Ministry of Natural Resources
Ministère des Richesses naturelles
Ontario

SM

February, 1992

Dear Participants:

You will recall that we advised you at the January 23-24th Workshop of our intention to request public comment on the current version of the Water Efficiency Strategy for Ontario.

On February 1st, we ran an ad in about twenty Ontario newspapers indicating that a working document was available for public comment. Readers were invited to cut out a coupon and return it to the Ministry if they wished to receive a "Working Document" that had been prepared by the participants involved in developing the strategy.

Respondents are being sent the enclosed letter from the Honourable C.J. (Bud) Wildman, Minister of Natural Resources, and the enclosed "Working Document Summary". The document is essentially the booklet prepared for Workshop #3 except that the wording of the draft principles and the draft sub-goals has been changed to reflect the consensus reached at the January 23-24th Workshop. The document has also been re-formatted to be more easily read by an individual who has not had the benefit of workshop participation. You will note that the scribes' notes and white spaces have been removed to make it user-friendly. Finally, a "comment sheet" has been added to make it easy for the public to comment.

We are anxious that this document receive as wide a circulation as possible at this time. If you are representing a group or association, you may wish to circulate copies to the Board of directors or members of the organization. Please feel free to either copy the document for circulation/comment or phone to ask for additional copies. Bill Wardle, Water Efficiency Advisor, can be reached at 416-314-2451, Fax 416-314-2427. We will present aggregated comments from the public at Workshop #4.

Yours sincerely,

Ken Sharratt
Manager
Water Policy Section

Attachments

Water Efficiency Strategy Workshops

Vol 3.6 - February 1992

Working Document Summary

Revised Draft Guiding Principles

These are in no particular order. They are discussed in detail on pages 17 - 19.

1. Optimize the efficient use of water by employing measures that are sustainable environmentally, socially and economically
2. Adopt an ecosystem approach to the provision and management of water and wastewater
3. Improve and preserve water quality
4. Maintain sufficient supplies of water to meet the needs of future generations
5. Individual water users should pay in the water bill all of the costs of delivered water and treated wastewater
6. Revenues from water and wastewater charges should be dedicated to maintaining and upgrading the water and wastewater systems respectively
7. The social costs associated with implementing water efficiency measures should be distributed equitably
8. If a subsidy is to be provided, then incomes/taxes rather than water charges should be subsidized
9. Governments, institutions and public agencies should show leadership by being efficient water users, by promoting efficient water use and by managing wastewater generation
10. The public should be informed about water use and be consulted in water management decision making

Draft Long Term Goal

This goal is discussed in detail on pages 16 - 17.

To Sustain Water Quantity and Quality Through Efficient Use.

Draft Supporting Goals:

These are in no particular order. They are discussed in detail on pages 20 - 24.

A. To provide economic incentives that foster efficient water use

B. To promote efficient water use among all water users by informing and consulting them

C. To establish a research and development program that will make Ontario a leader in water efficient technology and management

D. To develop and monitor water efficiency targets based on a sound database that will ensure sustainable water supplies

E. To set standards, adopt regulations and establish legislation that will promote efficient water use

F. To control pollution so as to enhance and preserve water quality

G. To work with self supplied water users and wastewater treaters (farmers, cottagers, rural residents and industries) so that they will become water efficient

H. To coordinate water management including water efficiency policies and programs

The Ontario Ministry of Natural Resources is taking a lead role, in cooperation with 11 other provincial Ministries and in consultation with the representatives of 95 organizations and the public, to develop a Water Efficiency Strategy for Ontario.

This working document has been designed to assist participants in preparing a water efficiency strategy and to aid the public to offer comments. The information contained in this document reflects the views of the participants and Ministry resource staff and does not represent the policies or positions of the Government of Ontario.

Copies disponibles en français

Table of Contents

Why is A Strategy Needed for the Efficient Use of Water in Ontario?

A water efficiency strategy is needed because Ontario's water use has been rising faster than the rate of population growth. Ontario's per capita water use levels are higher than Europe. These high and rising levels of water use draw down our groundwater levels, produce large quantities of polluted water, and require more treatment plants for water purification and sewage treatment. These in turn consume more energy and chemicals. All of which needs money. The Provincial Government has decided to develop a water efficiency strategy with a view to curbing the spiral of ever increasing demand.

Progress to Date

Four workshops have been organized to wrestle with the issues and develop a long term strategy for curbing the spiral of ever increasing consumption of water in Ontario. These workshops have brought together a cross-section of all user groups to share their information, views, and jointly work out a strategy.

Elements of a Strategy

The workshop participants have been discussing, debating and deciding on:

(a) what long term goal do we want to achieve on this issue of more efficient water use? Should we set some type of target to be achieved by some date?

(b)what underlying principles or beliefs do we need as guidelines to help us think about water efficiency in the context of ecosystems and sustainable prosperity?

(c)how should we break this long term goal down into its supporting goals? Should we break it down by categories of users, or by different uses of water, or by some other way?

(d)for each of these supporting goals, what mix of actions should we choose to achieve the goal-e.g. what combination of regulation, education, promotion, incentives, disincentives, etc. should we use?

(e) since we usually can't do everything at once, what are the short-term priorities - i.e. the things that should be implemented in the first 1 to 3 years of the Strategy?

1st, 2nd & 3rd Workshops Completed

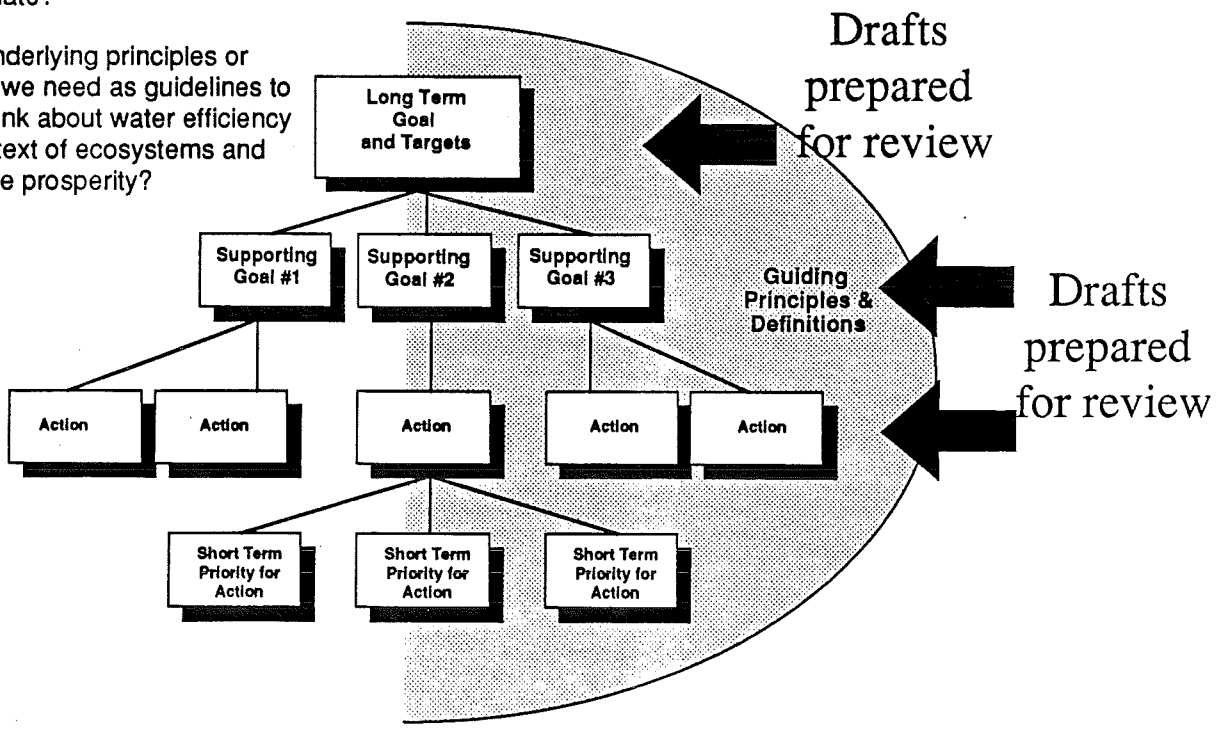
The 1st workshop identified the issues that the strategy must address and created a first draft of a possible long term goal, targets and principles.

The 2nd workshop revisited the long term goal, target and principles and began work on the supporting goals and actions.

The 3rd workshop finalized the long term goal, principles, supporting goals and actions, and developed short term priorities for actions.

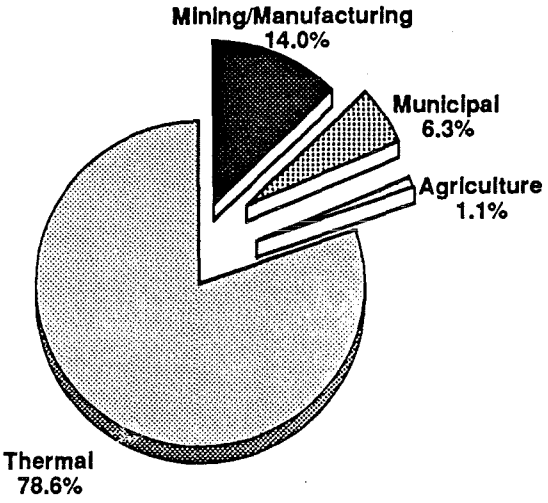
The 4th and final workshop will review the findings from the 3rd workshop, and, with input from the public, will finalize the elements of the draft strategy.

This workshop is scheduled for March 23 -24, 1992 in Queen's Park.



