP Update was a complex process and it is through both indirect research and direct interviews with participants and managers that this research assessed how they were able to influence the final plan.

Background research was important for gaining a perspective on water resource management in the Waterloo Region, including its historical management and public participation's influence on this management. This research included information available on the creation of the WEMP Update, including the original WEMP. The RMOW was a source for water resources material, including the

WEMP itself, the work of the consulting firm either in research reports or recommendations for the WEMP, recommendations to council, WEAC meeting minutes, and reports provided to the committee from staff.

2.1.2 Collaboration with the Water Management Communities Involved with WEMP

To understand the processes that took place in the creation of the WEMP Update, it was important to go beyond written material and discuss the process of water management with those that were involved. This was completed by contacting and presenting information to stakeholder and proponent groups to explain the research interests and to gather a better understanding of the mechanisms used by the proponents to gather public input.

Initial Contact (a): After some preliminary research with Environment Canada employees about public participation and water management in Canada, it was suggested to contact the water manager with the Regional Municipality of Waterloo, because they had a number of water related programs that used public participation. It was through this contact that the entire research processes started

Visiting the Region before formal interviews took place allowed me to gain perspectives and contacts that were unavailable to me in Ottawa. My visit with the water resource department at the RMOW was helpful in my preliminary research. The department provided me with a hard copy of the WEMP Update, the questionnaire that was used to gather information and historical records of the WEAC.

Building trust and an understanding of WEAC (b): Another component of the initial contact involved attending WEAC meetings to gain a first-hand understanding of how the committee operates, the level of membership participation, and was an opportunity to introduce myself for further follow-up with interviews. I was given the opportunity to present my research plan to the committee. This presentation allowed me to gain recognition and to establish myself and help build trust within the committee. It was an opportunity for me to let the committee know of my interests and it also served as an opportunity for them to ask me questions on my research. In the following months I was able to attend another meeting which, I believe helped to establish a sense of the importance of the committee to my research. Attending the meetings also gave me an opportunity to view how the WEAC worked in person. In the end I was able to interview a majority of the WEAC committee and sit in on all of the WEAC committee meetings between June 2007 and April 2008.

Follow-up reporting (c): Follow-up reporting was done through three different methods. The first was through informal follow-up emails and meetings to discuss my research and water efficiency in the Region. The second mechanism was a short letter that I wrote to my research participants to thank them for participating in the process and to let them know the current status of my project. WEAC has asked for a presentation of my research at a future meeting to present my findings and present them with a copy of the final thesis.

2.1.3 In-Situ Data Collection (Step3)

Performing research in the Region was a critical aspect of my research. It was my interviews with key participants in the creation of the WEMP that informed my final assessment and reflection on the process. This section outlines the different research methods used and challenges that were faced to complete my research. While in Waterloo, local university libraries were used to access information that would have been much more difficult to access from Ottawa.

Development of research tools (a): Conducting interviews was the main research approach used to gather information. The following section describes the in-depth interview techniques, how questions were chosen, how participants were chosen, and includes example questions. Interviewing allows researchers to gather information while grasping the different points of views of varying participants in a study (Legard and Ward, 2003).

An in-depth interview is an opportunity to create a clearer understanding of the various actors involved with public participation in Waterloo Region. In his text *The Long Interview*, Grant McCracken describes the interview process as “one of the most powerful methods in the qualitative armory[...] the method can take us into the mental world of the individual[...] to see and experience the world as they do themselves” (1988: 9). It was the goal of these interviews to allow interviewees to express ways they participated thus enabling me to construct how the public participation process influenced water efficiency management in the Region of Waterloo.

Development of questions: The interview component of this research was an important method for gathering information from those that participated in the creation of the WEMP. It was essential to develop questions that would both put the interviewee at ease, but also procure as much information about the processes as possible. Two main groups were interviewed: those that created the process and those that influenced it through public input. Since the role of these groups differed greatly, it was important to create different questions for each group. However, for both groups there was some overlap. Specifically, the opening and closing questions were all the same. All the questions followed the main themes, outlined in the secondary questions. Specific questions were asked to the participants about their participation and the role that their other responsibilities had in influencing their participation. In total, there were four sets of questions that were used to initiate longer interviews. Each of these sets of questions involved some research into the backgrounds of the people that were interviewed to allow for productive interviews so that questions were geared towards them. Many of the questions led to follow-up questions and other points made by the interviewees that were not planned, but added much to the research process.

Contacting participants (b): Initially, it was my intention to speak with public participation participants in the WEMP who came from different socio-economic positions in the Region, and who participated in various elements of the public participation plan. The first challenge of the research project was the difficulty in

tracking down interested parties that participated in the creation of the WEMP. This proved difficult for two main reasons: first, there were not as many participants as originally expected. Participation levels were low at town hall meeting public participation s, and very few people filled out surveys at information booths. The second challenge was that those who did participate were also protected by privacy laws and ethics policy from the Region of Waterloo. For this reason, neither the Region nor the consultants who implemented the participatory research and processes could allow me to use their participant contact information.

With these challenges in mind, it was my responsibility to contact participants and let them know about the research. In an attempt to access participants, the research was advertised in local community social networking and bartering websites, and on community poster stands. In addition to these advertisements, a local telephone number and mailbox was purchased to eliminate any long distance fees to Ottawa, Ontario. Unfortunately, these mechanisms only procured one participant. Through word of mouth, I was able to speak with two other participants, beyond the WEAC and the Regional Staff. However, contact was made with two key groups: the Water Efficiency Advisory Committee and the proponents that created the Region's participation process interviews focused on members of these groups. The second group comprised of employees of the Region and consultants that were hired by the Region. This was important to take into consideration when designing which questions needed to be asked and how to ask them. See Table 2.1 for a summary of the methods used to collect primary data for this thesis.

Table 2.1 Summary of primary data collection		
Method	Total	Dates
Long interviews	15	Between September 2007 and February 2008
WEAC meeting observations	2	September 12, 2007 November 13, 2007
Presentations to WEAC	1	September 12, 2007
Informal discussions	8	Various between January and September 2007

Data Collection: Interviews and observations (c): All interviews were seen as a flow of conversation about the WEMP, the WEAC and the future of water efficiency in the Waterloo Region. Legard and Ward (2003) outlined a six stage approach to interviews, which was used as a basis for my research interviews (See Table 2.2 for a depiction of Legard and Ward's approach compared to the approach used in this research). Legard and Ward's approach was modified in two ways: (1) expanding the interview stage and (2) by adding a post interview follow-up step. Below is a description of the process that was taken to perform the interviews. Common elements were used in the interviews to gain different perspectives about these elements.²

² See Appendix A for versions of the questionnaires used to create a dialogue of information during the interview process.

Legard et al 2003	For this research
1) Arrival	1) Arrival and interview set-up
2) Introducing the research	2) Introducing the research
3) Beginning the interview	3) Explain structure and themes of interview
4) During the interview	4) Formal interview
5) Ending the interview	5) Follow-up questions
6) After the interview	6) Ending the interview
	7) Mover out of the interview
	8) Post interview follow-up

(Source: Legard and Ward 2003: 144-146).

Stages in the interview: The interview setup (*stage one*) involved introducing myself, the research interests and why the particular interviewee was important to my research. If the person agreed to be interviewed they were given further information concerning ethics approval, sample questions and the theme of the interview itself. All of the interviews were conducted via telephone or in person, with the majority of the interviews done in person to gather non-verbal information. It was important to ensure the participants were in a comfortable location, with few distractions. This helped to make the interviewee comfortable and open to discussing their role in the participation process in as much detail as possible (Legard and Ward, 2003). After initial introductions, the interview was started without recording it, with some small talk, leading to a consent letter³, the interviewee's rights, an explanation the research goals and the structure and themes of the interview (*second and third stage*). Once the consent form was signed or verbally authorized, the recording of the conversation started (which began the *fourth stage* of a formal interview) (ibid, 2003). The formal stage involved asking background questions such as: *can you tell me a bit about yourself and your background in the community?* These background questions

³ See Appendix B for a copy of the consent letter

helped the interviewee to relax because they were answering questions they were comfortable with, which set the stage for the further dialogue on later questions in the interview. In the *fifth stage* worked through the main themes and questions which also included any follow-up questions that would keep the conversation moving along the current theme. The *sixth stage* started the wrap-up of questions, mentioning that the final questions involved thinking beyond the current WEMP and about the future of water resources in the Waterloo Region and how water efficiency could play a role in how the Region manages its water supply. The final question was always: *in preparing for this interview you might have thought of things that I was going to ask you about. Was there anything that I did not ask you that you would like to comment on or something that you thought of later that would like to add?* This open ended question gave the interviewee an opportunity to add anything, and also acted as an opportunity for me to gather information on issues that were not initially apparent. Once the formal interview was completed, there was a formal away from the interview (*the seventh stage*). If the participant did continue with more conversation, the interview could move out of the seventh stage and back to stage six. *The eighth stage* occurred after the interview was completed, where post interview follow-up thank you notes were sent and asked if there were any further questions. Each stage of the process is critical for the overall information provided during an interview. The interviews provided first hand insight into the public participation that took place in creating the WEMP Update and many of them led to new contacts that were also very beneficial to the research.

Observing social interaction is another way in which to gather qualitative data (Layder, 1998). Observational data allows for a better understanding of how a group interacts and how power is shared within the group. Simply observing the interactions of a group may help with other research techniques such as interviewing participants. As an outside observer, I was able to see how the public participation process works within the WEAC. Most of my data is comprised of casual observations, however before going to the meetings, I had a short list research questions that I wanted answered⁴. I did not interact with the committee while it was undertaking official business. The internal observational questions that I created analyzed how water was discussed (as a social, economical or physical resource), how the meeting was run (official committee), who participated and how did they participate, how did others react to their participation, who controlled the conversation, and who attended the meetings (any members of the public).

2.1.4 Major Findings and Reflection

Using primary and secondary questions as a guide, I reviewed the data collected, research notes and recordings. The assessment first looked at each of the public participation tools that were used in the creation of the WEMP and then the use of various levels of participation. It then evaluated the public participation process as a whole, in terms of three themes: (1) factors that influenced participation rates, (2) how the RMOW defined the public and (3) overall influence of the public participation program. Coding the information under the research themes provided an opportunity to review the collected data and see common themes. The analysis and

⁴ See Appendix C for a copy of questions and minutes from WEAC meeting presentation

concluding remarks also highlighted some key findings in the broader context, beyond the WEMP Update and how research on public participation and freshwater management can be expanded on for future research.

2.2 Summary

This research framework includes some of the assumptions that were made during the creation of this thesis in its entirety. It explains many different methods of gathering data to understand how public participation influenced freshwater resource management. Using the creation of the update to the Waterloo Region's Water Efficiency Master Plan provided the necessary context for a better understanding of the relation between public participation and freshwater management. Through collected information on this case via interviews with key participants in the creation of the plan, document research and observational data, this research analyzed public participation in the Region, as well as gained a better understanding of how the social process of public participation can influence freshwater resource management.

Chapter 3: Public Participation

Citizens have also recognized a need to become more involved in resource management and are routinely demanding opportunities to provide input. This trend reflects several factors including dissatisfaction with current government institutions, a belief that elected officials lack the ability to fully represent citizen's concerns and a possible cultural change that is demanding more control over public policies (Brunckhorst and Reeves, 2006; Dale and Newman, 2007; Lane, 2005). Creating opportunities for public participation during the planning, implementation and monitoring of the management of natural resources represents an opportunity to enhance water resource management. With growing concerns about resource scarcity and human well being, analyzing how public participation can increase confidence in public decision making processes and use of freshwater resources is vital.

3.1 Public Participation: What is it?

The IAP2 provides a very broad definition of public participation stating it is “any process that involves the public in problem solving or decision making and uses public input to make decisions” (IAP2, 2006: 2). Mitchell (2002) takes a somewhat more restricted view and defines public participation as a way to empower local people to create a sustainable resource management process, by providing them with opportunities to participate and inform the process. To empower implies that the public will have an influence on the final decision (ibid, 2002). Although this might be true in some cases, it is important to note that public participation does not always

increase empowerment. One such example is when the purpose of public participation is to seek validation of a decision that has already been made (Mitchell, 2002). In this case, public participation would provide an alternative for data gathering but would not be empowering.

In its simplest form, public participation is defined by creating an opportunity for human agency. Harvey (2002), as reported in Dale and Newman, defines agency as “the capacity of a persons to transform existing states of affairs” or it can be defined as a person’s ability to respond to ideas that are not within his or her sphere of influence yet enable the creation of change (Dale and Newman 2007: 57). In the IAP2 definition, agency is implied, however by not including empowerment as Mitchell does, public participation from the IAP2 perspective could occur with varying degrees of agency.

Clearly there is much debate by practitioners and researchers regarding the definition of public participation, how it works and who should be involved (Thereon *et al*, 2006). Since there is no clear definition of public participation, I bring together the various definitions of public participation into my own definition: *Public Participation in Resource Management is any process that involves the public and promotes human agency in decision making processes.* This definition places emphasis on both human agency and the public. The term public is used here to include individuals and groups that will be affected by the outcome of a decision (IAP2, 2006) and thereby includes citizens, interest groups, industry, corporations and governments agencies that are not the proponents. This definition emphasizes the inclusion of the public in a decision making process, even if the input from the public

is not used in the final decision. Even if input does not influence the decisions made, public participation could help the public understand the issues that are faced by those trying to manage resources, thus creating an opportunity to increase empowerment and human agency in decision making processes.

3.2 Defining Stakeholders and Interested Parties: Who should be involved?

An ideal public participation process should include many stakeholders, such as organized interest groups, profit and non-profit organizations, planners, public administrators, mass media, industry, other governments, First Nations and citizens (Innes and Booher, 2004, Webler and Tuler, 2002). It is important to question who should be involved in a public participatory process. Stakeholders in a project are seen as key participants and it is important to have an understanding of who the stakeholders are for a particular project. The 2002 Earth Summit states stakeholders “are those who have an interest in a particular decision, either as individuals or representatives of a group ... [including] people who influence a decision, or can influence it, as well as those affected by it” (From Earth Summit, 2002, in Brklacich *et al*: 1, 2006). This corresponds well with how the IAP2 defines the public as “any individual or group of individuals, organization or political entity with an interest in the outcome of a decision” (IAP2, 2006:5). Both definitions stress an importance on how different people are interested in or are affected by a decision. When using the terms stakeholder or public to describe interested individuals or groups, it is also important to understand that these are just generalization of a complex network of interests. For example, Environment Canada's *Handbook on Public Participation*

explains that the term stakeholder can be used as a catch-all label to describe any party interested or affected by a situation and that

"care should be taken when using the term 'stakeholder'... this terminology can be inappropriate and potentially offensive. This is because it lumps together all participants as equal players without recognizing that some participants may hold a greater right to influence decision making than others, based on how the issue impacts them." (Environment Canada 2007: 5).

The term stakeholder does not have a universal meaning and it is important to define the term when creating participatory approaches in freshwater management, because there are different stakes by various holders including obligation to act and authority to exercise their preferences.

3.2.1 Stakeholders and Geographic Scale

Water resource management projects can move well beyond regional boundaries (Mitchell, 2002). For example, it is common for river systems to cross national borders. A few key examples of international river systems include the Mekong Basin (China, Myanmar, Vietnam, Thailand, Cambodia and Laos), the Nile river (Burundi, Congo, Rwanda, Tanzania, Uganda, Kenya, Eritrea, Ethiopia, Sudan and Egypt) and the St. Lawrence river (Canada and the United States), the international status of the water that flows through these countries raises many complex legal and political issues for water management (Waterbury, 2002 and Mekong River Commission, 2005). How one country uses the water while it is in their country can influence the amount and quality of the water when it reaches other downstream countries. Public participation in water resource management is often focused on local stakeholders. With larger projects, such as the management of

transboundary river systems, organizations such as those set out by the European Community Water Framework use an international participatory approach to incorporate both regional and international stakeholders in decision making (Giordano *et al*, 2007). Similar concerns are not limited to international boundaries and could also be present within interregional bodies of water that are found within one State (Saskatchewan and Mackenzie Rivers in Canada). Growing water concerns that cross geopolitical boundaries lead to the question of whether or not international groups or interregional groups should also be included in public participation processes.

3.2.2 Future Generations: A Missing Stakeholder?

The inclusion of future generations as a stakeholder is assumed to be part of the Earth Summits definition, however without specific mention of this important affected group, they may be forgotten. One of the key concerns of sustainable development, defined by the Brundtland report, is to "meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987: 24). By considering the needs of future generations, resource managers include the needs for future population and economic growth, but also the potential impact of future environmental problems such as those brought on through climate change. The inclusion of future generations could be a difficult task in freshwater management because multiple assumptions need to be made in order to understand future needs. A possible way to include future generations is to use a First Nations approach to decision making which is to nominate one person who is

involved in the decision making to consider the plan from the possible perspective of future generations. This way they act as a representative of this stakeholder group (Mitchell, 2002). The Earth Summit in Rio de Janeiro provided an inclusive definition, involving those that are affected by a decision instead of only those parties which can influence a decision and it is used to define stakeholders for the remainder of this research. In using the Earth Summit's definition it will be important to keep in mind future generations and the geographical radius of water resource management. This can be accomplished by acknowledging and respecting the different levels of participation and interest by different stakeholders as noted by Environment Canada.

3.3 Different Degrees of Participation

Resource managers have various reasons for including the public in the management process, which in turn creates many types of public participation. Arnstein's (1969) ladder of citizen participation provides a useful conceptualization of the degrees of participation and the amount of decision making power held by the public (Diduck, 2007; Lane, 2005) (see Figure 3.1 for a depiction of Arnstein's ladder). Arnstein's ladder was instrumental to public participation research, and though her theories have been expanded and critiqued by many public participation researchers, her basic ideas are still critical to public participation (See IAP2). A review of Arnstein's ladder of public involvement provides a historical and practical understanding of the different reasons for public participation, the possible power sharing that could take place, and how this depends on the goals of the water managers or planners (Mitchell, 2002). Specifically, Arnstein divides the different

participatory methods into eight ladder rungs, each of which are then divided into degrees of participation. The first and second rungs on the ladder show the method of public participation occurring through (1) Manipulation and (2) Therapy. In both cases, government agencies dominate and the other stakeholders are coerced into an understanding of the management process. The next three rungs (3) Informing, (4) Consultation and (5) Placation are seen as a type of tokenism in participation because the public still lacks the power to ensure their views and advice are incorporated into the management plan (Lane, 2005). The final three rungs allow the public to work directly with the proponents of the management plan. From creating a Partnership in which there can be some negotiation to Delegated Power and Citizen Control in which there is a shift to move decision making authority away from the controlling interest groups towards a partnership between the public in the resource management planning process (Arnstein, 1969). Arnstein's ladder has influenced public participation for almost four decades, and not surprisingly it has received critique. A main critique of Arnstein's work questions why there needs to be an allocation of decision making power for participation to be meaningful (Dorley, *et al*, 1994). This critique suggests that participation that does not allocate any decision making power to the public can still be meaningful and will influence final decisions.

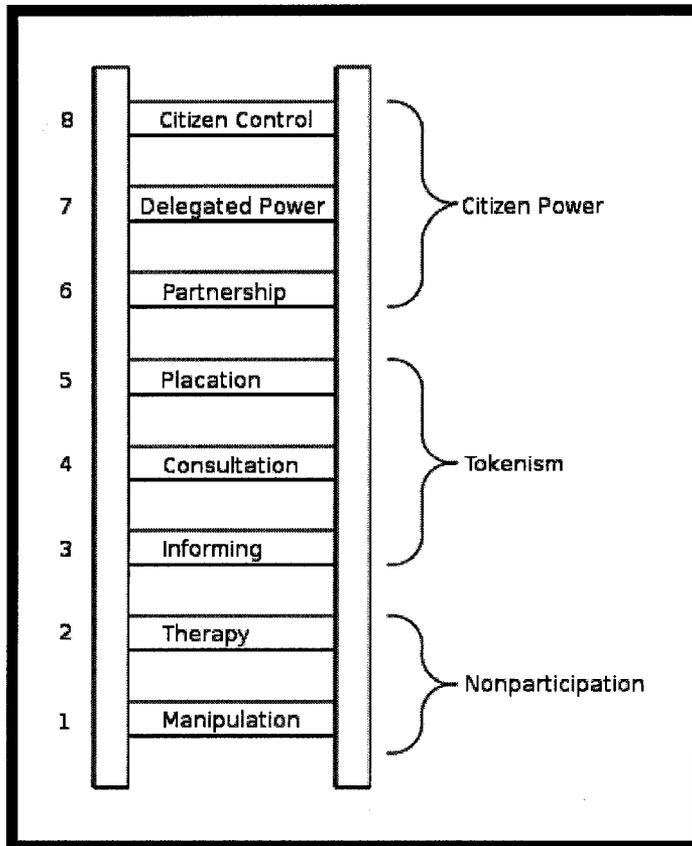


Figure 3.1: Eight rung ladder of citizen participation (Arnstein, 1969)

Another issue with Arnstein's ladder is that it depicts separate rungs, however, in reality, there could be a number of methods used at one time which would influence the degree of participation (IAP2, 2006). For example, it would be important to inform the public of a proposed plan before there is any type of delegation of power to the public. The ladder depiction is critiqued for the reason that it is tiered, thus implying a hierarchy of the methods when, in reality, actual degrees of participation could vary greatly between the different rungs. The degree of involvement might increase up the ladder, but the methods at the top of the ladder are not necessarily superior to those at the bottom. For example, a water planner could consult (Rung 4) with over 1000 people or groups for their opinion on a matter, or they could work closely with 40 people on an integrated plan using degrees of citizen

power (rungs 6-8). One version is not necessarily better than the other, but it is important to recognize that one approach provides broader consultation while the other provides intense involvement of a limited spectrum of the public.

The International Association for Public Participation has expanded on Arnstein's work and through dialogue with public participation practitioners created a public participation spectrum (see Figure 3.2) This spectrum looks at the different degrees of participation in a similar manner to Arnstein, yet takes into account the criticism of Arnstein's ladder by using a non-hierarchical approach. In the IAP2 spectrum, as the approaches move from left to right, the level of public impact increases and therefore, to use Arnstein's theory, so does the degree of participation. One major difference between the two conceptualizations of public participation is that the IAP2 regards each step as equally important to the entire process. Depending on the needs of a project, the required amount of public input will differ. In many cases, the IAP2 suggests that many different levels should be implemented in every public participation process. As outlined in the spectrum, each level has its own goals and a promise to the public of informing them of what is expected of them in the public participation process. Each of the five sections along the spectrum (to (1) inform, (2) Consult, (3) Involve, (4) Collaborate and (5) Empower) are considered public participation even if there is not any allocation of power to the public (IAP2, 2006). Because IAP2's spectrum has been updated and incorporates Arnstein's original ideas and was created through consultation with public participation practitioners, this thesis used the IAP2 spectrum as a base to compare the level of

participation used within different participatory approaches during the WEMP Update.



Figure 3.2: IAP2's Public Participation Spectrum (IAP2, 2006).

3.4 Public Participation Mechanisms

In Canada, there are many different mechanisms or approaches used to involve the public in freshwater management. Some of the different forms of public participation include public hearings, town hall meetings, smaller interest groups, on-line groups or workshops and questionnaires (Wang and Chen, 2006; Forrest, 1998). Finally, through the mass media, brochures, pamphlets and advertisements can be used to inform the public of issues and, if available, ways that the public can participate (Wang and Chen, 2006).

The examples given above are not an extensive list of mechanisms and often many of them are used within a water planning project. Many different groups of approaches are often employed when designing a participatory process (IAP2, 2006).

A combination of these mechanisms of public participation could maximize public input because each may have varying results. For example, a meeting or committee would only reach a limited number of stakeholders, but the input received could be very valuable. In comparison, questionnaires and surveys have the ability to query a large selection of the population, however the feedback from this form of public participation is not always as useful as that which would be collected from meetings or a working committee (Wang and Chan, 2006). There is not one mechanism that is necessarily better than the other, each mechanism has benefits and drawbacks. To help design participatory programs it would be useful to have a classification method for different mechanisms to help planners determine the level of participation and which technique should be used.

Both Mitchell and IAP2 have designed public participatory classification schemes. Mitchell used basic functions to group the public participation techniques into four thematic areas: (1) information-out, (2) information-in, (3) continuous exchange and (4) facilitating consensus. While the IAP2 breaks public participation into three basic forms of communication; (1) sharing information, (2) collecting and compiling input and (3) bringing people together (IAP2, 2006) (Table 3.1).

