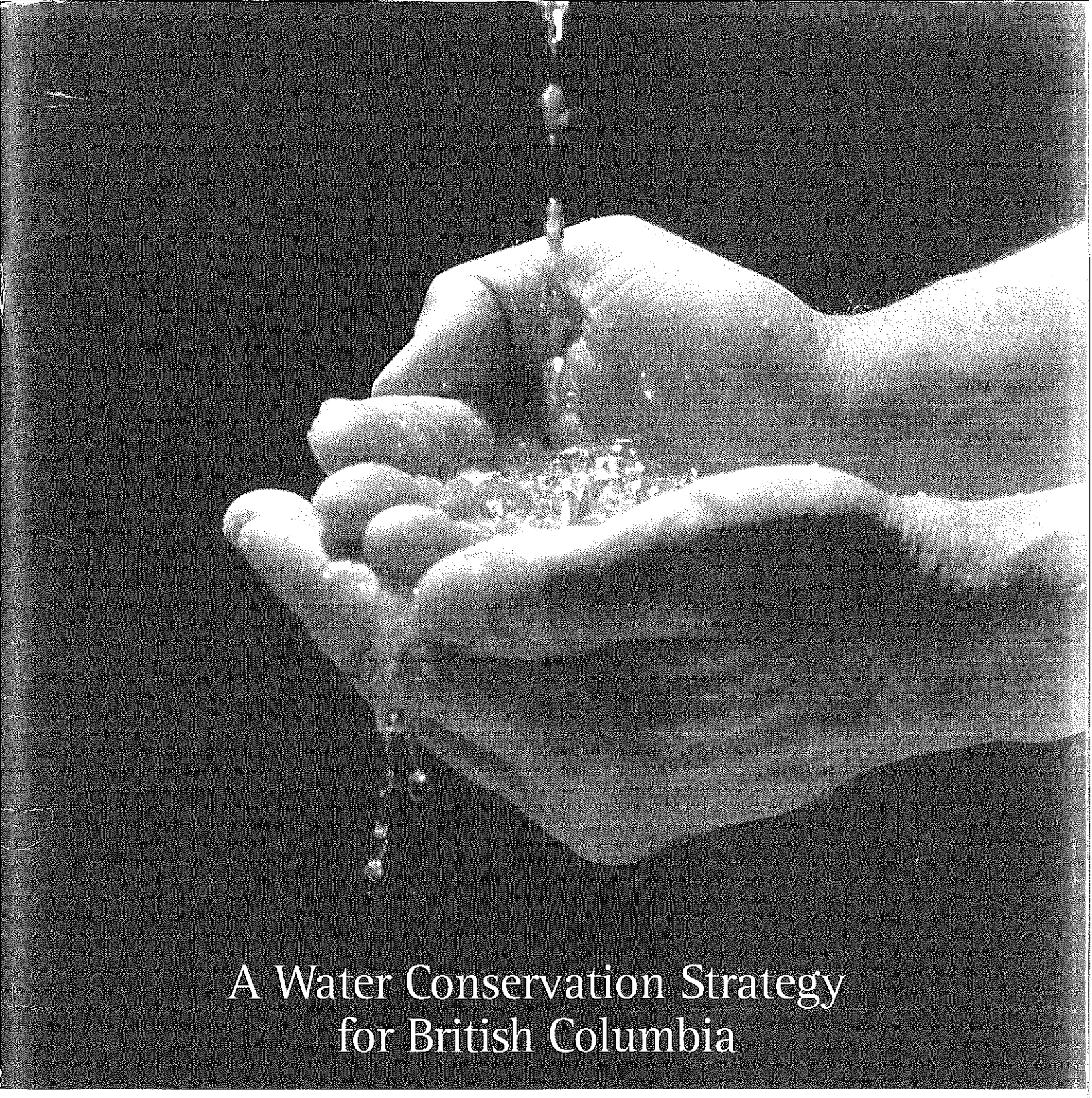

A Water Conservation Strategy for British Columbia

An Interagency Working Group Report to the Water Management Branch
Ministry of Environment, Lands and Parks

WATER BC our vital resource

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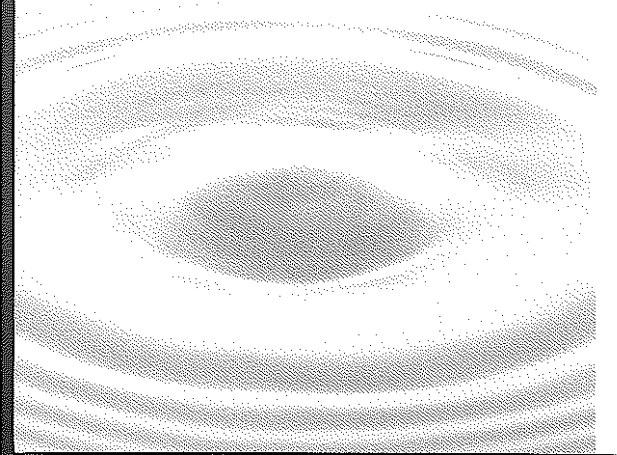

A Water Conservation Strategy for British Columbia

SEPTEMBER 1998

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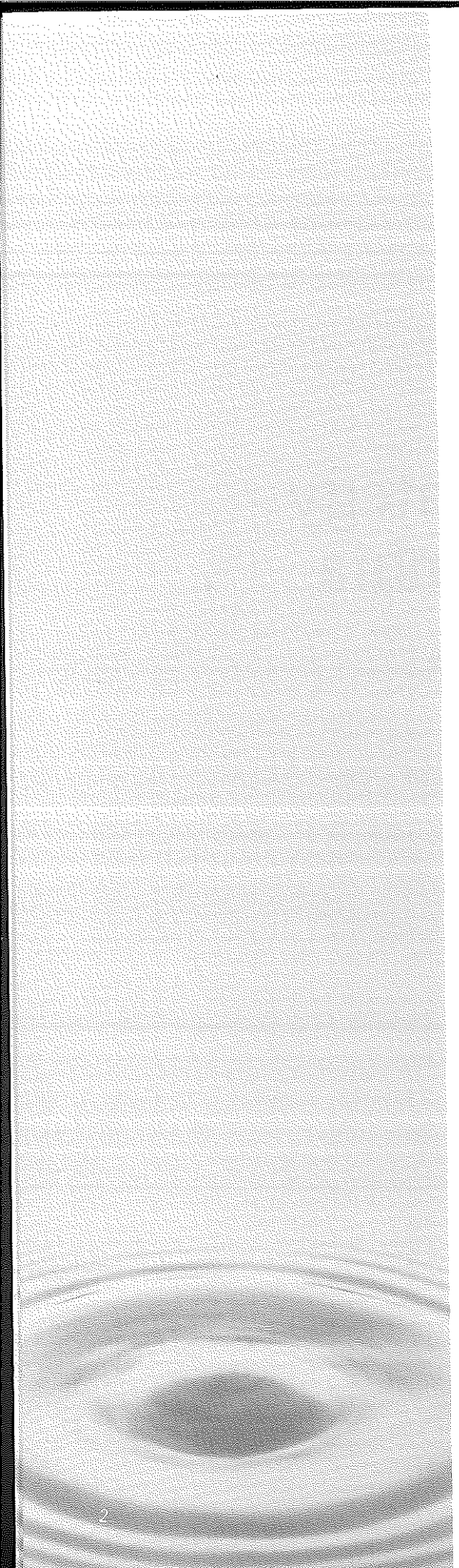
The Water Conservation Strategy Working Group was supported by Ministry of Environment, Lands and Parks staff members Bob Brown, Miranda Griffith, and Kim Walker.

The Working Group gratefully acknowledges Bill Berry (City of Kelowna) for leading the water conservation strategy workshop at the 1997 BCWWA seminar "The Logical Link." The Working Group would also like to acknowledge the BCWWA Water Use Efficiency Committee for their valuable contribution.



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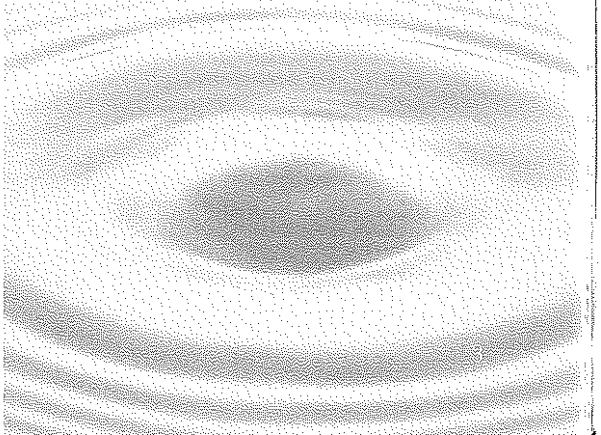
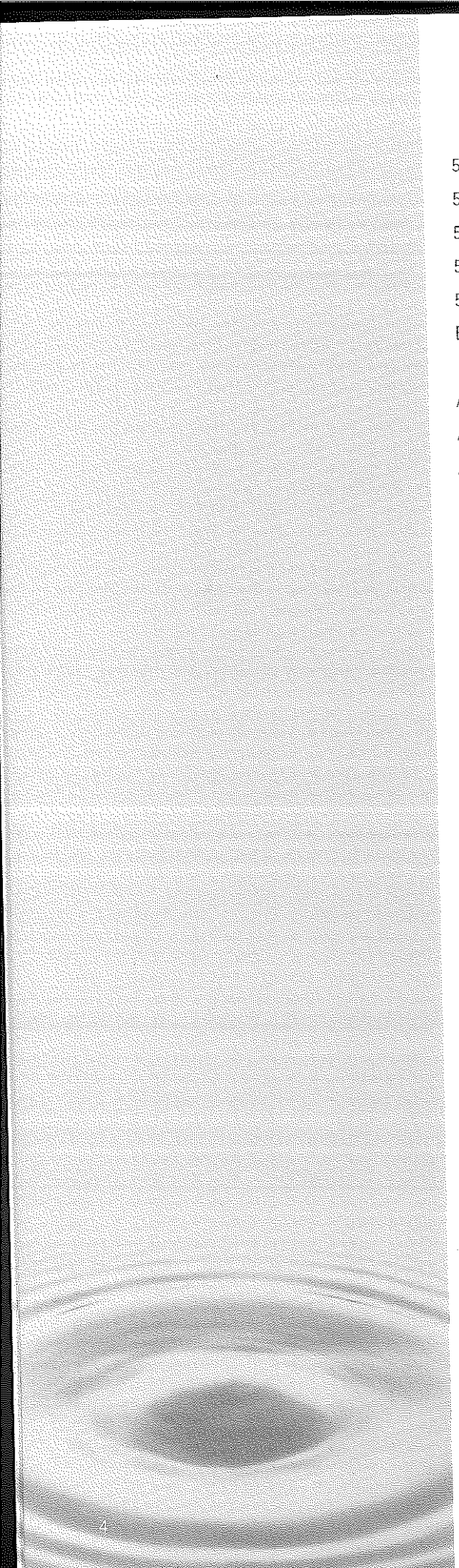




EXECUTIVE SUMMARY

British Columbia is on its way to becoming a water-use efficient province. In a recent survey of regional districts, municipalities and improvement districts, 76% out of 127 respondents have already developed, or are in the process of creating water use efficiency programs. Local governments and utilities are engaged in a wide variety of water-use efficient programs such as watering restrictions, media announcements, fixture replacement programs, metering systems and water efficient irrigation.

Despite these efforts, over 17% of our surface water sources have reached, or are nearing, their capacity to reliably supply water. Groundwater levels in some regions are declining and over one-third of our aquifers are vulnerable to contamination. While the water supply situation is not a serious problem for many communities, these figures tell us that the availability of a healthy, sustainable and plentiful water resource can no longer be presumed.

The *Water Conservation Strategy for British Columbia* points to the need for a more co-ordinated, province-wide approach to water use management to ensure the most efficient use of our resource. Initiated in the fall of 1997 by the Ministry of Environment, Lands and Parks, the *Water Conservation Strategy for British Columbia* was developed through a working group comprised of federal, provincial and local government representatives; water utilities and managers; professional associations and special water use interest groups.

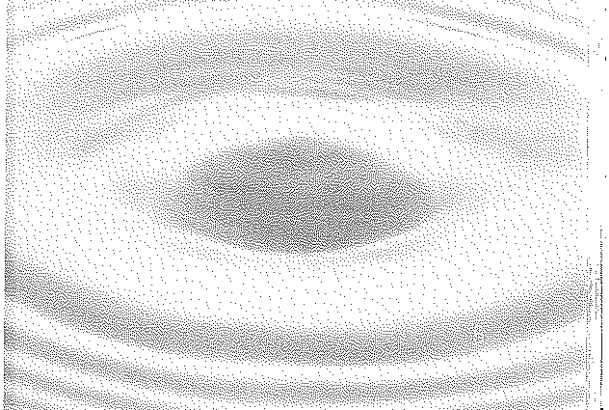
The Strategy promotes our water as a highly valuable resource and provides a framework to guide and encourage efficient and cost-effective water use throughout the province.

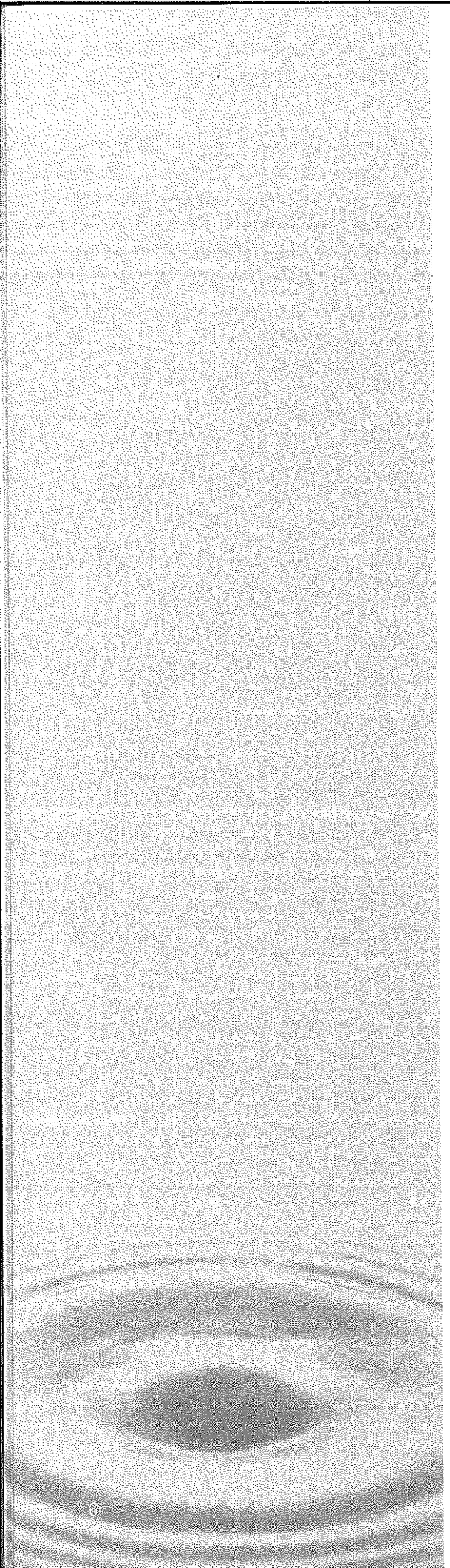
Local Actions

The Strategy offers a general framework and menu of water use efficiency tools from which to begin assessing water supply and demand management needs. The Strategy encourages the selection and implementation of these tools to customize a water supply management plan to local areas and circumstances. These tools include:

- **Regulatory tools** - to reduce institutional, legal or economic barriers or to establish barriers against unnecessary waste;
- **Economic and financial tools** - to reinforce the value of water and motivate people to reduce excessive water use;
- **Operations and maintenance tools** -to reduce leakage and improve efficiency of fixtures and processes;

British Columbia is on its way to becoming a water-use efficient province.





- **Market development tools** -to increase the development and availability of water efficient products.

Strategic Directions

The Water Conservation Strategy identifies 10 strategic directions aimed at minimizing barriers to actions and encouraging a broader understanding and adoption of water use efficiency actions. Under each strategic direction, specific actions have been recommended to move us closer toward water-use efficiency in the province of BC. While provincial agencies and associations are being called upon to lead in implementing the Strategy, many strategic actions are directed at the local level, to enhance benefits gained from initiatives already taken.

Strategic Actions to Enable and Regulate:

- place a high priority on enabling local governments to require water conservation measures;
- consider ways to improve provincial review processes and policies; and
- provide direction toward updating building and plumbing codes.

Strategic Actions to Plan, Manage and Evaluate:

- encourage full consideration of water use efficiency in long-term comprehensive water supply planning; and
- support the development of industrial standards and guidelines for landscaping and irrigation.

Strategic Actions to Value and Motivate:

- promote the review of pricing structures; and
- support the development of financial incentives for municipalities, water purveyors and water users.

Strategic Actions to Communicate and Educate:

- reinforce the importance of existing education programs and encourages program enhancement; and
- provide the direction to develop seminars, workshops and guidebooks.

Strategic Actions to Encourage Market Development and Innovation:

- provide direction on exploring options, collaborating and encouraging innovation.

Implementation

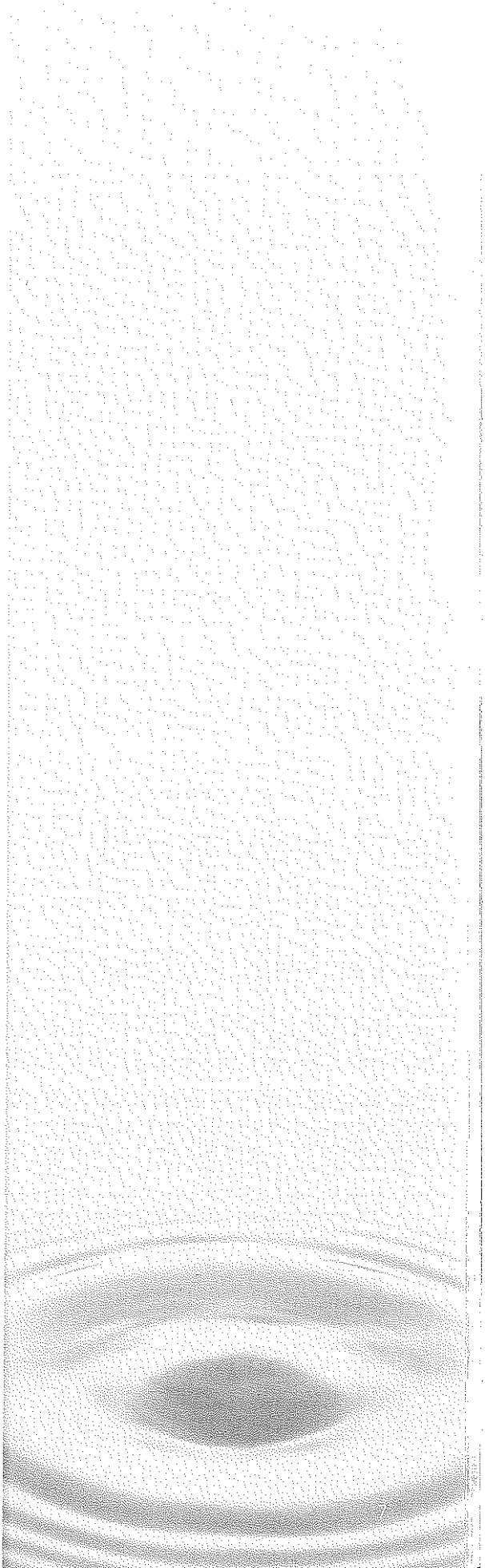
It is important to recognize that BC is in a transition period with regard to its water resource. Population growth and economic development in the province dictate a new outlook on our use of water. The *Water Conservation Strategy of British Columbia* is a living document which has been designed to allow flexibility and adjustment over time as priorities change.

