Cowichan Basin
WATER MANAGEMENT PLAN

A partnership of

Cowichan Valley Regional District
BC Ministry of Environment
Fisheries and Oceans Canada
Catalyst Paper Corporation
Cowichan Tribes
Pacific Salmon Commission

WESTLAND
RESOURCE GROUP INC.

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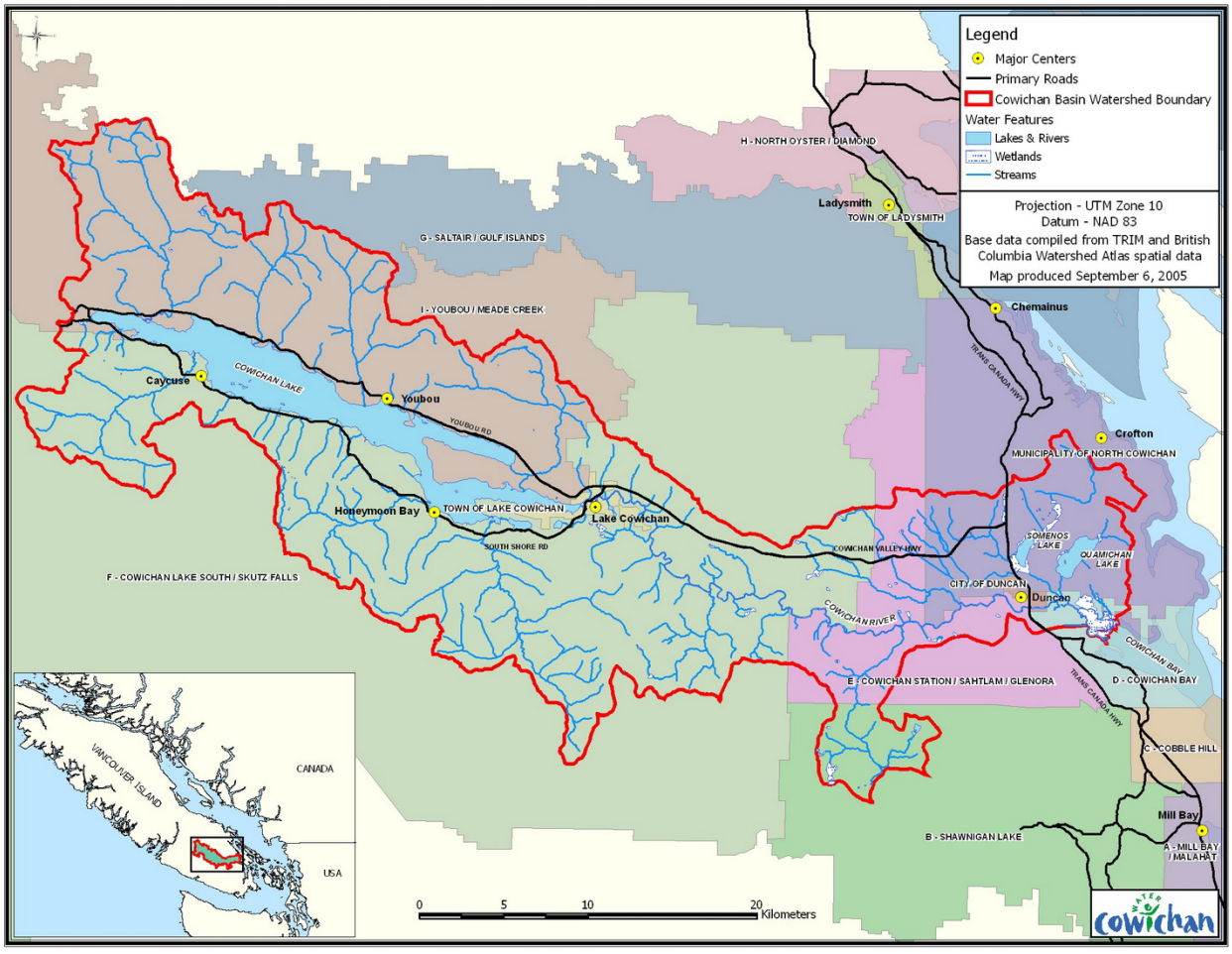
1.0 CONTEXT