Table 3.1 Comparison of categories of public participation		
Mitchell	IAP2	This research
<i>Information-out</i> : provides enough information to meet the needs and wants of those that have a key interest in the problem. (ex. Advertisements, public meetings)	<i>Share information</i> : Allows for the dissemination of information to the public. (ex. News releases, fact sheets, non-interactive web sites)	<i>Share information (IAP2)</i>
<i>Information-in</i> : involves giving interested parties an opportunity to express their concerns and ideas on a management issue. (ex. Interviews and workshops)	<i>Collect and compile input</i> : Involves asking for some type of feedback on information that is shared with the public. (ex. Comment summaries, survey instruments, voting)	<i>Collect and compile input (IAP2)</i>
<i>Continuous exchange</i> : creates on-going dialogue between public participation managers and key stakeholders. (ex. Advisory committees and task forces)	<i>Bring people together</i> : Working jointly with different stakeholders to gain a better understanding of different perspectives. (ex. Open houses, chat rooms, small group meetings, sharing circles)	<i>Continuous exchange (Mitchell)</i>
<i>Facilitating consensus</i> : facilitates a long term commitment between interested parties to come up with a viable solution. (ex. Mediation).		<i>Facilitating decisions (partly Mitchell)</i>

(Source Mitchell's as found in Diduck, 2007 and IAP2, 2006: 89)

Table 3.1 illustrates that sharing information techniques described by the IAP2 such as newspaper advertisements or articles corresponds well with Mitchell's information out category. Similarly, Mitchell views the use of surveys as information in, while the IAP2 sees this as collecting and compiling input. Town Hall meetings are seen as both ways to gather as well as provide information. IAP2 and Mitchell view committee meetings as opportunities to bring people together however only Mitchell discusses opportunities to form consensus between interested parties.

Incorporating Mitchell's and IAP2's categorizing of approaches is useful to analyze techniques implemented in any public participation process because they each cover different themes and by incorporating them it will cover a wider number of approaches. These categories are not impermeable, often some techniques could fit

into two or more depending how it is finally executed. Both of these systems are very similar, with one exception in that Mitchell breaks the IAP2 category of bring people together into another level of detail. Although public participation practitioners may be bringing people together to work through issues, there are two scales at which people participate in groups: sharing information or decision making. This research has incorporated these two classifying systems as a base; (1) sharing information, (2) collect and compile input, (3) continuous exchange and (4) facilitating decisions (see third column in Table 3.1). The major difference in the framework is that this research does not use Mitchell's use of consensus for the reason that many participatory approaches can involve decision making even if the final decision is not created through consensus, or there is not a consensus of the decision.

3.5 Benefits and Barriers of Public Participation

This section will look at some of the key benefits to public participation and at some of the barriers and challenges that practitioners face when trying to implement participatory processes in resource management (See Table 3.2).

Benefits	Barriers and Challenges
<ul style="list-style-type: none"> • Sharing knowledge, incorporate new ideas, knowledge and perspectives • Transparent and inclusive planning • Legitimize decisions • Reduce cost, conflict and time • Trust and respect building • Increase understanding of mutually exclusive concerns • Create a sense of ownership • Strengthen democracy 	<ul style="list-style-type: none"> • Little preplanning or understanding of local complexities • Neutral P2 professionals • Nature of the issue • Consensus leading to limited plans • Social, language and information barriers complex issues • Schedule conflicts • Power imbalance

3.5.1 Benefits of public participation

Resource managers that implement public participation processes to obtain information could benefit by receiving a diverse understanding of the public views, local knowledge and the ability to reduce costs, time and conflict in management plans. The local community could also gain through greater understanding of the issues around a management plan, the plan itself and the views of other community members. The following are some of the key benefits of public participation for both those implementing the process and those participating in it.

Sharing knowledge: Sharing knowledge is one of the most important benefits to public participation processes. Knowledge shared amongst different interest groups will add to the pool of knowledge that is used to make final decisions (Innes and Booher, 2004). Knowledge sharing is a key benefit because it potentially will improve the planning by incorporating new ideas, knowledge and perspectives. As well, it could increase general understanding of an issue (Diduck, 2007). Interested parties come from many different perspectives and therefore may not understand other perspectives on the same issue. It is difficult for interested parties to support something that they do not understand. However, by bringing these parties together and analyzing each others' position, a better understanding of each others' concerns could produce a solution that integrates all ideas and positions.

Transparent and inclusive planning: Public participation is one way that resource planners can create a planning process that is both transparent and inclusive. Transparency and inclusiveness are two criteria that the public request when presented with issues and decisions that could affect them. Even if the public cannot take an active role in decision making processes, many interested parties want to be able to see how decisions are being made. Public participation does not guarantee an inclusive process as resource managers and other participants can influence the breadth of the public participation process. The chief advantage of transparency and inclusiveness is that it encourages buy-in throughout the planning process and thereby the public should become more agreeable towards the final resource management plan (Innes and Booher, 2004).

Legitimize decisions: Including the public in the decision making process acknowledges that other stakeholders are valued and this in turn should create an atmosphere where participants are often more willing to confirm the final decisions. Even if an individual or group's perspective is not included in the final decision, public participation provides an opportunity to explain choices and the underpinnings to the final conclusion (Innes and Booher, 2004).

Reduce costs, conflict and time: Employing public participation processes can be less expensive and timely in comparison to other dispute resolution mechanisms such as litigation, administrative mechanisms and political mechanisms (Diduck, 2007; O'Leary and Husar, 2002; Mitchell, 2002). Collaborative methods could allow for a

better understanding of the issues and concerns that were involved in creating the final plan and this understanding could reduce the potential for future conflict and the use of costly and time consuming legal interventions or protests. The implementation of many resource management plans that do not allow for significant input from stakeholders are often held up due to legal challenges, which will ultimately add to the financial cost and time to develop a resource (Wang and Chen, 2006).

Trust and respect building: Trust is a key non-tangible component of public participation. Whether it is just informing the public or in a committee setting, trust is imperative to the success of these processes. With many different groups coming together in the forum of public participation in water resource management, it is a difficult task to build trust, and almost impossible to assume that it will be there before the process begins (Innes and Booher, 2004). For example, public participation in the form of collaborations intent on the best management of a resource are dependent upon trust between all partners (Innes and Booher, 2004). Building trust becomes difficult with less active participatory methods. If people do not trust a group that is simply informing them of a decision they may demand other ways of participating and influencing the outcome. Many public participation processes start with informing and move to other types of public participation (IAP2, 2006). However, if trust-building policies are in place within all participatory processes, this would allow for a better working relationship between all interested parties for future projects. By soliciting input from the public, governments and other resource organizations show respect towards those that will be affected by a decision, and is a

prerequisite to trust. This increase in trust and respect amongst stakeholders should limit the need for litigation and will potentially speed up the creation of resource management plans (Wang and Chen, 2006 and Mitchell, 2002).

Sense of ownership: Groups working on management plans that involve public participation processes often have an enhanced sense of ownership on the final decision. This sense of ownership should help speed up the implementation of management processes. Participatory processes can help to expand the social responsibility of a project to many different stakeholders. This increased social responsibility gives a large and often diverse group more initiative to see that projects are implemented. This shared sense of ownership between stakeholders could also reduce the risk of conflict because many groups have an interest in the final decision and are often hesitant to critique something which they have worked to achieve (Diduck, 2007).

Strengthen democracy: Many governments have created laws that mandate the use of public participation process in new resource management plans as a way to increase democratic input into the decision making process. By including these processes, resource development organizations are forced to gather some public input. However, the efficiency and effectiveness of these mandatory public participation processes is debatable (Innes and Booher, 2004). At its core, public participation is viewed as a way to strengthen democracy. Interested groups are able to participate in governing decisions that move beyond simply electing officials. At all levels of participation,

citizens have an opportunity to directly influence the outcome of decisions. This citizen engagement has created a type of pluralist decision making that could work to change the way people in many countries such as Canada view democracy (Diduck, 2007).

3.5.2 Barriers and Challenges with Public Participation

There are challenges and barriers which can impede the effectiveness of public participation in creating a resource management plan that need to be addressed during the planning process. It is important for resource planners to understand these barriers and challenges when considering how public participation should be presented, the amount of inclusion, at what stage of the plan it should be included and who should be involved so that new plans are better able to overcome these barriers and challenges.

Lack of preplanning and local complexities: One of the first barriers to public participation is a lack of preplanning in terms of gathering information on the project and on the societal norms of the communities in which the management is needed (Forrest, 1998). This challenge is often the result of inadequate funding as it is particularly difficult to secure resources for preplanning activities. Without this preplanning, unique aspects of a situation might be overlooked or key participants and stakeholders might be omitted from the process, which could lead to future misunderstandings (Webler and Tuler, 2002; Lane, 2005).

Public participation professionals: A key component of many participatory processes is the use of a professional who is trusted and respected by all stakeholders to mediate and run the process (Andrew, 2001). However, if any interested parties believe that the contracted professional is influenced by more than one stakeholder and is not impartial, they may feel uncomfortable providing input into decisions (Andrew, 2001). This could work at all levels of participation. It may be difficult to find a person or organization that is trusted by all stakeholders to run a participatory process, but if they are able to show that they are impartial to any stakeholder, the easier it might be to receive a wide variety of participation.

Nature of the issue: The effectiveness of public participation can be limited by the critical nature of the issue and the people involved. If the management of a resource is not a critical issue, and there is a conceived clear path of action, public participation may be unnecessary. In this situation, it could be hard to find participants because most people are either indifferent to the issue, or a solution seems clear (Diduck, 2007). However, if participants have deeply rooted views which oppose or conflict with other viewpoints, the process could be limited due to the difficulty of incorporating all ideas (Diduck, 2007, Pope, 1987).

Social barriers: Social barriers may influence the number of participants in any process. A major criticism from Reed (2007) about Canadian public participatory programs is that they often limit participation to people able to communicate in either of the two official languages. People, who do not speak, read or write French or

English are marginalized or left out because they do not have the opportunity to understand the mechanisms that are available for them to participate in decision making. This is especially problematic if there is not enough time in the beginning of the public participation process to allow for the dissemination of information to all of the stakeholders. Often public participation is seen to only benefit those currently in a position of power and who understand the resource management process, including any technical jargon that might be used while soliciting public input (Reed, 2007). One way to overcome these obstacles is by bringing together stakeholders and explaining the process and technicalities in more understandable terms (Reed, 2007; Diduck, 2007). Citizens may be unable to participate at certain times of the day or may need to commute to far destinations to participate. If a process is not flexible in timing and location it could be difficult to attract a wide variety of participants, or any participants at all (Reed, 2007). Also, if the topic is very technical or involves a lot of preparation for the participant, many may choose not to spend their time on participation in resource management and move to other activities (Glicken, 2000; Lane, 2005; Diduck, 2007).

Power imbalance: A potential hindrance to public participation is an imbalance of power between interested parties. If one group were to be overrepresented, results might weigh in favour of this group while ignoring the issues of other groups (Diduck, 2007). How to balance power in resource management depends on many factors including the level of interest, costs and benefits, capacity to understand the issue (locally and from different perspectives) and social implications. If one

organization has much more clout than others, the public participation process might be seen as a facade and not respected or acknowledged by other stakeholders with less power.

For effective resource management it is important to analyze the benefits and barriers to public participation. It is important to incorporate the different interest groups and stakeholders as much as possible throughout the process. If resource management processes were created to be accountable to the participants, be transparent to the public, be inclusive and have stable amounts of participation, the process should produce positive results no matter the design of the actual process (Glicken, 2000).

3.6 Outside Factors Influencing the Success of Public Participation

Many different factors must be reviewed when determining the success of public participation in enhancing resource management plans. In terms of water resource management, there are at least three important macro elements that can influence stakeholder input: (1) economic stability, (2) environmental integrity and (3) human health quality (Rose and Suffling, 2001; Mitchell, 2002 and Wilkenson, 2006). Depending on the context of a situation, each of these factors can influence how the public views resource management and will influence how and why they participate in the creation of resource development and use plans.

(1) Economic stability: In a region where the economy is struggling and there are issues of poverty, citizens may be more interested in improving economy and not as

concerned with a sustainable environment and could use water in an unsustainable manner (Mitchell, 2002 and Wilkenson, 2006).

(2) Environmental integrity: A similar situation could be seen in areas of economic prosperity where people do not want to see land use changes near their properties or in their local areas. Here, many citizens may not need the economic benefits from natural resource extraction and do not want to deal with the environmental consequences that it could bring to the area (Rose and Suffling, 2001).

(3) Human health: Safe drinking water and how that relates to human health issues are critical factors in managing water resources. If human health is endangered by a resource management plan, participation in the creation of the plan will most likely increase. Management plans would have to reflect the need to improve health or reduce impacts on health. Human health is often more important than the other two factors, and to secure human health might mean compromising the environment through measures such as inter-basin transfers to ensure a clean water supply, or limiting economic growth (Rose and Suffling, 2001).

3.7 Moving Forward

Issues of legitimacy, reasonableness and fairness are critical indicators of whether or not a participation process succeeded in increasing human agency in the decision making process. Abelson *et al* clearly states that when evaluating a public

participation approach, it is critical to look at the legitimacy, reasonableness, responsiveness and fairness of the fundamental process. She suggests that

“Legitimacy and responsiveness principles are assessed by considering questions such as: 1) What point in the decision-making process is public input being sought (i.e., is the public involved in significant aspects of decision-making such as agenda setting or in minor decisions only?); 2) At what level of the organization does the participation occur? (i.e., who is listening and ultimately responding to the public?). Evaluations of deliberative processes in particular would also assess elements of the process such as: 1) was ample time provided for discussion? 2) Did participants have the opportunity to challenge the information presented? 3) Was mutual respect and concern for others emphasized throughout deliberations?”(Abelson *et al*, 2003: 244).

The questions outlined above are similar to those used in other case studies, research projects and could provide a basis for the analysis of new projects, including this research.

3.8 Summary

Public participation has evolved immensely and with the creation of organizations such as the IAP2, the inclusion of public input in the decision making will continue to be important. There is still much debate over the exact definition of public participation and the benefits and barriers to employing public participation in resource management. Today there are a vast number of techniques that allow for a variety of participation in any resource management plan. Many decision making organizations understand the benefits to having public input. However, due to many of the hindrances to proper public participation, many processes lack the ability to truly increase public agency in decision making.

While public participation is important in the creation of management plans at any level, managers need to consider the environmental, economic and health factors that can influence the public decisions making. Considering these factors will create a better understanding of how and why stakeholders are involved. The previous section outlined a number of important questions and criteria used while evaluating public participation processes within water management.

Chapter 4: Freshwater

This chapter provides an introduction to freshwater issues in Canada. It is an overview that establishes the importance and context for this study of public participation in freshwater resource management and water efficiency planning. This is not meant to be an exhaustive analysis of freshwater issues in Canada (see, Bakker, 2007 and Barlow, 2007 for recent texts on this topic). It is purposely selective and designed to illustrate the complexity and severity of freshwater concerns in Canada. The first section of this chapter reviews how the human need for water has moved beyond the minimal amounts required to sustain life to depending on water for economic gains. The second section reviews how humans influence the hydrological cycle and attempt to manage water availability through water exploration and water efficiency plans. The final section looks in detail at water efficiency as a management technique. Water is important to so many aspects of human life that decision makers need to move beyond relying on technology and non-social solutions to manage this critical resource. The use of public participatory approaches in water management is one way to move away from a technical formula and incorporate social knowledge into water management.

4.1 Water: A Key Resource

Water is one of the key resources that maintains the Earth's environmental systems (Environment Canada, 1996). At different stages of the hydrological cycle¹,

¹ The hydrologic cycle is driven by the sun and converts solar energy to energy which is critical for the main transport functions in different ecosystems. Water cycles through oceans, soils, the atmosphere, freshwater and living organisms. There are six main processes to the hydrologic cycle; evaporation, precipitation, condensation, infiltration, flow and transpiration or run-off (Environment Canada, 1996).

water influences all global natural systems (see Figure 4.1 Environment Canada, 1996). Shiklananov (1998) states that there are two main categories of freshwater: static storage and renewable water. Static storage refers to “freshwater with a period of complete renewal taking place over many years or decades” (Shiklananov, 1998: 6) and includes large reservoirs such as the Great Lakes in Central Canada and The United States of America. High usage of static storage freshwater could deplete the resource at a much faster rate than the rate of renewal (Shiklananov, 1998). Renewable water “includes water that is replenished yearly by the process of water turnover of the earth” (Shiklananov, 1998:6). This includes water runoff from rivers, such as inflow from groundwater and upper aquifers that are not drained into rivers systems (Shiklananov, 1998).

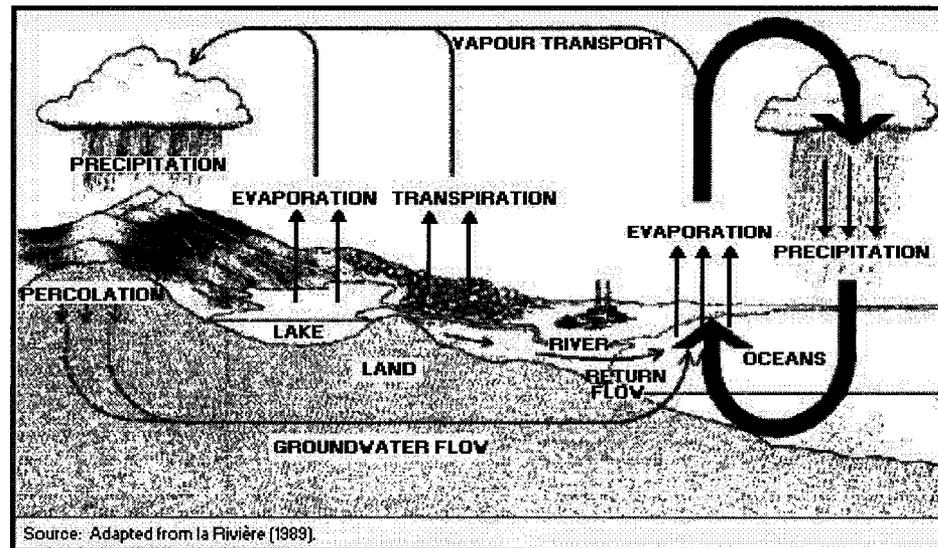


Figure 4.1: Hydrological Cycle (Environnement Canada, 1996)

4.1.1 Water Globally

Economic growth spurs water demand and as a result, water demand routinely increases at a rate that is twice that of population growth (deVilliers, 2003 and

Matthews et al, 2007). Figure 4.2 illustrates that only 2.5 % of the total amount of water in the world is freshwater, emphasizing the fact that water is a finite resource. With over two-thirds of the world's freshwater trapped in glaciers and snow, much of it is not readily accessible for human use. The freshwater that is accessible for human consumption accounts for less than 1% of the total freshwater and only 0.01% of the Earth's total water (United Nations Environment Programme, 2002). Compared to the other types of water, freshwater is a scarce resource.

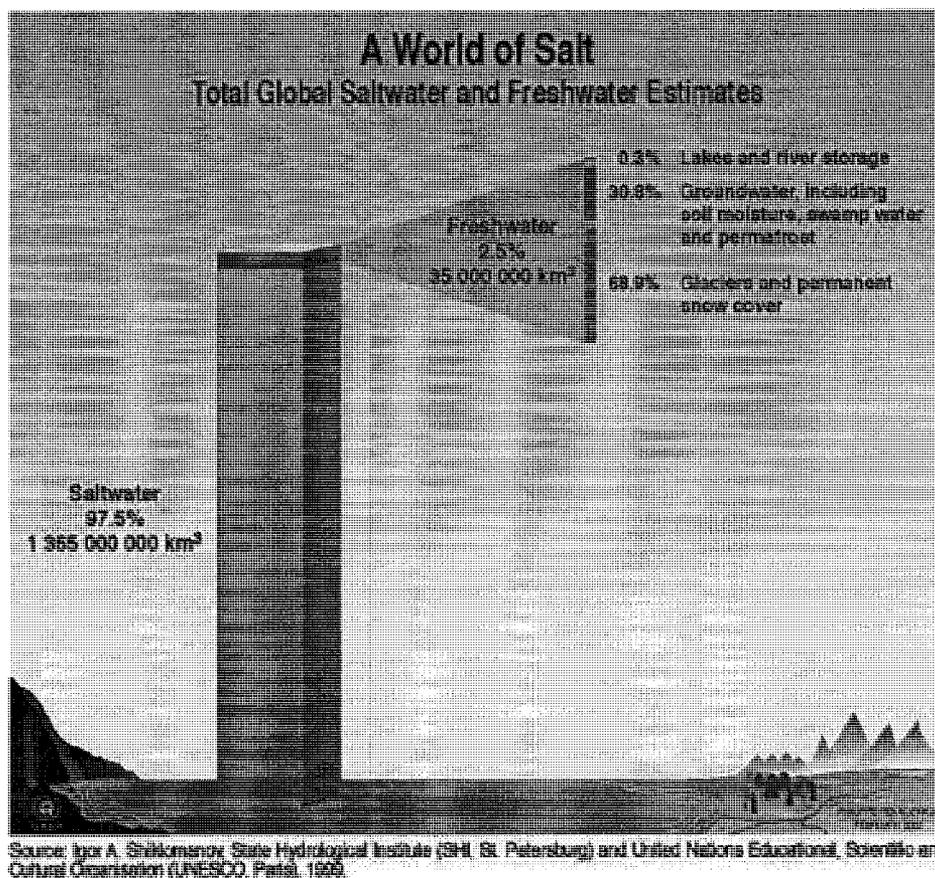


Figure 4.2: Global Water broken down between salt water and freshwater. From United Nations Environment Programme, 2002

Even amongst the 10 most water rich countries in the world, there is a great variance in the total internal water supply (see Table 4.1). At the other extreme are several countries in the bottom 10 countries with little internal freshwater supply.

These variations in water supply underscore the challenges and inequalities amongst nations in regards to water availability to support economic development. In addition to variability in water supply, there is also substantial variation in water usage. The water footprint is often used to gauge overall water usage (Hoekstra and Chapagain, 2007)

Table 4.1 Countries in terms of total internal renewable water and water footprint			
Rank	Country	Total internal renewable water km³/year	Average national footprint per capita (m³/capita/yr)
1	Brazil	5,148.00	1381
2	Russian Federation	4,312.70	1858
3	China	2,879.40	702
4	Canada	2,850.00	2049
5	Indonesia	2,838.00	1317
6	United States	2,818.40	2483
7	Colombia	2,112.00	812
8	Peru	1,616.00	777
9	India	1,260.54	980
10	Congo, Dem. Rep	900.00	734
173	Barbados	0.08	1355
174	Antigua and Barbuda	0.05	NA
175	Malta	0.05	1916
176	Qatar	0.05	NA
177	Gaza Strip (Palestine)	0.05	NA
178	Maldives	0.03	NA
179	Saint Kitts Nevis	0.02	NA
180	Bahamas	0.02	NA
181	Bahrain	0.004	NA
182	Kuwait	0	1115

Table created from source data UNESCO, 2003 and Hoekstra *et al*, 2008.

The water footprint is defined as:

The total amount of water that is used to produce the goods and services by the inhabitants of the nation. The national water footprint can be assessed in two ways. The bottom-up approach is to consider the sum of all goods and services consumed multiplied with their respective virtual-water content. In the top-down approach, the water footprint of a nation is calculated as the total use of domestic water resources plus the gross virtual-water import minus the gross virtual-water export. (Hoekstra *et al*, 2008)

Although knowing how much water humans consume is difficult to accurately measure, the water footprint provides a standardized measure of water consumption (Hoekstra and Chapagain, 2007). It includes internal consumption of water that is used domestically and external consumption, which is water that is used from other countries. For example, in Ontario, Canada, water used on strawberries in June is seen as internal domestic water use and is calculated into the water footprint.

However, the water that is used in California, U.S.A. to grow strawberries that are then imported by Canada would also be included in Canada's water footprint as virtual (or international) water use and subtracted from the U.S.A.'s domestic use. This method of calculating the water footprint allows for the recognition that some countries use (either through domestic or imported use) much more water than others. Globally, the water footprint is $7459 \text{ Gm}^3/\text{yr}$ with a global average per person of approximately $1240 \text{ m}^3/\text{cap}/\text{yr}$ (Hoekstra and Chapagain, 2007).