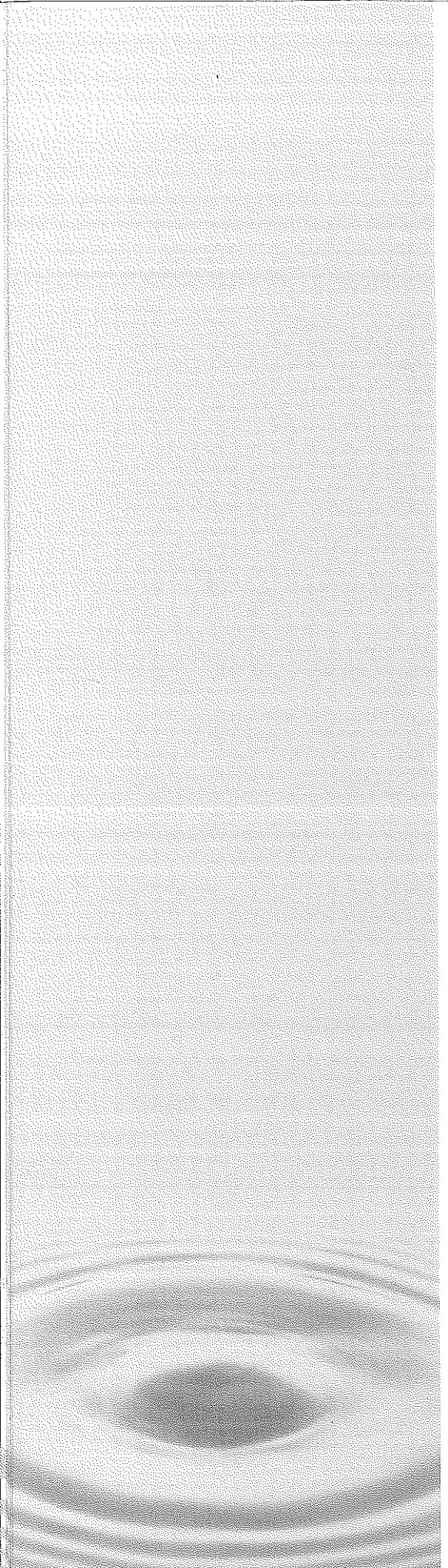
The initial implementation plan will be developed this fall and delivered over the next two to three years. The first step to implementation of the Strategy will be to discuss principles, directions and actions with water managers, decision makers and water users.

Working in partnership will be essential to the successful implementation of the Strategy. Partnerships will be developed among key agencies to carry out strategic directions that require collaboration. A water use efficiency committee representing the range of interests will continue to provide strong leadership and coordinate efforts.

Some areas throughout the province will require more attention to water use efficiency measures than others. At the local level, one sector or type of water use may also require special attention. These key areas will be prioritized by the appropriate agencies.

Ongoing evaluation and reporting will be essential to share information, document accomplishments, lessons learned, and ensure accountability.





1.0
A Water Conservation Strategy for British Columbia

1.1 Introduction

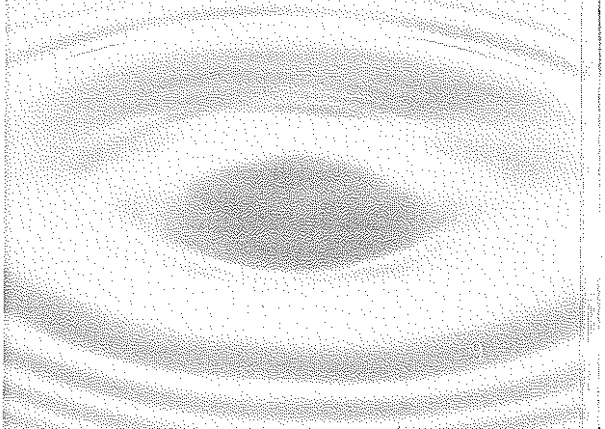
Overall, British Columbians enjoy reliable sources of water. More than 24,000 rivers, creeks and lakes provide water for use in homes, farms, and industries as well as for power generation. Groundwater aquifers are also an important source of water for over 600,000 people around the province.

Despite the apparent abundance of water in BC, our water supply is not as plentiful as we would like to think. Over 17% of our surface water sources have reached, or are nearing, their capacity to reliably supply water for extractive uses. Long-term trends of observation wells indicate that groundwater levels are declining in some areas of the province and over one-third of our aquifers are vulnerable to contamination. While the water supply situation is not a serious problem for many communities, these figures tell us that the availability of a healthy, sustainable and plentiful water resource can no longer be presumed.

Many factors including climate, population growth, water quality and infrastructure costs have an effect on the availability and reliability of our water supply. Extractive water uses also have an effect on fish and aquatic habitats as well as water recreation and transportation uses. To ensure sufficient water for both human and ecological needs, it is imperative that British Columbians move toward a more sustainable and strategic approach to managing water use.

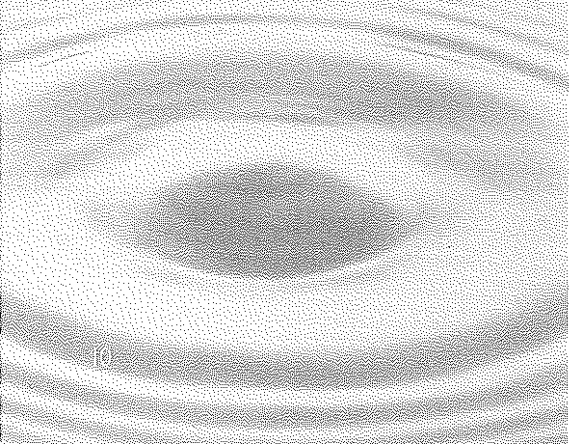
In the fall of 1997, the Ministry of Environment, Lands and Parks initiated the development of a Water Conservation Strategy for British Columbia. The purpose of this Strategy is to ensure sufficient water for all uses through efficient utilization of the resource, and to encourage a more comprehensive approach to managing water supply systems. An interagency working group was formed to develop the Strategy (see the list of Working Group members on page 2 and Terms of Reference in Appendix 1). The Working Group represents federal and provincial agencies; local governments;

Despite the apparent abundance of water in BC, our water supply is not as plentiful as we would like to think.



The objectives of the Strategy are:

- *To demonstrate the need for and benefits of improved water use efficiency measures;*
- *To reinforce the value of British Columbia's water resource;*
- *To present a menu of water use efficiency tools and techniques;*
- *To identify, acknowledge and learn from water use efficiency initiatives in British Columbia;*
- *To guide the development of provincial and local legislation, policies, guidelines and standards to improve water use efficiency;*
- *To engage community leaders, water managers, government agencies, water utilities, suppliers and the public in addressing water supply issues through creative partnerships; and*
- *To recommend next steps for advancing water use efficiency in British Columbia.*



utilities; water managers; professional associations and special water use interests.

The Strategy provides guidance and direction from two perspectives. Provincially, the Strategy recommends joint actions aimed at reducing commonly experienced constraints, creating opportunities, collaborating and sharing resources. Locally, the Strategy offers a general framework and menu of water use efficiency tools from which to begin assessing water supply and demand management needs. This document encourages the selection and implementation of water use efficiency initiatives to match local circumstances.

The *Water Conservation Strategy for British Columbia* has been developed primarily for elected officials, government agencies, water utilities, suppliers and managers, but should also be of interest to all users. As part of long term planning, water use efficiency measures can substantially contribute to:

- accommodating future economic development and population growth;
- reducing or deferring costs of maintaining and expanding water delivery, treatment and disposal systems;
- reducing energy and maintenance costs;
- ensuring sufficient water flow for both in-stream and downstream extractive uses; and
- maintaining riparian habitats and aquatic ecosystems.

British Columbia is already on its way to becoming efficient in its water-use. The Working Group commissioned a survey of regional districts, municipalities and selected irrigation and improvement districts to ascertain the extent of, and experience with water use efficiency initiatives throughout the province. It discovered that 76% of the 127 respondents have already developed, or are in the process of creating water use efficiency programs (see summary in Appendix 2). However, successful implementation of the Water Conservation Strategy will require a province-wide, coordinated and effective commitment with active participation from both the communities and the economic sectors.

This report is the first step toward ongoing actions. It is up to all of us - every user, water authority and supplier – to use our valuable water resource efficiently and responsibly.

1.2 Goals and Objectives

The *Water Conservation Strategy for British Columbia* will contribute to a sustainable and healthy resource by providing a common framework for water management activities throughout the province. It advances water as a valuable resource to be utilized efficiently, wisely and cost-

effectively to sustain a high quality of social, environmental and economic well being, for now and in the future.

The goal of the Strategy is to identify and promote supply and demand-side management measures for use by municipalities, water purveyors, drawers and users throughout the province, while recognizing regional differences.

The objectives of the Strategy are:

- To demonstrate the need for and benefits of improved water use efficiency measures;
- To reinforce the value of British Columbia's water resource;
- To present a menu of water use efficiency tools and techniques;
- To identify, acknowledge and learn from water use efficiency initiatives in British Columbia;
- To guide the development of provincial and local legislation, policies, guidelines and standards to improve water use efficiency;
- To engage community leaders, water managers, government agencies, water utilities, suppliers and the public in addressing water supply issues through creative partnerships; and
- To recommend next steps for advancing water use efficiency in British Columbia.

1.3 Challenges

British Columbia has changed significantly over the past two decades. Increasing demand for water, as a result of population growth and economic development, is altering water levels and aquatic ecosystems. Water quality problems caused by intensive land use further reduce the availability of drinking water. These and other factors combined with aging waterworks and infrastructure are, or soon will be, placing considerable stress on our water supply systems and public expenditures.

What specific challenges and limitations do we currently face?

Availability of water is constrained by biophysical conditions

When we pour a glass of water, we're tapping into the earth's hydrological cycle. Although water is a renewable resource, the time it takes for rivers, lakes, and groundwater aquifers to replenish themselves varies dependent on the source. Climatic and seasonal weather variations also significantly affect water availability from region to region and through time. In British Columbia several groundwater aquifers are nearing water use capacity (Figure 1). These limitations of the natural system to supply and recycle water need to be recognized.

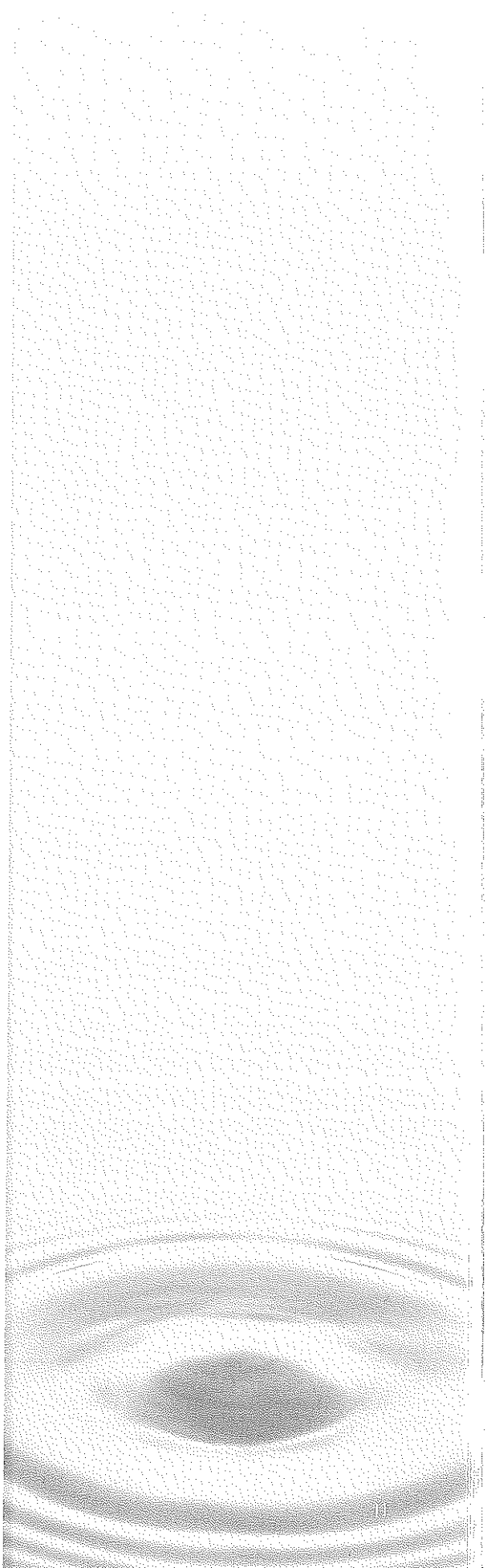
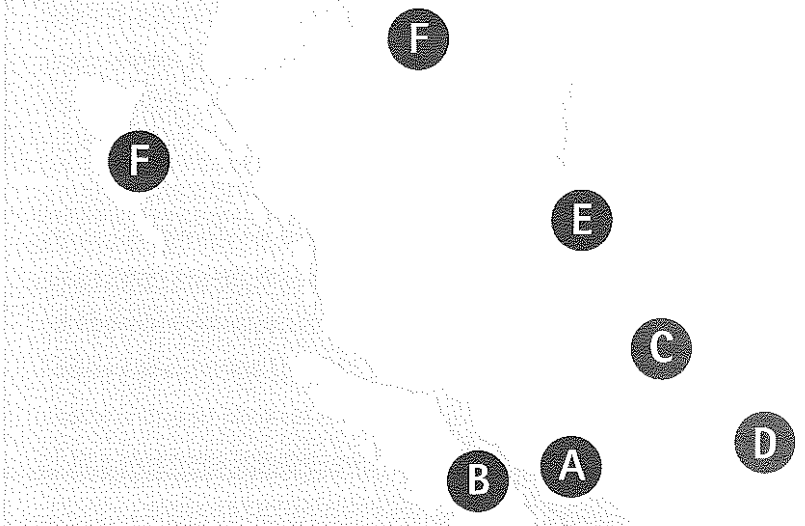


Figure 1: Aquifers in BC with Limited Groundwater Availability



A. In the Lower Mainland 3 Aquifers have quantity issues:
   - Abbotsford/Sumas
   - Hopington
   - NE of White Rock

B. On Vancouver Island 8 Aquifers have quantity issues:
   - Saltspring Island
   - Yellow Point
   - Madrona Point
   - Lantzville
   - Parksville
   - Qualicum
   - Gulf Islands
   - Saanich

C. In the Kamloops area 3 Aquifers have quantity issues:
   - Semlin Ranch/Cache Creek
   - Cherry Creek
   - Salmon River Valley

D. In the Penticton area 7 Aquifers have quantity issues:
   - Marron Valley
   - Summerland (Trout Creek)
   - Kalamalka Lake
   - Meyers Flat/Willowbrook
   - Naramata
   - Bx Creek
   - Spallumcheen

E. In the Williams Lake area 2 Aquifers have quantity issues:
   - Chimney Creek
   - Williams Lake

F. In the Smithers Area 2 Aquifers have quantity issues:
   - Bulkley Valley/Smithers
   - Hardingville, Morseby Island

The availability of water for human uses is also limited by the need to leave water in place to maintain aquatic ecosystems. The more water removed, the less there is to sustain aquatic habitats and to support water-related activities.

The pressure for water is rising

Though water bodies are numerous in British Columbia, only a small number of those are available for water usage. As a result, competing demands for that water are causing water shortages and decreased water quality in some regions of the province (Figure 2).

BC's population is growing by 100,000 persons per year (BC Ministry of Municipal Affairs, 1995) (Figure 3). By the time today's pre-schoolers graduate from high school, British Columbia could have another one million residents living in up to 500,000 new homes and apartments. The additional population will increase demand for water and will continue to put pressure on nearby water sources.

Water rates may not reflect the full costs of supplying water

Water supply and treatment systems are expensive to build, maintain and upgrade. Currently, residential customers in BC pay an average of $250 annually for water (Environment Canada 1996). For individuals wanting to draw water from a waterbody for domestic use, the cost of a surface water licence is currently $19 per year.

The actual costs of supplying water include more than just what a water purveyor or municipality pays to install, maintain and deliver an existing water supply service. In addition to direct water supply costs, there are indirect environmental costs, energy costs, costs accrued by support agencies through funding programs, future development costs, and sewage and water treatment costs. These costs may not be incorporated into retail water charges throughout the province. Related equity issues, such as who pays and who benefits, are increasingly drawing attention to the need to account for these externalized costs.