1.1 The importance of water in the Cowichan Basin

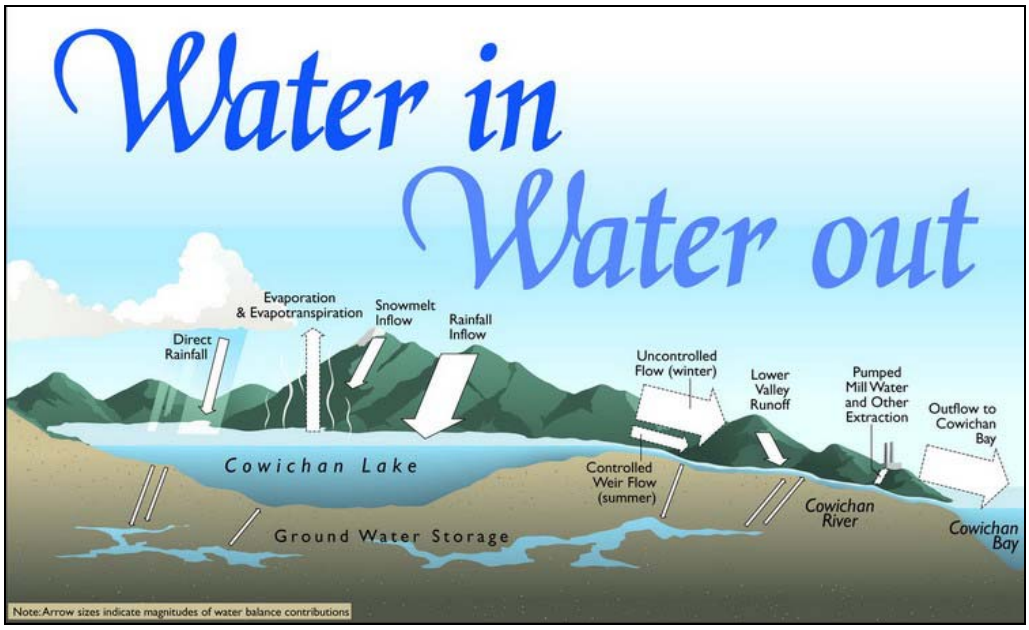
The Cowichan Basin is located in the heart of the Cowichan Valley Regional District (CVRD) on Vancouver Island. The Basin, which has a total catchment area of 930 km^2, drains nearly one-third of the CVRD and includes three municipalities (Duncan, Lake Cowichan, and North Cowichan) and five Electoral Areas (Figure 1).

Figure 1
Jurisdictions in the Cowichan Basin



Water shaped the Cowichan Basin. The Basin we see today is the product of the working of the hydrologic cycle (Figure 2) over thousands of years of geologic and climatic processes, and several centuries of human activity.

Figure 2
The hydrologic cycle, which explains the timing, amounts, and movement of water in the Cowichan Basin



About 29,000 years ago, precipitation in the form of snow and a cold climate resulted in a period of glaciation that, upon its retreat about 10,000 years ago, formed the deep depression of Cowichan Lake, the channels of Cowichan River and its tributaries, and the gravels, sands, and clays in the Cowichan Estuary.

As the climate began to warm, plants recolonized the land, watered by winter rain and snow. Up to five metres of water fell yearly on the peaks west of Cowichan Lake. Much of this precipitation would percolate into forest soils, where it would slowly flow into streams and enter aquifers. Annual floods carried soil into the flatter reaches of the Cowichan River, where it accumulated in fertile pockets.

Gradually, animals began to fill the ecological niches of the Basin. Salmon came to spawn in the gravels deposited in the Cowichan River. Juvenile fish found excellent rearing habitat in the lakes and channels of the Basin. The web of life in the Basin became complex and resilient.

Aboriginal people reached the Cowichan Valley not long after the glaciers receded. The people adapted themselves to the seasonal pattern of weather, fish, and plants, and a rich culture flourished in the Cowichan Basin for centuries.

Then, in the early 1800s, Euro-Canadian settlers arrived, bringing a different view of the Cowichan Basin. The new residents made big changes to the hydrologic system in the Basin.

Dykes were constructed to control winter floods that threatened roads, railroads, and settlement. Water was extracted from waterbodies and aquifers to meet the increasing human demand. Farmers took advantage of the rich soils in the lower Basin and began to straighten and deepen streams to hasten drainage, drill wells, and extract water for irrigation. With settlements came pavement, storm drains, septic fields, and sewage treatment plants, all affecting water in the Basin. Industry also needed water, and in the 1950s the government gave permission for a pulp mill at Crofton to divert substantial volumes of water from the Cowichan River. A weir was built at the outlet of Cowichan Lake to store water for the mill.

In the past 150 years, the face of the Cowichan Basin has changed more than in the preceding 5,000. As the population and development increases in the Basin, so does the rate of change to the hydrologic cycle. Forestry, settlement, agriculture, recreation and tourism, industry, and cultural values compete for water in the Basin, often not leaving enough for healthy ecosystems. The old growth forests are nearly gone and forest soils are thinner, their water-holding capacity reduced. Wishing to be near the water, people build houses on the banks of rivers and lakes, removing riparian vegetation to improve access and views. More than 530 licences have been issued to divert water from streams and lakes in the Basin, and more than 1,300 wells have been drilled to pump water from the aquifers. Thousands of visitors come to the Basin each year to kayak, inner tube, swim, and fish in the lakes and streams and to hike and camp along the shores. Catalyst Paper continues to withdraw water from Cowichan River for mill operation in Crofton.