The second column in Table 4.1 lists the water footprint on a national scale, by countries with the most and least renewable water. It highlights one major trend, which is that the majority of the top six countries with the most of renewable water, such as Brazil, Canada, United States, and Indonesia also use the highest amounts of water, having an average footprint over the global average. China is significantly different because it uses little water, however it is ranked third highest in terms of amounts of internal renewable water availability. However, with increased economic growth, China's water footprint could be much higher today in 2008 compared to the 2005 data included in table 4.1.

4.1.2 Canadian Freshwater

Canada is endowed with significant freshwater resources and this has contributed to the Canadian belief that freshwater is infinite and can be used with few consequences (Barlow, 2007). As Table 4.1 reveals, Canada has one of the largest water footprints and Canadians routinely use 2.5 times more water than most European countries (Brandes, 2005 and Dearden et al, 2002). However, Canada does not have infinite amounts of water. Approximately 12% of Canada is covered by lakes and rivers while only 3% of this area is in heavily inhabited regions. Sixty percent of water in Canada flows north, compared to 85% of the Canadian population that lives in Southern Canada within 300 kilometers of the United States border (Brandes, 2005). Overall, Canada is home to almost 6.5% of the world's renewable water ranking it among the top countries, but this masks that only 2.6% of the world's renewable water supply is in close proximity to the majority of Canada's population (Barlow, 2007).

Due to this disparity of water availability, Canada is not immune to water scarcity. It is estimated that 25% of Canadian municipalities experienced water shortages between 1994 and 1999 (Bakker, 2007). Without change, more municipalities are expected to experience shortages (Environment Canada, 2004). However, on a community level, many Canadians are gaining a better understanding of how water consumption impacts other aspects of nature and the economy (Brandes et al, 2006).

Recently, media coverage focusing on water has increased (Bakker, 2007). With water quality and supply issues making national headlines, Canadians are

beginning to question water resource management. Table 4.2 describes a number of water issues that have occurred in Canada since 2000. Most concerns with future freshwater in Canada revolve around issues of water quality and quantity or how these two issues relate to transboundary water.

Water quality issues: The introduction of E-coli into the municipal water supply in Walkerton Ontario in 2000 resulted in 7 deaths, cost the Province of Ontario approximately 155 million dollars and remained in the media for several years afterwards (de Loë and Kreutzwiser, 2003) (Table 4.2 issue # 1). First Nations communities have also suffered from water quality issues. As many as 30% of First Nation reserves are without proper water treatment and are at risk for water contamination (CBC News, February 20, 2006). The recent example of the problems that are facing these First Nations communities occurred in Kashechewan, a community in northern Ontario where the E-coli levels and water pollution were so severe that the Province of Ontario airlifted the entire community out until the water could be properly treated (CBC News October 31, 2005) (Table 4.2 issue # 8). Since 2000, there have been a number of boil water advisories, with the largest one occurring in 2006 in the lower Vancouver area with over one million people under an advisory for 12 days (CBC News, November 27, 2006) (Table 4.2 issue # 3). These three examples illustrate that water quality issues that span all regions of Canada are routinely reported in various media coverage and suggests that Canadians are sensitive to water quality issues.

Table 4.2 Selected Freshwater Issues in Canada					
#	Date	Location	Issue	Impacts & Responses	Reference
1	2000	Walkerton, Ontario	Contaminated municipal drinking Water	<ul style="list-style-type: none"> • Seven people died • 2300 people seriously ill • Creation of a source water protection plan for Municipalities in Ontario 	(de Loë & Kreutzwiser, 2003)
2	2001 - 2002	British Columbia, Prairies, Ontario, Quebec, Nova Scotia	Drought	<ul style="list-style-type: none"> • Estimated cost at \$5 billion dollars • Drought reduces stream flow, water levels (natural and municipal reservoir), runoff, and soil moisture • Increased forest-fire numbers • Decreased Agricultural output • Creation of water conservation plans (including watering by-laws ex. Guelph & RMOW) 	(Environment Canada, 2003; City of Guelph, 2004, RMOW, 2005)
3	2006	Greater Vancouver, British Columbia	Greater Vancouver boil-water advisory	<ul style="list-style-type: none"> • Approximately a million people under a boil-water advisory for 12 days • Response: Test water after turbidity levels fall for contaminants • No reports of sickness • Shortages of bottled water 	(CBC News, November 27, 2006)
4	2007	Waterloo, Ontario	Boil Water Advisory for North Waterloo Residents	<ul style="list-style-type: none"> • Quality of the water cannot be guaranteed because of potential contamination • No evidence of illness or adverse water results • Boil water advisory until testing proved no contamination 	(RMOW, 2007)

#	Date	Location	Issue	Impacts & Responses	Reference
5	2007 - 2008	Guelph, Ontario	Citizen outrage over water extraction for bottled water companies	<ul style="list-style-type: none"> • Lowering and depletion of groundwater reservoirs • Guelph residents under water use restrictions during periods of peak usage • Over 5,000 citizen letters of protest to future withdrawals for bottled water • Response: Ministry of Ontario currently reviewing Nestlé permits to extract groundwater 	(Wellington Water Watchers, 2007; Clarke, 2007; City of Guelph, 2008)
6	Ongoing	Okanogan Valley, British Columbia	Potential Water Shortages	<ul style="list-style-type: none"> • Water conservation programs • Drying out of river systems • Use of non-renewable water from lakes • Reduced agriculture output and recreation opportunities 	(Natural Resources Canada, 2008)
7	Ongoing	Athabasca River, Alberta	Increasing the use of surface water and groundwater for in situ production of oil sands	<ul style="list-style-type: none"> • Expansion of tailing ponds (polluted water source) • Reduction of water flows (both ground and surface water) • Response: Alberta's Water Conservation and Allocation Policy for Oilfield Injection 	(Griffiths et al, 2006)

#	Date	Location	Issue	Impacts & Responses	Reference
8	Ongoing	Various First Nations Communities in Canada	75 - 100 First Nations communities across Canada are under boil-water advisories Missing water treatment facilities	<ul style="list-style-type: none"> • Response: Department of Indian and Northern Affairs spent two Billion dollars to upgrade water treatment facilities from 2001-2006 • Ontario government airlifted people from Kashechewan to other areas in the province because of E Coli contamination • Health problems (long-term a short-term) • Rise in cost of living with people relying on bottled water for drinking, cooking and brushing their teeth • Some water is seen as to dirty for bathing • Currently, there are no laws or regulatory standards similar concerning drinking water for approximately 325,000 residents of Canada's First Nations reserves 	(CBC News, February 20, 2006; CBC News, October 31, 2005; CBC News, November 1, 2005)
9	Ongoing	Devil Lake	Devils Lake outlet to move water from Devils Lake into the Red River water system. Moving water between watersheds and between the United States and Canada.	<ul style="list-style-type: none"> • Negatively impact Manitoba's fishing and tourism industries because of contamination of foreign organisms • Risk of higher polluted water flowing to Lake Winnipeg • Reduce flooding in area of Devils Lake • Response: install permanent filter to stop organisms from transferring watersheds 	(Council of Canadians, 2007; Sawatzky, 2005)

Water quantity: Water quantity issues have also been reported more regularly in the media (Barlow, 2007). In western Canada, two potential ongoing scarcity issues are located in the Okanogan Valley, in British Columbia (Table 4.2 issue # 6) and in areas that are developing oil sands along the Athabasca River, in Alberta (Table 4.2 issue # 7). In both areas, water scarcity is viewed as a major barrier to future growth. However, water efficiency programs are being implemented to conserve water and allow for more effective use of available water in the area (Natural Resources Canada, 2008 and Griffiths et al, 2006). In southern Ontario, recent drought conditions (Table 4.2 issue # 2) have increased the need for municipalities to implement water conservation and use restriction policies to help ensure water availability. In the Grand River Basin, both the City of Guelph (2003) and the Region of Waterloo (2001) initiated rotating water use restrictions for residential use (City of Guelph, 2004; RMOW, 2005). Residential water restrictions have become common place in many communities in southern Ontario. In Guelph there has been rising tensions between private and public water use (Clark, 2007). Specifically, this tension is occurring between Guelph citizens and the company Nestlé, which is extracting water to bottle and ship out of the region (Clark, 2007). A recent Nestlé application to increase the amount of water it extracts and bottles from the ground has sparked heated debates and protest from citizens groups (Table 4.2 issue # 5) (Wellington Water Watchers, 2008). Many residents are outraged by the idea of a company taking water out of the region at a profit, while their water use is restricted (Clarke, 2007). As witnessed in Guelph, without a holistic management plan through

consulting with key stakeholders, the residential water restrictions have the potential to cause more conflict amongst water users.

Transboundary issues: In Canada there is an on-going concern over shared water with the United States. The International Joint Commission² between the United States and Canada manages shared water sources (International Joint Commission, 2006). A recent example of conflict between these two countries is the ongoing dispute over the outflow of water from Devil's Lake in North Dakota into the Red River system (which flows into Manitoba) (Table 4.2 issue # 9). This diversion has the potential to seriously impact the natural systems and species in the Red River system, interfere with water quality and to increase the cost to supply water to riparian communities (Sawatzsky, 2005).

With newsworthy issues such as these, Canadians may no longer view water as an infinite resource (Bakker, 2007). Through proper water resource management and planning, similar events could potentially be eliminated (deVilliers, 2003).

Resource management implements the plan and involves decisions and actions including how the resource is "protected, allocated, developed, used,

² The Boundary Water Treaty of 1909 established the International Joint Commission (IJC) as the organization whose purpose is to "help prevent and resolve disputes relating to the use and quality of boundary waters and to advise Canada and the United States on related questions" (International Joint Commission, 2006). The IJC has four main functions; the first is as semi-judicial power of deciding upon any applications to "use, obstruct or divert waters" across boundaries (Valiante et al, 1997). The second function is that the IJC is used as a referential or advisory group that focuses on differences between Canada and the United States. It researches and recommends actions to be taken to reduce conflict. Although it has never been used in this manner, the IJC can function as a tribunal to make binding decisions on questions of difference. Finally, the IJC performs administration functions to measure other transboundary rivers as well as operations that help regulate other agreements such as the Great Lakes Quality Agreements (Valiante et al, 1997). The IJC employs a joint fact finding approach that incorporates research prepared on both sides of the border by cooperative research scientist groups comprised of equal numbers of Canadians and Americans. Using this information, all final decision are made by consensus by the six member panel (three members from Canada and three members from the United States) (ibid, 1997).

rehabilitated, remediated and restored, monitored and evaluated” (Mitchell, 2002: 8). Management and planning of resources involves complex legal, political and administrative systems that ensure that resources are available for human consumption. The process involves many natural and human factors. Resource management is unpredictable because it involves managing nature which has many unknown variables, something that stakeholder input would help to flesh out (Mitchell, 2002). Freshwater management involves working with nature, investing in human infrastructure and assessing both qualitative and quantitative data to create a plan to provide accessible freshwater to human populations (Buras, 1995). This significant resource has implications, both legal and social, at all levels of government (Brandes *et al*, 2005).

4.1.3 Groundwater and Supplying Canadian Municipalities with Water

Many municipalities in Canada depend on groundwater for residential and commercial needs. In his text *Water*, deVilliers views “groundwater depletion [as] one of the great unseen but looming crises facing our planet” (2003: 165). In Canada, there has never been a national survey on groundwater and surveys completed by provinces and territories are either outdated or incomplete due to cuts in funding. This lack of information impairs understanding of Canadian groundwater resources and the importance of creating sustainable management plans to protect this resource for future generations (Nowlan, 2007 and Bakker, 2007).

Twenty-one percent of Ontario residents depend on groundwater, and the municipalities that do depend mainly on groundwater report more water shortages

than those that are more dependent on other sources (Nowlan, 2007 and Grand River Conservation Authority, 2006). In the Grand River watershed, almost 82% of the water used by the population comes from groundwater, the largest user is the Regional Municipality of Waterloo with 123 active wells (Grand River Conservation Authority, 2006). Public understanding and participation in water planning are important to create inclusive decisions, greater awareness and understanding of potential future problems (Nowlan, 2007). This understanding could help to create a paradigm shift in how Canadians understand how their actions could impact this critical resource.

4.2 Human Impacts on the Hydrological Cycle

Humans have direct and indirect influences on water resources (Brandes et al, 2006 and Barlow, 2007). Direct stresses that humans impose on freshwater can include pollution, waste disposal, overuse, diversion projects, agriculture, mining, flooding, urban development, manufacturing, energy demands, forestry and other habitat changing developments and are all for the most part related to urban growth (Nowlan, 2007). Urban areas do influence many of the “other” human influences (see table 4.3), however this chapter will be focusing on the influences that are specifically urban in nature.

Urban *	Other
Modifying landscapes	Climate change
Urban growth	Recreational uses
Microclimate changes	Overuse
Water discharge	Agriculture
Effluent discharge	Mining
	Energy production
	Forestry
* Discussed in the chapter	

(Sources: Environment Canada, 2004, Nowlan, 2007, Brandes et al, 2006, and Barlow, 2007)

Urban Growth: Urban growth and the manipulation of the natural landscape changes how water flows in the hydrological system. The urban landscape “interferes with water resources by altering the hydrological cycle and increasing the demands on provisions of water services in the affected areas” (Environment Canada, 2004: 3). Urban structure is changing the micro-climate, increasing levels of water discharge and effluent release. These changes can have a direct influence on water quality and quantity.

Micro-climate changes: Urban areas are dominated by impermeable surfaces that either absorb or reflect heat energy and are resistant to water. Urban growth changes natural surroundings and by doing so, create new problems such as urban heat islands. These islands are caused by the urban landscape absorbing and radiating thermal energy from the heat generated by urban living. This causes temperatures to be generally warmer than surrounding non-urban areas (Knox et al, 2004). The heat island effect influences the micro-climate and can change precipitation levels and frequency within this climate (Environment Canada, 2004). This change could reduce rainfall in urban areas (Environment Canada, 2004).

Water discharge: The impermeability of surfaces common to urban areas, such as concrete and asphalt, creates higher levels of water discharge into surrounding natural water systems. These high water levels lead to erosion, which could influence the quality of water in the natural systems. During large precipitation events, water is

routed directly into open water areas. This rerouted water is often not treated and may contain pollutants (Nowlan, 2007). Also, the impermeability of an urban landscape could significantly slow the natural rate of groundwater recharge in the region because much of the water that falls in urban areas does not permeate into the ground and is routed away from the urban centre (Nowlan, 2007 and Environment Canada, 2004).

Effluent discharge: Effluent discharge from waste water into natural water systems is a concern for communities that rely on surface water. Even after it has been processed, “discharge effluent contains residues of human waste, debris, nutrients, pathogens... pharmaceuticals and ingredients from household and personal care products” (Brandes et al, 2005:27). The water that is put back into the water system, even when treated, still contains a number of chemicals and other human waste material. Effluent water can make up large portions of water that is contained in river systems. For example, at any time, the Grand River may contain approximately 40% effluent from water treatment plants (Brandes et al, 2005). This high level of effluent will potentially influence the quality of water, reduce the amount of water that is available for human consumption, or increase the cost of purifying water.

4.3 Water Management Through Water Efficiency

The effects on the hydrological system that are caused by changing the urban landscape provide many reasons for urban planners to emphasize water management as a mechanism to help reduce future water shortages and reduce impacts on source

water. One mechanism that many governments and organizations use to manage water is through the creation of water efficiencies. Water efficiency can help citizens, governments and corporations reduce stress on water and mitigate future shortages. Most water efficiency programs target end users of the water, using both educational programs and the promotion of new technologies to reduce water usage. Water efficiency moves beyond how humans use water to include educating people on the importance of water and how to create systems and landscapes that are water friendly.

Water efficiency plans aimed at reducing the total amount of water used are viewed as creating new opportunities to use a finite resource. Efficiency is one mechanism that countries, municipalities and individuals can use to reduce their respective water footprint (Hoekstra and Chapagain, 2007). A critical component to water management through efficiencies is changing people's habits and moving them away from wasteful use towards conservation. Today, this can be completed with education programs in schools or pilot demonstration projects (Brandes et al, 2005).

Water efficiency can be addressed by individuals, the private sector and by government, and government officials. To be comprehensive, water efficiency plans cannot be delivered to a single sector or group. The plans require a considerable effort and collaboration across residential, governmental, industrial and commercial sectors. Residential users consume more than fifty percent of the water in urban areas and for this reason, many of the new efficiency measures have focused on the residential sector, through measures such as low flush toilets, rain barrels and other water collectors (Environment Canada, 2004 and United Utilities, 2006).

In their water efficiency research report for the Region of Waterloo, United Utilities Canada Limited stated that, “the amount of water that is available through efficiency measures is an important part of long term water management because it is difficult to tap a new source due to four major conditions (or limitations): availability, cost, sustainability and environmental impact” (United Utilities, 2006:2). With these four criteria in mind, water efficiency has many benefits compared to other new source options.

Availability: Some water efficiencies are available almost immediately through partnership with other regions that already use new water technologies and have implemented education programs³. With some initial research to look at region-specific needs, including both quantitative and qualitative (public participation) assessments, these programs can be reworked for the specific need of a particular region (United Utilities, 2006).

Cost: Another benefit to water efficiency includes savings on the costs associated with water allocation. If less water is being used, suppliers can save money on processing water for human consumption and on the energy costs associated with distributing water. Also, compared to other new source water options, efficiency is more cost-effective. For example, to implement efficiency measures it costs approximately 57 cents per litre, compared to \$1.20 - \$4.40 per litre to build new infrastructure (United Utilities, 2006). Efficiency can be more sustainable because it

³ The City of Toronto: <http://www.toronto.ca/watereff/plan.htm>; US EPA’s Water Sense Program: <http://www.epa.gov/watersense/>;

attempts to change people's attitudes towards water and how it is used and moves beyond technology. Even if other new sources of water are needed, efficiency can extend the lifespan of the new source so that costs can be spread out over many generations (Brandes, et al, 2006).

Environmental Impact and Sustainability: Using water more efficiently could limit environmental impacts on the natural ecosystem. By choosing efficiency, less water would be taken from the environment, leaving more untouched water for natural systems to flourish. Water efficiencies will also reduce the need to tap new sources of water. The process of exploring and finally tapping into new water can be environmentally damaging and will potentially increase environmental stress in areas where these activities take place (Brandes, 2006 and Untied Utilities, 2006). Greater conservation through efficiency can be seen as an option for municipalities that are looking to reduce water conflict, increase water availability and maximize water usage.

4.4 Summary

Although Canada has freshwater there is not a clear understanding of just how much water Canadians can use without negatively affecting the resource. Canadian municipalities are not immune to water issues, making it harder for them to provide clean water to citizens and companies. The exploration for new sources of water for human consumption is an important component of water management plans. These new sources will help relieve tension between water users over the quantity and

quality of water. Alternately, water efficiency is also a critical component of many water plans. Water efficiency has the ability to save millions of dollars and allow for new growth without searching for a new source of water and limiting environmental degradation. However, without the buy-in and support from citizens and large water users, it will be difficult to have an effective water efficiency plan. This is where the work of public participation practitioners can help create an inclusive plan, as well as one that the public understands and supports.

Chapter 5: The Regional Municipality of Waterloo

Context is important for research involving public participation and freshwater management. This chapter outlines important information about the Regional Municipality of Waterloo (RMOW) including location, government set-up, population information and the economy. It will also serve as an opportunity to review freshwater challenges in the Region, including the creation of the Region's Water Efficiency Master Plan and the WEMP Update in 2007.

5.1 Water Management in Ontario and the Grand River Watershed

Water in Canada is provincially managed and in the Province of Ontario, the Ontario Water Resources Act of the Ministry of Environment (MOE) is the primary legislation which establishes responsibilities. The MOE has the authority to monitor both surface and ground water quality and relies primarily on watershed organizations to manage water resources (Ivey *et al*, 2006). The RMOW falls within the Grand River Conservation Authority (GRCA) which is the largest watershed in Southern Ontario (see Figure 5.1). The close to half a million residents in the RMOW and supported economy rely almost entirely on underground aquifers for water supply (GRCA, 2006). As a comparison, only 29% of all Ontario residents rely on groundwater, while 82% of residents in the Grand River watershed use groundwater (GRCA, 2006). The largest user of ground water in the watershed is the Regional Municipality of Waterloo which uses over 120 wells to provide water to its residents (GRCA, 2006).

5.2 Background: The Regional Municipality of Waterloo

The Regional Municipality of Waterloo is located in South-Central Ontario in an area known as the Golden Triangle, named so because of its growing economy and it is bordered on three sides by three Great Lakes: Lake Ontario, Lake Erie and Lake Huron (RMOW, 2008) (See Figure 5.1). The land use in the Region is dominated by rural land and only 5% of the land occupied by urban landscape (Bellany and Boyd, 2005; Ivey, 2006). However, The RMOW is the 10th largest urban area in Canada, the 4th largest in Ontario and the Region contributed approximately \$19 million to the Canadian economy in 2004 (RMOW, 2008).

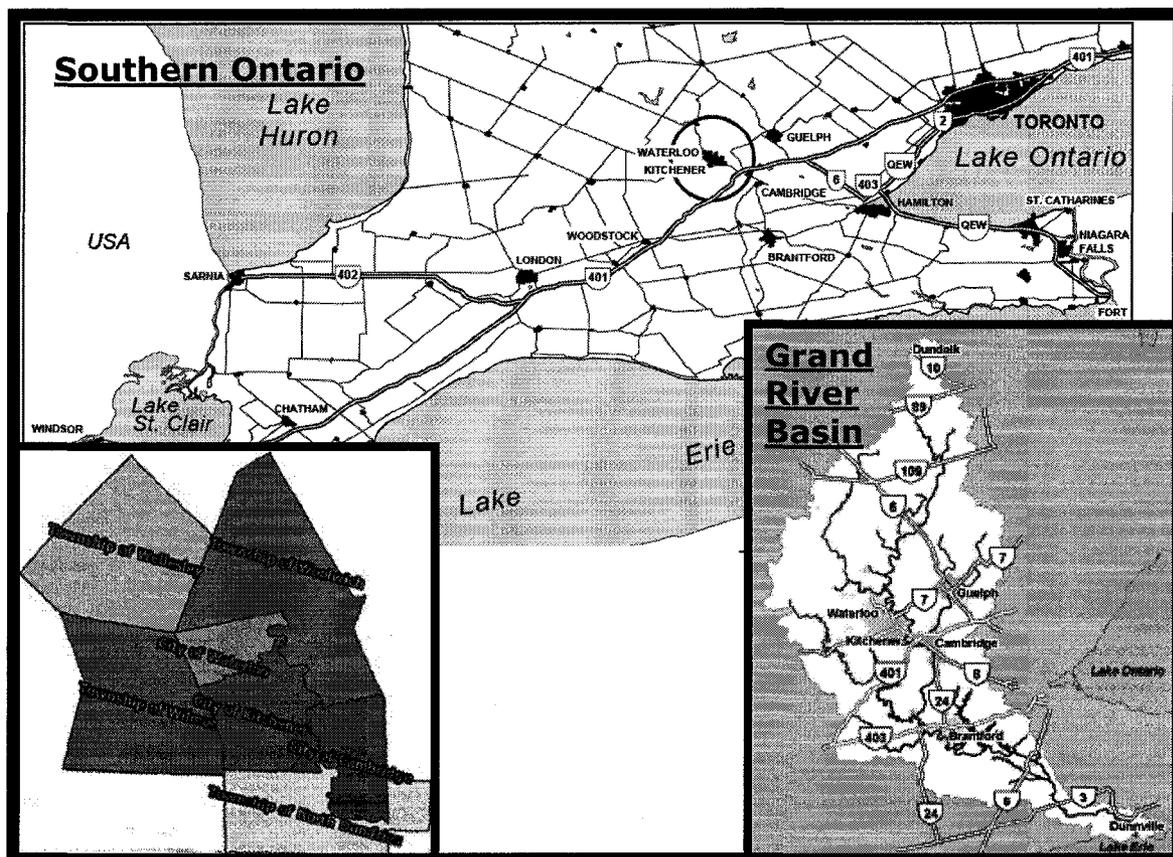


Figure 5.1: Location map of Waterloo in Southern Ontario. Insert maps (left) Waterloo Region broken up in different townships; (right) The Grand River Basin (University of Waterloo, 2008, Redmond, 2003 and GRCA, 2008)

5.2.1 Population

The majority of the over 470,000 residents of the Region currently reside in urban areas and its diverse economy is one of the fastest growing in Canada (RMOW, 2008; Gosselin, 2000). Between 1996 and 2001, population growth was over 5% in the Region with some areas such as Waterloo and North Dumfries Township growing at a rate in excess of 10% (Ivey, 2006). RMOW population growth is expected to be two times the national average over the next two decades, and younger families and workers looking to move away from Toronto, Ontario to establish themselves in the Region are expected to be the main contributors to population growth through to 2031. The Region has a similar age structure compared to Canada's, with the RMOW having a slightly higher percentage of younger (10 -39) population and lower older population (40 and older) compared to the national distribution (see Figure 5.2). This population distribution suggests that workforce in the RMOW will expand over the next 30 years and potentially drive up water demands over this period.