Future costs for improvement and expansion of services will soon become critical factors as aging infrastructure requires replacement. The 1996 *Report on the State of Municipal Infrastructure in Canada* found that, on average, BC's water distribution and supply systems were the second oldest in the nation, with an average age of 37 years old. This can be compared with the expected life span of 25 years for mechanical systems. Approximately 17% of the total budget authorized under the *Local Government Grants Act* is allocated to assist BC municipalities and regional districts in either the construction or upgrade of

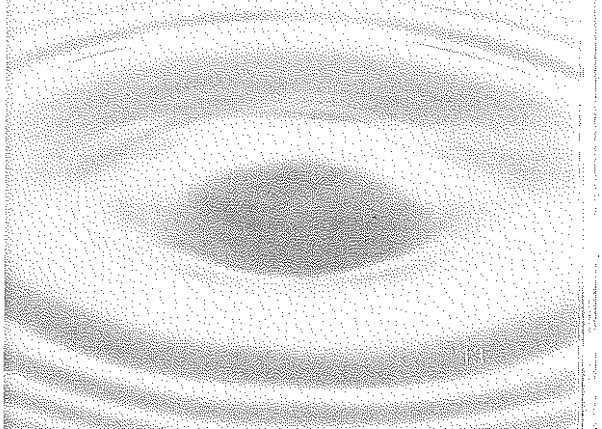
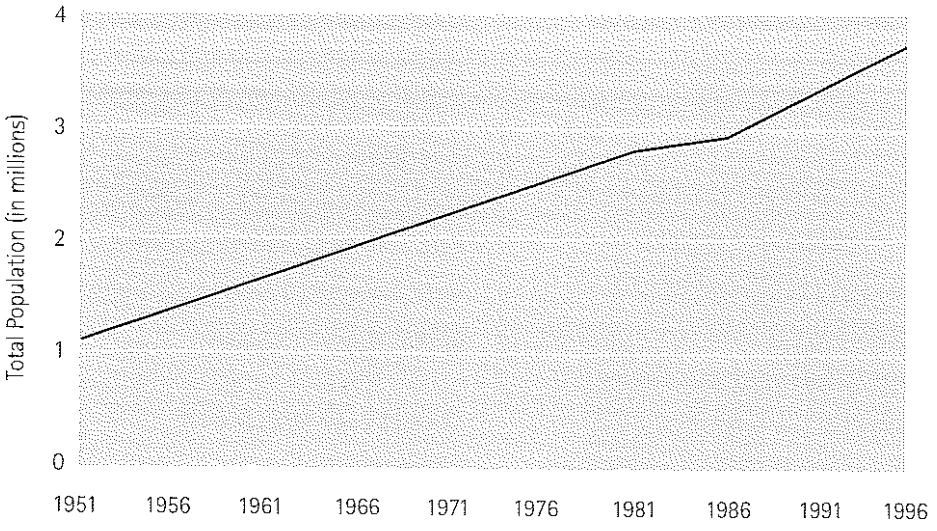


Figure 2: Areas in BC with Limited Surface Water Availability

* This map was prepared using information obtained from the Water Rights Information System (WRIS), held by the Ministry of Environment, Lands and Parks. It depicts the percent of licenced streams in each water precinct which have been designated as "Fully Allocated". The working definition of fully allocated is, "a stream is fully allocated if there is a water shortage at least one in 5 years".

The designation is based on the professional opinion of water managers and is intended only to alert water managers to the POSSIBILITY of water quantity problems when a new a water licence application is received.

Figure 3: B.C.'s Population: 1951 - 1996



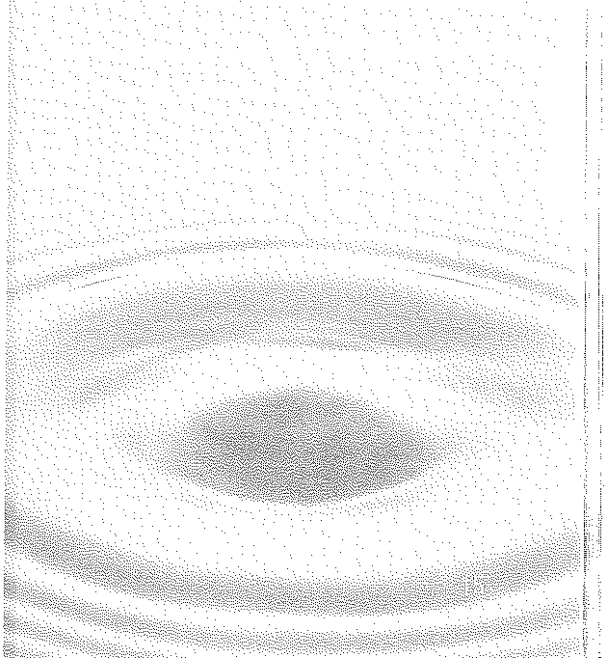
community water or sewer systems. On a per capita basis, together with roads, the maintenance and upgrading of water distribution and sewer systems will require the greatest capital investment.

In addition to aging infrastructure, some communities will be facing substantially higher costs for water treatment systems in the near future. British Columbians have become increasingly vulnerable to illnesses from water-borne diseases. Twenty-seven outbreaks of Toxoplasmosis, Criptosporidium, Giardia and other diseases have occurred in the past 18 years and annual advisories to boil water before using, have become commonplace. Upgrading water treatment and filtration systems to Canadian standards is expected to cost approximately $2 billion province-wide. An additional $1 billion is the anticipated cost to upgrade wastewater systems.

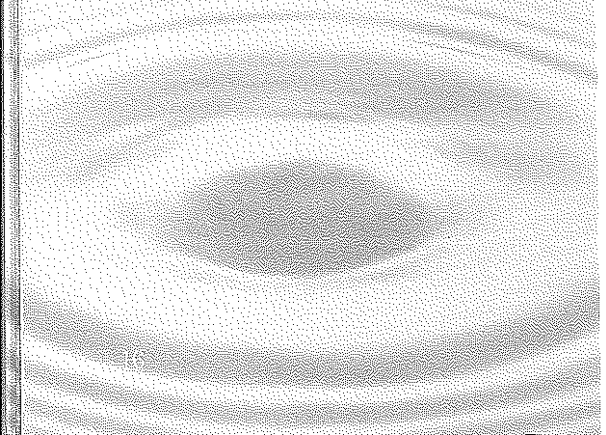
Water supply is a complex business

BC's vast and diverse resources have supported a variety of forms of development. Each type of activity - whether it is natural gas exploration in the northeast, farming in the central interior or residential development in the lower mainland - exerts a unique demand for water. That demand also varies by quantity, quality and timing in each community or watershed.

In the past, water managers did not need to worry about meeting demands. The provincial water allocation and licencing system was developed at a time when there was more than enough water to meet all needs. Similarly, community water systems were developed before



Water is perceived by many to be infinitely plentiful. We turn on the tap and it's there. But water is not infinite.



demand began to exert pressure on water supplies. However, the traditional approach to water allocation and supply is not easily adaptable to today's pressures.

Water use has an effect on social and environmental quality

Water is a basic need. The added benefits of our water resource can be seen in our industries, orchards, street lights and beaches. It contributes to the high quality of life enjoyed by British Columbians. But needless water extraction can have a negative effect on our quality of life. For example, groundwater contributes to base flows for streams and wetlands. When these resources are overused, nearby surface water is also reduced, affecting both people and ecosystems. Conversely, conflicts between water users arise where surface waters are fully licenced in areas with high groundwater use (Figure 4). Water quality can also become degraded when the demand exceeds supply as demonstrated by salt water intrusion into the Gulf Islands and southern Vancouver Island.

In BC, our water licencing system is based on the principle of "first in time, first in right", meaning that a licence holder with an older licence is entitled to draw an allocated quantity of water first. Water licences are often located along a river or stream that is known to run low at certain times of the year. In these places, water use can have a significant effect on both users and habitats located downstream, particularly during dry seasons or at critical life cycle stages for fish. These interconnections within a watershed need to be taken into consideration if social and environmental quality is to be kept at a high standard.

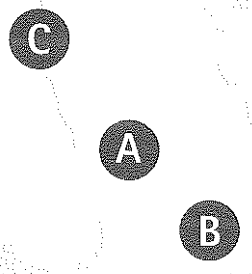
The water still flows and old paradigms persist

Is there a water supply problem? Though most British Columbians consider water an invaluable and essential element for life, that consideration does not inspire conservation. Rather, it reinforces the position that water should be made available at little or no cost to the consumer.

Water is perceived by many to be infinitely plentiful. We turn on the tap and it's there. But water is not infinite. Yet as long as the perception persists that water is plentiful – a perception reinforced by low prices and allowed excessive waste – water will continue to be taken for granted and the benefits of implementing a water use efficiency program will not be readily evident - until there is a crisis.

However, there is a noticeable shift toward a water conservation ethic as witnessed by the number of water use efficiency initiatives adopted by communities throughout BC.

Figure 4: Aquifers in BC with Groundwater Surface Water Conflicts



A. In the Kamloops area 2 Aquifers are experiencing ground-surface water conflicts:
   - Cherry Creek
   - Salmon River Valley

B. In the Penticton area 3 Aquifers are experiencing ground-surface water conflicts:
   - Marron Valley
   - Summerland (Trout Creek)
   - Kalamalka Lake

C. In the Williams Lake area 1 Aquifer is experiencing ground-surface water conflicts:
   - Chimney Creek

2.0 The Basics of Water Conservation

Water conservation: "the socially beneficial reduction of water use or water loss."

Water conservation has had negative connotations for many people because it unintentionally implies hardship and inconvenience associated with rationing. However, water conservation is not simply a matter of using less water through restrictions. It is about careful management of water supply sources, use of water saving technologies, reduction of excessive demand and many other actions.

2.1 Water Conservation Defined

Water conservation is generally defined as: "the socially beneficial reduction of water use or water loss." (Baumann, et al. 1980).

Net social benefit is one of the key concepts of water conservation. Consequently, water conservation implies that:

- water use is optimized over a medium to long term time horizon;
- water resource use and protection are given equal concern;
- external social, environmental and economic effects of water use are taken into account;
- tradeoffs must be conscientiously made to achieve net social benefit;
- social and economic planning are integral to water use management; and
- circumstances and context are important factors.

Reducing water use or water loss is the other main concept of conservation. This implies that:

- more water is used than is needed;
- attention to water demand is as important as water supply; and
- water can be used more efficiently.

"Water conservation" is a term commonly interchanged with "water-use efficiency" in this Strategy. It differs slightly but either way, the benefits of saving water, money, infrastructure, topsoil or fish are benefits that every British Columbian can appreciate.

2.2 Water Management Principles

Water use efficiency is based on a number of principles or premises that dictate management of the resource. Four key principles are identified

below to reinforce the basis for developing a Water Conservation Strategy for BC.

Principle 1:

Water is a Valuable Resource

Water is essential for the health and well being of society, and the environment.

- Acknowledge the intrinsic social and environmental values of water.
- Reflect both the value of water and the costs of supplying, treating and disposing it in water rates and charges.

Principle 2:

Water is a Finite Resource

Water availability is limited by many factors including geographic location, water quality, financial costs, weather and seasonal flows.

- Don't assume there is an endless supply of water.
- Use water efficiently.

Principle 3:

Water is a Renewable Resource

The water we use is part of the hydrological cycle - another user waits downstream.

- Keep it clean.
- One person's wastewater is another person's well. Disposal of wastewater must be treated with caution and respect, given the demands of other water users downstream.

Principle 4:

Water is a Shared Resource

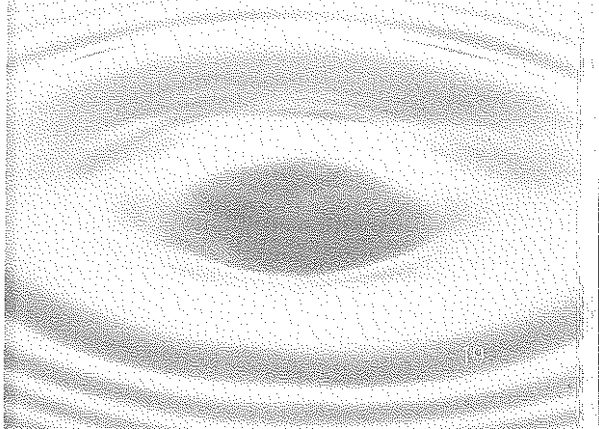
Water sustains life on earth. It is a common resource and it cannot be owned.

- Respect the needs of others, both human and non-human.
- Manage water use for intergenerational needs.

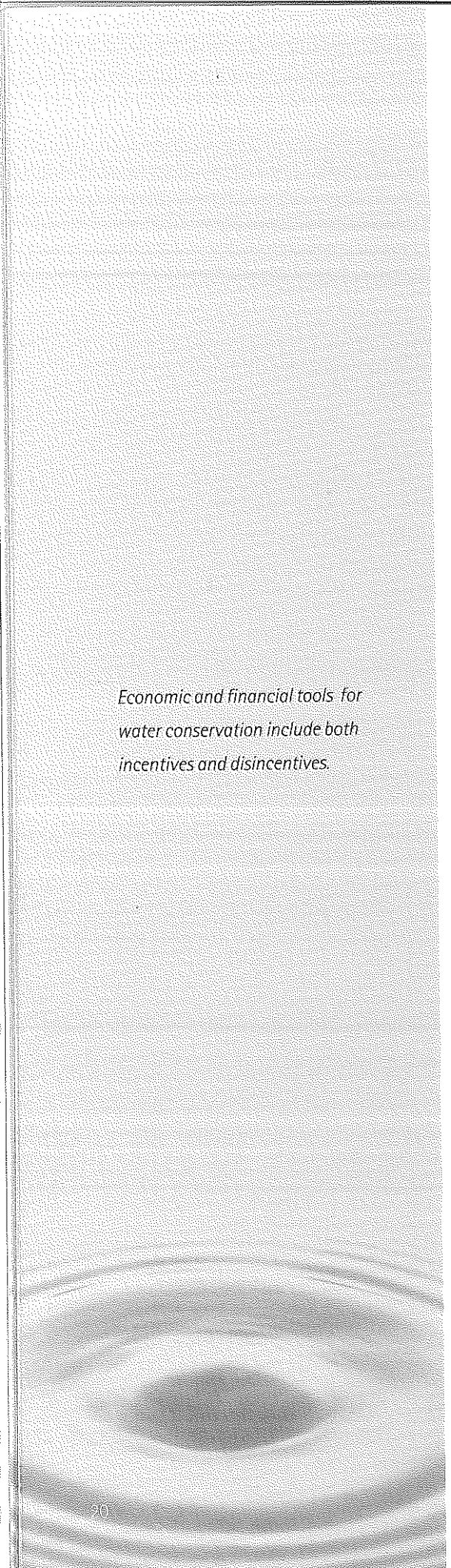
2.3 Water Use Efficiency Tools

There are a wide variety of water use efficiency measures, or tools. A range of tools should be included in any plan or program to complement efforts and address specific needs.

The best mix of tools should be identified and evaluated as part of a comprehensive water supply planning process. Specialists within the fields of water resource management, marketing and communications, social research, public policy, economics and engineering can provide valuable advice on the relative effectiveness of each tool. Readers of this Strategy are encouraged to select and implement those tools which best meet their needs and can be adapted to local circumstances. The following "menu of tools" is presented to demonstrate the variety of tools that have been, or can be developed and used.



Economic and financial tools for water conservation include both incentives and disincentives.



2.3.1 Regulatory Tools

Legal tools include both mandatory and enabling legislation, regulations, policies, standards and guidelines. These can be used to reduce institutional, legal or economic barriers or to establish barriers against unnecessary water use.

Samples:

- Building and plumbing code restrictions (federal & provincial regulations); e.g. toilets, faucets, showerheads, garburators, water and sewer lines, downspouts, water processing and cooling systems;
- Landscape requirements (local bylaws, provincial guidelines); e.g. pervious surfaces, xeriscapes, slopes, soil cover;
- Outdoor water use restrictions (local bylaw); e.g. lawn and garden, washing, swimming pools;
- Requirements or enabling legislation to consider water use efficiency in plans (provincial legislation and regulations);
- Bylaws for new construction; e.g. requiring "shunt pipes" to facilitate addition of meters in future, low-flow fixtures, standards for installation and construction of water mains, meters;
- Municipal effluent regulations; and
- Subdivision development control bylaw; e.g. specifications setting out material and construction practices for developers and contractors.

Considerations:

- Public and political acceptability is largely dependent on perceived need.
- Mandatory measures and voluntary/enabling measures will depend on several factors including: financing, availability of water saving devices and the relative effectiveness of water supply management objectives.

2.3.2 Economic and Financial Tools

Economic and financial tools include both incentives and disincentives. They may be used to convey the message that water is valuable and can assist in motivating people to reduce water use. Increased water service charges also recovers costs.

Samples:

- Grants and loans to municipalities and utilities;
- Financial incentives to install water use efficient devices; e.g. low interest or forgivable loans, tax credits, rebates, buy-backs of inefficient devices;
- Fines for non-compliance of regulatory requirements;
- Pricing structures; e.g. marginal-cost pricing strategies, increasing block rates, seasonal rates;
- Program funding; e.g. Environmental Youth Team;
- Revolving loan funds;
- "Fee-bate" systems; e.g. water savings from retrofit projects may

become the allowable water use in new developments;
- Start-up and venture capital financing;
- Surcharges linking sewer costs with water use;
- Full cost pricing; and
- Water licence rate adjustments.

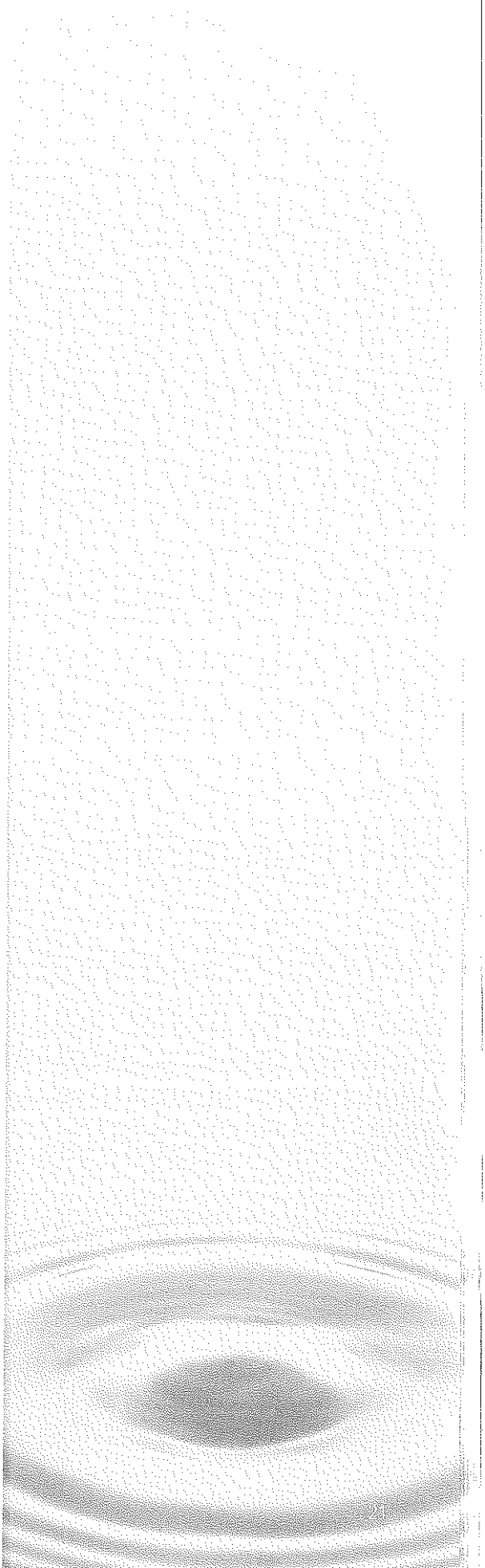
Considerations:
- Social issues such as equitable distribution and ability to pay require careful deliberation.
- Price is assumed to change consumer behaviour, when in reality a variety of factors influence behaviour.
- The approach taken to pricing is as important as the price.
- Availability of an inexpensive source of water is linked to economic development such as large industries and agriculture.
- Public funding may not be available; other financing arrangements should also be considered including partnerships, private investment and co-operatives.
- Some water uses, particularly indoor residential use, are relatively price-inelastic.
- An emotional response to rising water prices often clouds issues.