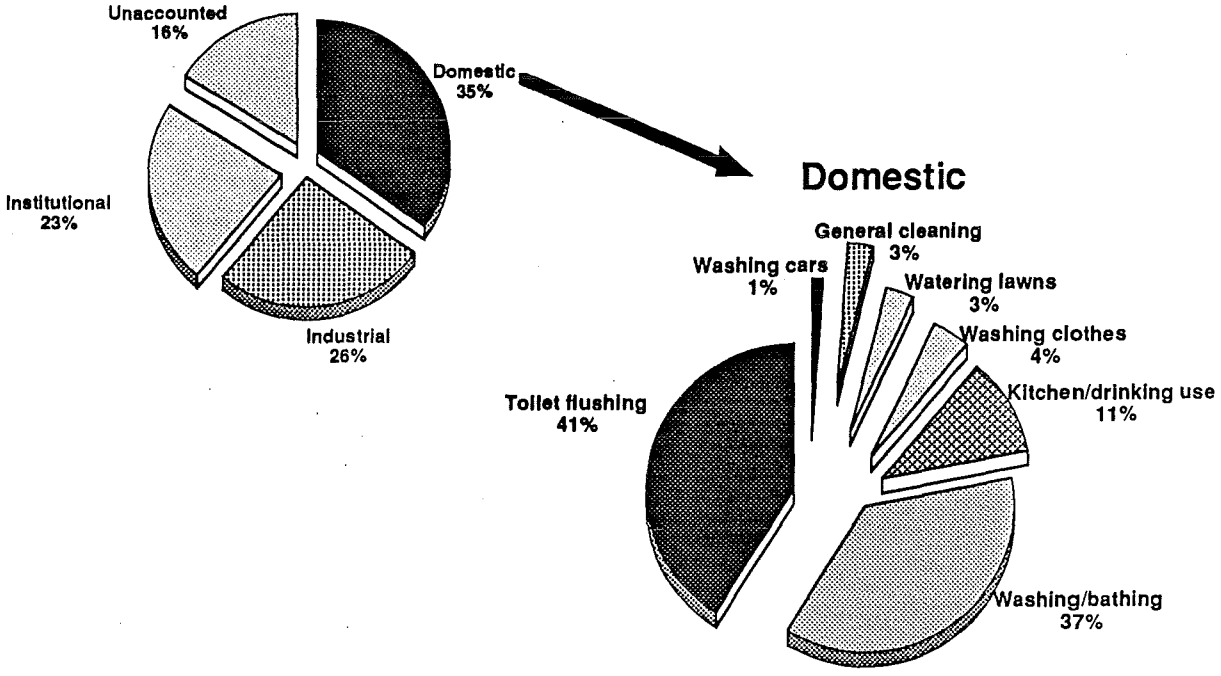
Elements of A Strategy

Figure 1
Water Use In Ontario
By Sector (In Per cent)



Source: Ontario Ministry of Natural Resources, (Toronto, 1991)

Figure 2
Municipal Water Use In Ontario



Source: Ontario Ministry of Natural Resources, (Toronto, 1990)
Tate, Water Demand Management in Canada, (Ottawa, 1988,9)

Ontario's Current and Future Water Use

Introduction

Even from earliest times, Ontario has been recognized as having a rich freshwater endowment. Ontario is an Indian word meaning "sparkling water".

Water is a finite, renewable resource constantly changing location or physical state. Water vapour is contained in the free-flowing atmosphere surrounding the earth. Under the proper conditions, it may fall as rain to the ground where it may run off to lakes and rivers, percolate downward to natural underground reservoirs (aquifers), or be absorbed and transpired by plants (as vapour). Surface waters are constantly evaporating to the atmosphere. Thus, water forms an indispensable and integral component of the natural environment and is part of the life-support system for both plants and animals, including humans.

Ontario's Current Water Uses

According to Figure 1, about 79 per cent of Ontario's water withdrawals (water taken from a well, pond, stream or a lake) are used to cool power plants, 14.0 per cent for manufacturing, 6.3 per cent for municipal use, with agriculture using only 1.1 per cent.

Thermal Electric Generation

About 79 per cent of Ontario's water withdrawals are used to cool condensing spent stream used to produce electric power in fossil fuel and nuclear power (thermal) stations operated by Ontario Hydro. Cool water is withdrawn by the powerplant from a large water body, usually a Great Lake, passed through the power plant and immediately returned to the lake in a slightly warmer condition. Most of this water is immediately available for reuse with about 0.2 per cent of the withdrawn water lost due to increased evaporation from the lake surface associated with the heat supplied by the power plants.

Industrial Uses

Industrial water use in this document refers to water which is self-supplied by industry and not water supplied by a municipal utility. The most common end uses for water in industry are cooling and condensing, processing and sanitation. Cooling and condensing uses are concerned with conveying heat from process operations, and with the condensing of spent steam from power production. For the most part, water used for cooling and condensing is contained in separate circulation systems, and remains relatively pollution free, except for a rise in temperature. Process water consists of water which comes into contact with, or is incorporated into, intermediate or final products. It carries most of the polluting materials generated during production, and also may contain substantial amounts of heat. In 1981, cooling, condensing and process water accounted for nearly 98 per cent of total water intake by Ontario manufacturers. The remaining water is used for plant personnel sanitary uses.

There are about 3,200 industrial water users in Ontario; however, four user groups - - primary metals, chemicals, petroleum and paper industries - - account for 80 per cent of all water consumed by manufacturing. There four industries use water primarily for cooling, although the paper industry tends to use more process water than the other three.

Municipal (Tap water)

Residences (domestic uses) as shown in Figure 2 are the largest water users within municipalities accounting for 35 per cent of municipal supplies followed by industrial users at 26 per cent and institutions (hospitals, universities, etc.) at 23 per cent with upwards of 16 per cent unaccounted for.

Among residential (domestic) uses, according to Figure 2, is 35 per cent of total municipal water supply, the most common of which is toilet flushing (41per cent) followed by washing and bathing (37 per cent) with food preparation accounting for about 11 per cent of domestic water use. Lawn watering accounts for a small portion of Ontario domestic water use.

Domestic per capita water use in Canada according to Figure 3 trails the United States but is about double that of European countries which have a similar standard of living.

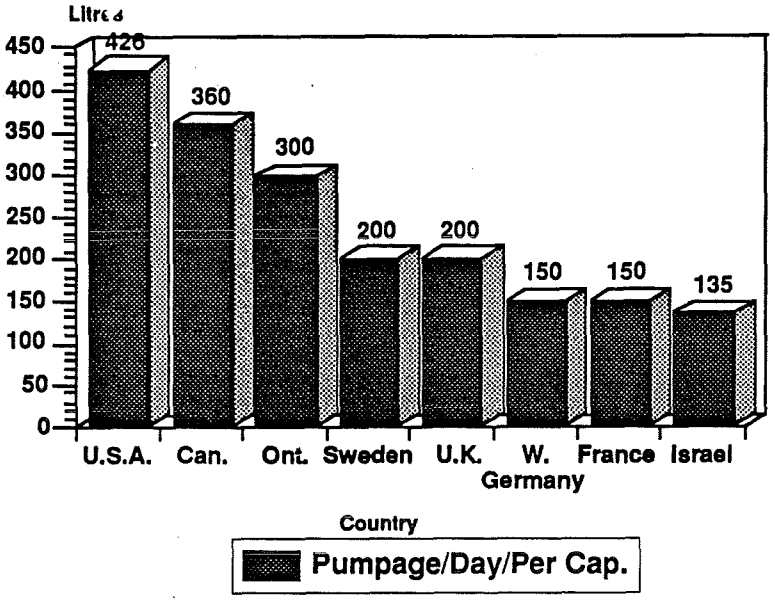
Figure 4 reveals that Canada generally enjoys lower municipal water rates than other developed countries, running at about three quarters U.S. rates and one-third to one-quarter European rates.

A key fact emerging from an analysis of municipal water pumpage is the substantial amount of unaccounted for water. This ranges from 10 to 30 per cent depending upon the municipality and may be caused by leakage, fire fighting, street cleaning and meter errors.

Agricultural Water Use

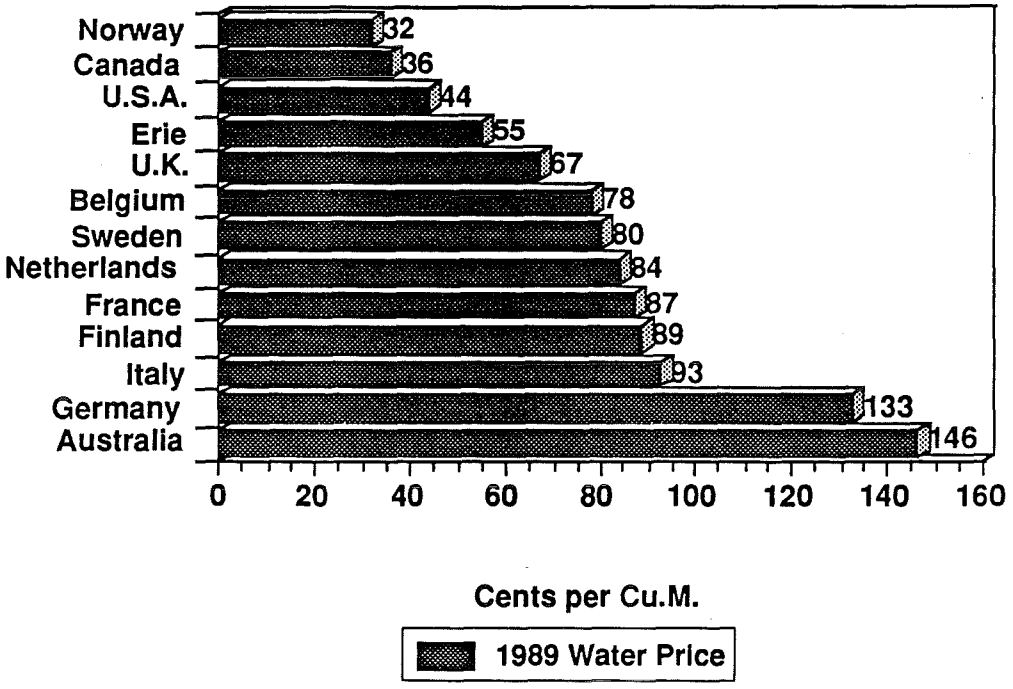
Agricultural water use is usually self-supplied and serves two primary purposes: irrigation and stock watering. Irrigation accounts for 43 per cent of agricultural water use with 57 per cent used for livestock watering in Ontario. There are about 4,000 water users

Figure 3
Municipal Domestic Water Use
By Selected Country (1983)



Source: Tate, Water Demand Management in Canada, 9.

Figure 4
International Municipal Water Rates



Based on 4,260 Sq.M. office space and 10,000 Cu.M. water/yr
Source: National Utility Services (1989)

involved in irrigation and 34,500 who water livestock.