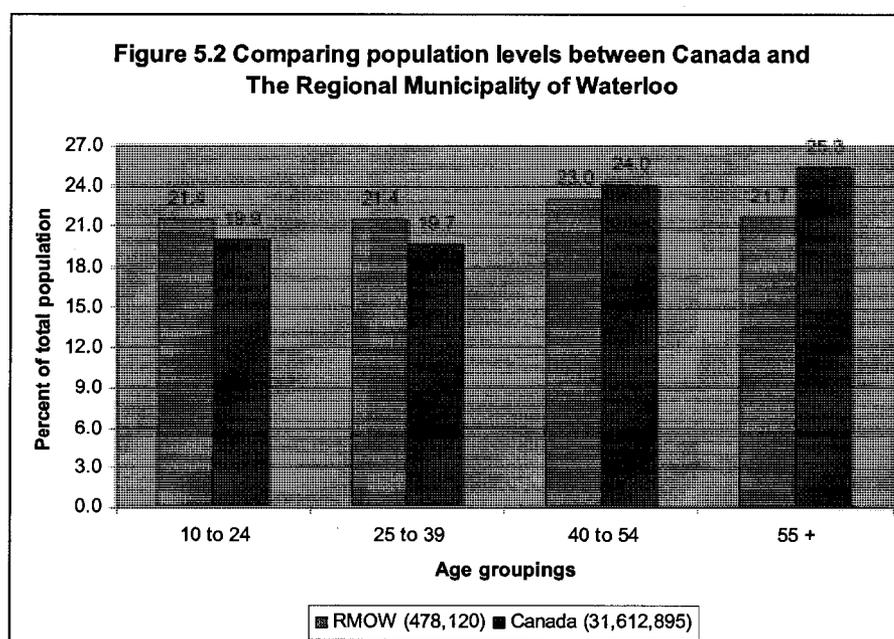


Figure 5.2: Comparing population levels (Statistics Canada, 2007)

5.2.2 Governance

In 1973, the County of Waterloo was reorganized into the Regional Municipality of Waterloo and this upper tier municipality has varying degrees of jurisdiction over seven lower tiered areas which include the cities of Cambridge, Kitchener and Waterloo and five rural Townships of North Dumfries, Wellesley, Wilmot and Woolich (See Figure 4.1) (Ivey, 2006, RMOW, 2008, Gosselin, 2000).

The Region is responsible for the management of water services. The RMOW treats and wholesales commercial water to the cities and townships which in turn sells the commodity to residential consumers (Ivey, 2006). Waterloo Region is one of the more advanced water planning authorities in Canada. It has developed a number of water policies and plans to manage water supply and quality and is also a partner in several joint research activities with universities, other government organizations and the Grand River Conservation Authority (Dearden and Mitchell, 2005). An example of the importance of working with organizations was highlighted when the Grand River was recently named a heritage river. The Grand Strategy was created through partnership with the Grand River Conservation Authority and the RMOW with a philosophy that “everyone who shares the resources of the Grand River watershed is encouraged to be part of the collective effort to address key watershed issues” (Dearden and Mitchell, 2005: 453). This philosophy implies that different members of the public, including the RMOW and its stakeholders, work together to develop ways to achieve the three watershed management goals: pursuing excellent wastewater treatment, slowing increases in water use and to develop long-term water quality and water budget plans (Dearden and Mitchell, 2005). The RMOW has

placed water management as a priority and has invested water related information, technical services, financial resources to help Regional staff, and the public manage this resource in sustainable manner (Ivey, 2006).

5.2.3 Water in the Regional Municipality of Waterloo

The RMOW has the largest population that is dependent on groundwater in Canada (Ivey, 2006). Groundwater makes up about 80% of the water used in the Region, while 20% comes from the Grand River and its tributaries (RMOW, 2008). Figure 5.3 from the *Grand River Conservation Authorities study on Water Use in the Grand River Watershed* illustrates the different supply sources including shallow overburden and deep wells for groundwater and surface water sources such as the Grand River. It also illustrates that the majority of water being pumped is near major urban areas including Cambridge, Kitchener and Waterloo.

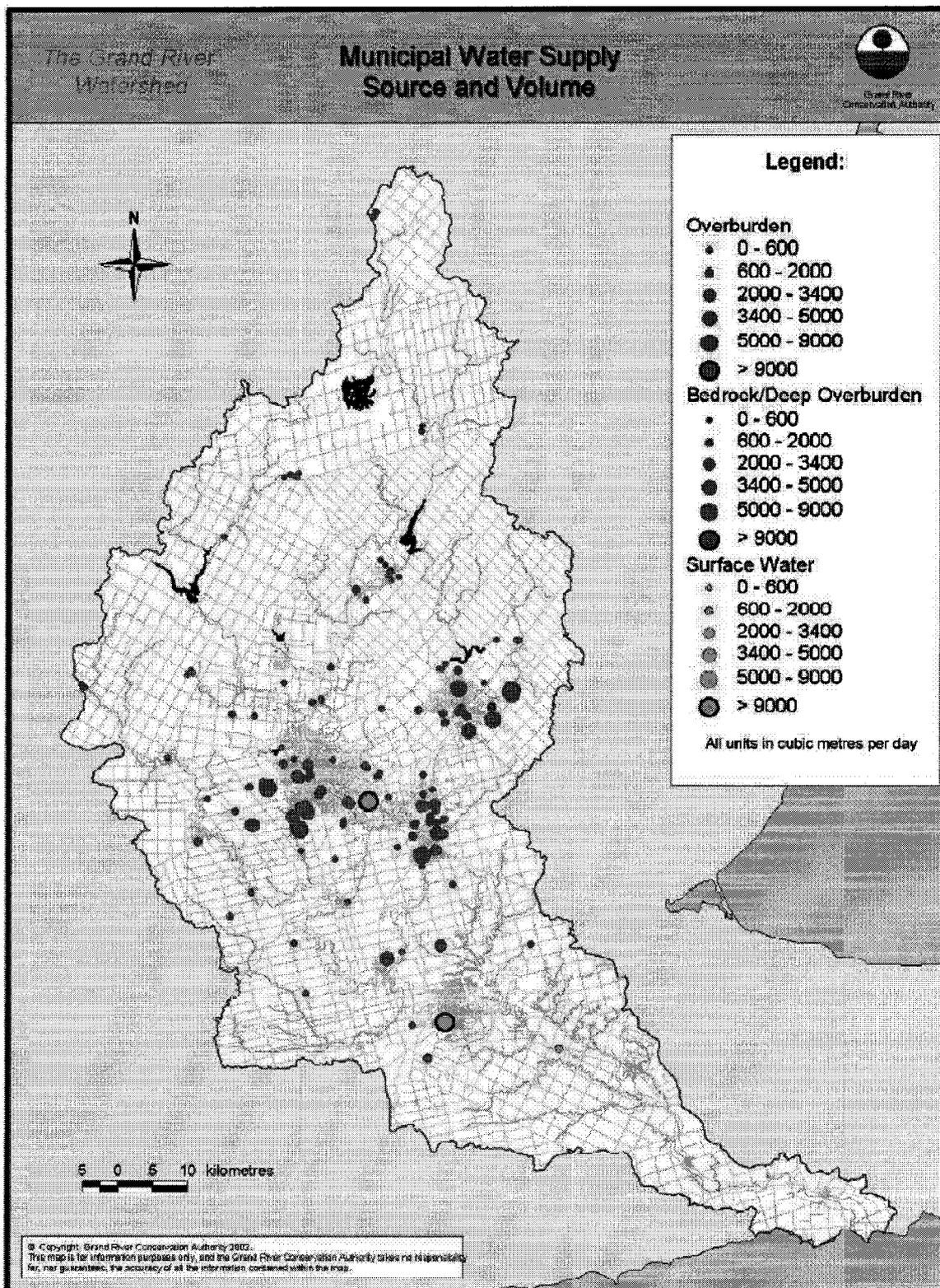


Figure 5.3: Municipal Water Supply in the Grand River Watershed, April 2005 (Bellany and Boyd, 2005).

The RMOW provides 180 million litres of water to its population each day (RMOW, 2008). The majority of municipal water is used for urban indoor and outdoor domestic use, industry, institutions and commercial ventures. Other smaller users in the Region include mining and aggregates, agriculture, recreation (golf courses), and bottled water. However, many of these smaller users have domestic private wells and are not directly tapped into the Regional water system (Bellamy and Boyd, 2005) (See figure 5.4). The Region is the common link among all water users (including lower tiered governments) and holds overall responsibility for water management and planning including the WEMP.

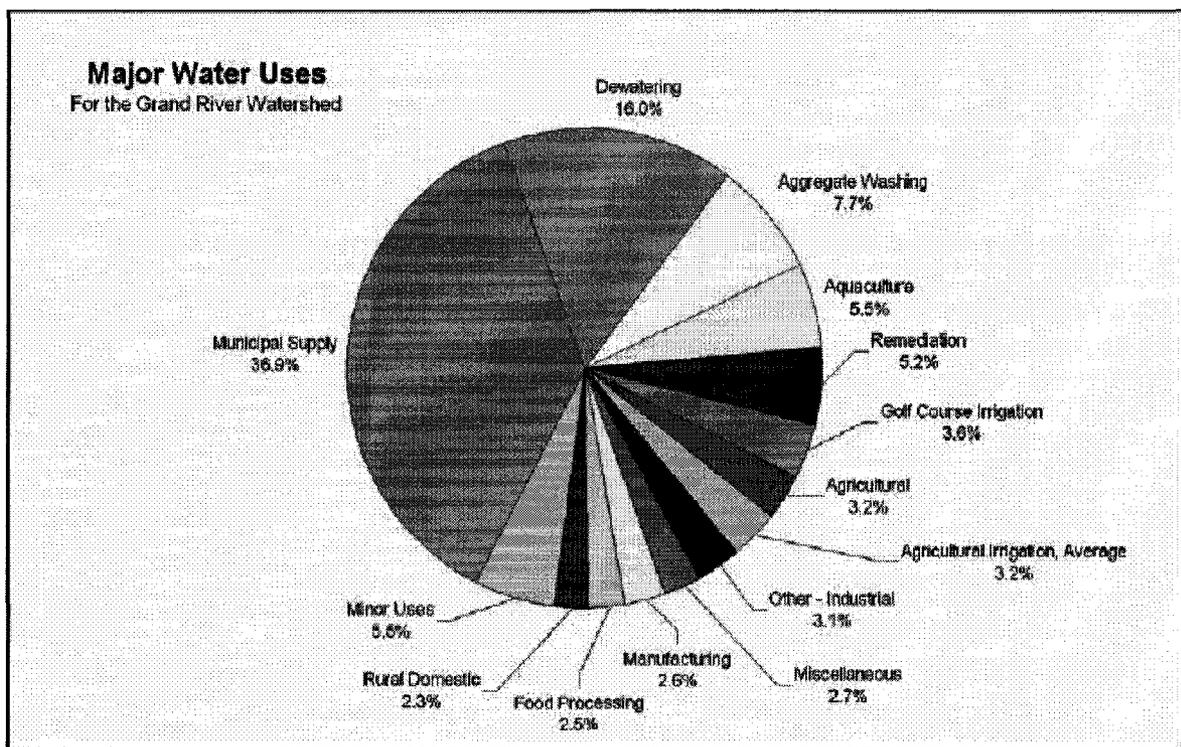


Figure 5.4: Water uses in the Grand River Watershed on an annual basis (Bellamy and Boyd, 2005: 28)

Water usage varies over time and over a years period, with the majority of water being used in the spring and summer months (Figure 5.5). The July peak is caused by two main factors: increase in agriculture production and in urban outdoor

domestic use (Bellamy and Boyd, 2005). Water usage over most of the year does not impede water supply but these peak periods are of concern and could constrict future growth in the Region. It is these summer peaks that the RMOW is trying to curb through water efficiency measures in order to avoid periodic water shortages.

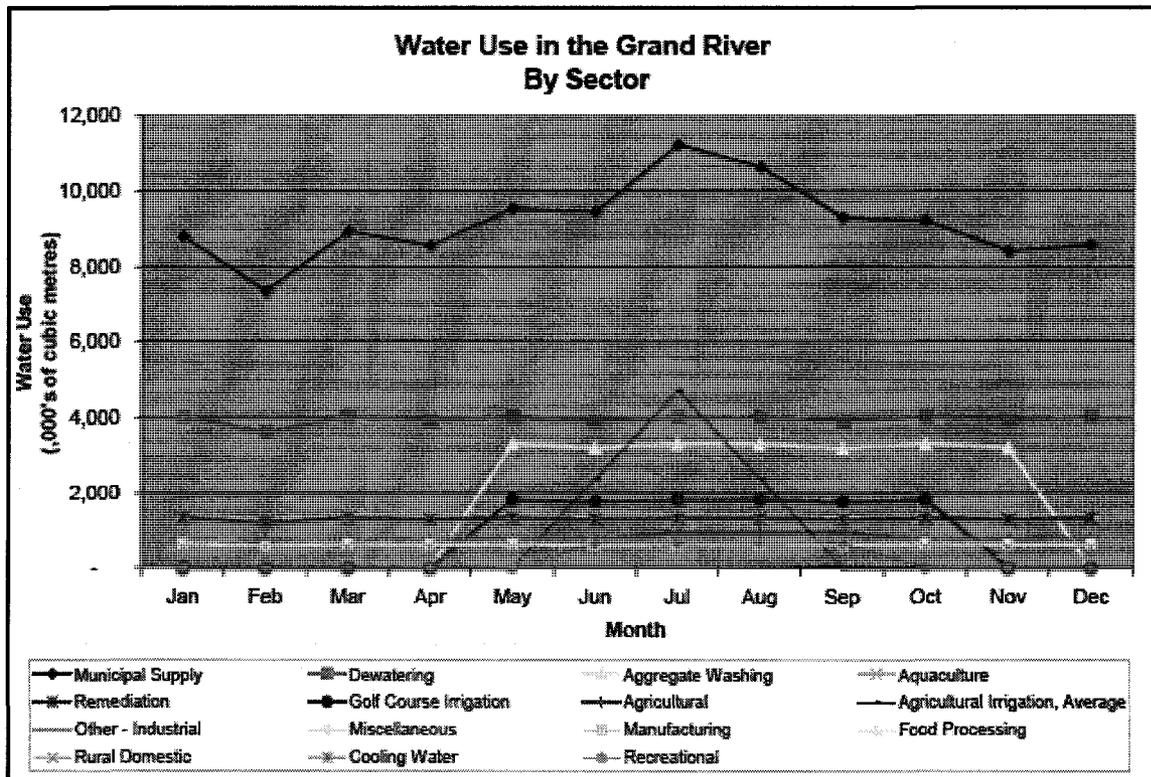


Figure 5.5: Water use monthly variation by major water users (Bellamy and Boyd, 2005: 29).

History of water resource planning: The Region has been analyzing water usage for many years and has been offering water conservation programs to the public since 1974, one of the first municipalities to do so in Canada. In 1985 the Water Conservation Committee was created in the Region of Waterloo. This working committee was comprised of stakeholders (including members from industry, environmental groups and institutional organizations), staff of the Regional Municipality office and Regional counsellors. The committee worked to promote water conservation and planning in the Region and eventually evolved into the Water

Efficiency Advisory Committee. The Water Conservation Committee suggested ways in which water efficiency techniques help to reduce the need for future water developments (RMOW, 2007a). The RMOW has worked closely with the Grand River Conservation Authority in funding a number of freshwater research projects. The Region has invested heavily in water research and \$2.6 (US) million between 1990 and 1993 on initial research to create a water resource protection strategy for the Grand River Watershed. The implementation of the plan between 1994 and 2003 cost the Region an estimated \$7.9 (US) million (Ivey, 2002). In 2000 the Region approved an update of its long-term water strategy to look at water management until 2041, emphasizing the need to plan well into the future (RMOW, 2006). As part of this long-term water strategy, the Region has a number of different water strategies and plans, including the Updated Water Efficiency Master Plan, the Water Supply Master Plan, a Water Resource Protection Strategy and a Rural Water Quality Program (RMOW, 2008). The above examples show the increasing level of support and interest in water management the RMOW has had over the past four decades. This interest and support has made the RMOW a water management leader and the Region's market research strategies are considered among the best in Ontario (Brooks, 2007).

Going into the creation of the WEMP Update, this investment in water research and planning along with working public committees such as the Water Efficiency Advisory Committee, have helped to build long a positive relationship between the Region and the public. The importance of this history can not be underestimated because it demonstrates that there already was a strong working relationship between

the public and the Region before the public participation processes for the updating of the WEMP started.

5.3 Water Efficiency Master Plan Background

With guidance from the WEAC in 1998, the first Water Efficiency Master Plan (WEMP) was created to help guide the RMOW in its water efficiency efforts. In the Region's *Long Term Water Strategy*, water efficiency was identified as an essential component of any management strategy (RMOW, 1998). There were three main objectives for the original 1998 WEMP:

- To create specific goals and targets for water use reduction over a twenty year period.
- To set up water efficiency programs and initiatives for the first ten years
- To create methods for monitoring the effectiveness of each program (RMOW, 1998).

With these objectives in mind, the Regional staff, along with a hired consulting firm, developed the WEMP via six different tasks:

1. *Background information search*: examine existing programs and mandates in RMOW long-term planning documents and similar programs in other jurisdictions.
2. *Regional water supply and demand review*: review the existing supply source capacity and per capita historical water use data.

3. *Create a baseline survey:* Gauge the public's perception towards water efficiency programs and technologies
4. *Identify water efficiency measures* that were already used in the Region and elsewhere.
5. *Evaluate methods:* Evaluate the success of the methods identified in the previous task on reducing water use and increasing community participation with these measures.
6. *Identify preferred water efficiency measures:* Analyze the results from public participation, financial limitations set by the Region and the amount of reductions that the measures can provide, this task outlined which measures would best fit for the RMOW's Efficiency Master Plan.

From these tasks, the WEMP and a number of monitoring programs were created. The monitoring programs included measuring success levels of the programs to reduce water rates and providing input into future projects (RMOW, 1998). In creating the WEMP, the Region viewed public participation as “of the benefit for major municipal studies because the broad community input and discussion lead to better decision making” (RMOW, 1998: 73). Public participation was seen as an important factor in the creation of the WEMP, especially for tasks 2, 3 and 6.

There were two main types of public participation used in the creation of this plan:

Workshops: Contractors viewed this format as a way to “allow for meaningful two-way dialogue” (RMOW, 1998:74). The RMOW initiated two rounds of workshops.

The first involved all stakeholders and the second split the workshops into three different stakeholder groups: industry, commercial and residential users (RMOW, 1998). The workshops were advertised in many different ways, with the main focus was on newspaper ads such as the one shown in Figure 5.6. Participation levels were low at all workshops but did provide valuable feedback (RMOW, 1998).

Water Efficiency Advisory Committee (WEAC): WEAC is comprised of 12 members from the community and council (see Table 5.1) who worked in collaboration with the Regional government to suggest different elements of the Update and exercised control over the final decision making (RMOW, 2007a). As part of the creation of the original WEMP, WEAC was consulted and relied on to give advice for both staff and consultants working on the project (RMOW, 1998).

Table 5.1 Breakdown of member affiliation of WEAC

- | | |
|----|--|
| 1) | Five Regional Councilors including regional chair (ex-officio) |
| 2) | Seven citizen appointees representing: <ul style="list-style-type: none"> a. The public or separate school boards b. The academic community c. Two representatives from either environmental or neighbourhood groups d. The Waterloo Chamber of Commerce e. Two representatives from major Regional water users |

(Source RMOW 2007a)

Advertisement Schedule for Second Round of Public Consultation

<u>Newspaper</u>	<u>Residential Ad</u>
Woolwich Observer	Sat., March 14/98
The Independent (Elmira)	Mon., March 16/98
Ayr News	Wed., March 18/98
Waterloo Chronicle	Wed., March 18/98
Cambridge Times	Wed., March 18/98
New Hamburg Independent	Wed., March 18/98
K-W Record	Tue., March 17/98
Cambridge Reporter	Tue., March 17/98



Did You Flush???
If so...
we need your ideas!
at
**Centreville Chicopee
Community Centre, Kitchener**
on
Thursday, March 26, 1998
7:00 p.m. to 9:00 p.m.

**Residential Public Consultation for Waterloo
Region's Water Efficiency Master Plan**

To reserve YOUR place call 575-4418

The Regional Municipality of Waterloo is developing a *Water Efficiency Master Plan* to determine the water efficiency programs it will provide over the next 10 years (e.g., Toilet Replacement Program, public education). We've already researched and evaluated the public's ideas on which residential programs to offer. Now we need the public's ideas for implementing these programs. Anyone who lives or works in Waterloo Region is invited to participate at this event. Don't let your ideas go down the drain—invest an evening in your community!



Figure 5.7: Advertisement used to promote town hall meetings (Source RMOW, 1998)

5.3.1 Comparing the Original 1998 WEMP with the 2007 WEMP Update

The 2007 WEMP Update was created to increase water conservation in the RMOW and used to evaluate how the original WEMP was able to influence the

public's water usage (United Utilities Canada Limited, 2006). This Update was seen as necessary because the original timeframe of the 1998 plan was coming to an end and it was outdated, in terms of new technologies, legislation and public knowledge of water conservation. Table 5.2, compares the different aspects of the original 1998 WEMP compared to the 2007 WEMP Update.

Table 5.2: Comparing the 1998 and 2007 WEMPs		
Comparisons	1998 WEMP	2007 WEMP Update
Estimated Cost	<ul style="list-style-type: none"> Up to \$347,000 per year for 10 years or at the most \$3,470,000 ending 2006 	<ul style="list-style-type: none"> Approximately, 347,000 per year adjusted for inflation for 9 years for a total of \$3,123,000 until 2015 Including \$539,548 over the 9 years for maintenance, monitoring and evaluation
Water Efficiency Recommendations	<ol style="list-style-type: none"> Residential public awareness ICI education, training and awareness Residential toilet replacement program School Curriculum Supplement Lobbying other levels of government Region to set an example Water rate structure review Aggressive Industrial Commercial and Institutional water efficiency initiatives 	<ol style="list-style-type: none"> Residential public awareness ICI Audits ICI buy back Toilet Replacement Low-flow showerheads Toilet flapper maintenance School Curriculum supplements Municipal Buildings Swimming pool education Efficient clothes washing machines (single and multi family) Residential indoor and outdoor audits Water softeners education Restaurant pre-rinse spray valves
Estimated Water Savings	6,800 cubic metres per day by 2009	8,222 cubic metres per day by 2015

(Source: RMOW, 1998 and United Utilities Canada Limited 2006)

Estimated Cost: The financial investment to implement the 1998 WEMP was only a slight increase from the total amount being spent on established water efficiency programs. However, over the life of the program the funding did increase to \$347,000 per year. In 2006 the consultants hired to create the WEMP Update proposed three funding levels to council: aggressive, moderate and status quo. Table 5.3 highlights these funding levels and reveals that an increase in the financial investment corresponds with increased water conservation (United Utilities Canada Limited, 2006). In July 2006 the Regional council voted to keep the status quo funding and therefore changed very little from the 2005 annual level of funding of \$347,000 (United Utilities Canada Limited, 2006). One of the major differences between the 1998 WEMP and the 2007 WEMP Update was the placing of finances towards maintenance, monitoring and evaluation, as part of an effort to sustain water savings in the long-term by maintaining the efficiency of past projects (United Utilities Canada Limited, 2006). However, these maintenance funds are taken out of the total funds available, which in the end leaves less money to implement the WEMP Update in 2007 than there was for the original WEMP in 2005.