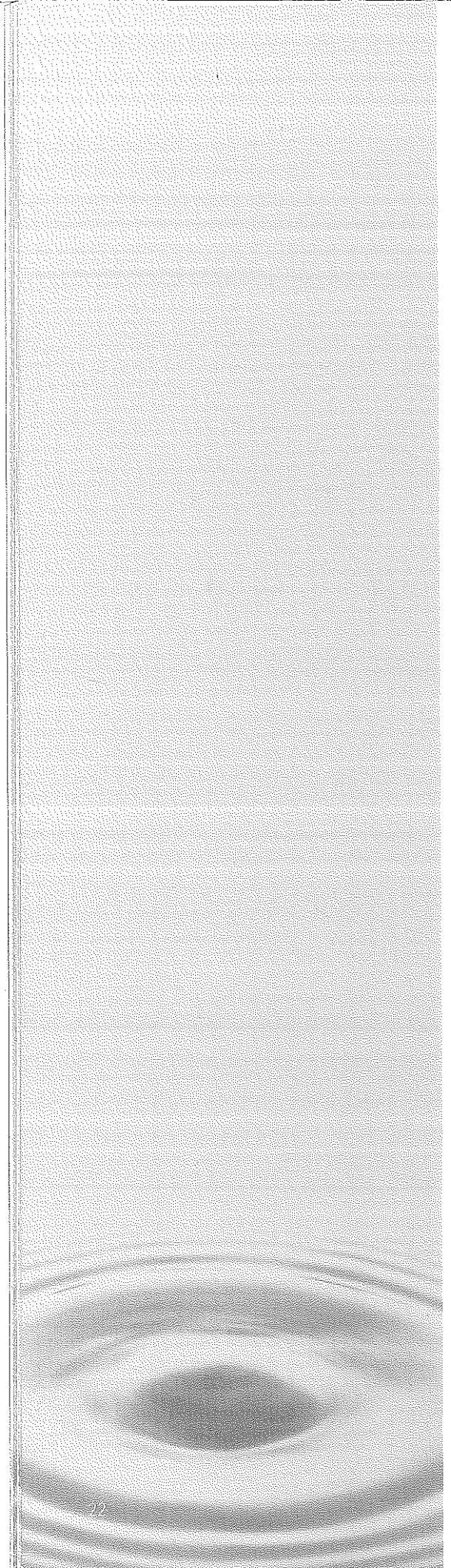
2.3.3 Operations and Maintenance Tools

These tools include structural or physical improvements and installation of water use efficient devices or processes.

Samples:
- Ditch and canal liners and covers;
- Dual line water systems for potable and non-potable water;
- Efficient irrigation systems;
- Moisture monitoring devices (e.g. irrometers) for improved agricultural irrigation scheduling;
- Irrigation audits, water audits;
- Landscaping activities including contouring, xeriscaping, trenching, soil moisture retention;
- Leak detection and repair;
- Low flow faucets, showerheads and toilets;
- Meters;
- Rain sensors for automatic irrigation systems;
- Rainwater collection;
- Recirculating and other efficient water-cooling systems;
- Wastewater reclamation systems;
- Water efficient appliances and machinery including washing machines, dishwashers, car washes, ice machines, commercial laundries; and
- Water pressure reduction.

Considerations:
- Many of these tools may require up-front expenditures.
- Effective water-pricing structures rely on a metered system.
- The products or expertise to install/maintain tools may not be locally available.





2.3.4 Communication and Education Tools

Communication and education tools are utilized to encourage voluntary water conservation actions and to support other tools.

Samples:

- Competitions, awards and recognition programs;
- Demonstration sites and information centres;
- One-on-one meetings with major water users;
- Irrigation design and scheduling guides;
- Social marketing campaigns such as public broadcasting announcements, brochures and handouts, public displays, slogans, bill inserts, advertising and news bulletins, special public events, internet sites, door-to-door campaigns, newspaper articles and radio/television programs;
- Published materials such as "how to" manuals, case studies, technical reports, resource libraries;
- School programs and materials including activity books, games, videos and CDs, poster contests, in-class visits and demonstrations, "teach the teacher" guides, curriculum guides; and
- Special project committees, seminars and workshops with specific water users.

Considerations:

- Communication and education is based on an assumption that action is influenced by awareness and understanding.
- Some tools are aimed very broadly or indirectly at water consumers, resulting in low or immeasurable results.
- Communication and education requires a good understanding of how people learn and how they are motivated.
- The focus is most commonly aimed at individual behaviour change, which requires a high critical mass and takes time before results are noticeable.
- Market research and targeting specific consumer groups are important elements of a social marketing initiative.
- Messages must be competitive with commercial and issue related messages in the media.
- Water conservation messages are difficult to market.
- Messages should be phased to:
  - create awareness and interest,
  - persuade and motivate,
  - educate and provide skills or other tools to enable people to conserve,
  - create actions, and
  - maintain the behavioural changes.

2.3.5 Market Development Tools

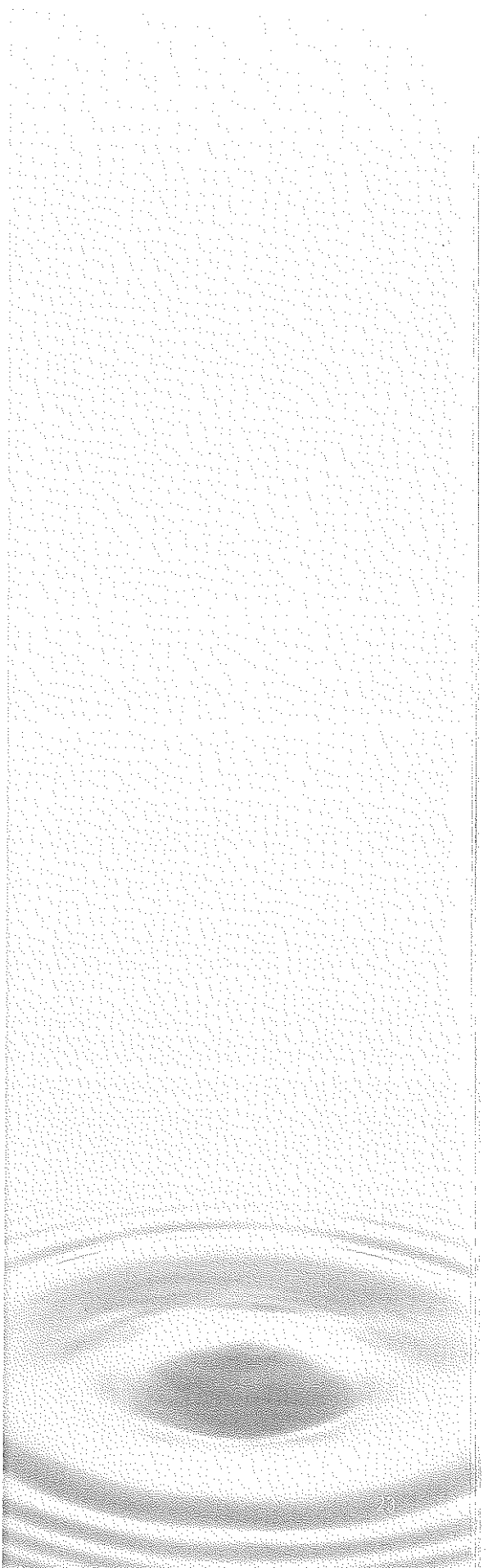
Market development tools serve to increase the availability of water use efficient products and services as well as to encourage improvements and innovations in product development.

Samples:

- Research grants and scholarships;
- Research contracts;
- Government procurement policies;
- Cap and trade systems to gain "water equivalency units";
- Product labelling such as Eco-Logo, Energuide, PowerSmart;
- Education and liaison with professional associations, trades, industries and wholesalers/retailers;
- Point of purchase education programs; and
- Product "testing".

Considerations:

- Expertise or opportunities to implement market development tools may need to be found in conventional economic development agencies and research institutes which may not be familiar with water use efficiency issues.
- Market development tools can be implemented at the local, provincial and national levels.
- Investment in market development is a medium to long term initiative.



3.0
Current Initiatives and Activities

Seventy-six percent of local governments surveyed in British Columbia practice some form of water conservation.

Water use efficiency is not a new concept. Its roots are founded upon long-established principles and theories within the applied field of environmental resource management. At an individual level, people have always been practicing water conservation in one form or another, for both practical and ethical reasons.

At the community or organizational level, water use efficiency has been applied as the need arose, and as skills and practices were developed. It has been taken up as a single issue initiative as well as an integrated part of other related programs. In British Columbia, water use efficiency has become a more prominent activity over the past five years, although some BC communities initiated water efficient measures well before then.

The following discussion on current initiatives and activities is not an exhaustive inventory. Small scale and individual initiatives are not represented in this overview. However, it demonstrates the breadth of activity, both in scale and in variation (See Appendix 2 for more detailed descriptions of initiatives).

3.1 Local Governments

In February, 1998, the Ministry of Environment, Lands and Parks (MELP), on behalf of the Water Conservation Strategy Working Group, contracted the compilation of existing or planned water use efficiency initiatives throughout British Columbia. The survey first enquired into the rationale for implementing efficiency measures and then identified eleven broad categories of water conservation tools. A total of 190 self administered surveys were sent to municipalities, regional districts and selected irrigation and improvement districts throughout the province. Additional information was gathered through follow-up telephone interviews. The results from 127 surveys (66% return rate) are summarized in Appendix 2.

Fully 76% of surveyed local governments in British Columbia indicated that they have adopted some water conservation measures as part of their water management programs. Among those local governments that indicated they had adopted a water conservation

program, capacity constraints (65%) and the need to reduce costs (62%) were the two most common reasons for doing so. Environmental stewardship reasons (33%) and potential droughts (23%) were also commonly identified. Other reasons included: more equitable distribution of costs, part of regional strategy or following the lead of another agency, and to reduce sewer flows.

Although a wide variety of water use efficiency tools have been adopted throughout the province, the most common conservation tools employed by local governments in BC include: mandatory restrictions, metering programs and communication tools such as media announcements and water bill supplements.

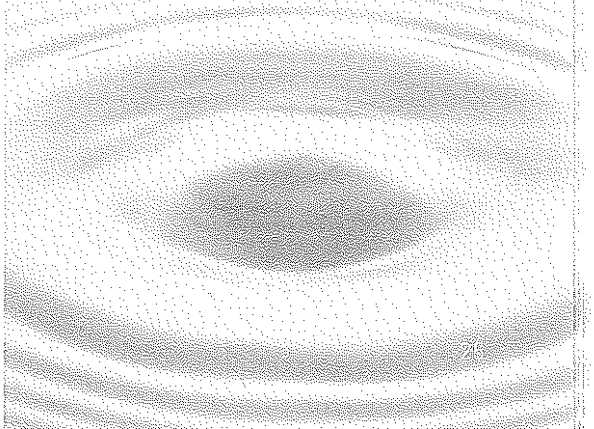
Almost 60% of the survey respondents have used mandatory restrictions and 50% have used by-laws to regulate water use or set water rates. In contrast, enabling tools such as standards, are not commonly used.

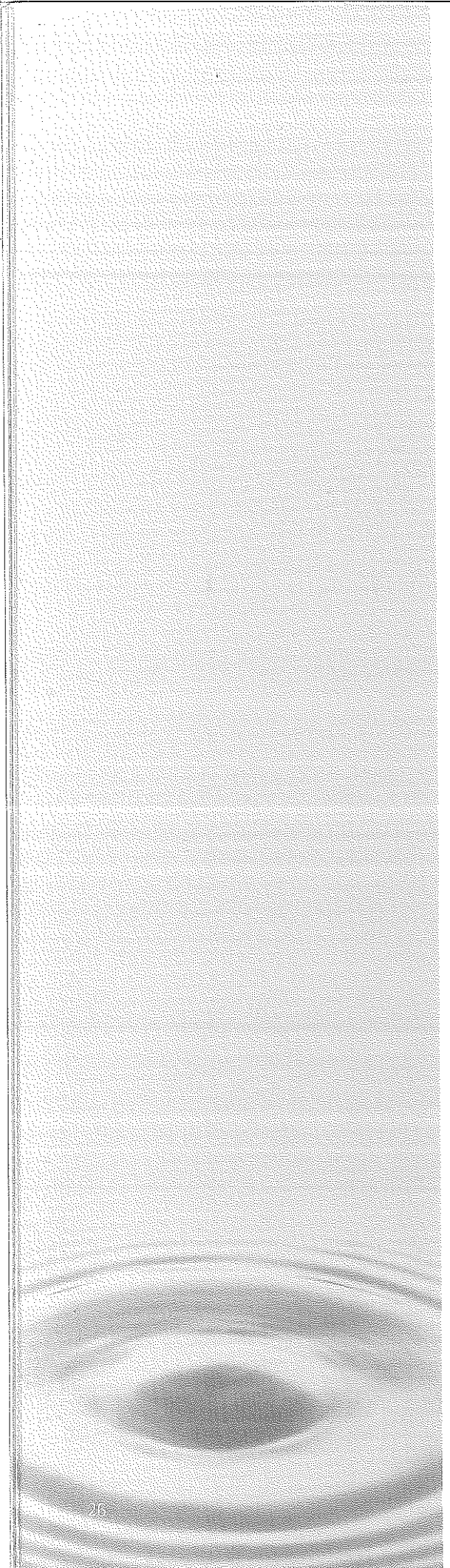
Meters are required to monitor water use and employ conservation pricing structures. Close to 50% of local governments reported using metering programs and several more are currently engaged in metering studies. Inclining block rates and seasonal rates were used in the survey as examples of conservation pricing structures. However, less than a handful of municipalities and irrigation districts utilize these tools. Of those 25 local governments currently testing meters, only 7 are also addressing alternative pricing structures.

Over 50% of respondents use at least one communication and education tool and 31 (24%) use five or more tools. The majority of communication initiatives are aimed at the residential sector through media announcements and water bill supplements. The industrial/commercial sector also receives information through these tools. Twenty percent of respondents have school curriculum programs.

It is evident that water conservation is still in the early stages of development in British Columbia although the survey response indicates that water use efficiency measures are viable and beneficial. Thirty-two percent of respondents have in-house programs that actually reduce water use or loss on government-owned property. Those that have taken action to reduce water use have done so through water efficient landscaping (i.e. xeriscaping, irrigation, operations & maintenance and climate comfort systems), leak detection and repair, low flow retrofits and employee education.

It appears from the patterns of implementation shown by the survey that local governments are approaching water use efficiency incrementally. Although almost 100 of the survey respondents have incorporated water conservation measures in some way,





only 17 (13%) have engaged themselves in strategic planning for their water utility. It is unknown whether those 17 local governments addressed water use efficiency in their plans. Moreover, only 10% of local governments reported that they are actively educating elected officials on water use issues and water conservation which indicates that decision makers may be largely unaware of the potential benefits of water use efficiency as an important component of long term water supply management.

There are several possible reasons why water use efficiency is not being widely adopted in a more comprehensive and rigorous manner, including: lack of knowledge and expertise, legal barriers, costs and a lack of recognition for the potential benefits of water use efficiency.

3.2 Provincial Government

Along with local government actions, the Province, through regulation and education, has also begun to undertake water conservation initiatives.

The Ministry of Environment, Lands and Parks (MELP) is currently leading or supporting a number of environmental education activities aimed at school children and the general public.

MELP has also proposed "Municipal Sewage Regulations" which will encourage the use of reclaimed water to address the issues of water shortages, and increasing supply demands from, and discharges to, streams and aquifers located within municipalities.

The Ministry of Agriculture and Food has been actively involved in piloting and testing water efficient measures for several years. This ministry is developing manuals and guides on ways to save water through irrigation.

Building codes are being reviewed to improve water use efficiency in the province. The Ministry of Municipal Affairs (MMA) will release a new Building and Plumbing Code this fall and will acknowledge the *Water Conservation Strategy for British Columbia* as part of a separate regulation that addresses water efficiency requirements for new buildings.

Also, British Columbia Buildings Corporation (BCBC) has adopted technical standards that require increased efficiencies in irrigation and landscaping for all provincially owned and operated buildings.

3.3 Federal Government

Although the federal government has no direct responsibilities over municipal water and sewer infrastructures, it has an important role in providing infrastructure funding, developing water policies, distributing information, conducting policy research and analysis, and improving water use efficiency in federal facilities.

The 1987 *Federal Water Policy* clearly stated the need to acknowledge the value of water and revise water pricing structures to reflect full costs and the user pay principle. The federal policy is currently being updated. Water use and demand continues to be identified as an important national issue.

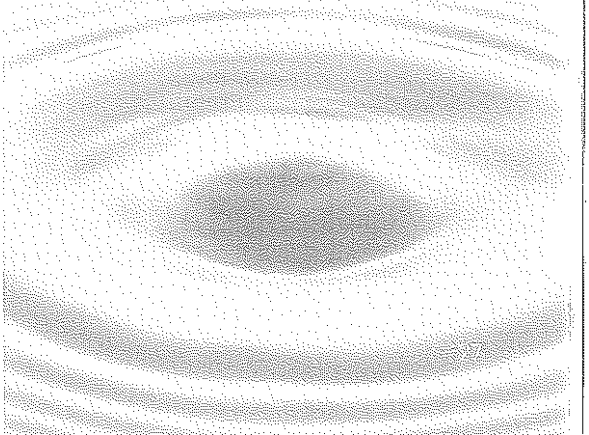
The *National Action Plan to Encourage Municipal Water Use Efficiency* (1994) has been an important catalyst in advocating water efficiency.

3.4 BC Water and Waste Association

The BC Water and Waste Association (BCWWA) has been instrumental in addressing water use efficiency in the province through the Water Use Efficiency Committee, technology transfer conferences and seminar series.

In 1995 the BCWWA committee merged with the provincial committee of the National Task Force (the task force developed the National Action Plan) and took on the leadership role to advocate municipal water use efficiency in the province. The Water Use Efficiency Committee is represented by the federal and provincial governments; a broad spectrum of local governments; BC Hydro; the Water Supply Association of BC and the academic community.

The BC Water and Waste Association (BCWWA) has been instrumental in addressing water use efficiency in the province.



4.0
Strategic Directions

The Water Conservation Strategy for British Columbia points to the need for a more co-ordinated, province-wide approach to water use management.

The *Water Conservation Strategy for British Columbia* points to the need for a more co-ordinated, province-wide approach to water use management to ensure the most efficient use of our resource. Several strategic directions have been developed to reduce barriers that currently hinder specific actions at the community or individual level. Others are intended to encourage broader understanding and adoption of water use efficiency actions.