Factors Which Will Affect Future Ontario Water Use

Several key factors will influence Ontario's future approach to water management.

Population Growth

Approximately 40 million people live in the Great Lakes basin and depend on its water. About nine million live on the Ontario side of the basin. Population is expected to increase substantially in the future rising to as much as 12 million in Ontario and a total of 50 million in the basin by the year 2011.

Increased Per Capita Water Use

Per capita water use is already higher in Canada than Europe and per capita water use is projected to increase at 2-3 per cent per year. This is faster than population growth. For example, in 1989, total municipal water use in Ontario was 10 per cent higher than in 1986. After adjusting for population, the increase was still about 8 per cent. This increase was consistent with the rest of Canada. Water withdrawals in Canada increased by over 50 per cent between 1972 and 1981, while population increased by only 5 per cent.

Climate Warming

If predictions of global warming come to fruition, then the climate in the Great Lakes area will be hotter and drier. Evaporation rates will increase and this will result in more irrigation, greater use of water for cooling, more swimming pools and other uses of water.

Costly Infrastructure Requirements

Ontario faces major expenditures totalling many billions of dollars for a variety of capital improvements to Ontario's water and sewage infrastructure. These include the need to upgrade plants to meet new safe drinking water standards, upgrading of sewage treatment plants to meet new pollution clean-up laws, new construction to prevent sewer overflow and contamination of beaches and general water and sewer rehabilitation. These expenditures are projected to occur as the Province ifaces difficult economic times.

Ecosystem Perspective being Adopted

Increasingly, all uses of water are being examined within the context of the larger ecosystem. Thus, water withdrawn from a well may not return to the aquifer and is no longer available to sustain fish in a nearby creek. Water drawn from a lake may be returned in an altered state or otherwise degraded with similar ecological implications. Increasingly, the emerging philosophy is one which holds that water users should not take any more than is needed. If water is used, then it should be returned to where it was taken in its original condition.

Lack of General Public Awareness of Water Quantity Issues

The public has generally become much more environmentally conscious over the past decade. With respect to water, people become aware of the phosphorous issue (foam) in the 70s, and more recently there has been much concern expressed about toxic substances in water. However, apart from people in a few areas such as Waterloo, there has been little concern with water supplies. Most people see the Great Lakes and Ontario's 228,000 lakes and simply assume that Ontario has unlimited supplies of clean water. This perception is reinforced by an annual water and sewer bill which will be lower than for any other household utility. It is probably safe to assume that people take the supply of water for granted and assume that all wastewater somehow simply disappears and is "looked after". There is no understanding of the hydrological cycle, the relationship between water quality and quantity and the linkages between the economics and the environmental aspects of water use.

Implications For a Water Efficiency Strategy

The key future developments will affect the major water uses in different ways and this will have implications for developing a Water Efficiency Strategy for Ontario.

Thermal Electric Generation

Population growth and a hotter climate could be expected to lead to more energy generation and as a consequence, the use of more water for cooling. However, Ontario Hydro's current strong emphasis upon the adoption of conservation technology, greater use of water power and co-generation to generate electricity plus a nuclear moratorium suggest that the thermal electric industry is unlikely to grow and that cooling water requirements, once Darlington is fully operational, should remain constant.

Industrial (Self Supplied Water)

Industrial self supplied water use could be expected to grow in response to the opportunities afforded by a larger population, and possibly in response to higher temperatures. In most areas, industrial water withdrawals from

streams or groundwater could be expected to affect the aquatic (fish, birds) ecosystems. However, the clean up mandated by the Ontario Government's Municipal Industrial Strategy for Abatement (MISA) program should reduce the water requirements of industry. This has been the experience in other jurisdictions where industries have undertaken water pollution clean-up. Consequently, the outlook for self supplied water users is steady or declining water use.

Municipal

Municipal water use isaffected by all the factors mentioned above. Population increases, per capita increases and global warming will generate additional demand. This will put additional pressure on communities which rely on wells. Most communities will face a demand for additional infrastructure to meet public desires for safe drinking water and pollution clean-up. Overshadowing all of this will be an increasing demand to protect and enhance urban aquatic ecosystems.

Agriculture

Agricultural water use level will increase because of rising production and the possibility of a warmer climate. Agricultural water use will also attract attention as it will be drawn from small streams or wells which are closely linked to sensitive local aquatic ecosystems.

Summary

Several key developments will influence future water use patterns in Ontario. These are increased population, per capita increases in water use, climate warming, large future water infrastructure investment costs, the emergence of an ecosystem perspective on all resource use and a general lack of public awareness of water quantity issues. These developments will affect major water use patterns and influence the development of a Water Efficiency Strategy for Ontario.

Thermal electric water use is likely to remain constant over the next decade or so due to energy conservation.

Self supplied industrial water use should also remain constant as new mandated pollution clean-up efforts are undertaken. Local ecosystem impacts, if they exist, will persist. Municipal water use will rise. This will pose a number of problems for municipal water use: (1) continued or shortages for some urban areas which rely on well water, and additional communities facing shortages; (2) the need for major expenditures on infrastructure; and (3) ecological impacts from additional aquifer drawdown and from surface water degradation. Agricultural water use can be expected to rise due to increased production and higher temperatures. This will result in local ecosystem impacts due to groundwater withdrawals or drawdowns from small streams.

Issues

The following were identified by participants as issues which must be considered in preparing a water efficiency strategy. They are listed in no special order.

1. GLOBAL CLIMATE CHANGE

Is the climate becoming warmer in Ontario? If so, what would this mean for water use? Should this be a source of concern to water managers?

In this decade, world attention has focused on the atmosphere around us as scientists, politicians, industrialists and environmentalists have expressed growing concern over the impact that increasing levels of carbon dioxide and other gases from combustion of fossil fuels will have on the earth's climate. This phenomenon, the "Greenhouse Effect" or global climate change, will result in wide-ranging changes to the world's climate patterns and the distribution of water, causing the warming of polar regions, a shift of productive agricultural and forest regions, and changes to water levels in oceans and lakes. Global climate change has been predicted to have the following consequences in the Great Lakes Region within the next century.

. Average annual temperature increases of as much as three degrees celsius leading to a reduction in net basin water supply to all the Great Lakes in the order of 15 per cent.
. Up to 20 centimetre reduction in Great Lakes water levels, which in turn increases shipping costs as well as reducing hydroelectric power production;
. An increase in soil moisture deficits leading to droughts, and subsequently a greater demand for irrigation water;
. An increase in per capita water use, as well as growing conflicts between water users, and possibly growing international pressure to engineer water diversions to supply water to other regions of North America.

2. COST OF WATER IN ONTARIO

How do Ontario water prices compare to other jurisdictions? Is there a difference in water rates depending on which municipality you live in Ontario? Should sewer surcharges be buried in municipal property taxes? How much does one pay for water and sewer services in Metropolitan Toronto?

Water in Ontario is quite inexpensive when compared to other jurisdictions. We are supplied with potable water at rates that are generally lower than U.S. rates, half western European rates, and a quarter of Australian rates.

When valuing the cost of water in Ontario, it is important to note that there is both a water component and a sewer component to the total cost of water. In some municipalities, the sewer component is included in the municipal tax base, so it is often difficult to compare water bills of these municipalities.

Household water bills in Ontario usually reflect a wholesale cost and a retail cost. For example, Metro Toronto will treat and deliver water to the six area municipalities at a wholesale rate. The area municipality will then add a retail component to the cost to deliver it to the household. Since Metro Toronto charges the same wholesale rate to its customers, water charges to households in the area municipalities are similar.

Household water rates in Ontario tend to be most expensive in small towns because there are fewer people to pay for the cost of the infrastructure (plants, pipes, etc).

3. QUALITY/QUANTITY INTERRELATIONSHIPS

Is there a relationship between the amount of water used and its quality? How much clean water does Ontario have available for use? Is this adequate for our future needs? If less water is used, will this help with water clean up? Will sewage treatment plants work well if less water is used, and wastewater is more concentrated?

In the first half of this century, much of the pollution control technology was based on a simple philosophy: the solution to pollution is dilution. As a consequence, there are non-natural compounds detectable in Great Lakes water and estimates of rehabilitation costs for 43 Great Lakes Areas of Concern in Ontario and the U.S.A. are in the billions of dollars.

While pollution prevention and zero discharge are not new concepts, they are now receiving increasing attention. However, there are concerns that the implementation of water quality/ management may negatively affect water quality if quality and quantity approaches are not coordinated. For example, sewer separation programs which eliminate stormwater from sanitary sewer lines thus freeing up treatment capacity for more sewage, may cause water quality problems in local streams due to increased runoff. On the positive side, according to scientific research, municipal sewage treatment plants should become more efficient in meeting their quality objectives if the amount of water in the wastewater stream is reduced. Also, home and cottage septic systems should be more efficient and last longer if water flowing into the systems can be reduced by using water efficient fixtures.

Likewise, many industrial water efficiency programs such as water reuse and recirculation, separation of "waste"streams and alternate heat dissipating technologies can reduce or greatly eliminate the need to discharge water at all: clearly, a quality/quantity benefit. Black's Photography of Markham has installed a closed loop water recirculation system, which has reduced water use by 97 per cent and virtually eliminated the discharge of chemicals into the municipal system. If water efficiency measures can reduce demand on groundwater supplies, then base flows in local streams may increase, improving water quality and aquatic (fish, bird) habitats.

4. INFRASTRUCTURE

Is Ontario's water and sewer infrastructure being maintained adequately? If not, why? What are the implications of not adequately maintaining Ontario's infrastructure?

Ontario's infrastructure is aging, and a recent report prepared for the Ontario Sewer and Watermain Contractors Association indicates current annual expenditures are inadequate to maintain the systems. An improperly maintained system means an inefficient one. It has been shown that leakage in water supply and sewage collection systems results in only 80-90 per cent of treated water reaching the municipal water user and this leakage, when it enters the sewers, uses an additional 20 per cent of sewage treatment capacity.