Table 5.3 Comparing proposed water efficiency program levels

Program Level	2007 to 2015 Program Costs	2007 to 2015 Water Savings (m³/day)	Recommended Maintenance, Monitoring & Evaluation Costs
Aggressive	\$17,984,934	32,886	\$2,158,192
Moderate	\$8,992,467	16,443	\$1,079,096
Status Quo - Enhanced	\$4,496,234	8,222	\$539,548

(United Utilities Canada Limited, 2006, Appendix 3)

Water efficiency tools used: The recommended tools for water efficiency varied slightly between the 1998 WEMP (Table 5.2 1-8) and the 2007 Update (Table 5.2 9-21) with 6 of the 8 recommendations from the 1998 WEMP being incorporated in the 2007 Update. The two tools that were not included were lobbying other levels of government (including Provincial and Federal governments) (Table 5.2 # 5) and reviewing the water rate structure (Table 5.2 # 7). Lobbying other levels of government was seen as best done through other mechanisms that are not tied directly to water efficiency and after the 1998 water rate review was completed different suggestions were put forward to council. However, none of the suggestions implemented but are still seen as relevant at the time of creating the Update (United Utilities Canada Limited, 2006). The major additions to the WEMP were an expansion of public awareness and education plans including, swimming pool education (Table 5.2 # 17), residential indoor and outdoor audits (Table 5.2 # 19) and water softener education (Table 5.2 # 20). There was also an expansion of replacement programs including: low flow shower head replacement (Table 5.2 # 13), toilet flapper maintenance (Table 5.2 # 14) and restaurant pre-rinse spray valve replacement (Table 5.2 # 21). The remaining efficiency measures fit within categories that were already outlined from the original 1998 WEMP.

Table 5.4 Average Daily Water Usage in the RMOW				
Year	Population	Water Usage (m ³)	Per Capita Water Usage	
			(m ³)	Percent Change From Previous Year
1999	446000	174296.8	0.3908	
2000	455000	174174	0.3828	-2
2001	462900	185160	0.4	4.5
2002	471500	183979.3	0.3902	-2.5
2003	479700	176913.36	0.3688	-5.5
2004	490600	175438.56	0.3576	-3
2005	499500	178771.05	0.3579	0.1
2006	509000	167970	0.33	-7.8
Average	476775	177087.88	0.3723	-2.3
% Change 1999 - 2006	14.1	-3.6	-15.6	

(Sources RMOW, 2007c)

Estimated water savings: Table 5.4 summarizes the average daily per capita water consumption from 1999 to 2006, the final year of the original WEMP. In this period, the per capita water use was reduced by approximately 61 litres. This reduction took place within the RMOW's integrated water supply (Cities of Cambridge, Kitchener, Waterloo, St. Jacobs and Elmira), where the majority of the population resides. This works out to an approximate decrease in water usage by 15.6 percent between 1996 to 2006 or at an average rate of 2.3 percent a year. However, the greatest savings occurred in 2006. If the 2006 data is not used, than the decrease in water usage is only 8.4 percent or an average of 1.4% a year, almost 1 percentage point lower.. This table also highlights the percent change of water usage from 1999 until 2006 and notes that the trend is a gradually decrease of water usage over time. However, there are some years where water usage increases. There could be many social, political and economical reasons for this gradual reduction in water usage, including the efficiency mechanisms built into the original Water Efficiency Master Plan.

Table 5. 5 Average Estimated Daily Water Savings from Water Efficiency Master Plans

Year	Population*	Total Estimated Water Savings From Implemented Water Efficiency Measures (m³)**	Per Capita Savings (1000 m³)
Original WEMP Implementation			
1998	437700	274	0.63
1999	446000	911	2.04
2000	455000	1626	3.57
2001	462900	2569	5.55
2002	471500	3307	7.01
2003	479700	3997	8.33
2004	490600	4911	10.01
2005	499500	5508	11.03
2006	509000	5600	11.00
Revised WEMP			
2007	515600	5900	11.44
2008	521500	6300	12.08
2009	527758	6800	12.88
2010	534091	7100	13.29
2011	540500	7500	13.88
2012	546986	7900	14.44
2013	553550	8100	14.63
2014	560193	8222	14.68
2015	566915	8222	14.50
* 2008-2015 population growth on an estimated rate of 1.2 percent			
** 2007-2015 water savings estimated to reach the set target			

(Sources: RMOW, 2008; United Utilities Unlimited, 2006)

When creating the original WEMP, the RMOW set a target that the water efficiency mechanisms that were implemented would save a total of 6,800 cubic metres of water a day by 2009 (United Utilities Unlimited, 2006). Comparatively, the

WEMP Update has set a water efficiency target at 8,222 cubic metres of water savings by 2015. Table 5.5 illustrates the estimated average per capita daily water savings from 1998 to 2015 based on the potential water savings of the efficiency mechanisms implemented in that year. For each year of the original WEMP, the total estimated savings per capita range between 1 and 1.75 litres per day. Alternately, under the WEMP Update, only a modest increase in savings is forecasted, with estimated per capita water savings never increasing above 1 litre. Furthermore, increases in water demands associated with a population growth rate of 1.2% per year through to 2015 are expected to outpace the improvements in water efficiency that are to be realized under the WEMP Update.

This is not to suggest that the water savings that will occur over the lifespan of the WEMP Update are not important, but these estimates do suggest that the WEMP Update, by itself, will not result in a net reduction in total water usage over the 2007-15 period. In retrospect, the “status quo option” implemented under the WEMP Update may be sufficient to avoid exacerbation of the current water supply issues but it is not expected to lead to substantial water savings. By the end of the WEMP Update period, average per capita water in the Region will continue to be only just lower than the Canadian average of 330 litres. This suggests that programs that will be implemented under the revised WEMP will not eradicate current water scarcity concerns that tend to be confined to peak periods of water usage and, even more importantly, will not reduce the need for future expansion of water supply infrastructure (Bakker, 2007, Environment Canada 2004).

5.4 Summary

Water is an important consideration throughout the RMOW and it has implemented a wide range of programs to address current concerns on issues of water supply and quality as well as provide a stronger foundation to support its fast growing population and economic growth. The RMOW is working to secure water so that it is available to meet the needs for both current and future generations, particularly during peak usage periods. Water efficiency is an important component of increasing the level of water security in the Region (RMOW, 2008). Water efficiency is seen as a way to push development of new sources of water further into the future, including the Regions plans to build a water pipeline to the Great Lakes and thereby spread the cost of such projects over a number of generations. However, the estimated water savings from water efficiency funded at a status quo levels, even if they are enhanced is low. If the RMOW wishes to use its water more sustainability, it is going to have to reduce its per capita water usage by more then 8-11 litres to do so. The original WEMP was an example of how the Region is reaching out to the public to help reduce water use. This chapter outlined the context in which this thesis is based, the overall geography, freshwater use and water efficiency in the RMOW including a comparison of the 1998 WEMP and the 2007 WEMP Update.

Chapter 6: Assessment of the use of Public Participation in the Creation of the Regional Municipality of Waterloo's Water Efficiency Master Plan 2007-2015

This chapter provides insight into how public participation influenced the Region of Waterloo's Water Efficiency Master Plan Update. The chapter draws on information gathered via interviews with the proponents of the plan and the public (WEAC), observations at WEAC meetings and documentation regarding the creation of the original WEMP and the 2007 WEMP Update (see Table 2.1). This chapter is organized around public participation themes, not data collection methods. However, throughout the chapter data collection methods that underpin the information and analysis are denoted as follows:

O = Observations of WEAC meetings

Sw = Survey with WEAC members

Sp = Survey with proponents

Ss= Survey with public (not WEAC)

I = Information available from the creation of the WEMP Update.

The analysis is presented in four sections: (1) how public participation was employed, (2) how public participation influenced updating the WEMP, (3) how various public participation approaches were implemented within the program and (4) placing the WEMP Update in a broader context.

6.1 Types of Public Participation Used in the 2007 WEMP Update

The 2007 WEMP is an updated version of the 1998 WEMP. Both the 1998 and 2007 versions incorporate public participation, however, the public participation that was implemented in creating the 1998 WEMP was considered more intense than the public participation used in creating the 2007 Plan (Sp). Public input obtained from the creation of the 1998 plan also influenced the 2007 Update (see chapter 5 for a comparison of the 1998 and 2007 plans) (Sp). Table 6.1 compares the public participation measures that were used in the 2007 WEMP Update to the public participation classification system that was developed in chapter 3 (See table 3.1). These measures have been grouped by types of participation: Sharing information, Collecting and Compiling input, Continuous exchange and Facilitating decisions. Table 6.1 highlights the fact that the RMOW used three types of public participation: (1) Share information, (2) Collect and Compile input and (3) Continuous exchange, with the majority of the public participation focusing on the first two types of participation. The fourth public participation type, (4) Facilitate decisions, was not employed in the WEMP Update process because decision making power remained with the proponents of the plan and the Regional council (Sp, I, Sw).

Share Information	Collect and Compile Input	Continuous Exchange	Facilitating Decisions
Website Postings Regional Newsletter Availability of Previous WEMP Newspaper Notices Town Hall Meetings	Town hall Meetings Focus Groups Water Audits Surveys	WEAC	

(Sources Sw, Sp, I)

6.1.1 Sharing Information

Sharing information is the process of making information available for stakeholders to review. This information could be used to facilitate other types of public participation, or it can stand alone. The RMOW undertook a number of initiatives to inform the public of the need for an update to the WEMP. This included making available previous water efficiency documentation, a Regional newsletter, website postings and newspaper notices (Sp, I). Each of these methods were used to inform the public of water efficiency in the Region and how the public could provide input into creating the new WEMP.

Availability of previous water efficiency documentation: As it does today, the public had access to the original WEMP and all of the documentation concerning its 8 years of implementation (including council and committee minutes, changes to the WEMP and other water efficiency information) prior to creating the Update. This information provided the public with an opportunity to inform themselves about the components of the original WEMP and its evolution until 2006 (I, Sp). Specifically, members of the public could review how water efficiency was implemented and managed during the 1998-2006 period, and how water efficiency planning had impacted their lives. Many of these documents can be found via a search for water efficiency on the RMOW's website. Compiling this database allowed the public to gain a more complete understanding of water efficiency in the Region prior to the creation of the WEMP Update. Interviews with members of the WEAC stated that the historical records were used as a starting point to the WEMP Update (Sw).

Regional newsletter: The RMOW also shared information about water efficiency and the creation of the WEMP Update through its EnviroNews newsletter, which is sent to every residence and business within the Region. EnviroNews is a quarterly publication that focuses on how residents can reduce their impact on the environment (Sp, I). During interviews, residents indicated the newsletter kept them apprised of water issues and efficiency within the Region (Ss). The newsletter presented information about the Update, including how to provide input into it, as well as information on the water conservation mechanisms made available by the Region (See Appendix D for examples of the EnviroNews).

Region of Waterloo's water website and newspaper postings: The Region's website was also a key component to sharing information about water efficiency and the WEMP Update (Sp). The RMOW's website has interactive components on water and water efficiency. The site breaks down its water section into four categories; (1) conservation, (2) protection, (3) quality and treatment and (4) supply and distribution. Each of these sections provide information such as water rates, efficiency plans, treatment processes and other water efficiency and protection tools that could help water users conserve water (I). These tools are an important source of information to help educate the public on the importance of water and water efficiency. Both water quality and supply are the underlying themes of the majority of the information contained within the site (I). This focus emphasizes the importance that the RMOW places on how water is treated, distributed and in the end, used. The website, along

with newspaper advertisements, was used to inform the public of the different ways they could actively participate in the creation of the plan (Sp).

Due to few interviews with members of the greater public, it was unclear how effective the website was in informing the public during the creation of the Update. However, these methods are also used throughout the Region to inform the public of their rain barrel distribution program and each year hundreds of citizens participate in this program. Often, all of the barrels are sold in less than one hour (I, Sp, Sw). This example helps to illustrate that many of the citizens and businesses in the Region are informed through using these methods concerning a specific conservation program and it could have had the same impact on the WEMP Update itself.

6.1.2 Collecting and Compiling Information

Collecting and compiling information as to the WEMP Update was the main method used by the RMOW to gather public input from the public. For the most part, this was a one-way process in which the Region asked questions and collected information without the public being given the opportunity to influence the questions being asked. An exception to this process was through town hall meetings, during which the public was asked for feedback on the WEMP Update. Information was presented at town hall meetings as an open house showcase of the proposed plan (Sp). Beyond town hall meetings, there were three other ways that the RMOW collected and compiled information from the public: water audits, information surveys, and focus groups (I).

Town hall meetings: After compiling the data gathered through surveys and focus groups, the RMOW held three town hall meetings. During these meetings, Regional staff and hired consultants shared information and gathered feedback on the proposed water efficiency measures that were short-listed for the plan, and on how aggressive the plan should be in reducing water usage in the Region (RMOW, 2006).

Water audits: The RMOW hired consultants to visit residents to discuss water usage, water efficiency measures that residents were using, the potential for further water conservation and to conduct water audits (United Utilities Canada Limited, 2006). Water audits are not traditionally a participatory approach but were seen as a necessary component to understanding water use in the Region. Audits were performed randomly and were spread out geographically to incorporate the different districts within the RMOW. In total, the Region performed 245 outdoor audits and 80 indoor audits (United Utilities Canada Limited, 2006). These water audits served as guidance for the RMOW in terms of current water use and water conservation by area residents and this information influenced the creation of new target water conservation levels for the revised plan (Sp).

Surveys: From the perspective of the proponent, telephone surveys were the most influential method of collecting public information. Over 600 telephone surveys were completed, creating a statistically viable source of input that was estimated to be accurate to within +/- 4.2%, 19 times out of 20 (United Utilities Canada Limited, 2006). Table 6.2 is a breakdown of the demographics of those surveyed compared to

the demographics of the Region. After a comparison between the two different demographic numbers, the survey respondents are, for the most part, representative of the RMOW (United Utilities Canada Limited, 2006, Statistics Canada, 2007 and RMOW, 2007b). The only large variance is found within the level of education section. Here this difference may be the result of including people with some college or university education in the RMOW survey compared to the Statistics Canada information which only includes those with a college diploma or university degree.

Table: 6.2: Demographic breakdown of participants in survey data compared to demographic breakdown of RMOW

Gender	Survey	RMOW (2006)	Education	Survey**	RMOW (2006)
Male	47%	49.3%	High School or less	38%	52%
Female	53%	50.7%	Some/Graduated College	25%	30%
			Some/Graduated University	37%	18%
Age			Time in Waterloo Region		
18-29*	22%	14.4%	Less than 2 years	8%	NA
20-39	23%	14.6%	3-5 years	10%	NA
40-49	22%	16.2%	6-10 years	11%	NA
50+	34%	28.5%	11-19 years	14%	NA
			20+	56%	NA
Household Size					
1 person	12%	NA			
2 people	35%	44%			
3 people	16%	22%			
4 people	26%	23%			
5+ people	10%	10%			

(Source United Utilities Canada Limited, 2006 Appendix 3, Statistics Canada, 2007 and RMOW, 2007b)

The goal of the telephone survey was to collect quantitative data from the public regarding water efficiency measures (Sp). The survey company randomly selected residents of the RMOW that were 18 years and older and who were connected to the municipal water supply (I). The survey began with broad questions about conservation and the environment in the Waterloo Region and the household's water usage and knowledge of water efficiency. The survey then moved on to more specific knowledge questions about current programs, including the effectiveness of

methods such as the EnviroNews and the use of the Region's website to inform the public on conservation options. The survey also questioned the public on how likely the homeowner would be to use water efficiency technology in their homes (I, Sp). Each survey of approximately 45 questions lasted about 13.5 minutes (Sp)¹. The conclusions from the survey were used in the creation of the WEMP in terms of what the public knew about water efficiency, the current uptake of programs and program advertisement (United Utilities Canada Limited, 2006).

Supplementing these telephone surveys was information gathered through public information centres (Sp). These information centres were set up in major shopping centres throughout the Region as a means to increase participation. When discussing levels of participation, one person working with the main proponent stated that "part of the reason we do [these public information centres] at malls is because we get the walk through traffic, so that we actually get some people to talk to" (Sp). He indicated that previous information centres that were not at malls had very low participation rates. Malls, however, are an easily accessible site which allows people to participate, even if the person does not normally go to malls (Sp). The survey used at the information centres² was also available on-line for members of the public to fill out and email to the Region's water management staff (Sp). Participation in these two supplementary surveys was very low, with an estimate of less than 25 respondents (Sp).

"[...] basically 21 responses we got, which I would say is not much, you can't really base your program on that, but it gives you a clue [of what they wanted]. The people who did the questionnaire were very strongly pro conservation" (Sp)

¹ See Appendix E for a copy of the questions used in the telephone survey

² See Appendix F for a copy of the questions used for the internet and a information centres

Here the main proponent discusses the fact that even though the RMOW did not receive mass input, the input they collected provided them with an idea of what the public wanted. However, this person did add that he felt that most of the respondents of the supplementary survey were aggressive in terms of conservation and that the majority of the population would not support the increased rates that the respondents to the questionnaire were willing to incur (Sp). However, he did not have any data to back this feeling up. This would suggest that those that did take the time to complete the survey were already conservation orientated and were inclined to ask for greater efficiency measures.

Focus groups: The last method of collecting and compiling information was through focus groups. The goal of the focus groups was to gather qualitative information that was used to verify the findings from the information gathered through surveys (Sp). There were 3 groups of eight people in each of the 90 minute focus group sessions, and each participant was paid \$40.00 for their participation (Metroline, 2005a). Table 6.3 illustrates the focus group selection requirements outlined by Metroline, the consulting company hired to establish and run the focus groups. The purpose of these selection requirements was to establish groups that were representative of the RMOW (Metroline, 2005b). Key components of the criteria included: all members use the municipal water supply, 50% or more of participants currently practice water conservation in their households, and members must be from various geographical areas within the Region (I). The second criterion may have skewed the focus group towards those who do not currently practice water conservation. The consultant's own

telephone survey found that 70% of respondents “have made at least some change to the way they conserve water in the past 5 years” (United Utilities Canada Limited, 2006 Appendix 3). This specific criterion could have been set higher at between 60 and 70 percent to be more representative of the population to ensure that more people who are using methods of water conservation were in the focus groups.

The focus groups were conducted in an informal manner, with a lead facilitator using a number of guiding questions throughout the conversation (Sp). When asked how the moderator ensured that there was participation by all members of the focus groups, he answered by first going into some detail regarding the process and then illustrating that he was aware of people who were not participating and brought them into the discussion (Sp).

“as part of our [...] background[...] it’s [the focus group process] not strictly a question and answer thing, [...] there are [...] definitely categories that need to be covered there are some key questions that have to be covered but, in any time you do a focus group you will end up going off on different tangents from time to time because people bring something up that maybe you haven’t thought about or maybe its something interesting that wants to be pursued to see if it goes somewhere,. Typically, we watch as a moderator we will watch for people who are not saying much and encourage them by asking them the next question directly to encourage them to participate”. – Sp

Table 6.3: Focus group selection specifications
Total 8 participants (4 female, 4 Male)
Over 25 years of age (with a good spread of each age group)
Home owners
Responsible for monitoring and paying utility bills
Minimum 4 per group using water conservation in their household
Lived in the RMOW for at least 3 years
No other participation in Metroline over the past 6 months
<i>Specifications for individual groups</i>
<u>Group 1</u>
All live in the Waterloo Region
5 participants will be farmers OR living in rural areas
3 respondents will live in a town/city
No respondents will draw water strictly from private sources
<u>Group 2</u>
All participants will live in Cambridge
<u>Group 3</u>
4 participants will live in Kitchener
4 participants will live in Waterloo

(Source Metroline, 2005b)

6.1.3 Continuous Exchange (Water Efficiency Advisory Committee)

Continuous exchange creates on-going dialogue between proponents and key stakeholders and assists with establishing and maintaining trust (IAP2, 2006). The Water Efficiency Advisory Committee (WEAC) provided a forum for continuous exchange amongst multiple stakeholders during the 2007 WEMP Update (Sw, O). The WEAC is comprised of Regional Counselors (including elected Counselors and Mayors of Townships) and key stakeholder groups (environmental, citizens, industry, education, institution and business associations). The WEAC works as an ad-hoc committee with the RMOW. Its work is staff driven, in search of input into future

decisions (see chapter 5 section 5.3 for details on the WEAC) (RMOW, 2006). The committee included members that view water as a key resource, they were appointed into the committee because their input was seen as valuable, respected and useful in decisions regarding water efficiency in the Region (Sw, Sp). A comment from the most recent member of the WEAC highlighted the value of the members' input, specifically when she stated how her involvement was perceived:

“I have a strong interest in water, whether it be water conservation or cleaning up water, I saw it as an opportunity to become involved [with the decision making process] I believe that the people in the committee do respect everybody and everybody's opinions and everyone is listened too, and questions are answered and all of that, it is more as the group...I do believe that everyone's opinions are respected.” (Sw)

Water was the driving factor for this WEAC member's participation and, as indicated, she believes that even though members have different interests or tendencies, the perspective of each member of the committee is respected and trusted.

Table 6.4 presents public participation activities that occurred in the creation of the WEMP Update. From this timeline it is clear that the WEAC was continuously involved in the process, from initiating the process to finally recommending the plan to Regional Council for approval. Part of the WEAC's role was the creation of a subcommittee or task team comprised of 3 members of the WEAC (one counselor, two stakeholders) and one staff person to closely manage the WEMP Update process and to report back to the entire committee (Sp, Sw). As described by the stakeholder who represented environmental groups on the subcommittee:

“there were 3 of us [on the WEAC WEMP subcommittee] that met several times with the staff and the consultants, at various stages of production, and it was quite useful, I mean, we were able to comment, we were able to recommend changes, question assumptions, um have the consultants think

about particular issues, so it was, I was satisfied by the approach that we took on review the draft of the report...” (Sw).

WEAC had a strong influence on the outcomes of the WEMP Update. This group was involved in every aspect of the WEMP Update including drafting the request for proposal and hiring the consultant, deciding on the mechanisms used to gather public input, editing and providing input into the final report that lead to the WEMP Update.

Table 6.4: WEMP Update P2 timeline 2004-2007				
Year	Quarter	P2 Activity	IAP2 Spectrum	Sources
2004	1			
	2	WEAC advise Regional staff to start an Update of the original WEMP	Collaborate	(1) (2) (3)
	3			
	4			
2005	1	WEAC - WEMP sub-committee involved in hiring of consultant	Collaborate	(1) (2) (3)
		Telephone surveys	Consult	(2) (3) (4)
	2	Focus Groups	Consult	(2) (3)
	3	Outdoor Water Audits	Consult	(2) (3)
	4	Indoor Water Audits	Consult	(2) (3)
		Open Houses	Inform & Consult	(2) (3)
2006	1	Final Info Centres Survey submissions	Consult	(3) (2)
	2	WEAC approval of WEMP Research Report	Collaborate	(1) (2)
		WEAC endorses WEMP update	Collaborate	(1) (3)
	3			
	4			
2007	1	WEMP Update implementation begins		(2) (3)
Sources: (1) WEAC interviews: (2) Proponent interviews: (3) Background research: (4) General public				

The WEAC was the main source of dialogue between staff members and the public (Sp). Regional counselors on the committee represented various jurisdictions and members tended to take into consideration the need of their constituents along

with the needs of the Region as a whole. When asked what perspective she brought to the WEAC, one Mayor noted the following:

“Actually, I try to think regionally. That’s how I think first of all. Because, regionally we have 7 municipalities [in the Regional Municipality of Waterloo] every one of them is very different, everyone’s water resources are very different. [...]. So I try and think regionally or globally as I put it, rather than of just sitting in here [her office] and thinking of the township. And of course anything that might come up that might pertain to the Township or what goes on here, I feel is a bonus that I am sitting at that table that perhaps I can discuss or listen to those items much quicker and better than if I wasn’t on the committee, but I do try and think regionally” (Sw).

This balancing of local constituents and Regional needs was shared by all the WEAC members interviewed, and was built upon trust in each other and trust in the Regional staff that ran the Water Efficiency Program (Sw). This trust most likely comes from the success of previous projects such as the 1998 WEMP and continued open and supportive communication between all members of the group.