The ministries of Environment, Lands and Parks; Municipal Affairs; and Agriculture and Food are being called upon to lead in the implementation of several strategic directions, either within their mandated responsibilities or to support local actions. BCBC, BC Hydro, BCWWA and other provincial organizations will have key roles in implementing this Strategy.

However, many strategic actions are more appropriately directed at the local level, to enhance benefits gained from initiatives already taken. Each community within its associated watershed has a unique set of biophysical, social, economic, organizational and infrastructural circumstances that influence long term water supply management. The strategic directions and actions identified in this document will have varying degrees of relevance from one community to another.

4.1 Enable and Regulate

Legislation and policies play an important role in society. They reflect commonly held values; they help to protect resources upon which we all depend; they require standards and expectations to be upheld; and they enable governments to act on behalf of the common good.

Strategic Direction 1
Legislation and Regulations

The application of legal tools for water use efficiency will require the development of new laws and policies, as well as amendment of existing tools, to encourage actions and reduce existing legal barriers to water use efficiency.

Actions:

- Review section 694 of the *Municipal Act* to give local governments authority to require water conservation measures in

new buildings (lead: Ministry of Municipal Affairs).

- Review section 22(l) of the *Environmental Assessment Act* to enable the executive director to require the inclusion of water use efficiency and water conservation measures in project reports (lead: Ministry of Environment, Lands and Parks).
- Implement the proposed "Municipal Sewage Regulations" to increase the use of reclaimed water to address water shortages, and to reduce supply needs from and augment discharges to streams and aquifers located within municipalities. Produce on-site water conservation guidelines including the use of municipal effluent (lead: Ministry of Environment, Lands and Parks).
- Review water licence allocation policies under the *Water Act*, to address, among other things:
  - the timing and rate of stored water use for irrigation purposes;
  - the use of water conservation devices and techniques for all purposes; and
  - installation of metering devices to monitor water use for large scale water licences.
- Develop policies and proclaim relevant sections of the *Fish Protection Act* to temporarily reduce water diversion in times of drought and to address water use efficiency measures in water management plans (lead: Ministry of Environment, Lands and Parks).
- Review water supply plans, official community plans, by-laws, standards, policies and procedures as applicable to ensure efficient delivery, use, and pricing of water (lead: regional districts, municipalities, irrigation districts and other water purveyors).

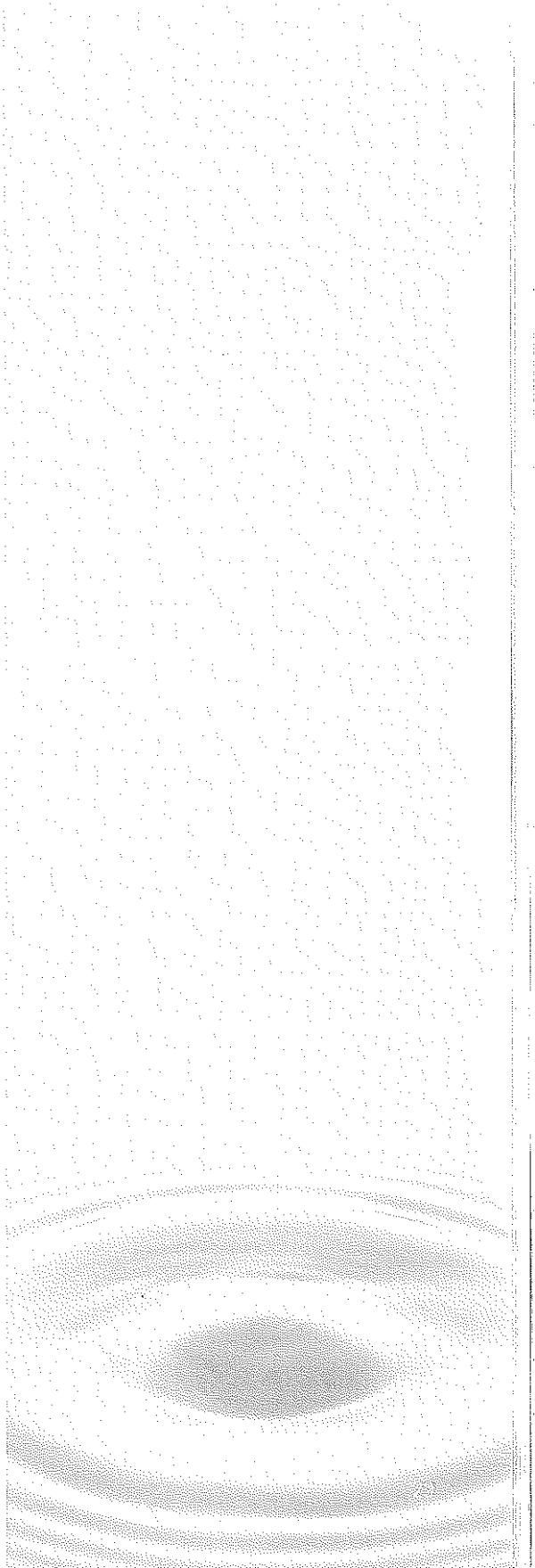
Strategic Direction 2

British Columbia Building and Plumbing Code

The new BC Building and Plumbing Code is expected to be released this fall. Existing references to water efficient plumbing fixtures were recently extracted from the Code and placed into a specific regulation. The Ministry of Municipal Affairs will take the lead in amending the regulation to improve requirements for water use efficient fixtures.

Actions:

- Convene a sub-committee of the Water Conservation Strategy Working Group over the next 6 to 12 months with representation from local governments, Ministry of Municipal Affairs, British Columbia Building Corporation, Ministry of Environment, Lands and Parks and industrial associations. The sub-committee should address proposed amendments to the water efficiency regulation, including:
  - Ultra low flush toilets (6 litre) and urinals in new developments; and



Most communities implement water use efficiency activities incrementally, often starting with public information or watering restrictions during emergency situations. Well planned water supply management which considers a variety of water use efficiency strategies will provide greater opportunities to successfully deliver water in a cost-effective manner.

- Similar standards for industrial, commercial and institutional buildings.

4.2 Plan, Manage and Evaluate

Most communities implement water use efficiency activities incrementally, often starting with public information or watering restrictions during emergency situations. These measures are relatively inexpensive and politically supportable. However, neither of these actions in themselves result in long lasting or substantial water savings.

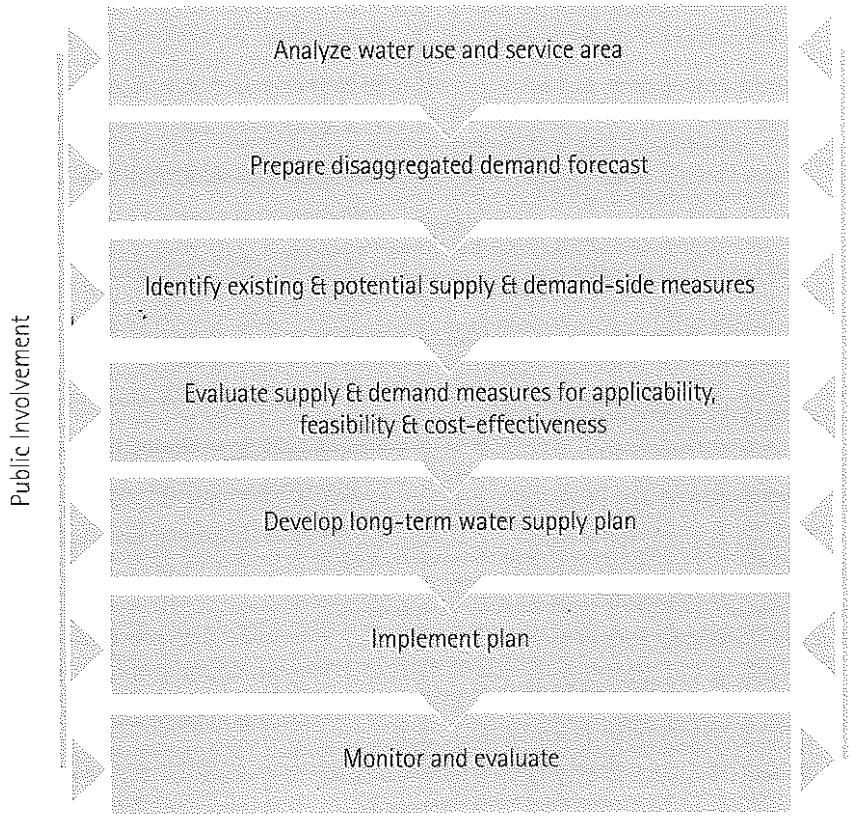
Well planned water supply management which considers a variety of water use efficiency strategies, in conjunction with securing water supply sources, will provide greater opportunities to successfully deliver water in a cost-effective manner. In effect, increasing water use efficiency can be viewed as a water supply source.

Strategic Direction 3

Comprehensive Water Supply Planning

Comprehensive water supply management begins with a long-term plan and follows through with evaluation and improvement as part of an iterative process (Figure 5). Evaluation results can be used to redirect strategies and programs, reallocate budgets and measure overall progress in achieving desired

Figure 5: Planning Process



objectives. The goal of a comprehensive water supply plan is to ensure there will be a reliable, cost-effective water service to meet a community's needs most of the time. However, a contingency plan should also be developed in anticipation of unusual events or emergencies that may arise.

Local governments, utilities and other large-scale water licensees are encouraged to seriously consider the following advantages in conducting a comprehensive water supply and management plan.

- Public involvement in a planning process determines acceptable levels of risk and defines desired social benefits.
- Costs and benefits to individual consumers, to purveyors and to society can be assessed.
- Uncertainty factors that influence the reliability of water supply can be explicitly considered.

Actions:

- Give full consideration to water use efficiency measures in local and regional water supply planning processes (lead: local governments, private utilities). Criteria for evaluating water supply and water use efficiency measures should include:
- cost vs. benefits (environmental, social, economic);
- ability to meet peak flows, baseline flows and future uses;
- potential volume savings;
- reliability risk;
- confidence that a given measure will work;
- acceptance and ease of implementation; and
- preliminary unit cost.

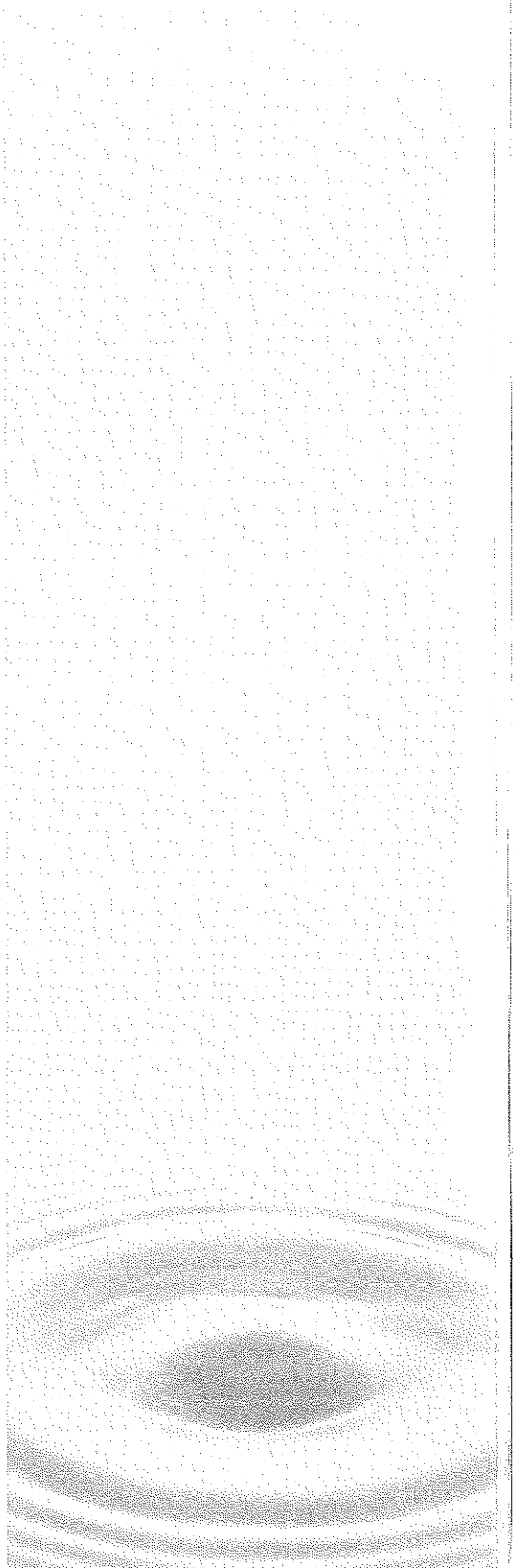
Strategic Direction 4

Industrial Standards and Management Support

As previously mentioned, each community and water supply service area will possess different circumstances and require different approaches to achieving water use efficiency. The development of standards and best management practices will provide valuable guidance for water supply planning and management. Industry associations are often the most appropriate group to develop standards and codes of practice. They possess the knowledge required to overcome problems and they hold credibility as peers within their industrial sector.

Actions:

- For the landscape industry, develop irrigation design standards and guidelines, scheduling procedures, and irrigation system auditing programs. Establish a certification program for irrigation design professionals in British Columbia (lead: Irrigation Industry Association of British Columbia).
- Develop irrigation design guidelines; scheduling procedures and guides; and best management practices for agricultural irrigation and other



water uses (lead: BC Ministry of Agriculture and Food and BC Agriculture Council).

4.3 Value and Motivate

Water is an undervalued resource. Although several factors influence behaviours, the importance of economic incentives to reinforce water use efficient practices and disincentives to discourage over-use cannot be underestimated.

Strategic Direction 5

Water Rates and Pricing Structures

Full cost accounting and cost recovery pricing structures sends a strong message to water users on the value of water. A carefully calculated water pricing strategy can fulfil two important needs. First, it contributes to financing water supply, treatment and disposal systems. Second, it can be used to motivate people to adopt water efficient measures through application of the "user pay" principle.

There are several types of water rates and conservation pricing structures. Determining the type of structure and specific rates will depend on program objectives; relative advantages and disadvantages of each structure; and cost-effectiveness. Some of the principles that should be considered in designing a rate structure are:

- Effectiveness in generating revenue to cover full costs and receive a fair return on public resources;
- Effectiveness in allocating costs;
- Effectiveness in achieving efficient water use;
- Administrative efficiency in implementing the new rates; and
- Willingness and ability to pay on the part of water users.

Allocating costs merits particular attention to address equity and economic efficiency issues. Rate structures should address fairness among different types of water use and users, and avoid subsidization of one group by another (e.g. industrial customers subsidizing residential customers). Economic efficiency refers to reflecting all direct and indirect costs of service (Mitchell and Hanemann, 1994).

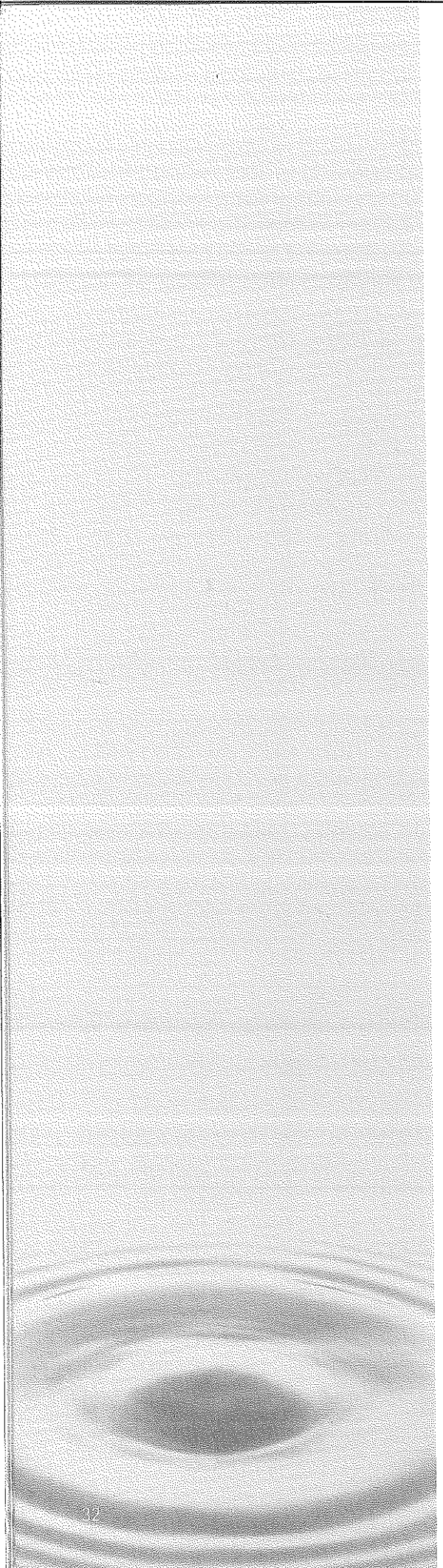
Actions:

- Review pricing structures for water allocation (lead: Ministry of Environment, Lands and Parks) and retail water systems (lead: local governments) to address the full social, environmental and economic costs, benefits and value of water.

Strategic Direction 6

Financial Incentives

Positive reinforcement and incentives to implement water use efficient programs have been under-utilized.



As prices will necessarily rise to cover the costs of infrastructure replacement, water treatment and future expansion in services, water use efficient initiatives should be supported and rewarded through financial incentives. If developed as part of a cost-effective strategic plan, economic incentives can become investments with a high potential for gaining both cost and water savings in the medium to long term.

Actions:

- Continue to provide provincial grants with added encouragements to adopt water use efficiency measures, such as:
  - Implementation of water audit and leak detection programs;
  - Universal metering and conservation-oriented pricing structures; and
  - Accurate records of water consumption and water quality over a period of years (lead: Ministry of Municipal Affairs).
- Consider financial incentives, such as low interest or forgivable loans, tax credits and rebates to install water use efficient devices (lead: local governments, utilities, federal government, and provincial government).
- Support the continuation of the Federal, Provincial and Local Government Infrastructure Funding Program to promote the efficient use of water (lead: local, provincial and federal governments).

4.4 Communicate and Educate

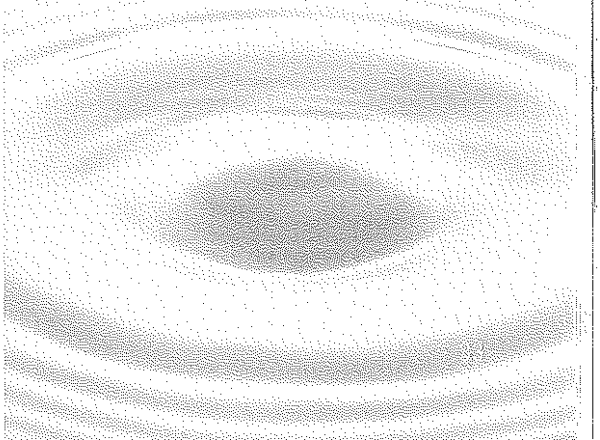
Most British Columbians realize the importance of water in their lives. However, many are unaware of the benefits of efficient water use and require information on how to achieve efficient water use. The following strategic directions are aimed at enhancing awareness, understanding and actions in water stewardship, water use efficiency and water resource values, and promoting life long water conservation behaviour. Initial target audiences will include educators, school children, community groups, water managers, purveyors, elected local government officials and community leaders. Additional audiences may include key business sectors and the media.