Estimates of the replacement value of Ontario's water services infrastructure are in the order of $50 billion, and the demand for more infrastructure is increasing. It has been argued that this growing demand for increased water supplies has been artificially inflated by a self reinforcing supply management-driven cycle:

. users use excessive amounts of an under-valued resource
. excessive use creates artificially high demand
. high demand inflates operating and maintenance costs and argues for major expansion
. usage fees must be kept low to encourage use of expanded facilities

There is growing evidence that water conservation practices, education and demand management techniques break the supply management cycle and result in reduced water use which can delay or even eliminate the need for costly expansions. Such technologies have been shown to reduce total water use very substantially. Installation of water efficient fixtures can reduce residential water use by 30-50 per cent.

5. WATER EFFICIENT TECHNOLOGY

What is water efficient technology? Is it available in Ontario?

Water efficient technology uses less water. The EcoLogo program defines water efficiency as follows:

. showers less than 10L/min
. toilets 6 litres or less/flush

At the moment, there are ample supplies of faucets and showerheads available for sale in Ontario at costs comparable to conventional fixtures. Several models of toilets using 6 litre per flush can be ordered in Ontario at prices ranging from $125 - 350. They are not widely available in retail outlets as yet. About 1-2 million 6 litre toilets are in operation in the U.S.A.

6. RATE STRUCTURES - BILLING SYSTEMS

What type of water rate structures exist in Ontario? What types of structure are most prevalent in the province? Which rate structures offer an incentive to use water efficiently? Are water prices a factor in industrial development?

There are four main types of rate structures in Ontario:

(a) A flat rate system, whereby a fixed charge is levied regardless of the volume used. A total of 33.2 per cent of Ontario residents are under this structure.

(b) In a declining block rate system, the greater the volume of water used, the lower the price per unit. 34.1 per cent of Ontario residents are charged for their water under this system.

(c) A constant rate system in which the user pays a fixed amount per unit of water. The cost is exactly the same for each additional unit of water. In Ontario, 32.5 per cent of residents pay for their water in this manner.

(d) The increasing block rate billing system charges a higher price per unit, the greater the volume of water used. Only 0.3 per cent of Ontario residents pay their water bills using the increasing block rate.

The cost of water often varies depending on the rate structure. A flat rate billing system does not offer an inventive to be water efficient. Flat rate charges are usually based on an average family size of about three people with a corresponding average family use. In a metered block rate system, a value is assigned to each additional unit of water used. Therefore, it is usually advantageous for single or two person households to be on a metered system. The measured lower water use would result in lower water bills.

The decreasing block rate billing system, like the flat rate system, also offers a disincentive to use water efficiently because it promotes the use of large volumes of water to obtain lower per unit costs.

The decreasing block rate is often used by a municipality as an incentive to entice large industry. Large industrial companies are usually great water users. Under this billing system, economic benefits are accrued by large water users since they pay less per unit when they use more water. The constant rate and the increasing block system are consistent with efficient water management as users have an incentive to use water wisely.

Some municipalities have more elaborate billing systems. For example, Windsor charges a summer levy between June and November in excess of the winter average. This is intended to encourage efficient use during the summer when a great deal of water is used on lawns.

Most pricing experts favour water rate structures where price tracks the actual cost of water supplied, a marginal or increasing block approach. This recognizes that providing additional water costs more than current supplies, and that large volume users should bear their fair share of water supply expansions. Theoretical studies suggest that use of increasing block rate structures could reduce water use by 50 per cent. In 1986, only two

Ontario municipalities had such rate structures.

Adoption of anything other than a flat rate structure requires the installation of meters.

7. METERING

How many households in Ontario are metered? Does metering reduce water use?

Nearly all commercial and industrial water users tied into municipal systems are metered. About 2,000,000 out of 3,000,000 household water users tied to a municipal system are metered. This leaves about 1,000,000 users who are unmetered.

Metering is generally credited with being a significant factor in promoting water consumption because it enables municipalities to charge users for water based upon the amount that is actually used. For example, Edmonton meters its water and homeowners' use about one half the amount consumed in Calgary which is generally unmetered. Residential areas in Calgary which are metered use one half of what residents in unmetered areas of Calgary use.

The chief disadvantage of metering is cost. The City of Toronto budgets $350 per meter installed in existing houses in Toronto. Accordingly, the cost of installing meters in all existing unmetered households in Ontario could be $350,000,000.

8. PLUMBING CODE

Should Ontario accept the U.S. evidence that 6 litre per flush (lpf) toilets can perform adequately? Should Ontario mandate the 6 lpf toilet from, say, 1994 onwards? Is there a risk of job losses if Ontario proceeds? Can fixtures and fittings producers alter their manufacturing processes to produce the water efficient devices? Which government agency, if any, should assist the manufacturers, the users such as hotels, etc.? Should CSA testing/approvals be mandatory?

The Ontario Plumbing Code does not reference water efficient devices such as toilets, which use only six litres of water per flush. Many states in the United States have mandated the use of 6 lpf toilets, and other devices, in new construction and renovations. A Task Force chaired by the Ministry of Housing is considering how Ontario should proceed.

9. WHO PAYS FOR WATER EFFICIENCY

Since water is a common property resource, should water efficiency program costs be added to the general tax base or be collected through a royalty on water use? Should economically disadvantaged people be limited in their access to water by their inability to pay? Should municipalities provide incentives for retrofitting buildings or installing water meters, or should the province require these changes through legislation? Should economically disadvantaged regions of the province receive a water or sewer subsidy to attract industry?

It could be argued that by not paying for water efficiency programming now, we are asking future generations to pay for the consequences of our wasteful uses.

In the long run, installation of water efficient fixtures, full cost pricing for water and use of water efficient technologies and processes will represent a cost savings. In the short run, however, the cost of retrofitting buildings with these fixtures, the installation of meters to allow accurate water auditing and pricing, and full cost pricing for water represent a new cost to all water users.

10. CANADIAN STANDARDS ASSOCIATION (CSA)

Should all water efficiency devices be CSA tested/approved? Should CSA accept test results from other jurisdictions?

CSA is a national organization of business, government, labour, consumers, and associations all working together voluntarily in their common interest to develop national consensus standards. Standardization through the Canadian Standards Association is intended to be voluntary and self-regulating, using the consensus principle. CSA Standards are widely used by industry and commerce and are often adopted into regulations by municipal, provincial, and federal government, particularly in the fields of health, safety, and the environment.

Currently, only faucets, faucet aerators, showerheads and toilets are certified by CSA. Some manufacturers have requested certification for 6 litre per flush toilets.

11. WATER USE CHARGES

Would a water use charge promote the most efficient use of water? Should there be a charge for using water as there is for most other natural resources—i.e. timber, fish, gravel? Should it be based on withdrawal, consumption or degradation? To whom should it be applied?

In Ontario, royalties are collected on many natural resources including timber, petroleum and some mineral resources. Except for a charge on hydropower production, water in Ontario is free for the taking. Municipalities, industries, thermal power producers and farmers pay only for the infrastructure and facilities costs of withdrawing, treating, transporting and discharging water. Users also rarely pay for use of water as a waste or contaminant assimilator (although this may limit subsequent uses of this water for recreation, drinking supplies, etc.) Such costs are usually considered part of the cost of doing business. Because water is so ubiquitous, it is difficult to find an equitable basis on which to charge a fee and to establish a value for water. For example, Ontario Hydro would pay 80 per cent of a withdrawal-based charge, but only 8 per cent of a consumption-based charge: corresponding municipal figures are 6 per cent and 47 per cent respectively. Most strict economic estimates of the value of water are very low, because of its abundance. Some experts question whether a charge on water would cause users to reduce use or simply regard it as

another tax. For example, about 40 per cent of the retail price of beer is taxes and a water charge would probably only add another 1-2 per cent to the cost of the product.

12. MUNICIPAL FULL COST PRICING

Should the users of municipal water pay the full cost of using water? If so, what should they pay for? What are the implications of a full cost pricing scheme?

The issue of full cost pricing arose as a result of a growing concern that the funding required for operation, replacement and expansion of water and sewer facilities/infrastructure was insufficient to meet the growing costs of producing to meet the demands for water. Canadian water use trends indicate that, during the past decade, water use far outstripped population growth.

Ontario's municipalities treat and supply water to 80 per cent of the population, and about 10 per cent of all industrial water use is municipally supplied (excluding power generation). Figures for the collection and treatment of wastewater by municipalities are similarly large. However, the way in which the cost of water treatment, distribution and wastewater treatment varies greatly across the province, and may be paid through property taxes, provincial/municipal subsidy arrangement or development levies. As a result, consumers do not pay all the water costs in their water bill. They pay these costs in other ways, accordingly, they have no concept of the cost of water use, which usually results in overuse/abuse. The impact on the environment of wastewater discharges which fail to meet provincial water quality standards (because of capacity or technological limitations) is not currently charged as part of the cost of water, although substantial public funds are devoted annually to water management and rehabilitative programs.

Full cost pricing refers to a pricing scheme which reflects the real economic cost of the resource in the water bill. Factors considered for inclusion are direct operating costs, costs of providing for peak demands, storm sewer separation costs, metering, public awareness and some other costs such as environmental assessments and rebates for the economic disadvantaged. A full cost pricing scheme would ensure that all resource costs are considered upfront, thus encouraging water conservation and reducing the need for costly, publicly funded remedial programs. It should also assess charges as much as possible to individual customers based on the customer's contribution to incurring the full costs.

13. IMPACT OF WATER EFFICIENCY MEASURES ON MUNICIPAL REVENUE

If everyone adopts water efficient technology, won't this adversely affect municipal revenues requiring a rate increase? Doesn't this punish the water user for adopting water efficient technology or better management practices?

Utilities have fixed costs which must be paid for, even if less water is used, or even if no water is used. If everyone suddenly reduces their water use, then rates may have to be raised. In practice, some people will reduce immediately and others will take longer. During this time, new customers will be connected to the system which will offset any decline in sales. Over time, there will be more customers paying less which will maintain revenues to the utility. The aim will be to hold demand at a constant level, thus holding revenues constant.

14. THE NEED FOR INTEGRATED MANAGEMENT

How should water be managed? Is new legislation required? Are new management mechanisms needed?