6.2 How Public Participation was used

The IAP2 recommends that when proponents design a participatory program to gather information from the public that: (1) appropriate methods should be implemented to ensure that over the duration of a participation process, (2) a number of types of public participation are employed, (3) specifically types of public participation that fit along different stages of the IAP2 spectrum (IAP2, 2006) (See Figure 3.2 in chapter 3 section 3.3 for a copy of the IAP2 spectrum). Table 6.5 illustrates the various participatory approaches that were used in the creation of the WEMP Update and their correlation to the IAP2 spectrum. Table 6.5 demonstrates that most participation is based on informing and consulting with the public. The only

exception to this was collaboration via the WEAC. The WEAC could fit into both the Involve and the Collaborate stages of the IAP2 spectrum. As a whole, the committee was involved throughout the process to ensure that their concerns and aspirations were consistently understood and considered in creating the WEMP (Sw). However, the WEAC sub-committee that worked specifically on the WEMP Update is an example of collaborating with the proponent, because this sub-committee was a partner in each aspect of the creation process (Sw, Sp). The only IAP2 stage that was not used was the Empower section which partially places final decision making power in the hands of the public. For the WEMP Update, the decision making power rested with the Regional staff and finally with the Regional council (Sp). Participation at the inform level of the spectrum provided information that the proponents used and interpreted, and while this can be an important component of the public participation program, it had little direct influence on the final decision making process. However, the information provided at the other levels were seen by the proponents as having significant indirect influence on the creation of the WEMP Update (Sp). When asked how public participation influenced the creation of the plan, the main consultant stated that “the market research part of [creating the plan] provided significant information for us that was extremely valuable” (Sp). He explained that the information collected in the RMOW was so valuable that their consulting company emphasizes that market research (Collecting and Compiling information) should be an integral part to any efficiency planning process (Sp).

Table 6.5: Public Participation involved with creating WEMP update compared to the IAP2 spectrum

Inform	Consult	Involve	Collaborate	Empower
Website Postings Regional Newsletter Availability of previous WEMP information Newspaper Notices Town Hall Meetings	Town Hall Meetings Focus Groups Water Audits Surveys	WEAC	WEAC Sub-committee	

Source (Sp, Sw, W, I)

In creating the WEMP Update, the RMOW focused its public input on three main areas along the IAP2 spectrum: Consult, Involve and Collaborate. Compared with Table 6.1 these approaches fit into either Collect and Compile input and Continuous Exchange. The Inform stage was used extensively through Sharing information. However, due to the one way nature of this stage, the participation public influence on the final plan was minimal and therefore was not looked at in this section of the assessment. Collect and Compile input and Continuous Exchange types of public participation have a number of useful qualities however, they also have shortcomings that may hinder future uptake of the plan by the public (Table 6.6 looks at some of the positive and negative aspects of these approaches).

Table 6.6: Comparing some of the positive aspects and shortcomings to types of P2 used

Approach	Positive	Shortcomings
<p>Collect and Compile input: <i>Surveys</i> <i>Town hall meeting</i> <i>Focus groups</i></p>	<ul style="list-style-type: none"> • Broad perspective from many stakeholders • Creates quantifiable numbers • Fairly inexpensive • Focused input (focus groups) 	<ul style="list-style-type: none"> • Inflexibility of questions • High levels of interpretation of questions • Little public buy-in of process • Limited time to participate • Little input into final decision making
<p>Continuous Exchange: <i>WEAC</i> <i>WEAC Sub-committee</i></p>	<ul style="list-style-type: none"> • High level of involvement with decision making • Improved buy-in by stakeholders • Increase understanding of issues between stakeholders 	<ul style="list-style-type: none"> • Small numbers participating • Missing stakeholders from the process • High number of proponents on committee

(Sources: United Utilities Canada Limited, 2006, Mitchell, 2002, Diduck, 2007).

6.2.1 Collect and Compile Input

Collecting information is one of the most common forms of public participation (Mitchell, 2002). It was the opinion of the RMOW and the consultants hired to analyze the data that, “water efficiency/conservation is an important issue to area residents and it has become more important over the past five years as water shortages/droughts and media coverage [have] captured attention” (United Utilities Canada Limited, 2006: 17). The RMOW staff and the consultants were able to use the information collected through public participation to evaluate different water efficiency methods available to the Region (Sp). The consultants took into consideration the implementation costs, low water conservation rates and interest of community members in creating a shortlist of water efficiency measures that would

make up the WEMP Update (Sp) (see Table 5.2 in Chapter 5 for a list of water efficiency measures).

Surveys: Surveys are limiting because they only gather information that is related to the questions that are being asked. In the case of the WEMP Update, surveyors had a set number of questions to ask the interviewees. The consultant hired to implement the telephone surveys commented that there was very little room for dialogue within the questionnaire and it was difficult for the surveyor to clarify any of the questions (Sp). For example the first question in the telephone survey was “When you think about conservation or the environment in Waterloo Region, what comes to mind? (Unaided)” (United Utilities Canada Limited, 2006 Appendix 3). This question specifically states that the surveyor cannot aid the respondent. This type of question leads to much interpretation by the respondents in terms of what is meant by conservation or the environment³. The structured nature of the surveys did not give the respondents an opportunity to expand on the questions and elaborate on the questions being asked. An example of the survey limiting the ability for respondents to expand on input was “How important is water efficiency to your household?” (United Utilities Canada Limited, 2006 Appendix 3). This question was rated out of a scale of 1-10, in which respondents were given the following interpretations of the scale: very important 9-10, somewhat important 5-8 and less important 1-4 to respond. In this example, slightly less than half of the respondents replied either 9-10 or very important (United Utilities Canada Limited, 2006). This question leaves a lot

³ However, even with the large number of interpretations 47% of residents mentioned water issues as the first topic that they think about, which is a significant number.

to be interpreted, including what is meant by water efficiency and more importantly what the term important means to those being interviewed. Alternately, these types of market research questions are very good at gaining information that is not opinion based. As for example when asked, “Does your household have/use any of the following?” (United Utilities Canada Limited, 2006 Appendix 3), responses could either be yes or no, allowing the surveying consultants to put together a list of water conservation measures used in the Region. Interviews with the consultants in charge of gathering the survey data state that even after taking the approximately 13.5 minute survey, many people did not connect the input provided with the WEMP Update and instead saw the survey as a general questionnaire on water efficiency in the Region (Sp). One of the benefits of public participation is to create a sense of ownership over the proposed plan. With this type of quantitative input and a low understanding of the purpose of the input for the public, an increased sense of ownership of the WEMP will most likely not occur.

Town hall meetings: The three town hall meetings were advertised through newspaper notices, website postings and posters in Regional buildings for a period of one month before the meeting (Sp I). Over 25 interested citizens attended the town hall meetings which was well below RMOW expectations (Sp, I). However, the town hall meetings were influential to the Update because it demonstrated that the public who did attend the meetings approved of the measures presented. When asked about the rain barrel subsidy program the participants at the town hall meeting were strongly in favour of keeping it as part of the Updated plan. This is important to note

because the rain barrel program had originally been taken off the list of efficiency programs for the Update. The public at the meeting in the end had a direct influence on the efficiency programs included in the WEMP Update. However, the town hall meetings were less conclusive regarding how aggressively the Region should promote and pursue water use efficiency (RMOW, 2006).

Focus groups: The focus groups were seen as important to gathering first hand public opinions on water conservation and efficiency in the Region. This method allowed the Region to move beyond the quantitative process used to collect information from the surveys and created an opportunity for the Region to have a dialogue with citizens about water efficiency, the cost of water use and the likeliness of these citizens to participate in future water conservation programs (Sp). The main proponent saw focus groups as the best way to qualify the data gathered through the surveys. Without this qualification it would have been difficult to create a plan that was representative of the needs of the community (Sp).

6.2.2 Continuous Exchange (Water Efficiency Advisory Committee)

Continuous exchange participation occurred in the form of the Water Efficiency Advisory Committee. The WEAC is comprised of 12 members, 5 of which are Regional counselors and 7 are representatives of other stakeholders and water users (Sp, I). The Regional Counselors represent different geographic areas in the RMOW, including rural areas and urban centres (O, Sw). Although the counselors do represent a wide range of constituents (or publics), they are closely affiliated with the

RMOW staff that were gathering information for the WEMP Update. All of the counselors that were interviewed discussed their personal concern for water efficiency and their role as part of the WEAC as representatives of the public and the Regional government. They also have a number of other commitments and concerns beyond water efficiency including financial implications the WEMP might create, specifically a rise in taxes or water rates. Water efficiency planning is just part of the complexity of municipal decision making, which moves away from just water issues. Concerns over Regional finances may have influenced the ability of these counselors to make decisions that moved beyond the status quo, especially if there were negative consequences in other sectors (O). This is not to discount the input from the counselors, because they provided a needed perspective from both their constituents and the Regional government. It is a question of whether these counselors should be considered public or as part of the proponent, and in the case of the WEMP Update they were seen as both (Sw Sp). Regardless, the majority of the WEAC's members (7 currently and 6 while creating the WEMP Update) were not counselors and were not part of the Regional government (see Table 6.7).

Table 6.7 Breakdown of the 6 Citizen Appointed Members of WEAC During the WEMP 2007 Update

Number	Representative Group	Specific Organization or Company
1.	Public or Separate School Boards or Chambers of Commerce	Public School Board
2.	Academic Community	The University of Waterloo
3.	Environmental or Neighbourhood Association Groups	Environmental Association (non-specific)
4.	Environmental or Neighbourhood Association Groups	Neighbourhood Association (non-specific)
5.	Major Regional Water User	Maple Leaf Consumer Foods
6.	Major Regional Water User	Toyota Motor Manufacturing Canada Inc.

(Source: Sp, Sw, I RMOW, 2007)

The 7 non-counselors members now represent all other stakeholders from a population of approximately 500,000 people. Each representative group corresponds to a large cross-section of the population in the Region (Sw). One representative is left to understand the water efficiency needs of each of these groups. For example the Chamber of Commerce represents a number of small and large businesses, each with different needs. It would be difficult if not impossible to think that one person could represent the needs for this complex group of businesses. With just a small number of stakeholders being represented in collaborative participatory methods, there is a real danger of missing key stakeholders in the decision making process. These missing stakeholders could potentially be lost in the process and could cause future delays in implementation because they were not involved in the public participation program and would be hesitant to take on any new responsibilities that they did not help create. There is not a key ratio of members of a committee to the population, it is dependent on the context of the resource that is being managed. However, it might have been

useful to have expanded the WEAC while updating the WEMP and then continue with its normal membership after the Update is completed.

6.3 Overall Assessment of the Public Participation Used in Creating the WEMP Update

It is important to review all aspects of the public participation program used to Update the WEMP, specifically in terms of how effective the program was in soliciting public input that influenced water management in the RMOW. By including a number of options to participate, many challenges caused by using only one participatory approach were avoided. This section first looks at two of the problems in the program; low participation levels in the WEMP updating process and how the RMOW defined stakeholders. The second part of this sections looks at a number of positive aspects of the program as a whole including how public participation influenced the creation of the plan.

6.3.1 Reasons for Low Levels of Participation

In 1998 and again in the 2007 creation of the WEMP Update, participation levels at invitational or open events such as town hall meetings or public information centres were very low (RMOW, 1998, Sp). The literature on public participation lists a number of reasons why this may occur (see section 3.5 in Chapter 3), the following section focuses on three of the influences that had the greatest impact on participation rates during the creation of the WEMP Update: (1) trust in Regional staff, (2) social barriers – lack of flexibility/variety of opportunities to participate and (3) the nature of the issue – public indifference or a clear and obvious solution.

Trust in Regional staff: From the research performed to gather input into the WEMP, the public in the Waterloo Region understand that water efficiency is important for future growth in the Region. Even with flaws in survey questions used to collect information from the public, over 96% of respondents placed water efficiency as important or higher which in turn created an environment that recognized water efficiency as a component for future growth (United Utilities Canada Limited, 2006). A recent survey, completed as part of the WEMP Update, found that the water conservation by-law that restricts outdoor water usage during periods of peak water usage in the RMOW had a very high approval rating by the citizens of the Region. This approval rating implies a sort of trust in staff or in the regulations that they create (United Utilities Canada Limited, 2006). There is an understanding by Regional staff that the public trusts them to deliver water programs so that when they turn on the water tap, clean water flows out. One staff member stated when asked why participation levels were low that “we [those working on the WEMP] are the experts, and they [the public] look to us to manage water” implying that the public has trust in how the staff manages water resources (Sp). However, if the water did not flow as expected, there is a strong likelihood that the trust would be broken and there would be a rise in direct public participation on how water is managed in the Region.

Timeline for participation: The Region had a short time period for public participation (Table 6.4). Not including the time for the WEAC participation, all other participation occurred within a 6 to 9 month timeframe. All of the approaches,

with the exception of the Internet surveys and the water audits, were only available on a specific date. This timeframe was incorporated because of financial constraints to complete the WEMP Update on budget. This shortened period for public participation limited the number of participants as some public participation approaches were only offered once. If a person could not participate in that specific timeframe, then there were few other opportunities available to participate in the WEMP Update creation process. Although there was a short public input period, the RMOW asked for input via various methods. If a concerned stakeholder was interested in participating, they were given a number of mechanism to provide input, including contacting their Regional representative. The WEAC councilors that were interviewed said they were not contacted by constituents in order to provide input or with concerns over the WEMP (Sw), implying that there were no major public concerns with the plan. The WEAC continues to oversee the implementation process of the Update and therefore, despite the limited timeframe for public participation, stakeholders can still provide input into water efficiency planning through the WEAC and their Regional Counselors.

Nature of the Water Efficiency Master Plan: The nature of the WEMP does not impact any stakeholder in a negative way. With the exception of the peak period water usage by-law, all other efficiency measures in the Region are encouraged rather than enforced and. For example the head of water efficiency programming for the RMOW stated that:

“[the public] will complain if something affects them that they don’t want [...] we did get a lot of public input from our decision to restrict water use

during the summer time, we had tones of public input there, but primarily for the most part in support of it. There is an example of a situation where we got a huge amount of public response [...] because it affects them directly” (Sp).

Stakeholders are encouraged to become more water efficient through educational campaigns, water audits and subsidy programs as part of the plan. If citizens choose to become involved with water efficiency, than they are doing so voluntarily and are not forced to through legislation. The only area where the WEMP could impact all stakeholders is with an increase in price of water to cover the cost of implementing the plan. However, with the council’s decision to continue the WEMP at a status quo level, there would not be an increase in expenses to implement the updated plan and therefore minimal if any water rate increase (RMOW, 2006). This status quo level of funding also means that there will not be an increased level of water efficiency projects and very little improvement on current programs. As discussed in section 5.3, the average reduction of daily per capita usage of water from 1999 to 2006 was 2.3%. This small reduction has minimal impact on public behaviour, and therefore the impact of the WEMP on the public is relatively low and many members of the public will see the public participation processes associated with the creation of the WEMP Update as secondary to other concerns. The estimated water savings that will occur with water efficiency funded at a status quo levels is an important start. However, if the RMOW wishes to use its water in a more sustainable way, it is going to have to invest more into water efficiency to reduce its per capita daily water usage by more than 8-11 litres. The majority of interviews completed with staff, consultants, and members of the WEAC reiterated that until water shortages occur or the cost of

bringing water into the Region increases the price of water, the levels of participation in the creation of the Update should remain low (Sp, Sw, I).

6.3.2 RMOW and Defining the Public

Residential versus other users of freshwater: The Waterloo Region's WEMP Update recommended measures that will influence a number of stakeholders and different components of the public. However, when reviewing the documentation concerning public involvement, the majority of participatory approaches were focused on the residential users. Residential users draw on the highest amount of water in the RMOW and it is understandable that public participation on water management would focus on this segment of the public (United Utilities Canada Limited, 2006) (Figure 6.1). However, looking at the final recommendations for water efficiency (Table 5.2 in Chapter 5) there are recommendations for businesses and the institutional, commercial and industrial (ICI) groups, an important segment of the public, together using 28% of the freshwater used in the Region. From the available documentation and through in-depth interviews with key proponents, the only two sources of input from these groups were from their presence on the WEAC and from input into the 1998 plan. They were not fully included in the participation process, which reveals a missed opportunity to discuss water efficiency measures with key water users. The WEMP Update has included measures to consult with ICI users through water audits but only after the plan was implemented. Possibly a more robust program could have been created if a greater number of these ICI groups were

consulted. By relying on the WEAC representation for input from these groups, the WEMP may not be meeting the needs of these community members.

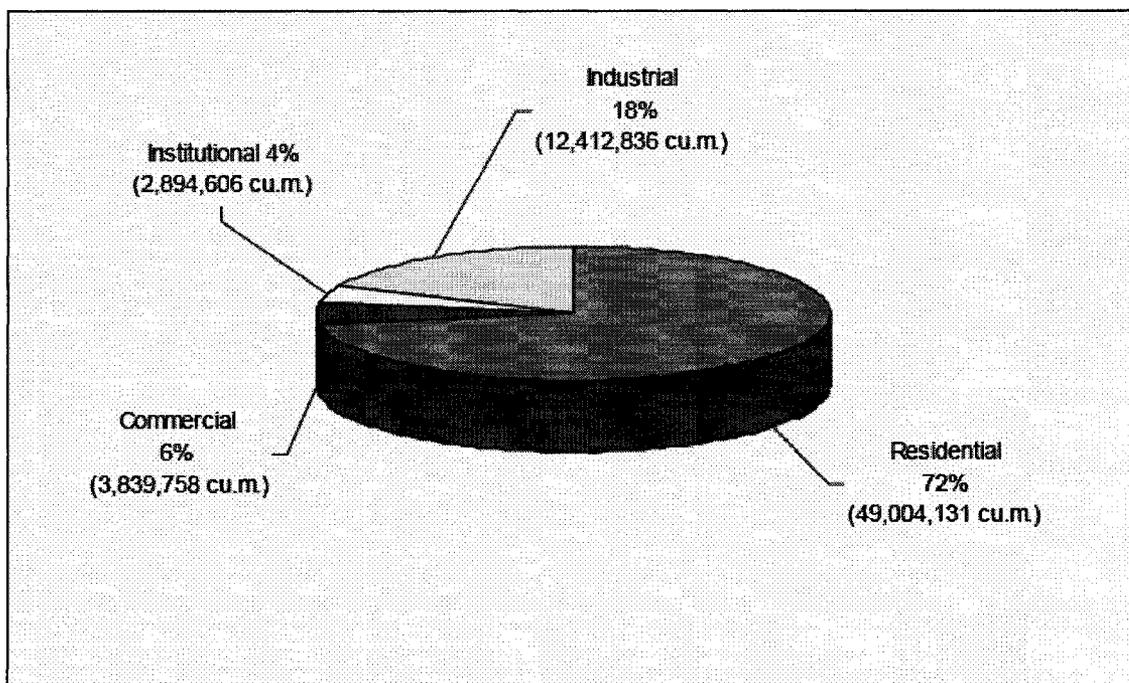


Figure 6.1: Break down of billed water usage for the cities of Cambridge, Kitchener and Waterloo (United Utilities Canada Limited, 2006).

Future generations: Although the WEMP Update was created to help manage water efficiency from 2007-2015, the perspectives of future generations were assumed to be looked after, but in the end were left out. To consider the sustainability of the water supply in the Region, the needs of future generations must be taken into consideration.

The average reduction of per capita daily usage attributed to activities implemented over the lifespan of the WEMP Update is estimated to be 13 litres of water. Future economic and population growth coupled with future environmental problems such as climate change could overshadow this efficiency with an increase in the total amount of water needed (Bates *et al*, 2008). If the perspectives of

sustainability for future generations and the environment were included at any point in the participation process, the intensity level of the WEMP Update may have been aggressively increased.

6.3.3 Assessing the Participatory Program as a Whole

Types of approaches used: Tables 6.1 and 6.5 reveal that the public participation program implemented for the Update used a variety of approaches over most of the IAP2 spectrum. However, the majority of the public participation approaches focused on Informing and Collecting and Compiling Information. Only the use of the WEAC and the WEAC WEMP sub-committee are identified as imploding Involving and Collaborating. However there were no approaches that fit into Empowering people (Sp I). This is often common in public participation programs as Informing and Compiling Information are often easier to implement than other approaches found on the spectrum. These approaches also tend to incorporate a larger number of participants, which was the case in the RMOW. The majority of participants were found using telephone surveys and informed of the processes through the Region's website and publications (Sp). The WEAC only involved 12 people and the sub-committee was made up of members of this already select group, therefore involving only a small number of stakeholders. Empowering people from the IAP2 suggests that the public can have decision making power, however as with the RMOW, many governments are legally required to make the final decision and can not relinquish final decision making power (Sp).

Public participation and water efficiency: A major criticism of the updated WEMP was that very little was added to enhance it beyond the plan that was already in place. By not including future generations, the public participation that took place focused on mechanisms that could reduce current water usage. Without the WEMP Update implemented at a more aggressive level, the RMOW has incorporated an increase in of efficiency that is only slightly above the previous plan. At town hall meetings there were mixed messages in terms of how aggressive the WEMP should be, which should have signaled an opportunity to gather more information on how aggressive the Region could be with their plan.

One of the components of any participatory program is to inform the public. Through programs such as the environmental news, the Region informed the public about water efficiency and water use and defined the WEMP and the need for its Update. However, the public knowledge of how much water is used in the Region was not in the forefront of informing the public. Instead, the public was informed about how much they could save by implementing some of the water efficiency measures (I). If the total water usage was compared to the amount that was estimated as saved through the WEMP, the public might have been more likely to participate and request a more aggressive plan. Although there is a better understanding of water usage in the RMOW (I), like the rest of Canada, most citizens do not have a full understanding of their water usage levels. By informing the public of how much water it uses, the consequences of that use, and providing options on how to reduce water usage to a sustainable level, participation levels in both the creation and implementation of the plan could have increased.

6.4 The WEMP in a Broader Context

The WEMP Update highlights one way in which the public can influence water resource management. Both public participation and water management are very complex processes with many factors that influence how they are implemented. Water efficiency is dependent on public participation. Public participation is a pivotal process for water conservation, because it is the members of the public who need to incorporate the water efficiency measures into their daily routine, and ensure the success or failure of the plan. Without this public buy-in water managers will most likely need to look to new water sources to secure water for public use. This process can be expensive, environmentally destructive and impossible in some water scarce regions.

One way in which the RMOW may secure water from an outside source is through potential plans to build a water pipeline to bring water from the Great Lakes to the Region (United Utilities Canada Limited, 2006). Water efficiency is seen as a method to reduce this need to divert water from the Great Lakes. However, after interviewing many of the proponents of water efficiency and the WEAC, there were varying perspectives on the ability of public participation and water efficiency to limit future water infrastructure costs. One of the last interview research questions on water efficiency and public participation was: “do you think that water efficiency, if expanded, could put an indefinite hold on a pipeline from the Great Lakes to the Region?” Participant responses varied, however they could be summarized into one of the three perspectives:

- 1) Yes, water efficiency and public participation can increase water availability and put the pipeline on an indefinite hold
- 2) If population and economic growth continues, water efficiency might be able to push the pipeline further away, but the pipeline will eventually be needed
- 3) The RMOW already has plans for the pipeline, and it will go ahead even with advancements in water efficiency.

The majority of respondents believe that the pipeline can be pushed well into the future and the costs of such a huge undertaking can be spread out over a number of generations (response 2) with the minority thinking that water efficiency can indefinitely hold the pipeline (response 1) or that it will go ahead as planned (response 3). Even with this small sample of proponents and members of the WEAC it is clear that water efficiency and in turn public participation has the perceived ability to influence other Regional water management practices.

The building of the water pipeline is seen as the end solution to the Region's future water problems (Sp Sw). However, this is a potentially controversial topic and could lead to conflict. The Great Lakes are seen as a static source of water and are currently under significant pressure from urban growth and environmental problems such as climate change (Barlow, 2007). The pipeline plan is one solution to increase water usage in the RMOW. With the potentially controversial nature of a water pipeline this might be a water resource management process that could spark a large amount of public demand for input and therefore should undertake an extensive

public participation process to try and incorporate all of the stakeholders that will be influenced by the project.

6.5 Summary

The RMOW was able to incorporate public input into almost all components of the decision making process, with the only exception being that the final decision making power remained with the Regional Council. The Water Efficiency Advisory Committee was seen as an essential group for public participation and water efficiency planning in the Region. This group was able to influence significant aspects of the entire decision making process in the creation of the WEMP Update. Even with its shortcomings, the WEAC is an excellent example of Collaboration or a Continuous Exchange between the proponent and the public. This is due to the fact that WEAC members challenged WEMP Update suggestions that were proposed by the Regional staff. Beyond the WEAC, participatory approaches remained at the Inform and Consult levels of IAP2's spectrum, focusing on approaches that shared, collected and compiled input. With a tight timeline and financial limitations, these lower spectrum approaches occurred within a short timeframe, potentially limiting the amount of participation that could take place.