Most British Columbians realize the importance of water in their lives. However, many are unaware of the benefits of efficient water use and require information on how to achieve efficient water use.

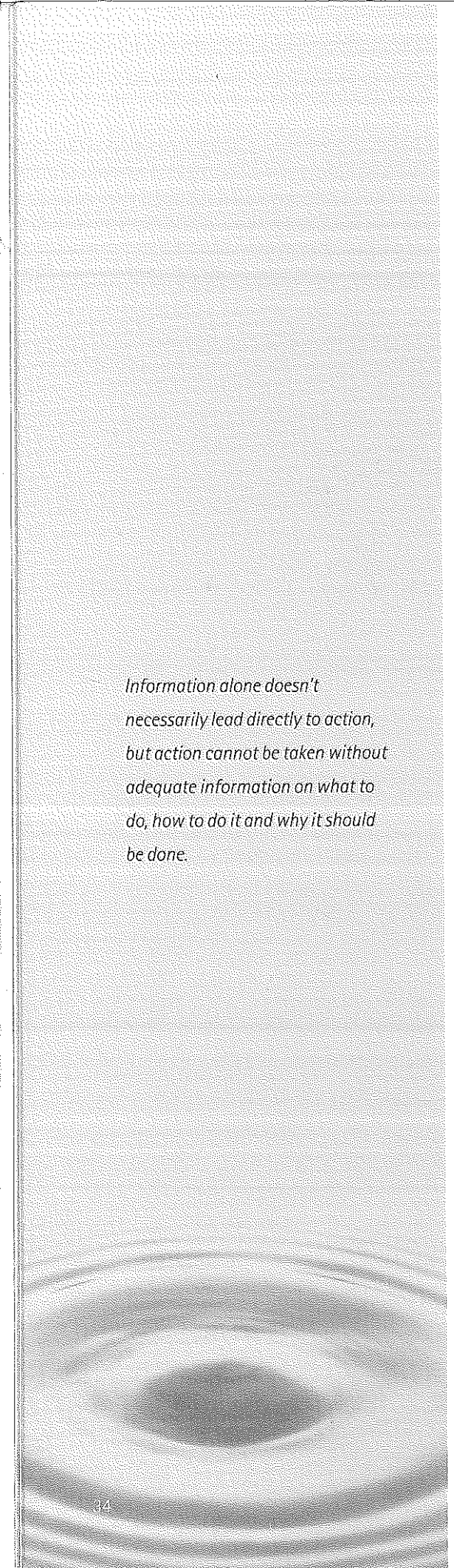
Strategic Direction 7

School and Community Education Programs

The Ministry of Environment, Lands and Parks already has a variety of educational materials and programs. MELP is encouraged to continue their education programs and work with the ministries of Education and Advanced Education; Training and Technology; local governments, the BC Water and Waste Association and community based organizations. Many local governments also support local school programs through presentations, tours, information



Information alone doesn't necessarily lead directly to action, but action cannot be taken without adequate information on what to do, how to do it and why it should be done.



brochures, contests and scholarships. They are encouraged to continue and expand their programs.

Actions:

- Enhance and expand provincial environmental education programs to include water use efficiency topics (lead: Ministry of Environment, Lands and Parks, local governments).
- Support local water education programs through summer employment and volunteer programs (lead: Ministry of Environment, Lands and Parks).

Strategic Direction 8

Seminars and Guides for Utilities and Licensees

Water managers, purveyors, local councillors, community user groups and individual water licence holders need good information to make sound water conservation decisions.

Actions:

- Develop presentations, seminars and workshops to introduce the *Water Conservation Strategy for British Columbia*, share information, ideas and successes (lead: BCWWA).
- Consideration should be given to a series of "How To" guides and related materials on water audits and specific water use efficiency measures for water licensees, industries, private utilities and local governments (lead: Ministry of Environment, Lands and Parks, Ministry of Agriculture and Food, and BC Water and Waste Association).
- Consider "Water Efficiency in the Workplace" educational materials for specific industrial, commercial and institutional water users (lead: Ministry of Environment, Lands and Parks, and BC Water and Waste Association).

Strategic Direction 9

Social Marketing

Technically sound, cost-effective programs can often fail if pertinent information doesn't reach the right audience. With few exceptions, a communication or social marketing strategy should be an integral part of any water use efficiency program.

Many water use efficiency programs are voluntary measures. Therefore, they rely on market acceptance and individual actions. Information alone doesn't necessarily lead directly to action, but action cannot be taken without adequate information on what to do, how to do it and why it should be done. Even mandatory programs, such as watering restrictions, will not be successful if people are unaware of the program.

Reporting results of water use efficiency measures is also very important. Regular reporting helps to maintain interest in water issues and increase public support. Keeping people appraised of successes, failures and subsequent improvements will also help build a supportive constituency for the next water use efficiency initiative.

Informing people requires an organized and concerted effort. One-time general announcements or broadcasts will often result in scattered and scanty information.

Actions:

- Develop social marketing strategies to support water use efficiency initiatives and convey important messages to water users (lead: all water management agencies). To maximize success, keep the following points in mind:
  - Target your audience;
  - Use a variety of media, including community connectors such as local organizations;
  - Communicate often to reach both early and late adopters;
  - Actively engage people; and
  - Be open and responsive to your audience's problems, questions, observations and suggestions.

4.5 Encourage Market Development and Innovation

The *Water Conservation Strategy for British Columbia* recognizes the role of innovation in bringing about change. Many of the initiatives presented in Appendix 2 and practiced throughout the province have stemmed from innovative ideas that didn't exist ten or twenty years ago.

Many new innovations and practices may broaden the notion of water use efficiency as it currently stands in British Columbia. For example, toilet tanks with built in hand basins which drain to the tank have been used in Japan for many years. Measures to increase precipitation in a water basin have been explored in drier areas of the world, as have measures to decrease evaporation, transpiration, and losses to groundwater seepage or water running off the land. These ideas and other unimagined ones may provide solutions in the future.

Strategic Direction 10

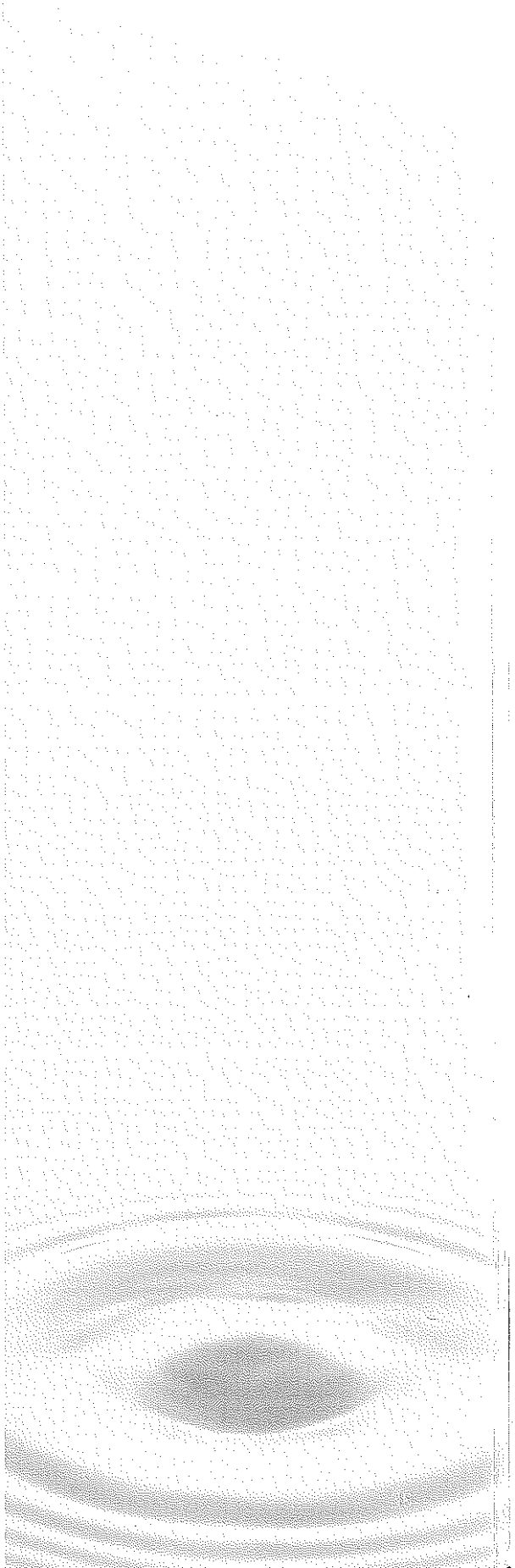
Market Development and Innovation

In coming years many innovations in the forms of technological invention, creative planning methods, landscape designs and other new ideas will arise to advance water use efficiency. Existing innovations utilized in other places may also be successfully adopted in British Columbia as the need arises or techniques and tools become available in the province.

This Strategy supports the principle, the need and the value of innovation and encourages all water purveyors, drawers and users to explore alternatives and innovations that can lead to greater water use efficiency.

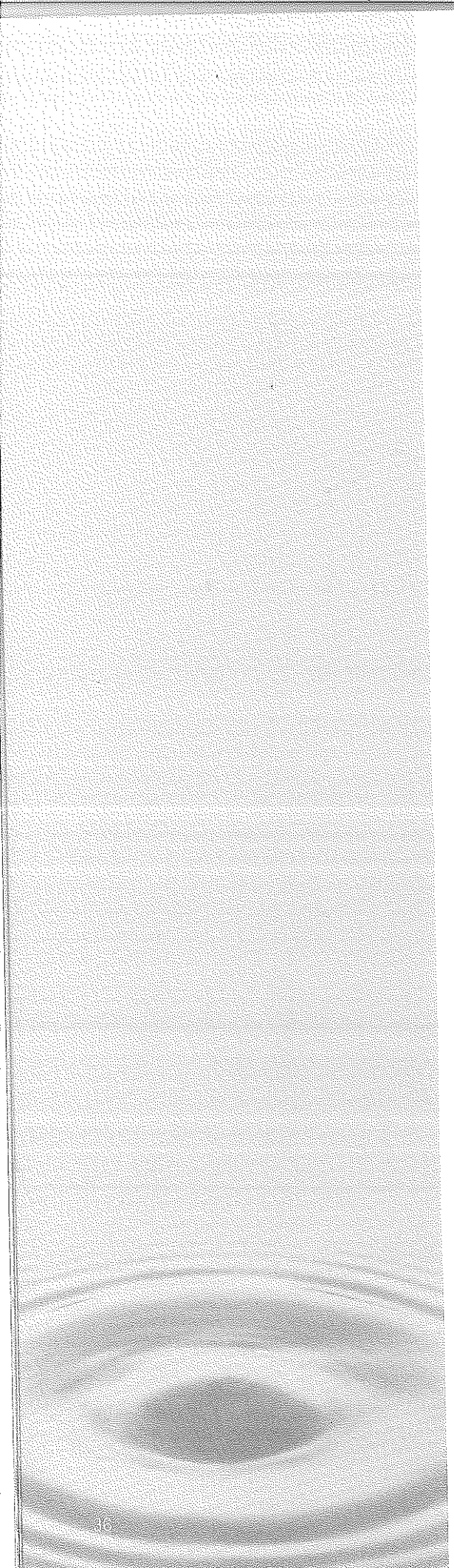
Actions:

- Convene a sub-committee of the BC Water Conservation Strategy Working Group to explore options, disseminate information and encourage innovative technology



(lead: BC Hydro, Capital Regional District Water). Possible activities include:

- Collaboration with post-secondary institutions to conduct research and develop training programs;
- Collaboration with industry and trades associations on market development for water use efficient devices and services;
- Assessment of innovative market mechanisms such as cap and trade systems where water savings from retrofits may be applied to new developments, resulting in no net change in total service area water use; and
- Analysis of financial incentives / disincentives and potential partnerships to encourage market development for proven technologies (e.g. front loading washing machines).



5.0
Implementing the Strategy

The *Water Conservation Strategy for British Columbia* is a living document. Priorities will change over time and the Strategy will be implemented in a manner to allow flexibility and adjustment. Implementing the Strategy will require concerted and ongoing efforts from all levels of government and water users. The success of these efforts in influencing significant changes in water supply management will hinge on a high level of co-operation, collaboration, communication and leadership.

An implementation plan for the Strategy will be developed this fall and delivered over the next two to three years. The first step will be to discuss principles, directions and actions with water managers, decision makers and water users. Forums such as the UBCM Annual Convention, the Joint Committee on Agriculture and the Environment, and regional workshops will provide opportunities to discuss strategic directions in greater detail.

5.1 Fostering Partnerships

Responsibility for water management is very fragmented and co-operation is needed among agencies with different jurisdictions in order to adequately address the full range of issues and avoid negative impacts on other jurisdictions.

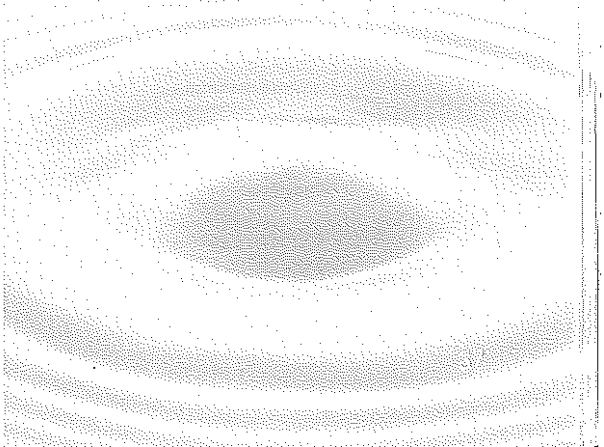
Partners can achieve more together than can be achieved separately, often resulting in greater efficiencies in service or program delivery. A partnership agreement will be developed among key agencies to carry out strategic directions that require collaboration. Each partner will be asked to contribute resources and hold responsibility for the success of the Strategy.

Partnerships bring different interests and groups of people together to contribute to different aspects of water use efficiency initiatives. Additional partners will be invited to join as partners for water use efficiency.

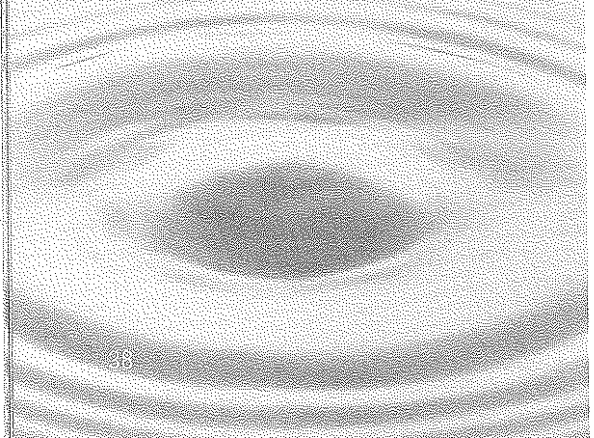
5.2 Leading and Coordinating

Because water is a common resource, it is vitally important that the Province continue to take a leadership role in fostering, supporting and guiding co-ordinated efforts to address water use efficiency. However, many other

Implementing the Strategy will require concerted and ongoing efforts from all levels of government and from water users.



The BC Water Conservation Strategy Working Group and the Water Use Efficiency Committee will join together to provide stronger leadership and co-ordinated efforts.



agencies and organizations have demonstrated leadership in this field, including numerous local governments and the BC Water and Waste Association. Continued leadership and proactive participation in water use efficiency will become increasingly important as the *Water Conservation Strategy for British Columbia* is implemented.

The Ministry of Environment, Lands and Parks and the British Columbia Water and Waste Association have led and co-ordinated two province-wide committees: the BC Water Conservation Strategy Working Group and the Water Use Efficiency Committee respectively. These committees will join together to provide stronger leadership and co-ordinated efforts to advance water use efficiency. Together, members of this inter-agency committee will develop and conduct an ongoing review progress to revise the Water Conservation Strategy as needed.

An important aspect of leadership is leading by example. Leading by example:

- can result in measurable water savings;
- promotes water use efficiency through real action;
- may increase the availability and affordability of water efficient devices in the local marketplace; and
- ensures that government is "walking the talk".

The British Columbia Buildings Corporation has developed a policy on water use efficiency and has installed timers and sensors in selected landscaped areas and sensors in the legislative building urinals. In addition, local government agencies have initiated many in-house programs such as xeriscaping, irrigation, leak detection and repair, fixture retrofit and employee education. The federal, provincial and several local governments, including members of the Water Use Efficiency Committee will continue to provide leadership through in-house programs and will actively encourage other government and utility agencies to develop in-house water use efficiency measures through the development of a water audit support program.