The management of water and related resources is a shared responsibility in Ontario, involving a number of provincial ministries, federal departments, municipalities and other agencies. Three federal statutes and at least eleven provincial acts relate directly to the use and management of water resources and there are in the order of 30 others which indirectly affect water. This multiplicity of agency involvement has often been viewed as an impediment rather than a strength in managing water. Legislation now in place provides a general framework for water resources management by defining rights and obligations regarding water use, and by laying out broad responsibilities for government bodies.

As the range and complexity of water issues continues to expand, however, it is becoming increasingly difficult to effectively manage on an ongoing basis. A more holistic or ecosystem approach is called for in order to cooperatively manage water proactively, by responding to water quality and quantity issues in an integrated way and managing water in the broader context of managing resource demands, sustaining environmental resources and maintaining economic stability. Steps toward an ecosystem approach are already occurring through initiatives such as Strategic Plan for Ontario Fisheries (SPOF II), Great Lakes Remedial Action Plans (RAPs), and new watershed planning initiatives.

15. POTENTIAL FOR URBAN INFILLING

Does the more efficient use of water and the resulting reduction in sewage volume lead to opportunities to build more residences/offices on a given piece of developed real estate? Would the introduction of water efficient devices permit the building of residences on presently unoccupied urban real estate?

If a sewage treatment plant has limited capacity and a community reduces the flow of sewage to the plant through water efficiency, then there should be an opportunity to put more people on the system until the flow returns to the level of the plant's capacity.

Within an existing built-up area, the introduction of water efficient fixtures amongst existing users would create some space capacity in existing pipes. Thus, development in the area could

be intensified without having to incur the expense of installing additional infrastructure.

16. WASTE TRANSFER

If the adoption of water efficient devices or better management practices results in less water used, isn't there a risk that toilets or drain pipes may clog? What has the U.S. experience with such fixtures been to date?

This topic has been raised over the past 10 years in the U.S. as 6 litre flush toilets and other low flow fixtures have been introduced. What research that has been done is positive. For example, a 250 home subdivision in Phoenix, Arizona was equipped with 3 litre flush toilets and a nearby subdivision was equipped with conventional 13 litre toilets. The characteristics of the people in the two subdivisions were similar. The 3 litre subdivision showed the following:

- 23 per cent less water use in winter months
- less double flushing
- significantly fewer homeowner complaints with toilet clogging
- no real difference with sewer clogging (both subdivisions rated very low)
- a greater need for additional bowl cleaning

No doubt, research of this nature should be continued. However, surveys of officials in communities where 6 litre per flush toilets have been installed, has failed to identify any significant concerns about toilet or sewer blockages.

17. WATER USE PERMITS

Is the existing permit system adequate? Should all water takers be required to obtain a permit? Should water users pay for this permit?

The Ontario Ministry of the Environment requires anyone who takes surface or well water in excess of 50,000 litres per day to obtain a permit. Excluded are household and farm uses (drinking, bathing, livestock). Permits are required for irrigation. The Ministry of the Environment has the authority to require permit holders to reduce their water taking in order to maintain minimum stream flows to protect fish and other aquatic life.

18. COMPETITIVENESS

If Ontario municipalities raise their water rates to promote efficiency won't this discourage industry from locating here and make local products more expensive? Within Ontario, if one municipality raises its rates to promote efficiency, won't it be less attractive to residents and industries in relation to nearby communities? Should the Ontario Government mandate that municipalities cannot give away free or underpriced water to attract industry as it now mandates that land costs to industry cannot be subsidized?

Ontario's water rates are generally lower than those in nearby states. They are certainly lower than those in other countries. Consequently, this should not be a major concern. Within the province, a different picture emerges. Water rates do range widely. There are legitimate reasons for this as some water supplies are more accessible, some require higher levels of treatment and some must spend more to clean their wastewater. In addition, some municipalities may be holding their water costs down by paying for water and wastewater services out of taxes in order to make the community more attractive. Should Ontario try to ensure a level playing field?

19. PUBLIC AWARENESS

Do members of the public see a water problem? Do they see an issue with water quantity? Should the public be made more aware of water issues? Do governments, public agencies and institutions have a role? What is it?

Most of Ontario's water is used by the general public - homeowners, owners of small business, corporate managers etc. Homeowners also use a lot of water to make their properties look good. People love their grass and their gardens. Only a tiny portion is used by government. At the moment there are some public water concerns with water quality - is my water safe for me or my children to drink? If any headway is to be made in dealing with either quantity or quality issues, then the cooperation and assistance of the public will be required. This is likely to be a long term effort. Accordingly, both adults and children should be involved in the awareness and educational effort.

20. GROUNDWATER (WELL) MANAGEMENT

What is the demand for groundwater? What is the supply? Is groundwater being adequately managed?

Groundwater is important in Ontario. About 25 per cent of all residents rely on wells including many large municipalities such as the Region of Waterloo. Historically, data is maintained by the Ministry of the Environment concerning all water wells in the province. However, with the exception of the work done by individual municipalities, there has been little systematic research to define how much groundwater exists, and whether or not the current and projected withdrawal rates are sustainable for long term use. Some changes are being made. The Centre for Groundwater Research at the University of Waterloo is becoming a focus for research.

21. EQUITY/HARDSHIP

If full cost pricing is adopted, won't prices rise and won't this hurt people on low or fixed incomes? Will small and northern municipalities be able to install and update water and wastewater systems if provincial grants are reduced or eliminated as is assumed in full cost pricing?

Full cost pricing, metering, etc. may not raise water rates for all users. Singles and couples may see decreases as may families and companies which do not have excessive summer use. For others, costs may be shifted from taxes to water bills with a corresponding decline in taxes. There are a variety of ways to deal with equity. One way is to provide a "lifeline" amount of water to all users at a low rate. Another is to adjust the rates for those receiving social assistance especially if they are in a

situation where they are large water users such as a large family. For certain municipalities, a reduction in provincial grants will be a serious issue. If provincial grants are reduced, how will they cope with financing the water and wastewater treatment costs? This is a question which will require a good deal of attention during the upcoming workshop.

22. STORMWATER (RUNOFF)

Should stormwater be considered as part of the Water Efficiency Strategy for Ontario Initiative?

Stormwater and the Water Efficiency Initiative have only one aspect in common combined storm sewers. In many municipalities, sanitary sewers carrying household wastewater also carry stormwater from residential downspouts and streets. When large rainstorms occur, then these sewers carry more water than the sewage treatment plants were designed to treat and as a result all of the excess water from such sewers is directed into a creek, river or lake. This pollutes the water and makes it unfit for swimming. Much money has been spent by governments to separate the sanitary from the stormwater systems. However, more money will be needed. Downspouts should be disconnected from sanitary sewers. In the opinion of government staff, other than with respect to the issue of combined sewers, there is no real need to focus upon stormwater as part of the Water Efficiency Strategy for Ontario. Stormwater is to be considered in other forums such as the watershed, subwatershed guideline development exercise, now underway within MNR and Ministry of the Environment (MOE).

23. DROUGHT MANAGEMENT

What is being done about drought management?

As a result of the 1988 drought, the province and other water partners prepared a booklet titled "Guidebook to Drought Management". This is available on request. The booklet suggests an action strategy for coping with a drought and recommends the creation of coordination task forces when it appears that a drought is imminent.

24. PUBLIC ACCEPTANCE OF TECHNICAL CHANGE

Will the public accept water efficient technology? What are the barriers to acceptance?

Water efficient toilets, showers and faucets on the market right now have the potential to reduce water use by 30%. The payback period for the investment would be less than three years. Potential reductions to industrial and commercial water demand use appear to be about the same magnitude with paybacks of 1-2 years. The key barriers are complacency about the small cost now associated with water and wastewater services and the lack of awareness about the technology available to reduce water use. However, this is a surmountable problem. Experience from many U.S. and some Canadian communities indicate that if the public is made aware of the need to use water wisely and if people are made aware of water efficient technology then they could accept it and install it. Thus, the problem lies in the area of raising public awareness and ensuring that water efficient products are available. At the moment there is a good supply of showers, faucets and toilet dams. However 6L toilets are in short supply due to a lack of consumer demand.

25. GREYWATER USE

Should greywater be used in place of treated drinking water for some uses such as lawn watering?

Greywater is water from sinks, showers, bathtubs, etc. It is not water from toilets. Greywater contains coliforms and therefore greywater presents some potential health problems if it is to be reused. There are some systems on the market to reprocess greywater for use in flushing toilets and watering lawns. However, these systems are expensive and do not enjoy a high level of reliability. Thus, use in the household does not appear feasible at this time. The main potential use of greywater appears to be turf watering. However, before any specific application could proceed, it would have to be scrutinized for its health considerations. If water supplies were severely constrained within a community then the whole issue of greywater use would be re-considered.

26. RETRAINING

Should workers be retrained to install water efficient devices?

Water efficient devices do not differ radically from current fixtures. However, plumbers and others in the industry will have concerns about the potential health impacts of water efficient fixtures using less water to transport the same amount of waste. This concern has been raised in the U.S. Research indicates that waste transfer can be performed safely with water efficient fixtures. Training sessions should be held with plumbers and others to discuss their concerns and make them aware of the potential for water savings associated with water efficient technology If greywater systems are eventually introduced then substantial training would be required as plumbers would have to become familiar with the use of two separate water systems in one residence or building.

27. PROMOTE WATER EFFICIENT TECHNOLOGY

Should the province, the municipalities and the utilities promote water efficient technology? If so, how?

Much of the water efficient hardware which could be utilized in a residence is already on the market in profusion. Public awareness programs (brochures, bill stuffers, ads, demos) could help.

28. ECOSYSTEM PERSPECTIVE

Should water efficiency be put in the big picture? What would this be? Should an ecosystem perspective be adopted?

Water is a renewable resource which should be managed based on the hydrological cycle. In this cycle, water is constantly falling on land, evaporating, running off or soaking into the

ground. Water from the surface and groundwater ends up in a river or lake and then evaporates to start the cycle all over again. Along the way it meets the needs of man and other living things. Any change in these flows either from a quality or quantity standpoint will begin to have major environmental and economic implications. Increasing the efficiency of water has a number of positive consequences for the ecosystem. More water is available for fish. Less water is degraded. Less energy is used. Water use of all kinds must be looked at from an ecosystem perspective.