One of the reasons that the IAP2 suggests the use of a number of different approaches to public participation is to overcome the shortcomings that each approach has. Even though they were poorly attended, the town hall meetings, public information centers and water audits filled in the information gaps left by the main approaches (surveys, focus groups and the WEAC). The lack of ICI participation

does raise some concerns about the ability to involve many different stakeholders in the creation of the WEMP Update. However, the WEMP Update focuses on residential water conservation and has included mechanisms to consult with ICI water users separately.

Public participation did influence the creation of the WEMP Update. By using a number of approaches, the Region gained feedback, critique and input that in turn shaped the final updated plan. However, not incorporating a perspective from the future generations into the participatory program and specifically, lack of planning for future economic growth and potential environmental problems, greatly reduced the efficiency mechanisms within the WEMP Update to significantly contribute to water savings in the Region. The concerns that are raised in this research could be enhanced through a longer and more intensive public participation program, incorporating missing stakeholder, and increasing the information about the current water situation in the Region.

Chapter 7: Conclusion: Summary of Research

7.1 Context and Process

Canada has recently seen increasing concerns over water quantity and quality, including: a 12 day boil-water advisory in the Greater Vancouver Region, drought conditions in the Prairies and E Coli found in the drinking water of the First Nations community of Kashechewan in Northern Ontario, These and other concerns about freshwater have sparked many communities to consider mechanisms to reduce the demand for freshwater or use water resources more efficiently. The Regional Municipality of Waterloo (RMOW) is a municipal leader in exploring and employing several approaches to manage its demand and use of water, including implementing water efficiency programs. Public participation is central to the RMOWs water planning processes and, similar to many local governments, engaging a wide range of publics who represent the major water users is part of their strategy to encourage future public buy-in and understanding of new water efficiency programs. Communities have also begun to recognize that understanding the local context is key to advancing public participation applications in water management.

This research assessed *how the public participation approaches that were implemented during the creation of The Region of Waterloo's Water Efficiency Master Plan (WEMP) Update influenced the Region's water resource management planning*. The Regional Municipality of Waterloo was chosen as a site for the research because of its growing population, long history of water and water efficiency planning, and recognition as a leader in water management. Multiple research

methods were employed, including a review and appraisal of background documents on water resources in the RMOW and scholarly literature on public participation coupled with in-situ research, specifically personal interviews with members of the Water Efficiency Advisory Committee (WEAC), the proponents of the Update and the public along with observing the WEAC meetings provided multiple vantage points for examining public participation applications to water planning on RMOW. The long interview was used to generate a conversation about the public participation approaches used in the creation of the WEMP Update. While observational data gave a different perspective of how the committee worked as a unit and how individuals fit within it.

7.2 Research Outcomes

Public participation did influence on the creation of the WEMP Update.

In-situ research confirmed that the WEAC, the telephone interviews and the focus groups employed between 2005 and 2006 influenced the water efficiency initiatives included in the Update. One proponent stated that the telephone interviews and focus groups or “the market research part of [creating the Update] provided significant information for us, that was extremely valuable”. Interviews with members of WEAC and the proponent also confirmed how influential both the WEAC and the WEMP sub-committee were in the creation of the plan, with one member of the WEMP sub-committee stated:

“[the sub-committed was] able to comment, we were able to recommend changes, question assumptions, [and] have the consultants think about particular issues, so it was, I was satisfied by the approach that we took on review the draft of the report...”.

The public input gathered through these three approaches of P2 were seen by both members of the WEAC and the proponents who drafted the final WEMP Update as extremely influential in creating the various components and targets that are found in the Update. However, even with this public influence on the WEMP Update, this research demonstrated that there were at least five areas of concern in terms of how the public was involved, who was involved, how many people were included and the ability of the public to represent future generations.

1. **While the RMOW used a variety of participatory approaches, it relied heavily on information gathering and the public was, for the most part, excluded from the actual decision making processes.** The RMOW, the proponent of the WEMP Update, used three main types of public participation Sharing, Collecting and Compiling and Continuous Exchange, with the majority of the public participation methods focusing on the first two types of participation. The Water Efficiency Advisory Committee was the only group that fit into the Continuous Exchange type of participation. Facilitating Decisions, the fourth type of public participation was not used at all due to the final decision making power resting with the Regional Council. Overall, the RMOW employed different mechanisms and approaches to engage the public. A private sector consulting firm was hired to assist with Collecting and Compiling information and effectively became an important part of the

proponents public participation program to help bridge the gap between the Region and the various publics. On the other hand the WEAC helped to develop and maintain a longer-term dialogue amongst key stakeholders, including the Regional councillors, industry, environmental groups, the chamber of commerce, citizen groups, the public board of education and other institutional members. The use of multiple public participation approaches and delivery mechanisms highlight the importance of considering the package of public participation elements relative to the local context.

2. WEAC was an important source for public input. However its membership profile raises concerns over its representation of the public.

During the creation of the WEMP, WEAC was comprised of 11 members, of which 6 members represented public water users and 5 members were Regional counselors. It is to be remembered that the counselors were also part of the Regional government and therefore charged with managing concerns beyond water efficiency. In other words, the counselors were faced with situating water efficiency within a broader set of public concerns such as economic growth, transportation issues and crime rates. All of the other stakeholders in the Region were represented by the 6 other members on the WEAC. Overall, some of the non-counselors indicated that it was very difficult for 6 individuals to represent such a vast array of interests, which in turn suggests that the WEAC may have had insufficient representation, at least while providing input into the WEMP Update.

3. **Low participation rates at public events reflect the RMOW's public participation program timeline, the nature of the WEMP Update and the general trust that public has in RMOW water managers.** With the exception of the WEAC, all of the other opportunities to participate in the creation of the WEMP Update occurred within a 6 to 9 month period. If the public was unable to attend a participatory approach during this time there were few other options to participate, with the exception of contacting their Regional representative directly with their input.

The voluntary nature of the implementation of the WEMP coupled with the Regional council's approval of status-quo funding without major increases to water bills or impact on the majority of the public is most likely the major factor in the limited participation. If water efficiency were to directly impact the public through rate hikes and legislation, participation levels would most likely rise along with the need to include new opportunities to participate.

A high level of trust in the proponent is one factor that could explain the low participation levels. In the RMOW there was an understanding by Regional staff that the public trusted them to deliver water programs and therefore did not need to provide input into the Update. For example one staff member stated when asked why participation levels were low that "we [those working on the WEMP] are the experts, and they [the public] look to us to manage water" implying that the public has trust in how the staff manages

water resources. With low participation levels at other public events (including town hall meetings, water audits and information centres), the WEAC, the telephone survey and focus groups remained a key influence in the creation of the Update with the information gathered through the other approaches used only to supplement the these main approaches.

4. **Residential water users draw on 72% of all municipal water in the RMOW and this user group was understandably well represented throughout the public participation processes but this was at the detriment to other important stakeholders including industrial, commercial and institutional (ICI) users.** These ICI users make up the other 28% of municipal water usage but were only represented through the WEAC and not in other public participation approaches. This slanted the influence on the Update towards residential users and cast the ICI users as secondary stakeholders in the creation of the WEMP Update. The final Update does include criteria to provide water audits of ICI users, to assess their potential water use and potential savings through water efficiency. However, the ICI sector represents a significant minority share of water use in the Region and its absence from the Update is effectively a lost opportunity to maximize water use efficiency.
5. **Low water savings relative to total water usage, due to a decision to fund the WEMP at a status quo level, suggest a failure of the public participation to be inclusive of ideas concerning future generations which**

are a key component to determine future sustainability. Daily estimated water savings contributed to the WEMP Update and will increase to approximately 8,200 cubic metres by 2015 (an increase of up to only 1400 cubic metres of savings from the original WEMP targets). This 1400 cubic metres represents a savings of about 0.3 % of the daily total per capita usage (based on current level of usage), and is a very slight decrease. The RMOW had three options in terms of levels of funding compared to the level of efficiency the WEMP Update would achieve, enhanced status quo, moderate and aggressive. The decision to maintain status quo funding was the minimum that the Region could do to reduce the need for future water infrastructure projects and help to reduce the risk of water scarcity during periods of peak water usage. From the perspective of sustainability or future generations, this amount of savings will not substantially reduce water usage, especially considering future economic and population growth that will increase water usage. Other environmental factors such as climate change are predicted to have a strong likelihood in influencing how much water is available to regions such as the RMOW and could heighten the potential for future water shortages. By seeking out further input specifically related to future generations and sustainability, the Region may have increased its level of efficiency to a more moderate or aggressive level.

The RMOW used a number of public participation approaches to gather information from the public, which led to a stronger public influence on the WEMP

Update and how water efficiency is managed in the Region. However, the failure to extensively seek input from the perspective of future sustainability (for both the environment and the public) could have been a major factor in only implementing an Update that will see minimal decreases in the daily, per capita water usage levels in the Region and decrease the overall sustainability of the plan.

Without the use of key approaches such as market research surveys, focus groups and the WEAC, the Update of the WEMP could have been irrelevant to the public, off target and in turn would create a management plan with little uptake of its efficiency programs. The public, specifically residential users, did have an increased opportunity to influence and respond to ideas that were not originally within their sphere of influence.

7.2 Future Challenges to Public Participation Processes and Freshwater Planning

Freshwater management in Canada is a growing concern for the public. Understanding how water is used and in turn, how to use it more efficiently, can reduce the potential for future conflict over this resource. One way to increase this understanding of water resources in a region is through public participation programs. There is no single method or program that will work for all situations; an understanding of the broad issues as well as the local context must be factored into the development of public participation strategies that will help to create applicable water management options.

The topic of public participation in freshwater management is complex and leaves room for many research projects. When looking at how public participation can influence the management of freshwater there are a number of challenges remaining in terms of scale, governance and water scarcity. This research points to at least three potential future research challenges:

1. Freshwater crosses geo-political boundaries, government jurisdictions and eco-zones. The potential scale of water management impact varies greatly. It would be beneficial to assess how the public can influence water management on larger scales, who is and who is not participating and why. An example of water management using public participation at a provincial scale is with the consultations currently taking place in Ontario to gather input on Ontario's new clean water act (Ministry of the Environment, 2006).
2. The IAP2 suggests that the goal of public participation is to bring the public into decision making processes (IAP2, 2006). When concerning water management, it would be an interesting comparison between how the public was involved with creating efficiency plans in areas where there is a greater sense of urgency surrounding water conservation. Comparing which mechanisms were used, the participation rates from the public and how the final plan might differ would be beneficial in fortifying the argument that context is a key component in creating public participation programs.

3. The RMOW implements different public participation processes each year for its various projects. It would be useful to take a broader perspective within the same region and compare different public participation processes in how they differ in mechanisms used, participation levels and influence on the final product. This research would help similar regions to compare their participatory programs and find best practices and areas for improvement.

Public participation and water management has much more research potential. It is a multi-disciplinary approach which provides a mechanism to share information across the multiple disciplines which are essential to water use planning, including, geography, biology, hydrology, engineering, environmental studies and science, sociology, political science, economics, history and more.

Public participation is widely accepted as an essential component for resource management (Webler *et al*, 2001). With rising health, environmental and economic concerns, public participation should become a key mechanism for new freshwater resource management plans. Involving the public is seen as a way to increase their agency and to have a greater influence on decisions that will affect them.

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Appendix A

Questions used for long interview question (Proponent and WEAC member)

Proponent and Consultant Questions

- 1) Who determined which participation approaches were used?
- 2) Why were these specific approaches of public participation used?
- 3) Did all stakeholders have equal opportunity to participate in each approach used?
- 5) How did the issue of water as a resource influence the way you initiated P2?
- 4) How did you create stakeholder awareness of the different public participation approaches available to them?
- 5) Did you take special steps to try and involve stakeholders that do not normally participate? If so what did you do and how effective do you think it was in engaging these groups?
- 6) How did Stakeholder involvement change over time?
- 7) What were the anticipated results from the public's input?
- 8) Were there issues of cost, time restrictions and economies of scale that limited the amount of participation?
- 9) In what ways do you believe that public participation influence water resource management planning?
- 10) How important was the Water Efficiency Advisory Committee?
- 11) Who were the more active members? Counselors? Or other?
- 11) Did you do as much P2 in the update as the original WEMP? Why not? Or Why?
- 12) Did you feel that the results from the original WEMP in 1998 still reflected the needs for people?
- 13) Do you feel that it is important to get public input into water management?
- 14) How long was the P2 process in Waterloo?
- 15) How many staff did you have on this task?
- 16) In terms of water efficiency do you think that water efficiency if expanded in the region could put an indefinite hold on a pipeline from the Great Lakes to the Region?

16) Thank you very much, is there any pressing questions that you thought I would ask that I did not that you would like to comment on now?

WEAC Questions

- 1) Can you tell me a bit about yourself and your background?
- 2) Can you explain to me the different ways in which you participated in the creation of the Water Efficiency Master Plan Update?
- 3) Were there ways in which you could participate but did not? What were these methods and why didn't you participate?
- 4) The entire public participation process lasted over a year, did your participation change over this time? How?
- 5) Who do you believe determined which participation approaches were used?
- 6) Why do you think were these specific approaches of public participation used?
- 7) Did the issue of water as a resource influence your decision to participate?
- 8) In what ways do you believe public participation (including focus groups, the WEAC and other market research influenced the creation of the WEMP?)

WEAC

- 9) What were the main factors that influenced your decision to participate in the committee? (personal and professional)
- 10) How much influence do you feel you have concerning water efficiency in the region of waterloo?
- 11) How long have you been participating with the WEAC?
- 12) Can you give me a brief description how the WEAC is run?
- 13) Do you influence how WEAC is run, who brings items to the decision table?
- 14) Do you think that there will be an increase in interest and need for public participation opportunities in future water management projects?
- 15) In terms of water efficiency do you think that water efficiency if expanded in the region could put an indefinite hold on a pipeline from the Great Lakes to the region?
- 16) Thank you very much, is there any pressing questions that you thought I would ask that I did not that you would like to comment on now?

Appendix B

Example of the consent letter used in research interview process

Matthew Street
 Graduate Student
 Carleton University
 Department of Geography &
 Environmental Studies
 Ottawa, Ontario
 mstreet@carleton.connect.ca

Dear _____,

Under the supervision of Mike Brklacich, I, Matthew Street, am conducting a research study through the Department of Geography at Carleton University. The goal of this research is to assess how the public participation approaches that were implemented during the creation of the Waterloo Region's Water Efficiency Master Plan influenced water resource management planning in the region.

Part of my research process will involve interviewing people either through one-on-one interviews via the telephone or in person, or in a small focus group consisting of no more than five participants. To help me with my record keeping I will be creating an audio recording so that I can review the interview at a future time with better accuracy. Please find below a couple sample questions that I will be asking during the interview. Finally, it is important that you understand that you may decline from answering any questions and stop the interview if you wish to do so.

Sample Questions

For those implementing the Public Participation Process:

Who determined which participation approaches were used?

How did you create stakeholder awareness of the different public participation approaches available to them?

This research will add to the body of knowledge around public participation in Canada. A final report will be given to the Region of Waterloo that might be used to help them with future projects, this report will keep the anonymity of all participants. By participating in this research you will help to increase the knowledge of public participation and help create better practices for gathering information for future resource management processes.

If needed, I might contact you after the interview to follow up on a couple of themes that may present themselves later in my research. Please indicate the best way for me to contact you.

Following the interview session it is my intention to keep the records for approximately five years, in that time it is my intention to use this research to complete my research thesis, present my findings at conferences and to the region of

Waterloo as well as publish my results in an academic journal. Finally, it is my intention to post my thesis and the final report to the Region of Waterloo for download off of the internet

This project was reviewed and received ethics clearance by the Carleton University Research Ethics Committee. If you have any concerns or questions about your involvement in the study please contact the ethics committee chair.

Prof. Antonio Gualtieri, Chair,
Carleton University Research Ethics Committee
Carleton University
1125 Colonel By Drive
Ottawa, Ontario K1S 5B6
T: 613-520-2517
E: ethics@carleton.ca

Thank you for your time and I look forward to working with you on this project,

Matthew Street
151-A Willow Street
Ottawa, Ontario, K1R 6W2
T: 613-237-1044
E: mstreet@connect.carleton.ca

Mike Brklacich, Chair
Department of Geography
and Environmental Studies
1125 Colonel By Drive
Ottawa, Ontario, K1S 5B6
T: 613-520-2560
E: Michael_Brklacich@carleton.ca

Consent Form:

I, _____ have read the above letter and understand that I am participating in a research project and I voluntarily agree to participate

Date

Signature

Appendix C

List of questions used to guide observations at the WEAC meetings & Meeting minutes from first meeting presentation

Themes and Questions for Observations of WEAC Meetings

- 1) What is the structure like?
- 2) Are there formal presentations from staff or public
- 3) How many members of the public are there (is it open to the public)
- 4) Who speaks/doesn't speak? (Stakeholder vs. Councilors)
- 5) How are new ideas taken by the group?
- 6) How ordered or formal are the meetings?
- 7) What is the atmosphere like? (Relaxed, formal, respectful ect.)
- 8) Does it seem that people are speaking because they feel the need to speak?
- 9) How long are agenda items discussed?
- 10) How many non-agenda items are discussed?
- 11) When is the next meeting
- 12) How long did the meeting last?

The Government in the Region of Waterloo

Water Efficiency Advisory Committee - September 12, 2007

Minutes ●●●

3:30 p.m.
Room 218

2nd Floor, Regional Administration Building
150 Frederick Street, Kitchener, Ontario

Present were: Chair J. Wideman, T. Galloway, C. Millar, J. Robinson, W. Roth, C. Toal, K. Seiling, K. Waybrant and B. Whitcher

Members absent: K. Denouden, M. Dorfman, G. Dunham, C. Hynd

Also Present: S. Gombos, N. Kodousek and I. Sa Melo

DECLARATIONS OF PECUNIARY INTEREST UNDER THE MUNICIPAL CONFLICT OF INTEREST ACT

None declared.

DELEGATION / PRESENTATION

a) Matt Street, Carleton University appeared before Committee regarding water resource management planning research. He expressed an interest in how public input is gathered in resource management, specifically in the way that governments overcome water scarcity problems. He indicated an interest in the updates to the Water Efficiency Master Plan. M. Street explained the Water Efficiency Advisory Committee (WEAC) is an example of a highly integrated form of public participation and his interest is to learn more about the committee's structure and how meetings work. By looking at WEAC M. Street will be able to identify the influential effects of water management planning, both within a united committee and individuals who represent various groups. He requested individual meetings with members of WEAC and would present his findings to the committee upon completion of his thesis research. (Submission attached to original minutes)

b) Dr. Khosrow Farahbakhsch, University of Guelph appeared before Committee regarding his Rainwater Harvesting Research Project. Dr. K. Farahbakhsch described through a presentation a rainwater harvesting project he has been involved in. He outlined the value of water and wastewater infrastructure and provided a breakdown of invested funds. Dr. K. Farahbakhsch outlined problems with infrastructure. He felt some funds should be redirected to rainwater harvesting and presented a picture of an underground rainwater harvesting tank explaining the operation details of the tank including the outtake and intake mechanisms. The savings is expected to be within 46%. He highlighted various sites where built in tanks are being constructed within the buildings foundation. Dr. K. Farahbakhsch outlined capacity development; discussed policies and regulations, integration and regulatory framework. He touched on water quality and outlined organizational capacity, financial capacity, building capacity and individual capacity. He expressed his interest and willingness to work with the Region regarding this initiative. Dr. K. Farahbakhsch suggested that outside of North America this type of project is sometimes the primary water source for many. He suggested a local rainwater

The Government in the Region of Waterloo

harvesting tank can be operational for approximately six or seven months throughout the year and has his own home retrofitted with one model.

Committee members expressed great interest in the project and indicated changes would have to be arranged within building codes. Dr. K. Farahbakhsh advised building codes in Ontario already contain some guidelines and he will be working and forwarding further information to the required agencies involved in order to advance this area of the process.

Dr. K. Farahbakhsh responded to questions from Committee members pertaining to costs associated with the project in order to retrofit an existing home; he advised the mechanics can be run inside or outside, wherever there is an outtake. He responded to inquires pertaining to the overall affect of less drainage into the ground and lack of replacement of out coming water, which he advised would be minimal impact. He responded to questions regarding the measuring of wastewater flow and explained further exploration and research is currently being performed on this initiative in order to make comparisons from the perspective of a homeowner, developer and municipality. An interim report is currently being produced and will be available in 2008.

Dr. K. Farahbakhsh indicated he would be in touch with S. Gombos regarding further developments.

APPROVAL OF MINUTES

MOVED by B. Whitcher
SECONDED by W. Roth

That the minutes of the Water Efficiency Advisory Committee meeting held on July 4, 2007 be approved.

CARRIED

COMMITTEE MEMBERSHIP

S. Gombos indicated four Committee members are required for a four-year term ending December 31, 2011. The four members whose terms are expiring are M. Dorfman, B. Whitcher, K. Waybrant and J. Robinson.

REPORTS – TRANSPORTATION AND ENVIRONMENTAL SERVICES

a) E-07-099, Rain Barrel Distribution 2008

MOVED by C. Millar
SECONDED by K. Waybrant

That the Regional Municipality of Waterloo distribute 3,000 rain barrels at the subsidized cost of \$30 each on April 26, 2008, as outlined in Report E-07-099, dated September 12, 2007.

CARRIED

VERBAL REPORTS

a) 2007 Outdoor Water Use By-Law Implementation

S. Gombos outlined the rain fall from 2001-2007 highlighting blocks of days without rain. He explained

The Government in the Region of Waterloo

the enforcement activity in comparison to rain activity. S. Gombos indicated in the near future there would be work done on the by-law and the Region would be reapplying to the province for set fine approval.

Committee agreed there should be some publication regarding good news pertaining to status and appreciation to the community for participating in this program. S. Gombos indicated it would be mentioned in the next Environews, but that further action with respect to public information would be taken.

b) Industrial, Commercial, Institutional Water Efficiency Program

S. Gombos discussed the new initiatives in the Industrial, Commercial, Institutional Water Efficiency Program (IC&I). He outlined the 2007 IC&I savings to date and further savings expected.

C. Toal suggested further involvement with the Chamber of Commerce Energy & Environment Forum to be held in June 2008. C. Toal advised he would co-ordinate this initiative.

OTHER BUSINESS

a) Committee members discussed other ways to excite and motivate the public to conserve. Discussion included rebates for front load washers.

NEXT MEETING

Tuesday, November 13, 2007 at noon with lunch included.

ADJOURN

Meeting adjourned at 5:20 p.m.

MOVED by
SECONDED by

THAT the meeting adjourn.

CARRIED

COMMITTEE CHAIR, J. Wideman

COMMITTEE CLERK, I. Sa Melo

Appendix D

*Examples of the Regional Municipality of Waterloo's EnviroNews:
Summer 2005 and Fall 2006*



Region of Waterloo

ENVIRONNEWS

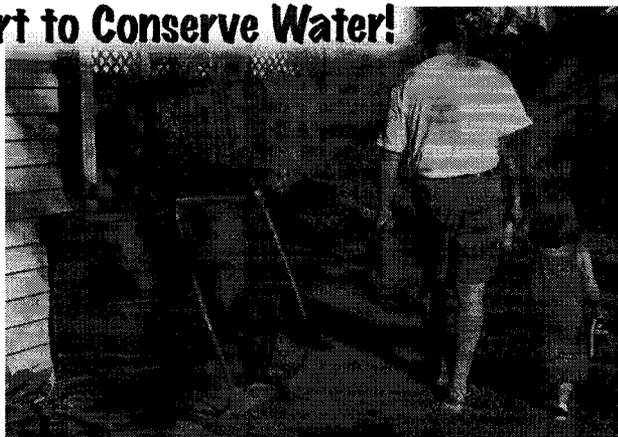
Special Edition - Summer 2005

Thanks for Doing Your Part to Conserve Water!

The Region of Waterloo would like to thank local residents who have been doing their part to conserve water. By following the Region's Stage 2 Outdoor Water Use restrictions - which limit outdoor water use to specified days - you are helping to reduce peak water use and limit the risk of an outdoor water ban.

Water demands have been high but consistent throughout the past weeks. Without water restrictions, peak demands would have been about 15 per cent higher.

Peak water use during a normal summer could jeopardize the supply of water for fighting fires and other emergencies. Please continue to conserve water so that our supply system will be sufficient for the summer.



The Region of Waterloo's water supply system consists of approximately 80 wells and one surface water treatment plant. This system is designed to meet requirements for drinking water, daily washing and cooking, business and manufacturing needs, fire control and outdoor water uses.