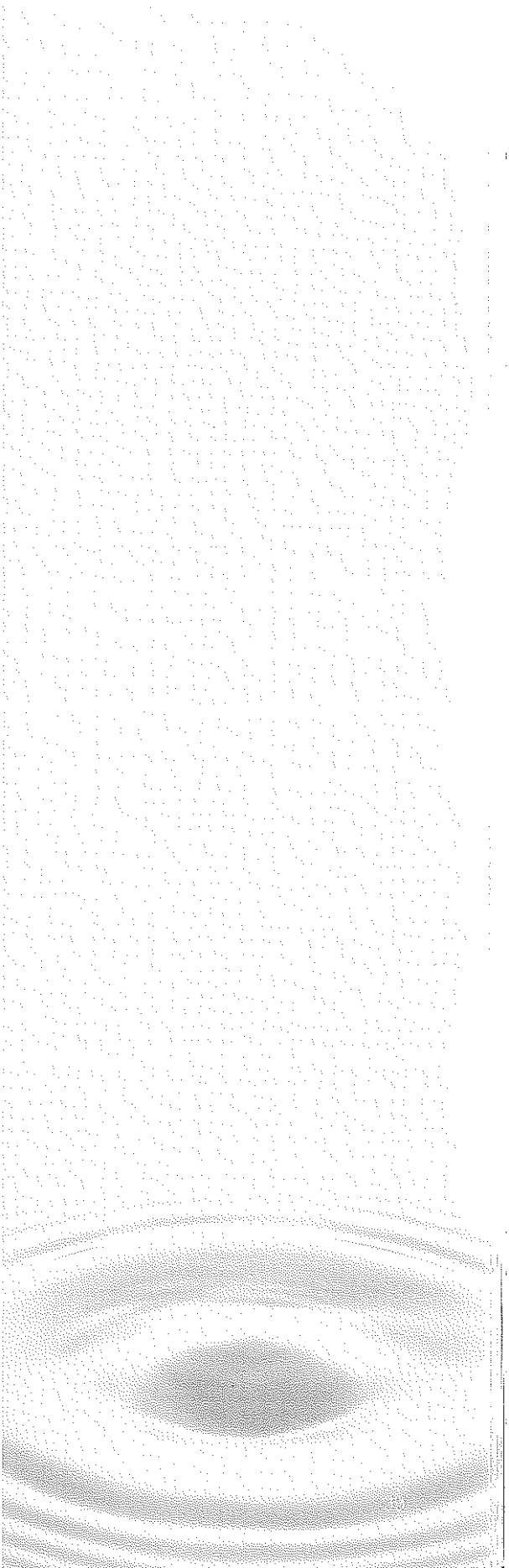
5.3 Targeting Key Areas

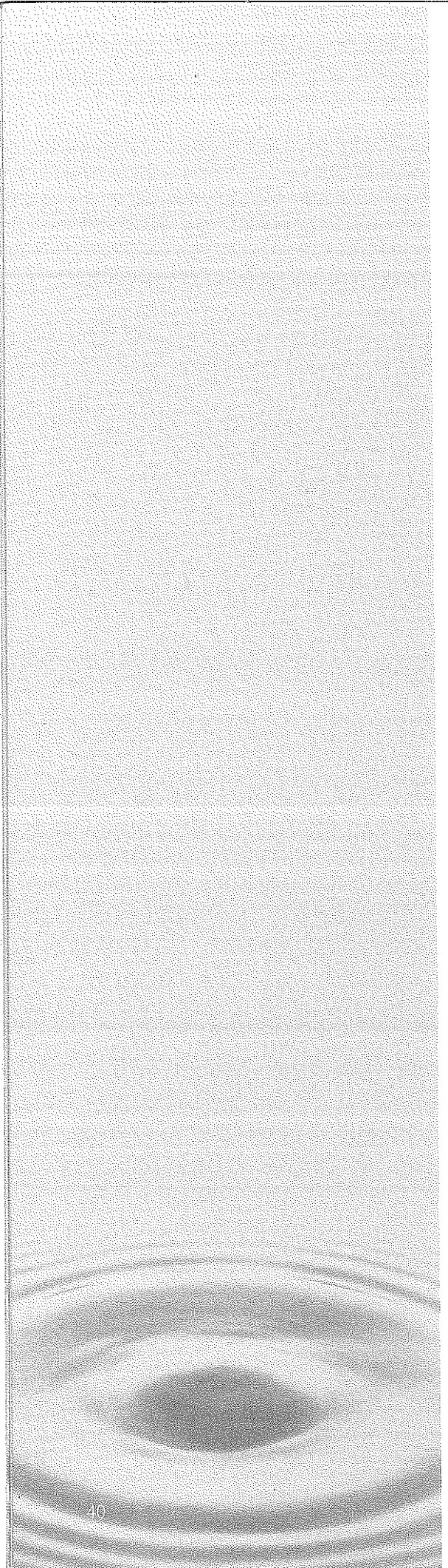
Some areas throughout the province will require more attention to water use efficiency measures than others. These include areas where there is a high demand for surface or ground water relative to supply sources, seasonally low or sensitive in-stream flows, water use conflicts, critical fish streams and aquatic habitats, and areas experiencing surface or ground water quality problems.

At the community level, various sectors or types of water use may require special attention. These key areas would be identified as part of comprehensive local water supply and management plans.

5.4 Evaluating and Reporting

An evaluation and reporting program will be developed by the Water Use Efficiency Committee. Evaluations are essential in determining the progress of strategic directions as well as revising the Strategy. Regular reporting will be conducted to share information; document accomplishments and lessons learned; show accountability; and sustain public interest in water supply issues.





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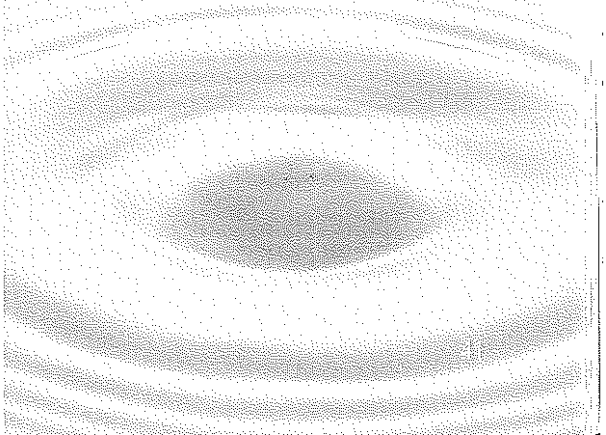
Appendix 1: Terms of Reference

Water Conservation Strategy Working Group

The overall goal of the Water Conservation Strategy is to ensure sufficient water for all uses and facilitate the move toward a more sustainable approach to managing water resources.

To be successful, the *Water Conservation Strategy for British Columbia* requires commitment and active participation from a variety of sectors and interests. A Working Group has been organized to assist in developing the strategy. The Working Group consists of water conservation leaders throughout the province as well as key players in developing future initiatives.

The strategy is intended to be action oriented and will build upon the work currently underway in several municipalities, regional districts and improvement districts. Users of the strategy document should be able to view it as a menu of tools, opportunities and suggestions from which they are encouraged to select and implement only those which they feel are complementary to their own set of circumstances.



Deliverables:

The mandate of the Working Group is to produce a strategy document. As part of the mandate, the following components will be included:

- A vision, principles, goals and objectives to guide water use efficiency;
- An overview of water use efficiency initiatives throughout the province; and
- Strategic directions and actions.

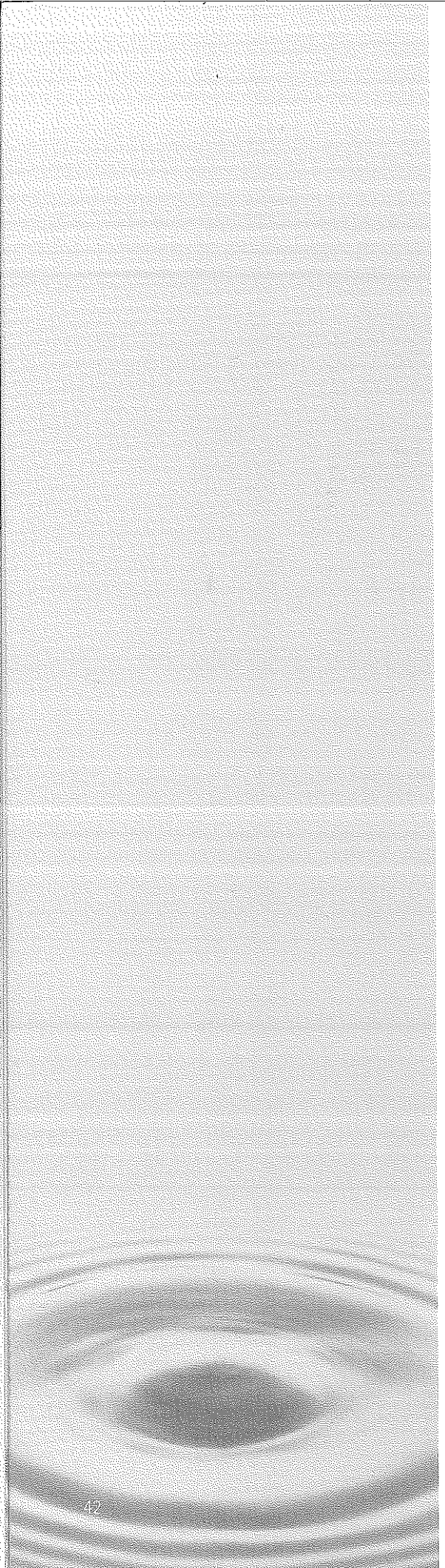
Appendix 2: Summary of Water Use Efficiency Initiatives

Local Governments

In February 1998, the Ministry of Environment, Lands and Parks (MELP), on behalf of the Water Conservation Strategy Working Group, contracted the compilation of existing or planned water use efficiency initiatives throughout British Columbia. The complete survey results are reported in the "Water-use Efficiency Catalogue for British Columbia", located on the Ministry of Environment, Lands and Parks web page (see Appendix 3 for website address).

The "Catalogue" was developed to promote co-operation and information sharing, and to serve as a resource. It lists water conservation measures by type and agency. The catalogue also draws on the experience of water providers by noting important details (where provided) including keys to success, costs, and actual and potential water savings.

A total of 127 surveys (66%) were completed. 76% of the respondents indicated that they have adopted some water conservation measures as part of their water management programs. The following is a summary of results from the survey.



Legal Tools

- Mandatory restrictions (57%) and bylaws (50%) were the two most commonly identified legal tools employed by survey respondents to reduce water use. Closely related, legislation was identified as a means of increasing water use efficiency by both the federal and provincial governments. Other legal tools included regulations (23%), standards (12%) and licensing (4%).

Economic and Financial Tools

- Metering studies and pilot projects (21%) are the most popular economic/financial tools employed by survey respondents. Others chose to use pricing structures and analysis (13%), inclining block rate structures (13%), fines for excess use (10%), cost/benefit analysis (7%), service charges (6%), and seasonal rates (4%).

Operations and Management Tools

- Metering programs (16%) are the most commonly employed operations and management tools. A further breakdown of survey results, from those who adopted water conservation measures, reveals 57% employ them for commercial or industrial customers, 30% are in place for residential customers, and 16% for agricultural/irrigation customers.
- 36% of respondents reported making water supply improvements. Leak detection programs, low flow/retrofit programs, and development of Emergency Response Plans were identified by respondents, 26%, 23% and 23% of the time, respectively.

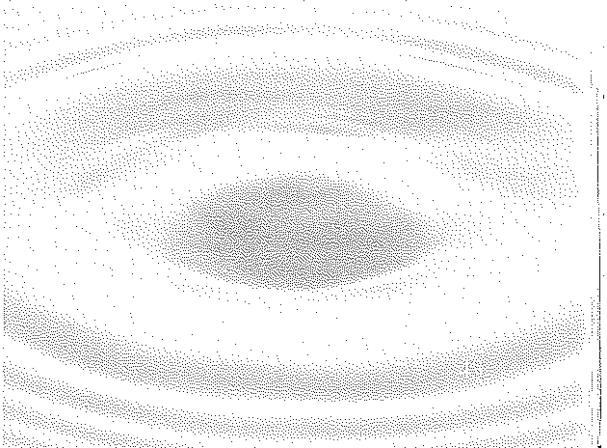
- Watershed protection (20%), computer upgrades (16%), xeriscaping (14%) and water audits (14%) were also employed.

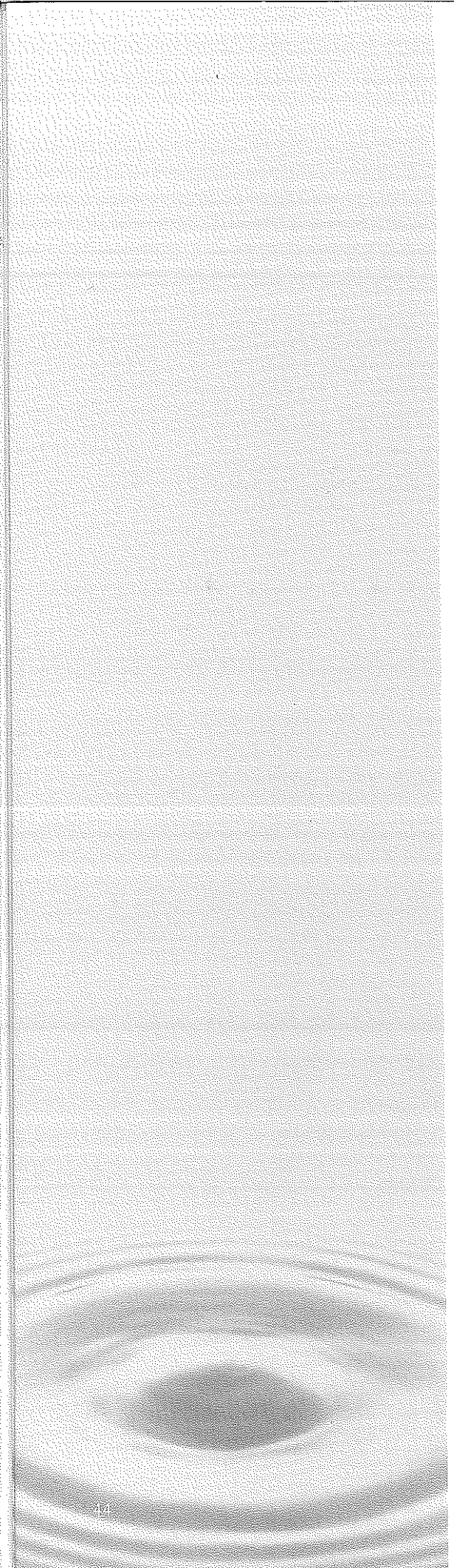
Planning Tools

- Municipal, local or regional land-use planning, and watershed management planning were each identified by 20% of respondents reporting the use of conservation measures.

Voluntary Restrictions

- A predominantly local measure where residents are asked to voluntarily restrict their use of water during dry spells and peak demand periods. Approximately 34% of all respondents employing water conservation included voluntary measures among their conservation tools.





Educational and Information Sharing Initiatives

- Local governments engaged in educating residential water users rely on a number of means of communicating their message. Chief among these is media announcements (47%), information supplements with water bills (42%), and other assorted publications and public information packages (29%). Other notable measures include voluntary low flow/retrofit programs (18%), community and special events, public displays and exhibits (14%), workshops and seminars (11%).

- Information with billing (22%) and announcements using various media sources (20%) were identified as the most popular means of educating the commercial/ industrial community. Other devices for educating this sector included publications, workshops, seminars, user committees and task forces.

- School program initiatives, identified by respondents reporting the use of conservation measures, included: curriculum programs (20%), class tours of water facilities (16%), publications (10%), and poster, writing and other contests for students (10%).

Lead by Example Initiatives

- 32% of respondents whose organization has adopted water conservation measures are engaged in water efficient landscaping, including: xeriscaping, water efficient irrigation, operations and maintenance, and climate comfort systems for landscaped areas. In addition, 27% and 23% respectively, practice early detection/early repair of leaks and water efficient operations. Low flow/retrofit programs (16%) and employee education programs (16%) are also well represented, although education for elected officials lags somewhat behind at 10%. Conservation libraries and reduced water pressure in government buildings were also identified (9% and 6%, respectively).

Partnerships and Co-operation Initiatives

- Respondents reported inter-governmental partnerships (12%) partnerships with (other) utilities (13%), government - industry partnerships (5%) and partnerships with major users (8%). Some examples of co-operative endeavours include landscape-related activities with landscape/irrigation experts, tourism related activities, co-operative associations with special interest groups and partnerships with science/educational enterprises.

Provincial Government Initiatives

- Water use efficiency has been identified under Section 10 of the *Fish Protection Act* as a potential measure for providing additional water for fish and fish habitat in a water management plan. (Note: this section of the Act has not yet been proclaimed to date).

Ministry of Environment, Lands and Parks (MELP)

Pollution Prevention and Waste Management Branch

The proposed "Municipal Sewage Regulations" will encourage the use of reclaimed water to address the issues of shortages; increasing supply needs from, and discharges to, streams and aquifers located within municipalities. Uses for municipal effluent via supporting infrastructure such as a third pipe include toilets, outdoor residential and commercial landscaping uses, and hay irrigation. The main targets for indoor re-use will be office and commercial buildings.

Water Management Branch

The Ministry of Environment, Lands and Parks is currently leading or supporting a number of environmental education activities aimed at school children and the general public. Specific educational initiatives and activities with water conservation messages include:

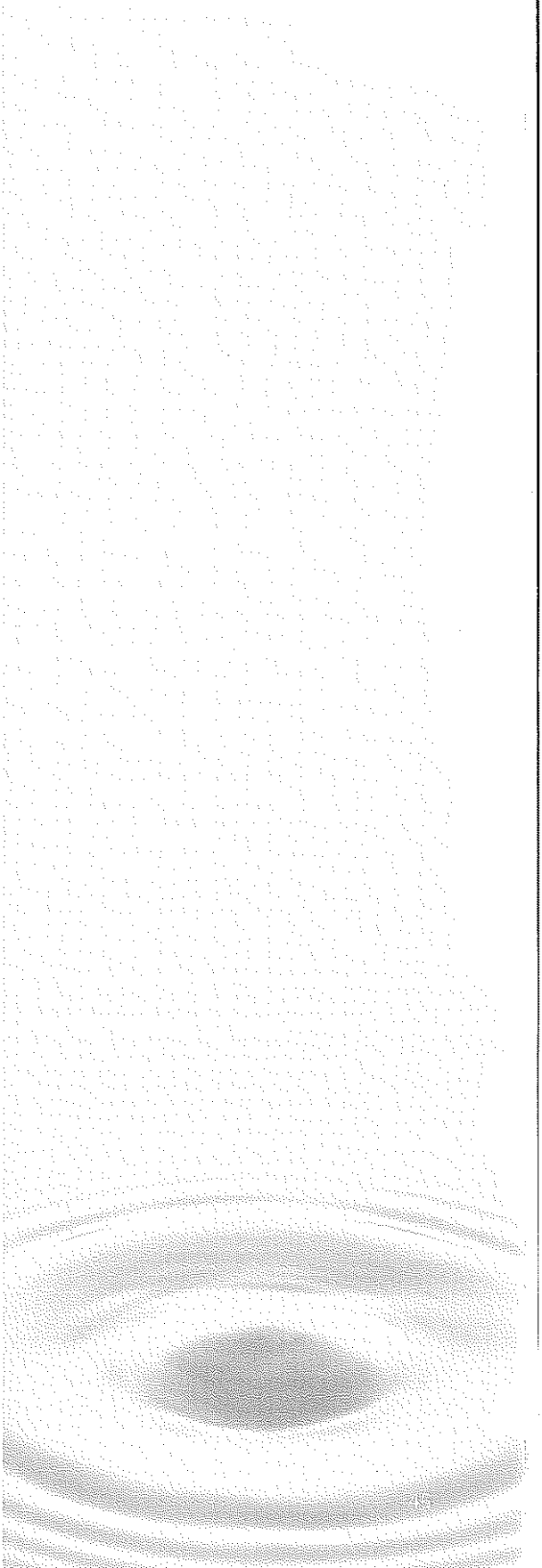
- Community Water Educators - development and delivery of water education materials to a broad audience in several communities throughout the province;
- Green Team Water Crew- development and delivery of school education workshops;
- Environmental Youth Team - funding to support municipal education programs;
- Project Wet - purchase of teach the teacher packages for distribution at workshops conducted by WILD BC.