29. WATER MANAGEMENT

Who manages water in Ontario? Is there room for coordination?

The management of water and related resources is a shared responsibility in Ontario, involving a number of provincial ministries, federal departments, municipalities and other agencies such as the province's 38 conservation authorities. There are 15 federal and over 75 provincial statutes with direct or indirect pertinence to water.

Provincial responsibilities for water management are shared among a number of ministries, each with their own legislative mandate. The Ministry of Agriculture and Food is responsible for fostering the development of an economically viable, environmentally responsible agriculture and food sector in the economy. The Ministry does not directly develop policies on water but Ministry responsibilities have a water component.

The Ministry of the Environment is responsible for achieving and maintaining a quality of the environment, including water, that will protect human health and the ecosystem and will contribute to the well-being of the people of Ontario. Major responsibilities include the protection of drinking water supplies, regulation of communal sewage treatment facility discharges, the operation of water and wastewater treatment facilities plus other environmental protection initiatives.

The Ministry of Municipal Affairs (MMA) is responsible for providing a framework within which local governments can plan for their future. The Ministry does not directly develop programs or policies on water. However, some Ministry activities have a water component. Ministry responsibilities related to water involve policy development and plan review. While the Ministry financially assists municipalities, direct expenditures by individual municipalities are not included in MMA's budget.

The Ministry of Natural Resources is responsible for: the management and conservation of water quantity resources, the management and control of riverine and shoreline flooding and erosion hazards, fisheries, wildlife population and habitat management, protection and conservation as well as the coordination of water and related land use planning and management. The Ministry also enforces the federal Fisheries Act which has major implications for water management.

30. INDUSTRIAL WATER EFFICIENCY

What can industry do to use water more efficiently? Does it make economic sense?

Water audits performed for MNR and jurisdictions in the U.S. suggest that saving of about 30 per cent in municipal water use by individual companies is generally achievable. These savings are realized by recirculating cooling water and by reuse of water used for one purpose in a plant for some other purpose, e.g., use of cooling water for rinse water. These water savings can often be realized with a one to two year payback on capital cost investment. Similar savings appear possible in the commercial and residential sectors.

31. PRIVATE WATER USERS

How important is this group? Should it be included in the strategy?

About one quarter of Ontarians rely on well water. Many of these are people who rely on their own private wells and their own waste disposal systems (septic systems). The septic systems are a source of concern as they contaminate groundwater. Water efficiency improvements help these water users in two ways. They reduce the need to take water, meaning that more remains in the aquifer. In addition, reduced flows into the septic system enable it to work better and produce less pollution.

32. ZERO WATER USE INCREASE TO 2011

Is this goal feasible? By what means?

To achieve this, commercial and industrial water users tied to municipal systems should reduce their water use by 20-30 per cent. Residential water users can save 20-30 per cent through the installation of toilet dams, water efficient toilets, and water efficient showers. Based on a review of U.S. and Canadian experience, this seems feasible. Changes in water use behaviour resulting from education or water efficient pricing could add to this total.

33. BASELINE DATA AUDITS

Is there a need for additional water data? Do we know what water use takes place today?

The province has only a general database concerning water use in the province. This information is derived from a number of sources - i.e., surveys, estimates, etc. In order to gauge future progress towards more efficient water use, it will be necessary to improve the quality of the database.

34. INCENTIVES

Are incentives needed to bring about water efficient behaviour? Who should receive them?

Financial incentives may be able to produce results which have traditionally been achieved by regulation or legislation.

Draft Long Term Goal

To Sustain Water Quantity and Quality Through Efficient Use.

Several ideas are embodied in the goal. Both water quantity and water quality are central features of the provincial strategy. Achieving sustainable quantities of water will be a hollow goal if this water is polluted. Likewise, sustaining quality will require attention to quantity management, otherwise Ontarians will be faced with the task of trying to clean up even larger quantities of polluted water. Second, implicit in the use of the word sustaining is the idea that water quantity and quality will be available to meet the needs of future generations. Third, the concept of efficiency represents a very important philosophical approach to guide future water management in Ontario. Efficiency means the use of improved technologies and management approaches to deliver the same or better service with less water.

Excluded from this definition are measures which people will find distasteful and abandon as soon as possible. These include such measures as permanent bans on lawn watering, bans on car washing or less frequent showering. Ontario does not face a critical water supply situation which would justify such approaches. These measures can be justified only for short periods of time to deal with emergencies such as severe summer drought, contamination of a well or a problem with the distribution system. Efficiency is aimed at maintaining or enhancing the quality of life by introducing water efficient devices and approaches utilized elsewhere, or by developing new ones to meet Ontario's needs.

More efficient use will require a change in water use thinking and behaviour by water users and water managers. For household and commercial users, it means purchasing new and much improved fixtures such as 6 litre per flush toilets, efficient showers, faucets and other fixtures as well as designing lawn layouts and plantings which are water efficient. For industrial users, it will mean better housekeeping such as leak reduction, recycling, reuse and ultimately changes to technological processes which require water. The result is less water use per unit of output.

For water managers, water efficiency means a change of outlook. Previously, whenever demand for water began to approach the limit of available supplies, a water manager compared the cost of several sources of supply and selected the one offering the greatest net benefit. This goal signals that water efficiency is now explicitly an alternative to adding new supply.

There are several major benefits associated with the consideration of water efficiency. Water users may see higher water, energy and sewer bills in the future, however, if they adopt water efficiency measures, the bills will be lower than what they would have been. For those with septic systems, water efficient fixtures will reduce the flows into the system, improve the performance and life of the system and require smaller fields. Water providers can extend the life of their existing treatment plants without having to undergo costly environmental assessments that would be required if a new plant were to be built. In addition, water efficiency can be added in stages which are under the control of the utility rather than having to bring a step increase in capacity associated with a new water plant. Lastly, since most water efficiency measures cost less to install than the cost of a new plant, the utility can enhance the competitiveness of the community and increase the purchasing power of its citizens by keeping down the cost of water.

Wastewater treaters will see the life of their existing facilities extended. Water efficiency can expand water service to more people without generating additional wastewater flows. In addition, there are operating efficiencies which arise from reduced per capita water flows. These include the reduced usage of chemicals, longer equipment life due to reduced backwashing and reduced energy use due to reduced pumping.

The environment is also a beneficiary of a water efficiency approach. Less raw water needs to be taken from wells or streams. This means that more water can be left in aquifers and streams to augment flows for aquatic creatures or meet the needs of future generations.

Reduced flows into wastewater treatment plants and septic systems improve the treatment and thus enhances the quality of the effluent returned to streams, lakes and aquifers.

Draft Guiding Principles

Ten principles, or beliefs, have been established to provide a guide to actions aimed at achieving the goals and sub-goals for the Water Efficiency Strategy. They are listed in no particular order of importance.

1. Optimize the efficient use of water by employing measures that are sustainable environmentally, socially and economically

Efficiency is the use of technology and management schemes that use less water while maintaining or enhancing the level of service. Some additional tests are introduced in principle 1. This principle indicates that the accounting must include a range of environmental, social and economic considerations. Experience elsewhere suggests that when these criteria are applied to many current water uses, then major benefits can be achieved by applying water efficient technology. A decline in water use usually results.

However, this principle does not mean that all water uses in Ontario must be reduced. For instance, requiring Ontario Hydro to reduce its use of water for cooling would require major expenditures on cooling towers which would increase the rate of water loss, produce undesirable localized weather impacts and be aesthetically unsightly and costly. In this calculation, the disbenefits appear to outweigh the benefits. A similar calculation will have to be carried out to see if other water uses are efficient and pass the above tests.

2. Adopt an ecosystem approach to the provision and management of water and wastewater

In an ecosystem, "everything is related to everything else". In water management, we have witnessed an interrelated chain of events. Water has traditionally been priced very low, large quantities have been used, more and more plants have been built to provide this water, and more wastewater plants must then be built to cope with the additional flow. In the process several other events have occurred. Aquifers have been drawn down which adversely affects pond levels and stream flows. Valuable open spaces near waterbodies have been used for water or wastewater plants. More energy and chemicals are being put into the systems. All of this costs ever increasing amounts of money. The public is demanding higher standards while water providers and wastewater treaters are facing financial difficulties in meeting existing standards.

Using an ecosystem approach, these individual components are seen as part of a whole. Water efficient technology and management practices offer the potential to break this cycle. These measures offer the potential to expand services to water users without continuing the spiral of ever increasing demand referred to above. This provides an opportunity to meet public concerns about safe drinking water and about pollution. It also offers a means

Guiding Principles continued

for accommodating the growth which appears inevitable, at least in the Golden Horseshoe.

In order to successfully implement water efficiency, water utilities, municipalities, provincial ministries, water users, installers and manufacturers are going to have to work together. Each now holds part of the solution to the problem. A great deal of information will have to be shared. The development of this Water Efficiency Strategy by representatives of these key players, and the public is a first step.

3. Improve and preserve water quality

Sustaining water supplies means that Ontario must improve and conserve its water. Past practices have treated water quality as if supplies were unlimited. Accordingly, streams have been treated like sewers and lakes have been seen as sinks capable of absorbing enormous quantities of biological and inorganic wastes. The result has been a steady deterioration in the quality of Ontario's water resources including the Great Lakes. This has been manifested in a number of ways: excessive algae and plant growth in waterways, beaches where swimming is prohibited, wildlife which develop deformities and cannot reproduce, and waterbodies which support only the lowest forms of aquatic life. Humans are part of this biological process. They eat the fish and drink the water from these waterbodies. As a result, there is increasing concern about water quality.

Some improvements have been made, and more will be needed. Increasingly, each water user will have to gain an appreciation of the contributions that he/she can make to preserve water quality.

4. Maintain sufficient supplies of water to meet the needs of future generations

Most Ontarians have access to one of the Great Lakes. Maintaining supplies in such situations means ensuring that water users receive the appropriate economic and environmental message through full cost pricing. Measures which reduce demand such as the use of water efficient technology should be given the same consideration, in future planning, as measures to increase supply.

About one quarter of Ontarians rely on wells for their water. As population and development increase, the pressures on the aquifers will increase. The adoption of cost-effective efficiency measures can extend water supplies as users can enjoy the same level of service while using significantly less water.