As spring turns to summer, the demand for water rises due to outdoor water uses such as lawn and garden watering. The region's normal demand is 35 million gallons per day. During the summer this can increase to more than 50 million gallons per day, which puts a strain on our water supply system.

Reduced Capacity

Due to a number of factors, the capacity of the Region's water supply system has

been temporarily reduced. New Ministry of Environment regulations have decreased the capacity of the surface water treatment plant and some wells, which now require replacement or significant upgrades. Also, in August of last year, an industrial chemical was discovered in the Greenbrook well-field, causing the wells to be shut down.

Water - Now and For The Future

What Is Being Done?

Overall water capacity will be increased in coming years by upgrading operations at the Mannheim Water Treatment Plant, making use of new groundwater sources and regaining full operations at the Greenbrook Water Treatment Plant.

A system to temporarily store water in an underground aquifer during the winter months (when we have lots of extra water) was started up this spring to provide water when we need it most.

In the fall, the Region's Long Term Water Strategy will be revisited. This review will consider changes required to meet the Region's long term water needs including the timing of a Great Lakes Pipeline.

The Region of Waterloo is working hard to ensure a safe and sufficient water supply for this community today and in anticipation of future growth. By continuing to comply with current watering restrictions and conserving water whenever possible, citizens are helping the Region make this happen.

If everyone uses water at the same time, the system is unable to keep up.

Water Restrictions

The Region's water system can provide significant quantities of water during peak periods. However, if everyone uses water at the same time, the system is unable to keep up. One of the purposes of the Stage 2 Outdoor Water Use By-law is to reduce peaks by spreading the use of water evenly throughout the week rather than have usage totally driven by weather conditions.

When and How to Water During Stage 2

How to Find Your Watering/Washing Day

If your address ends in:	
0 or 1	your watering day is: Monday
2 or 3	Tuesday
4 or 5	Wednesday
6 or 7	Thursday
8 or 9	Friday
7:00 - 10:00 a.m. & 7:00 - 11:00 p.m.	



How to Find Your Extra Watering Day

Last Digit	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.*	Sun.*
0-1	Garden, Lawn & Car Washing			Garden only (hand held hose)			
2-3		Garden, Lawn & Car Washing			Garden only (hand held hose)		
4-5			Garden, Lawn & Car Washing			Garden only (hand held hose)	
6-7				Garden, Lawn & Car Washing			Garden only (hand held hose)
8-9	Garden, Lawn & Car Washing				Garden, Lawn & Car Washing		

* RESIDENTIAL VEHICLE WASHING - Anytime on Weekends

My Watering Days are:

garden, lawn & car + garden only
 Between 7:00 - 10:00 a.m. & 7:00 - 11:00 p.m.

Outdoor Water Use Stage 1

Odd/Even Rule:
 Odd numbered addresses water on odd numbered days and even numbered addresses water on even numbered days.

Outdoor Water Use Stage 2 Restrictions (now in effect until September 30, 2005)

- Lawns:** Once-per week watering between 7:00 - 10:00 a.m. and 7:00 - 11:00 p.m.
- Newly planted sod/seed:** Water for first 24 hours anytime and for six consecutive days during the morning and evening hours. A sign from the Region must be posted.
- Trees, shrubs, flowers, gardens:** Watering allowed on your primary day with time restrictions, as well as on a secondary day, three days after your primary day with a hand-held hose equipped with a shut-off nozzle.
- Residential vehicle washing:** Allowed on your primary day with time restrictions, as well as anytime on weekends.
- Washing streets, driveways, walkways, buildings:** Completely restricted.
- Wasting water:** Completely restricted.
- Watering or washing by can or bucket:** Allowed at any time.

For more information call 575-4495 or go to:
www.region.waterloo.on.ca/water

Outdoor Water Use Stage 3

Lawn watering and car washing are completely restricted and garden watering by can or bucket only.





ENVIRONNEWS

OCTOBER 2006

Learning about the 3Rs at the Landfill



The water recycling tanks here show what the water and recycling gets through Region.

Students and community groups are learning about the numerous waste management programs operated by the Region of Waterloo at the new and innovative Environmental Education Centre.

Designed to be an interactive and informative educational experience, the hands-on activities throughout the centre follow the waste stream from natural resource to recycled or composted product. Each room in the education centre follows a different environmental theme, all reflecting the 3Rs: Reduce, Reuse and Recycle.

The education program also lets students tour the Materials Recycling Centre (where all the blue box materials are sorted) and the tipping face (where your garbage is dumped every day). This combination of environmental education and garbage reality leaves a lasting and powerful impression on our visitors!

The response to the new Environmental Education Centre has been remarkable. In the first two months, the Centre had more than 800 visitors. The program can be tailored to elementary and high school aged students as well as other public groups.

"Waste management education is a key component in the Region's long-term waste strategy," said Kathleen Sackum, Waste Management Coordinator. "The Education Centre helps us inspire our young residents to take an active role in protecting our environment."

To reserve a visit date, call Suzanne at 519-883-5125 ext. 6814. For more information about the program, please visit our website: www.regionwaterloo.on.ca

Water Conservation Target of 1.8 Million Gallons Per Day Set

Region of Waterloo Council has endorsed an updated water conservation master plan that will continue until the year 2015. The seven-year "Water Efficiency Master Plan" outlines a program that will save a total of 1.8 million gallons per day (MGD), which is enough water to supply more than 50,000 households.

From 1998 to 2005, the community saved 4.2 million gallons per day of drinking

water. The plan is to build on that success with program elements that are recognized in the industry as best practices," said Steve Gombos, Manager of Water Efficiency.

The Region of Waterloo will continue to offer \$40 and \$60 rebates for efficient toilet replacements, and deliver public education campaigns. There will also be more financial incentives for outdoor water conservation, and industrial, commercial and institutional efficiencies.

To conserve water outdoors, the Region will promote lawn watering schedules and present community landscaping seminars to help people create attractive properties that need less water. The Region will also continue to sell subterranean rain barrels and launch other rainwater harvesting initiatives.

"By conserving water, we guarantee how valuable our drinking water is now, and how valuable it will be in our future," said Gombos. "Thank you for doing your part."

For more information about water efficiency programs, visit regionwaterloo.on.ca/water, call 519-575-6171, or e-mail water@regionwaterloo.on.ca

What's Inside?	
Toilet Replacement Program	2
Region Residents Set Summer Conservation Goals	4
Permitted by Law	3
Water Conserves in Art Display	2
A Cycle of Success	3
Tree Planting	3
Water Conservation in Schools	3
Water Conservation in Homes	3



Approximately 50% of a home's water is used outdoors.

Water is the most valuable resource in our lives.

Toilet Replacement Program Tops 40,000 Mark

The Region of Waterloo has replaced 40,000 toilets since 1994, but continues to strive to replace all older, water-guzzling toilets. Toilets account for one-third of all drinking water used in a home and represent a prime opportunity to conserve.

"The program now saves over five million litres of water per day, which is enough to serve the needs of approximately 7,000 homes," said program coordinator Ruth Hildebrand. "But there is a huge potential to save millions more litres if more people participate."



Property owners who replace 13-litre toilets with new 6-litre or 3-litre/6-litre dual-flush toilets are eligible for a \$40 or \$60 rebate.

The Region of Waterloo developed new performance standards for low-flush toilets that have greatly improved customer satisfaction, and ensure maximum water savings.

"Only qualified toilets from our list are eligible for the rebates. Make sure you check

our website or call to see if you're buying a toilet that works well and saves water," said Hildebrand.

Anyone wishing to receive a toilet replacement rebate should check the Region's website at: www.region.waterloo.on.ca/water or call 519-575-4021.

The Toto Drake is a good, low-flow toilet.



Most toilet leaks can be fixed by replacing your flapper.

Water Capacity in Ayr Doubling to Meet Future Growth

The Region of Waterloo is undertaking two major projects to increase the capacity of Ayr's water and wastewater treatment facilities. The projects will both be completed by the spring of 2007.

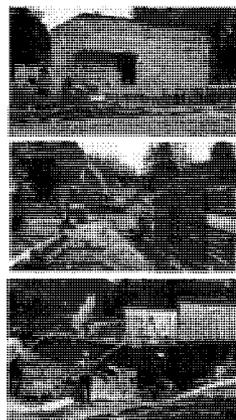
The settlement of Ayr, located in the Township of North Dumfries, is expected to double in size - from 3,500 to 7,000 people - in the next 20 years. This growth outlook caused the Region to embark on the project in 2003, beginning with an environmental assessment that took into consideration any environmental and social impacts.

Upon completion of the environmental assessment, construction began on the Ayr

Water Treatment Plant located on Gibson Street, which will double the water output in Ayr from 32 litres-per-second (lps) to 64 lps. This is being achieved through the construction of a new well, expanded treatment facilities and added storage capacity.

"The water expansion project will benefit the community of Ayr now and in the future," said Jorge Cavalcante, manager of Engineering and Planning, Water Services. "With twice the amount of available water, we can be confident in the water supply for years to come."

Construction on the Ayr water treatment plant expansion is well under way.



Summer Conservation Saved Millions of Gallons in 2006

Property owners in Waterloo Region kept lawn watering to a minimum this summer and saved millions of gallons of drinking water.

"We thank residents in Waterloo Region for conserving drinking water," said Water Efficiency Communications Coordinator Dan McLaughlin. "Everyone has recognized that water is a valuable resource that should be conserved for today and for our future."

During fall, winter and early spring, average water demands are about 50 million gallons per day (MGD), which is easily supplied by the Region's rivers

52 MGD capacity. But during summer, outdoor water use can push daily demands to 52 MGD. This summer, maximum demand did not exceed 41 MGD.

Reducing water use is good for the environment and ensures that we have enough water for everyone. We also benefit from using less electricity for treating and pumping water.

"It is encouraging to see how much water the community has conserved during the past two years. Even with the growing population, our peak demands have stayed consistently low," said McLaughlin.

Region of Waterloo staff expect the once per week lawn watering restriction will again be reintroduced for the summer of 2007.

For more information about water conservation, please visit www.region.waterloo.on.ca/water or call 519-575-4021.



What You Need to Know About the Pesticides By-Law

A Pesticides By-law will come into effect in Waterloo Region on January 1, 2007. The purpose of the by-law is to reduce the unnecessary application of pesticides by managing their use on any outdoor grass, turf or partially grassy land.

The Pesticides By-law:

- Prohibits the use of pesticides throughout July and August, unless you have a proven infestation.
- Requires 24 hour notification (with a lawn sign) before you or your lawn care company apply a pesticide.
- Can be enforced by Municipal Law Enforcement Officers and Police Officers.

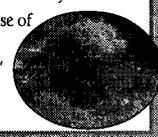
This by-law was created in response to concerns expressed by residents about the health and safety risks associated with the use of pesticides. Reducing the use of pesticides will promote the health, safety and well-being of everyone in our community.

Pesticides are products manufactured and sold to the public that are registered as controlled products under the Pest Control Products Act. Most herbicides (weed killers), insecticides (insect killers), fungicides (fungus killers) and "weed and feed" products contain pesticides.

If you have any questions about the Pesticide By-law, please call 519-575-4591. The by-law is also posted on the Region's website at www.region.waterloo.on.ca.

How to grow a healthy lawn without using pesticides:

- Fertilize and overseed in the fall
- Aerate in the spring
- Mow high (3 inches) and leave grass clippings on your lawn
- Water deeply once a week
- Dig out weeds by hand
- Make use of native flowers, grasses and shrubs



A Cycle of Success



Kim Kidd Kitagawa holds up three bikes that have been dropped off at the Waterloo Transfer Station. These bikes will get a second chance at life through a new partnership with the Waterloo Catholic District School Board and Recycle Cycles.

Generous Waterloo Region residents have dropped off more than 10 metric tonnes of adult and children's bicycles for the new "Blended Bicycles" reuse program! This program is a unique partnership between the Waterloo District Catholic School Board, Recycle Cycles, and the Region of Waterloo.

"We are very pleased with the response from our community," said Kim Kidd Kitagawa, Waste Management Coordinator. "Since April 2006, the drop-off area for unwanted bikes at the Waterloo Transfer Station has rarely been empty."

Dropping off the bikes at the Transfer Station is only the beginning. Local high school students refurbish the donated bicycles. Recycle Cycles then distributes these repaired bicycles to needy members of our community.

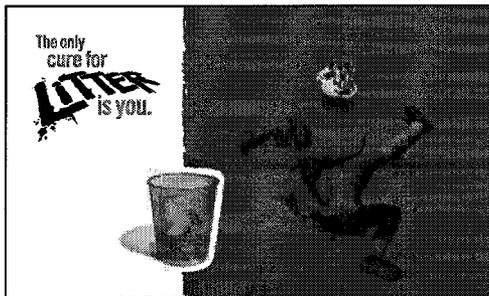
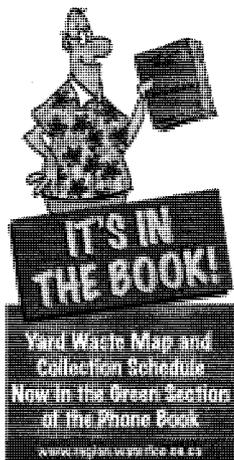
"It's a win-win situation," said Kidd Kitagawa. "Not only are the students learning new and transferable skills, but those individuals receiving the updated bikes can gain greater independence and be open to new opportunities."

Of course, the environment benefits too. These bicycles are kept out of our landfill, saving valuable space. In addition,

cycling is a great way to get around without polluting the air.

This program has received tremendous support, not only from residents but also from other members of our community. Morell Kelly Law Firm recently donated 30 helmets to help ensure those getting a bicycle also get the right gear.

For more information, please contact Kim Kidd Kitagawa at: 519-883-5100 ext. 8409.



Share a stop . . .
Save a lot!

Turn two collection stops into one . . .
put your recycling box beside
your neighbour's at the curb.

Region Helps Employees TravelWise.

Starting May 2006, the Region of Waterloo made it easier for its employees to get to work in ways other than driving alone. TravelWise is a new program that makes commuting in active and sustainable ways more convenient and desirable. TravelWise includes reduced fares with a Grand River Transit Corporate Transit Pass, improved bike parking, access to showers/changerooms, improved access to transit and cycling route information, preferential parking for employee carpools, and computerized ridematching service to bring carpools together.

All Regional employees who sign up for the program are also eligible to receive an emergency ride home for trips during the workday due to family emergency, unscheduled overtime or personal illness. This means a safety net is there when it is needed most and makes leaving the car at home a real option.

Response in the first few months has been very positive. Over 120 employees have already enrolled. Almost 50 per cent are switching some commute trips from driving alone. This means fewer greenhouse gases in the air we breathe, financial savings, and for

some, better health by building physical activity into their daily commute. One employee said "Thanks for TravelWise. It makes me proud to work for a Region that is thinking about sustainability and setting an example." Others have claimed they find the bicycle ride in to work a great way to start the day. Others have hopped on the bus for a stress-free ride home.

Your company can also join the growing ranks of public and private organizations in the country helping their employees to reduce auto use by offering a package of information, incentives and services. Your efforts will make travel choices such as taking transit, sharing a ride, walking and cycling real commuting options. To find out how your company/organization could enjoy the many benefits of a commuter options program, contact JoAnn Woodhall at 519-575-4019 or wjoann@region.waterloo.on.ca. With the cost of providing a parking spot ranging from \$3,000 to \$30,000, it's just good business to act now.



Space Saving Technologies at the Waterloo Landfill

The Waterloo Landfill has implemented two new products that will help extend the life of our landfill.

Region Staff at the Waterloo Landfill used to cover the garbage brought in every day with a 15 cm layer of soil. This layer of soil is called "Daily Cover". Daily cover helps control odours and litter generated from the landfill. It also prevents animals and birds from getting into the garbage.

Over time, the total amount of daily cover used in our landfill adds up to a lot of valuable landfill space!

Two new technologies - tarp and spray-on cover systems - have now been implemented at the Regional landfill site.

The tarp cover system uses two spooled tarps that measure 12 metres wide by 91 metres long. The white plastic tarps are rolled out over the garbage using a specially designed spool and

motor. The next morning, the same machine removes the tarps. The tarps are completely reusable, and are repaired as necessary.

The spray-on cover system uses a mixture of wood cellulose and recycled fibre that is sprayed over the garbage using a modified hydroseeding machine. This mixture contains a substance that allows it to stick to waste and a natural green dye

that shows staff where they have applied it. The spray-on cover dries to a very thin cover. The next morning, a compactor drives over top of the dried cover to break it up before the first load of garbage arrives.

These two new products will help staff decrease our need to use soil. Over time, our improved method of daily cover adds approximately three years of life to the landfill.



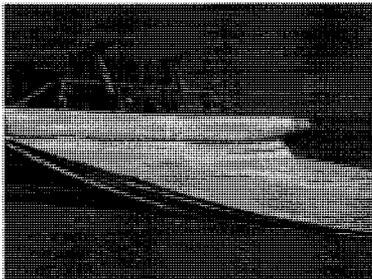
Region of Waterloo

Staff are available to speak to schools and special interest groups on a variety of environmental issues.

Call for more details:

Waste Management: 519-883-0600

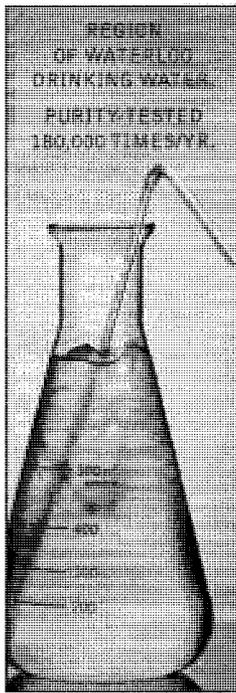
Waste Services: 519-375-4426



The tarp cover system ▲



The spray-on cover system ▲



Snow Clearing Guide for Winter Sidewalks and Driveways

Clip this guide and post it for reference during the winter season. Keep your sidewalks and driveways safe and slip-free using these helpful reminders. Visit our website to learn more about ice prevention and salt reduction: www.region.waterloo.on.ca/water.

Temperature	Wet Rainy Freezing Rain	Snowing	Drifting Snow
Warmer than 0°C	Watch Weather Forecast. If the temperature stays above zero, sit back and relax, otherwise see below.		
0°C to 10°C	Treat Slippery Surfaces Lightly sprinkle salt or alternative salt for processor to melt through. Scrape away ice.	Shovel Accumulated Snow Treat slippery surfaces with salt or alternative or apply sand for traction.	Shovel Accumulated Snow Salt may cause thawing snow to stick. Avoid salt if possible.
Colder than 0°C	Shovel. Salt is not effective at these temperatures. Use sand for traction. Use an alternative if being pushed to a freeze lot.		

Waste Management Contact Info: Waste Management: 107 St. John Street, Waterloo, ON N2Y 5K9 Tel: 519-883-0600 Fax: 519-747-4426 www.region.waterloo.on.ca www.region.waterloo.on.ca	Waste Services Contact Info: Waste Services: 1100 Frederick Street, 2nd Floor, Waterloo, ON N2L 2P7 Water Collection and Sewer Disposal: 519-333-4426 Water Collection: 519-333-4426 www.region.waterloo.on.ca www.region.waterloo.on.ca	Office: Waste Management: Waste Services: Contact Information: Contact: 519-883-0600 Call: 519-883-0600 Fax: 519-747-4426 Computer Following: Printed on 100% recycled paper using vegetable-based ink. Recycle logo approved.
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Appendix E

The questions used by the RMOW's consultants during the telephone interviews

WEMP market research survey

- 1) When you think about conservation or the environment in Waterloo Region, what comes to mind? (Unaided)
- 2) How important is water efficiency to your household? (Scale 1-10)
- 3) Compared to 5 years ago, do you think that water efficiency has become (much more, somewhat more, less or no more important)?
 - a. Why do you think that water efficiency has become much/somewhat more important?
 - b. Why do you think that the importance of water efficiency has not changed in the past 5 years
- 4) Which level of government is responsible for the following areas relating to water use?
 - a. Delivering water to homes
 - b. Monitoring water quality
 - c. Waste and sewage
- 5) Rating water quality in Water Region (Scale 1-10) (10 is the best)
- 6) Does your household have/use any of the following?
 - a. Water softener
 - b. Portable purifier (ex. Brita)
 - c. Water cooler
 - d. Powered humidifier
 - e. Water purifier
 - f. Swimming pool
 - g. Skating rink
- 7) How much has your household changed the way you conserve water in the past 5 years, if at all? (Scale 1-10) (A great deal 8 -10, somewhat 4-7, not at all 1-3)
- 8) Why has/hasn't your household changed the way you conserve water?
 - a. Why have you changed a great deal?
 - b. Why have you changed somewhat?
 - c. Why haven't you changed much/at all?
- 9) How does your household conserve water?
- 10) Have you taken part in the Rain Barrel program offered by the Region of Waterloo/
 - a. Why haven't you participated?
- 11) How interested would you be in obtaining a rain barrel in the future if it was subsidized by the Region of Waterloo?
- 12) How satisfied are you with the rain barrel?
- 13) How many toilets are there in your home?
 - a. How old is the most recently installed toilet?
- 14) What are low-flush toilets?
- 15) Do you have any low or dual flush toilets in your home?
- 16) What is the likelihood to replace a toilet in the next 3 years?

- 17) How likely to install a low flush/dual flush toilet when you replace?
- 18) How was your low-flush/dual flush toilet installed?
- 19) How long ago was the low flush/dual flush installed?
- 20) Satisfaction with low flush/dual flush toilet?
- 21) Did you participate in the Toilet replacement program?
- 22) How satisfied were you with the program?
- 23) What was your awareness of the Toilet replacement program?
- 24) Why didn't you participate when you changed toilets?
- 25) If you have a leak or developed a leak in your taps or toilet, how would it get repaired?
- 26) Do you currently have any leaks in plumbing fixtures in your home?

- 27) Have you ever heard of "water efficient" landscaping?
- 28) What is water efficient landscaping?
- 29) How do you receive information from the Region of Waterloo about water/environmental issues?
- 30) Are you aware of the publication Environews, put out by the Region of Waterloo?
- 31) How often is Environews published?
- 32) What type of information does Environews provide?
- 33) Should the Region increase/decrease the amount of information it provides about water use/efficiency?
- 34) Have you visited the Region of Waterloo's web site in the past 6 months?
- 35) Have you visited the Region of Waterloo's web site for the information about any of the following in the past 6 months? (Waste Management/Landfill, Household hazardous waste, Recycling, Yard waste days, Water restrictions/guidelines, Toilet replacement program, Rain Barrel, Water efficiency)
- 36) Are you aware of the new summer watering by-law that the Region of Waterloo has put in place?
 - a. Can you describe parts of the by-law?
- 37) How strongly do you agree or disagree that the Region should have a by-law that restricts grass watering and car washing?
- 38) Would you be willing to participate in the following programs with/without Region of Waterloo sharing costs? (Fixture replacements, water audits, water reuse/recycling, cistern, rain barrels, appliance replacement, low water use landscaping, and fixture retrofit).

(source United Utilities Unlimited, 2006)

Appendix F

The questions used by the RMOW for the internet and information centre public surveys

**Regional Municipality of Waterloo
Water Efficiency Master Plan Update
Public Information Centres**

February 21, 2006

Response due by 4:30pm, March 3, 2006
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1. Should the Region implement a water efficiency plan that is:

Status Quo-Enhanced

Moderate

Aggressive

2. Do you agree that the following water efficiency measures should be implemented in the Region of Waterloo?

Measure	Disagree		Agree		Strongly Agree
Residential Toilet Replacement	1	2	3	4	5
Water Efficient Washing Machines	1	2	3	4	5
Showers / Sink Aerators	1	2	3	4	5
Toilet Flapper Maintenance	1	2	3	4	5
Water Softeners	1	2	3	4	5
Indoor Water Audits	1	2	3	4	5
Outdoor Water Use By-Law	1	2	3	4	5
Outdoor Water Audits (Naturescaping)	1	2	3	4	5
Subsidized Rainwater Harvesting	1	2	3	4	5
Swimming Pool Management	1	2	3	4	5
Multi-Family Water Efficient Washing Machines	1	2	3	4	5
ICI Restaurant Pre-Rinse Spray Valve	1	2	3	4	5
Water Audits and Incentives	1	2	3	4	5
Municipal Buildings – by example	1	2	3	4	5
Residential Public Education and Awareness	1	2	3	4	5
School Curriculum	1	2	3	4	5
ICI Education and Awareness	1	2	3	4	5