Ministry of Municipal Affairs (MMA)

The Ministry of Municipal Affairs will release a new Building and Plumbing Code this fall. The current reference to maximum flow rates of fittings and water closet or urinal flush cycles has been extracted from the code and developed as a separate regulation. An additional page will be attached to the regulation acknowledging the *Water Conservation Strategy for British Columbia*, noting that the regulation will be updated.

The Ministry is considering ways to address water use efficiency in their infrastructure grant program. Water efficient measures that may be encouraged or required include:

- water audit and leak detection programs; universal metering and conservation pricing structures; and accurate records of water consumption and quality, representing a period of years.



Ministry of Agriculture & Food (MAF)

The Ministry of Agriculture & Food has been actively involved in testing and piloting water efficiency measures for several years. For example, in February 1990, the Ministry co-funded the Summary Report on Demand Management of Irrigation District Water Supplies in the Okanagan Valley with Agriculture Canada. The report made several conclusions regarding the costs and benefits of implementing an integrated program, including recognition of the value of:

- universal metering for service connections;
- a water rate structure based on the "user pay"principle; and
- possible public education avenues.

The Ministry is currently developing the following manuals and guides:

- B.C. Trickle Irrigation Design Manual - to be completed in early 1999, this document establishes design methodology, system operation and maintenance for trickle irrigation systems in British Columbia.
- Irrigation Scheduling Guide - to be completed in 2000, this document will provide information on the scheduling and timing of irrigation applications.

British Columbia Buildings Corporation (BCBC)

In 1997, the BC Buildings Corporation adopted technical standards that require increased efficiencies in irrigation and landscaping for all provincially owned and operated buildings. It has also endorsed the installation of sensors and timers in landscaped areas, including:

- the fountain located adjacent to the legislative building, which has been equipped with a sensor that turns the water off when winds reach 25 kilometres per hour;
- "climate comfort system" sensors which turn sprinklers off when it rains; and
- timers so that sprinkler systems only run during the night or late evening/early morning.

BCBC has also constructed a new water efficient government health building in Sooke, BC.

Federal Initiatives

The federal government has been a leader in the development of water use efficiency dialogue and policies.

The 1987 *Federal Water Policy* clearly stated the need to acknowledge the value of water and revise water pricing structures to reflect full costs and the user pay principle. The federal policy is currently being updated.

In 1994, the Canadian Council of Ministers of the Environment (CCME) led the development of the *National Action Plan to Encourage Municipal Water Use Efficiency* (1994). The key objective of the *National Action Plan* is to provide municipalities with ways

to reduce water use and subsequently defer or decrease the need to expand existing water/waste water infrastructure, thus saving costs and energy. Elements of the Plan included:

a) Government Leadership, through
- water use efficiency measures in government owned and publicly-funded facilities;
- consistent policies, regulations and codes;
- public education and awareness strategies; and
- encouraging use of existing water efficient products and development of new products.

b) Encouraging Municipal Water Efficiency, through
- senior government assistance, promotion and regulation.

Federal "Green Plan" funds were provided to the Southeast Kelowna Irrigation District for a metering program in February 1994. The program resulted in the installation of 400 irrigation meters. In turn, data from the meters resulted in the development of a software program that identifies periods of inefficient use based on variables such as weather and soil conditions.

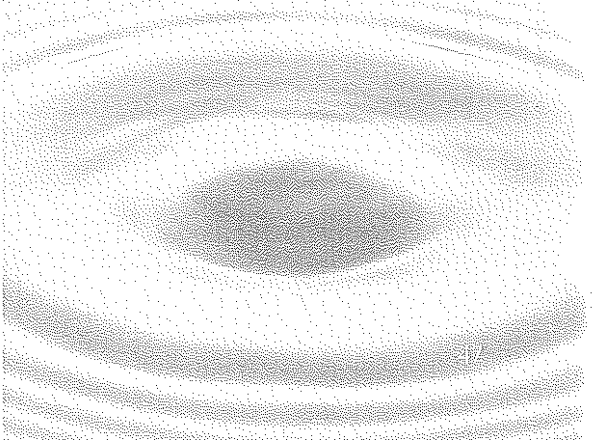
Several discussion papers and research reports have been developed on topics such as water pricing and demand management.

Environment Canada has produced a series of Water Wise pamphlets and associated water use efficiency materials. These may be accessed via the Environment Canada web-sites: www.cciw.ca/glimr/data/water-wise-pamphlets and www.doe.ca/water/en/info/pub.

BC Water and Waste Association (BCWWA)

The BC Water and Waste Association has been instrumental in addressing water use efficiency in the province. In 1992, the Association formed a water conservation committee (currently called the water use efficiency committee). This committee organized two technology transfer seminars over the following two years as part of the annual BCWWA conference. The seminars focussed on water conservation strategies and experiences, and planning and implementing water conservation.

In 1995 the BCWWA committee merged with the provincial committee of the National Task Force (the task force developed the National Action Plan) and took on the leadership role to advocate municipal water use efficiency in the province. The Water Use Efficiency Committee is represented by the federal and provincial governments; a broad spectrum of local governments; BC Hydro; the Water Supply Association of BC and the academic community.



Among the accomplishments of the BCWWA committee is a series of seminars that were delivered from 1995 to 1997. These seminars were intended to raise awareness of the National Action Plan; introducing participants to water use issues, the concept of water use efficiency, and how local governments can implement a water use efficiency plan. The concept behind the implementation of best management practices through a partnership agreement has been a key goal of the committee over the past couple of years.

BC Hydro and Power Authority

BC Hydro's PowerSmart Program includes water-conserving devices such as low flow showerheads and faucets.

Irrigation Industry of British Columbia

The industry has been very progressive in establishing standards that ensure consistency and quality in the installation and maintenance of a variety of irrigation technologies. Information on irrigation system design and operation is available including:

- Evapotranspiration Rates for Turf Grass in B.C.
- Determining Turf Irrigation Requirements and an Irrigation Schedule

Courses are offered on:

- Irrigation Auditing
- Sprinkler System Design
- Drip System Design

BC Nursery Trades Association, Irrigation Industry of BC, Western Canada Turfgrass Association, BC Society of Landscape Architects & Greater Vancouver Water District

This group collectively developed and are delivering a seminar series that provides landscape professionals with water use efficiency information and resources specific to their needs.

Appendix 3: List of Resources

BC Ministry of Environment, Lands and Parks

Water Management Branch,
PO Box 9340 STN PROV GOVT
Victoria, B.C V8W 9M1.
Phone: (250) 387-1181
Fax: (250) 356-0605

Enquiry BC service.
Greater Vancouver: 660-2421
Elsewhere in BC: 1-800-663-7867
By Telephone Device for the Deaf (TDD): Greater Vancouver: 775-0303
Elsewhere in BC: 1-800-661-8773

E-mail: BBrown@water.env.gov.bc.ca

You may also visit the Ministry web page at http://www.env.gov.bc.ca

See the Ministry's website for the Water Use Efficiency Catalogue for British Columbia at http://www.elp.gov.bc.ca/wat/wrs/surface.html

BC Ministry of Municipal Affairs

Municipal Financial Services
PO Box 9490 STN PROV GOVT
Victoria, BC V8W 9N7
Phone: 387-4077
Fax: 356-1873
website: http://www.marh.gov.bc.ca

BC Ministry of Agriculture and Food

Ministry of Agriculture and Food
Resource Management Branch
1767 Angus Campbell Rd.
Abbotsford, B.C.
V3G 2M3
Phone: 604-556-3100
Fax: 604-556-3099

Environment Canada

Environmental Conservation Branch
Ste 700 - 1200 West 73rd Avenue
Vancouver, BC V6B 6H9
Phone: (604) 664-9127
Fax: (604) 664-9126

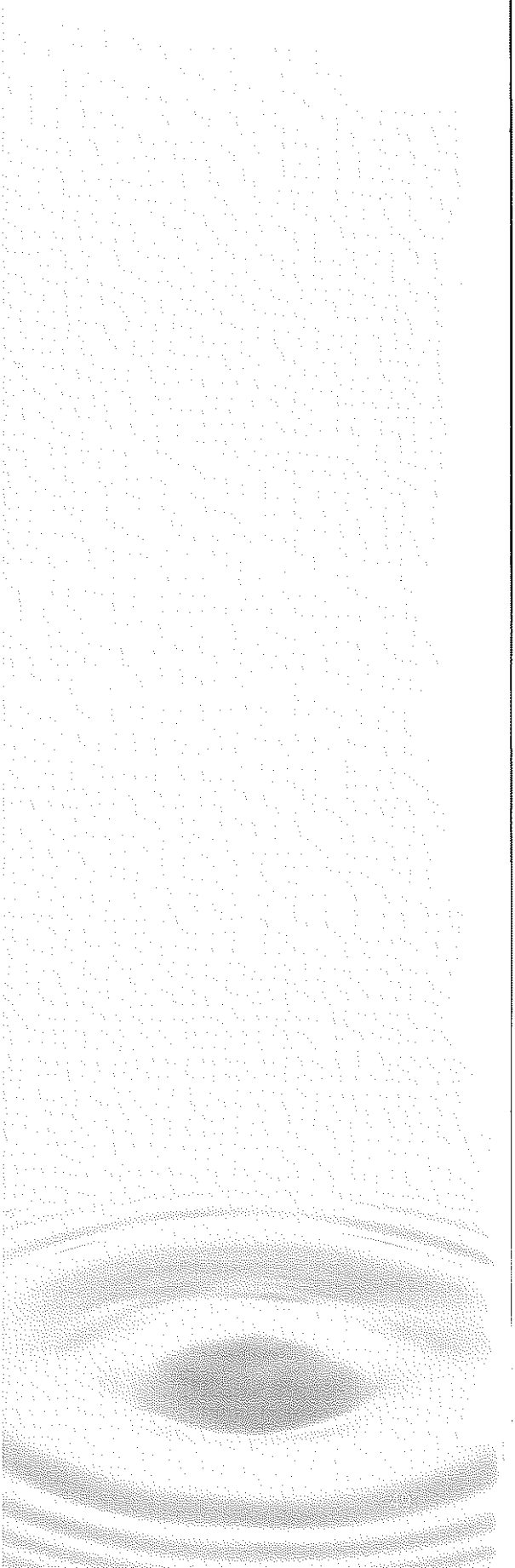
Environment Canada has produced a series of Water Wise pamphlets and associated water use efficiency materials.

Web-sites:
www.cciw.ca/glimr/data/water-wise-pamphlets

www.doe.ca/water/en/info/pub

Greater Vancouver Regional District

Policy and Planning Department
4330 Kingsway
Burnaby, B.C. V5H 4G8
Phone: (604) 451-6181
Fax: (604) 432-6297



BC Water and Waste Association Water Use Efficiency Committee

#342-17 Fawcett Road
Coquitlam, BC V3J 6V2
Phone: (604) 540-0111
Fax: (604) 540-4077

Water Supply Association of BC

P.O. Box 728
Vernon, BC, V1T 6M6
Phone / Fax: (250) 558-1473

BC Agriculture Council

#101-266 Lawrence Ave.
Kelowna, BC V1Y 6L3
Phone: (250) 763-9790
Fax: (250) 717-0370

Irrigation Industry Association of British Columbia

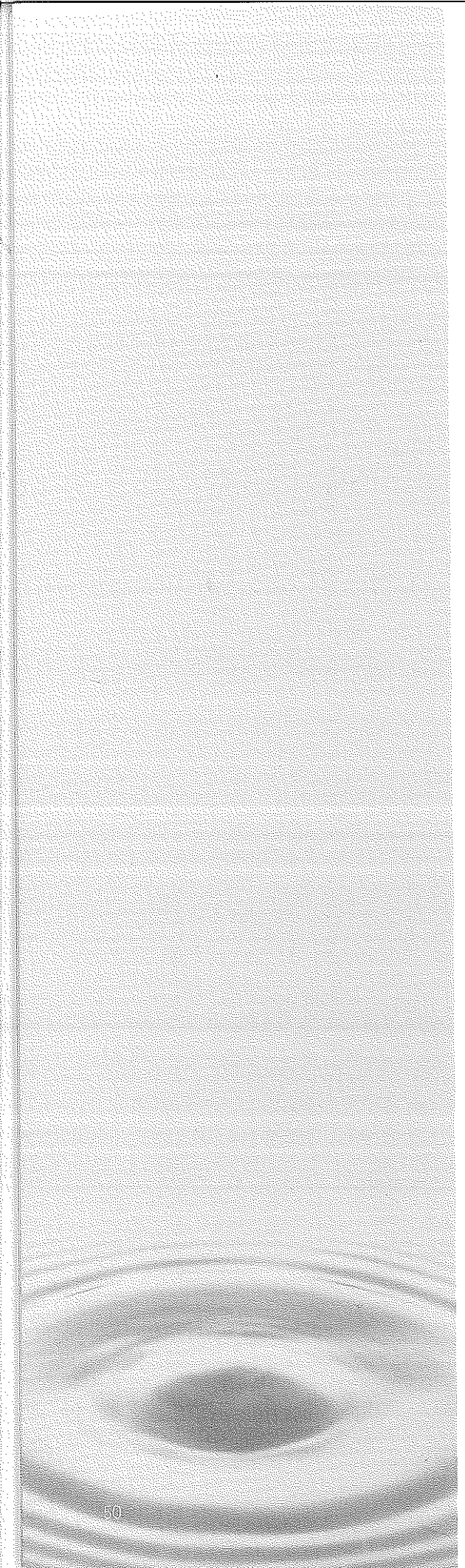
2330 Woodstock Drive,
Abbotsford, B.C.
V3G 2E5
Phone / Fax: (604) 859-8222
E-mail: iiabc@home.com
Website: members.home.net/iiabc

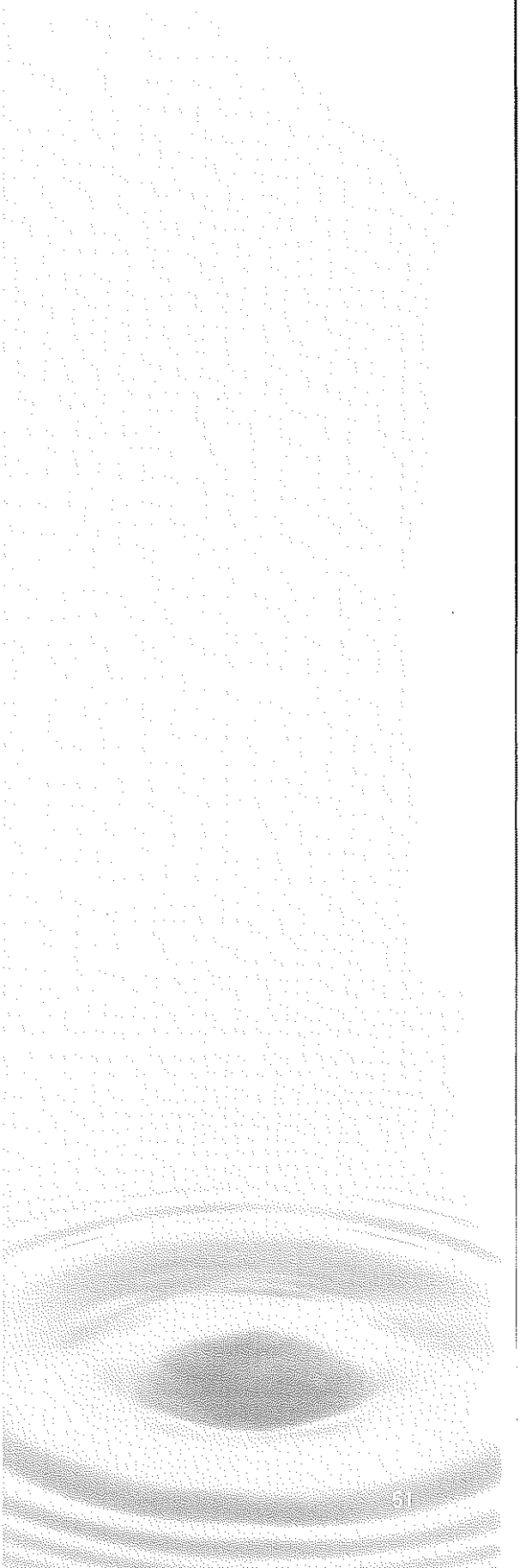
BC Hydro

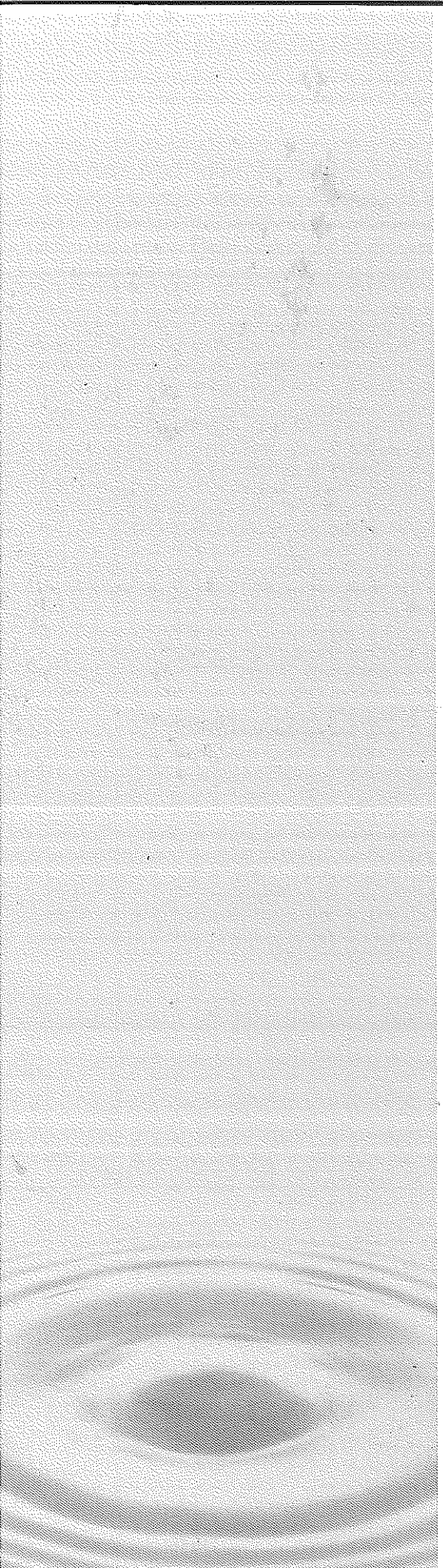
Power Smart
Energy Information Centre 1-800-663-0431

Intergovernmental Committee on Urban and Regional Research (ICURR)

150 Eglinton Avenue East, Suite 301
Toronto, Ont. M4P 1E8
Phone: (416) 973-5629
Fax: (416) 973-1375
internet: http://www.icurr.org/icurr/







BRITISH COLUMBIA
Ministry of Environment, Lands and Parks

QP #4500043629