Seasonal fluctuations and unpredictable amounts of annual precipitation create water management challenges in the Basin. The Basin can experience floods in winter and spring and droughts in summer and fall, when water demand is at its peak. In recent dry years, low summer water levels in the Cowichan River system have put fish populations at risk and threatened closure of the Catalyst Paper mill. Droughts also meant falling water levels in the streams and aquifers that supply many people with drinking water, and less water to dilute treated effluent discharges to the River. Water-based recreation, such as boating, swimming, and fishing, was also affected by the low flow in the River. These problems are likely to get worse in the future as climate change alters the hydrologic cycle of the Basin, bringing increasing winter rainstorms, less snow and earlier melt, and warmer summers.

Water flow at Skutz Falls in the summer (above) and winter (below)

A new relationship between people and water needs to be established to ensure that there will be reliable water supplies available for human use, thriving ecosystems, and a healthy economy in the Cowichan Basin, both now and in the future.

1.2 Why prepare a *Water Management Plan*?

Previous water management in the Cowichan Basin consisted of an Ad Hoc Cowichan River Committee, with members from Cowichan Tribes, Catalyst Paper, Ministry of Environment, and Fisheries and Oceans Canada, making in-season flow management decisions during annual drought crises. The Committee recognized that the approach was inadequate to deal with the complex and long-term issues facing the Basin, and in 2004 they advocated the development of a *Water Management Plan* that would move beyond crisis decision making, prepare responses to the effects of climate change, and plan proactively for current and future water needs in the Basin.

1.3 Purpose and scope of the *Water Management Plan*

The purpose of the *Water Management Plan* is to provide actions to manage water and its use that:

- have broad public support,
- protect the ecological function of the system,
- balance water supply and use today and in the future, and
- increase the understanding of the Cowichan Basin system and its water issues.

The funding Partners (Cowichan Valley Regional District, Ministry of Environment, Fisheries and Oceans Canada, Catalyst Paper, Cowichan Tribes, and the Pacific Salmon Commission) decided to dedicate their resources to tackling the most pressing problem facing the Basin—balancing supply and demand for water, particularly in summer and fall. The scope of the *Water Management Plan* did not include water quality, except when it was related to water supply. The funding Partners recognize that other water quality issues in the Basin will require future action.

The Partners commissioned this Water Management Plan. This is not a water management plan as described in Part 4 of the *Water Act*, so none of those provisions apply (such as requiring approval by the Lieutenant Governor in Council before implementation).