5. Individual water users should pay in the water bill all of the costs Of delivered water And treated wastewater.

To prevent overuse and abuse, water prices for both delivering water and treating wastewater should incorporate all environmental and social costs. They should include all costs associated with treating raw water, the cost of infrastructure including capital and replacement, the costs of administration and the costs of cleaning up the resulting wastewater to fully meet environmental standards. They should also include the costs of remediation of environmental impacts on aquatic ecosystems - e.g. replenishment of groundwater, flows to streams, etc. In addition, water users demanding water in peak periods of the day or year should be charged the extra cost of providing the infrastructure to meet this need. Requiring water users to pay, in their water bill, all of the costs of delivered water and treated wastewater is a powerful tool for promoting efficient water use.

6. Revenues from water and wastewater charges should be dedicated to maintaining and upgrading the water and wastewater systems respectively.

Water and sewer charges should only cover the costs of these systems and not become a "cash cow" to finance other municipal expenditures. If water and sewer charges are raised above the cost of providing these services, then the municipality will be punishing all water users, especially large water users. The results could be a loss of industrial competitiveness.

7. The social costs associated with implementing water efficiency measures should be distributed equitably.

Currently, water prices in Ontario do not reflect full cost accounting principles. Provincial grants to construct and operate municipal systems are

not recovered through water rates, nor are the administrative costs of provincially owned and/or operated water or sewer systems included in the water price. In addition, some municipalities recover a portion of their operating costs from taxes. Lastly many systems may not be setting aside sufficient financial resources to fully maintain their infrastructure.

As utilities move to full cost pricing, water prices may rise as costs which were previously paid for by taxes, or some other way, are shifted to the price of water. People on fixed incomes, smaller municipalities, and northern Ontario communities, where construction costs are high, will be most adversely affected. Some strategies will have to be developed to ensure that the impacts of water efficient strategies are shared equitably.

8. If a subsidy is to be provided, then incomes/taxes rather than water charges should be subsidized.

Social equity has been provided in the past by making water infrastructure grants to small municipalities or by offering low rates to big water users. This results in some water wastage in the sense that water users may be paying less than the full cost of water. Accordingly, they may use more than if all the costs were incorporated. In order to achieve full cost pricing on water, it is recommended that assistance be provided in some way other than providing cheap water. This could be a municipal tax rebate or an income subsidy which would achieve social equity without encouraging "wasteful" water use. Small muncipalities, water and wastewater infrastructures should not be subsidized directly, but through general transfers.

9. Governments, institutions and public agencies should show leadership by being efficient water users, by promoting efficient water use and by managing wastewater generation.

Government and other large organizations must lead with the implementation of water efficiency. If savings are possible, then governments and other large organizations can realize them just as easily as the public. These early initiatives will be pilot tests of the technical feasibility and highlight the economics and the environmental impacts of water efficient technologies. Governments and public agencies should then publicize these early pilots to promote water efficient measures and practices among the general public and the private sector. Measures that will reduce wastewater generation, including prevention of the infiltration of clean water into wastewater collectors, are also important.

Special attention should be given to carrying out these demonstrations in areas that will be visible to the public - i.e. washrooms near public reception areas of city hall or gardens along a road or sidewalk with heavy traffic volumes. Governments, public agencies, institutions and corporations must lead, for example, by adopting water efficient purchasing policies.

10. The public should be informed about water use and be consulted in water management decision making.

Ontario's nine million plus residents are among the prime actors accounting for Ontario's high water use. If this situation is to be altered, then the attitudes and water use behaviour of users will have to undergo a major change. Undertaking a public awareness program is a key part of this change strategy. This is all the more important if new legislation or full cost pricing is to be introduced. It can be anticipated that public concerns will occur if legislation or regulations appear to be unjust or if water rate increases are seen as merely another form of tax. Public discussion and debate can defuse this and serve to channel water user behaviour into more efficient and sustainable practices.

The public should also be consulted when water management concerns are being addressed. The consultation process is highly educational and will lead to increased dialogue between professional water managers and the public. The aim is to motivate water users to accept responsibility for their water use.

Draft Supporting Goals

The following supporting goals were proposed by one or more discussion groups. They are listed in no particular order. The actions listed for achieving the goal are in the early stages of development. More work will be done on them by workshop participants. It is expected that they will be implemented over a period of years.

A. To provide economic incentives that foster efficient water use.

Water consumers in Ontario are currently being provided with incentives to use more and more water. About 33 per cent of Ontario households and 26 per cent of the commercial users are paying a flat rate for water meaning that they pay the same annual water bill regardless of the amount of water that is used. Consequently, it is not uncommon to see the owners of residences on a flat rate system operate their lawn sprinklers all night throughout the summer. Another 34 per cent of households and 43 per cent of commercial users are on a rate system in which each litre of water becomes cheaper, as more and more is used. Thus, about three quarters of Ontario's water users are receiving the message that water is limitless. There are other features of the current pricing system which encourage heavy water use. Taxes are used to cover wastewater costs in some municipalities and the province pays grants to municipalities out of general provincial tax revenue to cover the costs of water and wastewater infrastructure construction. Consequently, many consumers never see the real cost of providing and treating wastewater. In addition, to these examples, there are more subtle ways in which all of the costs of providing water are not recovered. For example, the province does not apply any charge for water management. This is covered out of taxes. Utilities do not apply extra charges for the provision of water during peak periods for users such as lawn watering. Water used for lawns currently is charged at the same rate as any other time of the year in spite of the fact that purification plants are sized primarily to accommodate summer demand. This additional capacity represents a cost to the utility that is currently charged to all users rather than to those who are lawn waterers.

If water users are to see the true cost of using water and treating wastewater, then the pricing structure must be changed. People should be charged in accordance with the costs that their demand for water places upon the system.

Actions which will provide economic incentives for efficient use

- Implement metering for all municipal water users
- Implement full cost pricing - including the cost of environmental clean-up, the supply costs, infrastructure costs, the cost of environmental inspections and the cost of issuing permits
- Eliminate flat rates and decreasing block rates
- Implement increasing block rates
- Eliminate grants and subsidies
- Ensure that water/wastewater revenues are dedicated to expenditures on water/wastewater systems
- Separate sewer charges from the property tax - property taxes to be reduced to reflect this
- Encourage municipalities to monitor effluent discharges for quantity/quality and to ensure full cost recovery for treatment - adopt the polluter pays principle
- Implement a fee for the use of raw water
- Implement peak flow demand controls
- Subsidize incomes for financial assistance, not water bills
- Provide a block of low cost water to meet people's basic living requirements
- Adopt a utility style of management - look at both water and wastewater systems when carrying out a cost/benefit analyses
- Promote a water efficiency credit/quota system for development
- Provide incentives to water users to exceed the by-law requirements for indirect discharge
- Devise strategies for reducing peak demand, i.e. pricing structure

B. To promote efficient Water use among all water users by informing and consulting them

Most Ontarians probably take their water supplies for granted unless they are the exception and live in a municipality such

as the Region of Waterloo which has faced tight supplies in the past, or if they rely upon a shallow well which runs dry in a drought year. The major public concern in Ontario relates to water quality. Is the water safe for me and my family to drink? Most people probably assume that their water use is reasonable and is part of the Ontario way of life. People do not make a connection between the wastewater going down the drain and the quality of their drinking water.

There is a need to make the public more aware of the way in which individual homeowners, businesses, industries or farms affect the quantity and quality of available water. It will be important to involve young people in this awareness process and to begin educational programs in schools. There is also a need to inform individual homeowners and business operators and encourage them to become more efficient. Water audits should be done to highlight areas, in homes or businesses, where water is used and to provide a comparison of water use with similar situations elsewhere in Ontario or in the U.S.A. The audits should be followed up with demonstrations which would show what can be achieved if water efficiency measures are undertaken. The demonstrations should be monitored and publicized.

Actions to inform and consult water users

. Developing and distributing education programs for use in schools/ Conservation Authorities, etc.

. Instituting a comprehensive public information and awareness program to promote wise water use which will include the following program elements:

  . a core message tying water efficiency to environmental improvement such as reduction in the cost of infrastructure and improvement to water quality especially groundwater

  . target the need for wise water use in peak periods, i.e. provide information about water rates, good water use habits and money savings

  . promote water efficient technology, promote drought resistant plants, document benefits of user pay

  . advocate the availability of Ontario's resources as an attraction to industries and tourists.

. The program is to be implemented by creating partnership involving industry, the public, government and associations of water users. It is to be delivered by utilizing bulletins, presentations, multi-media programs, public service announcements and educational materials targeted by major employers at employees. Funding could be provided by apportioning a percentage of water bill revenue to the awareness program.

. Providing technical support, demonstrations and water audits to promote wise water use in industrial, commercial and institutional operations by gathering/documenting and disseminating case studies in the recycling and re-use of water (i.e. recycle washwater, utilize counter current cooling)

. undertaking demonstration projects

. training industrial, commercial institutions and utilities staff to be more aware of the need for wise water use, and methodologies for achieving it, i.e. water audits.

. fostering the development of a well informed government workforce on the issues of water efficiency.

C. To establish a research and development program that will make Ontario a leader in water efficient technology and management

Water and wastewater management in Ontario is a major industry with annual expenditures totalling around $2 billion per year. A portion of this expenditure is on research and development. Much water efficient technology exists in the U.S. and Europe that can be applied in Ontario. However, if Ontario is to maintain its fair share of jobs in this industry, then it will be desirable to build expertise in the design, development and manufacturing of water efficient technologies.

If Ontario offers incentives that encourage efficient use and establishes codes to compel the

Supporting Goals/Actions continued

use of certain water efficient products, then a very substantial demand for water efficient technology and management approaches will be created within the province. This represents an opportunity for manufacturing and management companies to establish a presence in the market.

Actions which will establish R&D and make Ontario a leader in water efficient technology and management

- Review and compile a listing of research work performed and technology developed elsewhere which could be used by governments, universities and industries in Ontario
- Government to form partnerships with industry in which governments coordinate research and development in innovative technology while industry finances and develops the products
- Incentive programs should be established to research, and develop new water efficient technologies
- University based research and development should be promoted
- A provincial centre of excellence for water efficiency should be created.
- Research and development should be undertaken to improve water quality and increase water efficiency in a number of areas including:
  - remediation of groundwater
  - alternative processes to septic systems
  - operations audits
  - integration of systems
- Encourage the manufacture of water efficient technologies/devices in Ontario.

D. To develop and monitor water efficiency targets based on a sound database that will ensure sustainable water supplies

Ontario possesses a lot of water. It shares jurisdiction with the U.S. over four of the five Great Lakes which account for 18 per cent of the world's freshwater resources. Moreover, Ontario has 228,000 other lakes. However, this apparent bounty is somewhat misleading. All but 1 per cent of the Great Lakes is fossil water. Only 1 per cent is renewable and available for use on a sustainable basis. More than one half of Ontario's runoff flows to the James Bay through areas of the Province which have only a very small population. The areas of the Province where most of the people live, have what might be characterized as reasonable amounts of water.

Ontario's per capita water use is about 300 litres/capita/day which is just below U.S. figures and much above European numbers. Demand for municipal water could rise by 25-40 per cent over the next 20 years.

Beyond these few tentative statistics, there is an absence of data concerning many features of water use including the relative efficiency of various classes of users as well as the availability of water supplies in many areas of the province. If Ontario's water use is to be made more efficient and if supplies are to be sustained for future generations, then a database will have to be established. Moreover, periodic measurements will have to be made to determine if Ontario's water use is becoming more efficient and its supplies are sustainable.

Actions to develop a sound database

- Development of a base for establishing measurable efficiency targets in different parts of Ontario and different types of industry.
- Establishment of a database concerning the efficiency of water and wastewater systems, i.e. water in-water out unit cost, quality in-quality out, etc.
- Provision of data concerning customer water use, customer types, use by month, etc.
- Collection of data showing progress toward the conservation goals.

E. To set standards, adopt regulations and establish legislation that will promote efficiency in water use

The Province has preeminence in the area of establishing plumbing codes. However, there are no explicit standards, regulations or legislation regarding water efficiency in Ontario. The use characteristics are determined primarily by the industry which manufactures fixtures in the U.S. and Canada. Toilets, for example historically used about 20-30 litres per flush. Ten years ago, U.S. legislation mandated the use of 13 litre per flush toilets in new construction. During the past five years, 11 states have mandated the use of 6 litre per flush

toilets. As these changes have occurred, these fixtures find their way into Ontario. Recently, the federal Government specified that toilets must use 6 litres of water per flush or less in order to qualify for the Eco Logo. This is intended as a guide to consumers.

Setting standards, adopting regulations and establishing legislation has a number of benefits. First, it ensures that purchasers of new premises will have access to water efficient fixtures. Fixtures in new premises are provided by the builder. Since the builder does not plan to occupy the premises the builder will consider only the first cost of the fixture. Very low cost fixtures, in today's market, will not be water efficient. Secondly, the code creates a market for Ontario manufacturers to produce water efficient product lines which they may be able to export.

In summary, setting standards, adopting regulations and establishing legislation are important components of a water efficiency strategy.

Actions to set standards, adopt regulations and establish legislation

- Implement a water efficient plumbing code
- Create a water efficiency testing agency
- Set standards for the manufacture of water efficient products (Eco Logo) toilets, taps, dishwashers, clothes washers
- Develop a strategy to resolve water use conflicts
- Minimize the amount of once through use of water, i.e. use of water for cooling where it is discharged into a sewer system leading to a wastewater treatment plant.
- Identify and minimize unaccounted for water.
- Develop water use by-laws.

F. To control pollution so as to enhance and preserve water quality

Population growth, urban development, industrial and agricultural practices and old waste dump leachate pose a continued threat to the maintenance of water quality.

This threat comes in the form of biological and chemical contamination. Since the 1970s, when water pollution emerged as a public issue, millions of dollars have been spent on nutrient removal and conventional pollution clean up. However, we have a long way to go. By the year 2011, municipal water use will increase 25-40 per cent unless water efficient strategies are adopted and this will all return as wastewater. Many of Ontario's wastewater plants now fail to comply with current standards. More than 100 municipal sewage systems contain significant sections of combined sanitary and storm sewers meaning that during rainstorms, raw sewage is diverted to a nearby waterbody.

A water efficiency strategy has a key role to play in enhancing and preserving water quality. By improving customer service without increasing wastewater flows, utilities will be better able to focus on achieving present and future pollution cleanup targets. Full cost pricing could provide the necessary financial resources.

Actions to Control Pollution

- Develop and enforce by-laws to control discharge of pollution into municipal sewer systems
- Regulate and enforce pollutant discharges to all waterways, including groundwater systems
- Pollution prevention at the source
- best management practices
- zero discharge of selected toxics
- Ensure quality of private sewage disposal systems
- implement improved technologies for sewage systems
- better inspection and enforcement

- Streamline the process for upgrading water and sewage treatment and pumping facilities i.e.

  - do environmental impact statements only, exempting facilities from being subjected to a full environmental assessment study under the "Environmental Assessment Act"
  - speed up the EA process for such facilities
  - have an EA for a total water and sewage master plan, allowing future expansion within the plan to proceed without further EA review

- Develop watershed based stormwater management systems:

. each water source should be developed and managed with careful attention to the hydrologic and ecologic systems of which the particular source is a part. Careful attention should be given to management practices that enhance base flow i.e. landscaping to reduce stormwater runoff, impoundments to improve quality, etc.

G. To work with self supplied water users and wastewater treaters (farmers, cottagers, rural residents and industries) so that they will become water efficient

About one quarter of all Ontario residents supply their own water, usually from wells. They are the closest to paying full cost for their water as they pay for it themselves without the benefit of provincial grants. Accordingly, as a group they have an interest in water efficiency as it will assist them to manage their water costs and protect their sources of supply.

Actions to help self supplied users become water efficient

. Implement good water management practices among self-supplied users
. Treat self-suppliers as we do other users of water and apply the same strategies to them
. Communicate the goals and objectives of the Provincial water efficiency strategy including financial commitments and time frames to all water users.

H. To coordinate water management including water efficiency policies and programs

A clearinghouse will be needed to coordinate water management including a water efficiency program. It will promote water efficiency through public information programs, provide direction concerning major policy issues (full cost pricing, rate structures, water and sewer rates) and it would compile and share information about studies and demonstrations carried out within Ontario and elsewhere. It will also convene workshops involving practitioners of water efficiency. And, it will promote and report progress towards the achievement of provincial water efficiency targets.

Actions to promote water management coordination

. There should be a "water management/ conservation" coordinating agency in Ontario.
. Create from existing staff resources - municipalities.

Water Efficiency Strategy Advisory Group

Purpose

An Advisory Group added a steering element to manage the process. It broadens the ownership of the process and increase the number of people at workshop events who can monitor reactions and help support the project. The Group also acts as a sounding board for the Ministry and allied ministries as it will reflect major viewpoints and offer sound water advice.

Procedures

The Group is composed of eleven individuals representing a number of groups interested in water management. It will meet five times - before and after the first meeting and after each subsequent meeting to review documents being considered and/or documents which reflect the deliberations of the meeting. The Advisory Group is chaired by David Balsillie, Assistant Deputy Minister of the Policy Division, Ministry of Natural Resources (MNR).

Duties

1. To provide advice to the government on the process and content of the stakeholder involvement process. This will involve vetting resource materials or proposals before implementation/introduction.

2. To monitor the progress and effectiveness of water efficiency strategy development process.

3. To offer advice on the content of the water efficient strategy at various stages in its development.

Members Appointed

The following people sit on the Advisory Group:

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Water Resources Branch
Ministry of the Environment
Toronto, Ontario

Mr. Leo Calderone
Director of Plant and Engineering
The Sheraton Centre Hotel and Towers
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Mr. Rick Coronado
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Mr. Brad Erhardt
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J.M. Schneider Inc.
Kitchener, Ontario

Mr. Glenn D. Harrington, OALA
Principal
Harrington and Hoyle Ltd.
Landscape Architects
Markham, Ontario

Mr. Ross Irwin
Box 1263
Guelph, Ontario

Ms. Maureen McCauley
Land Group, Bramalea Ltd.
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Mr. James MacLaren
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Mr. M. G. Thorne, P. Eng.
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The Municipality of Metropolitan Toronto
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Workshop Participants

The workshop participants represented approximately 95 individuals and organizations. A check mark indicates those who were able to attend the 1st and/or 2nd and/or 3rd workshops:

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- ✔ Natural Resources (Lead Ministry)
- ✔ Agriculture and Food
- • Education
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- ✔ Environment
- ✔ Government Services
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- ✔ Canadian Water Resources Association
- ✔ Canadian Water and Wastewater Association
- • Chiefs of Ontario
- • Christian Farmers Federation of Ontario
- ✔ City of Etobicoke
- ✔ City of Guelph
- ✔ City of London
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Workshop Coordinators

The Lands & Water Policy Branch of the Ministry of Natural Resources, on behalf of 11 sponsoring ministries and one provincial agency is coordinating this process to develop a Water Efficiency Strategy. If you have any questions, please contact any of the following individuals:

- Ken Sharratt
  Manager, Water Policy

- Bill Wardle
  Coordinator, Water Efficiency Strategy

- George Fiotakis
  Research Coordinator
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All three individuals can be reached at the following:

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Comment Sheet

We invite your comments. This sheet is intended to help you prepare your comments. Please tear it off and return it to the address on the last page.

Ontario's Current and Future Water Uses – pages 4 - 8. (Is this clear?)

Issues (Have some been missed?)

Draft Long Term Goal – pages 16 -17. (Is this appropriate?)

Draft Guiding Principles – pages 17 - 19. (Should there be any more?) (Are they clear?)

Comment Sheet

Draft Supporting Goals/Actions – pages 20 - 24. (Are these clear?)

General Comments: (Is there anything that you did not understand?) (Is there a question that is not answered?)

Your name: _____

Organization: (if you are commenting on behalf of an organization) _____

Address: _____

Postal Code: _____

Do you wish to receive a copy of the final report? Yes _____ No _____

Return to :
Ken Sharratt
Water Efficiency Strategy for Ontario
Room 5620, Whitney Block, Ministry of Natural Resources
Queen's Park, Toronto, Ontario, M7A 1W3