1.4 Related initiatives in the Cowichan Basin

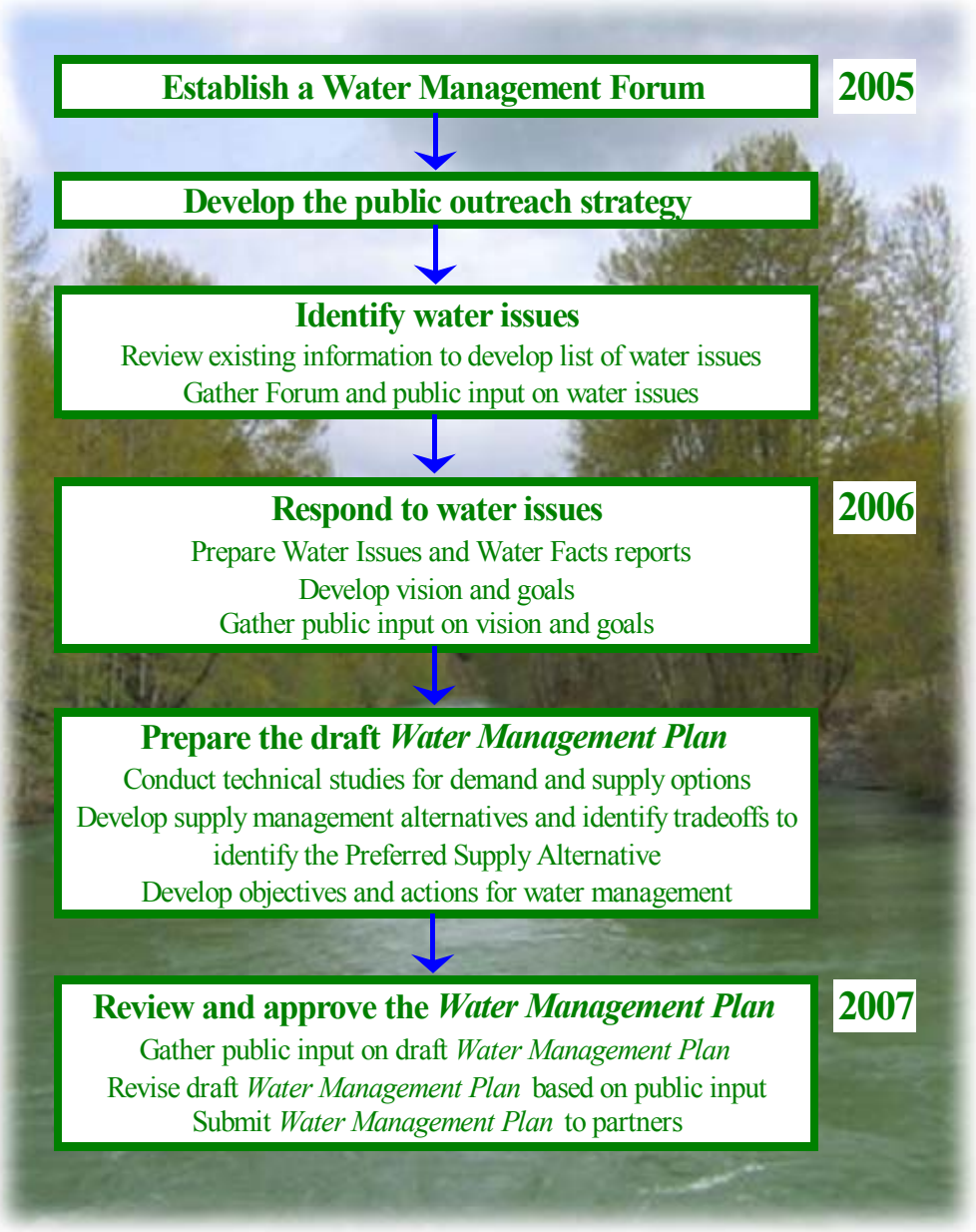
Water-related stewardship initiatives have been underway in the Cowichan Basin for many years. For example, the Cowichan Stewardship Round Table is very active in the Basin, and recently supported the Stoltz Slide project, the largest instream stabilization project ever undertaken on Vancouver Island. Some of the organizations in the Basin dealing with water issues include:

- Cowichan Valley Naturalists
- Somenos Basin Committee
- Quamichan Lake Stewardship Committee
- Cowichan Estuary Preservation Society
- Cowichan Agricultural Society
- Cowichan Community Land Trust Society

2.0 PLANNING PROCESS

2.1 Steps taken to develop the *Water Management Plan*

The planning process was conducted over a 28-month period, from December 2004 to March 2007. The following six main steps were taken to prepare the *Water Management Plan*.



A more detailed description of the planning process is presented in Appendix A.

3.0 PUBLIC INPUT

The public was encouraged to provide input throughout the planning process. Newsletters and response forms were distributed to Cowichan Basin residents at key stages of Plan development, including:

- scoping of water issues (June 2005),
- developing vision and goals (January 2006), and
- presenting the draft *Water Management Plan* content, specifically the objectives and actions for water management (January 2007).

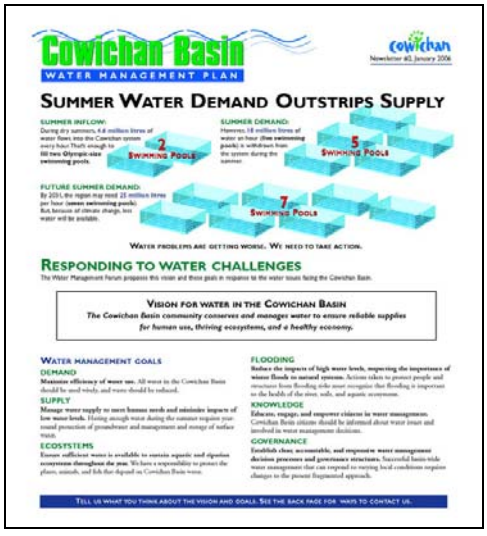
The input gathered during the planning process does not provide a statistically valid public opinion survey. Rather, it serves to identify the range of viewpoints held by those who felt strongly enough about this subject to participate in the public consultation.

3.1 Public input on water issues

The first *Water Management Plan* response form (June 2005) asked Cowichan Basin residents for their thoughts on the importance of water, critical water issues, and ways to resolve these concerns. 241 response forms were submitted. The most important issues for the *Water Management Plan* to address were identified by the public as:

- **sufficient water for household supply;**
- **sufficient water for fish and fishing;**
- **managing population growth and development; and**
- **reducing the demand for water by individuals, municipalities, and industry.**

3.2 Public input on the vision and goals



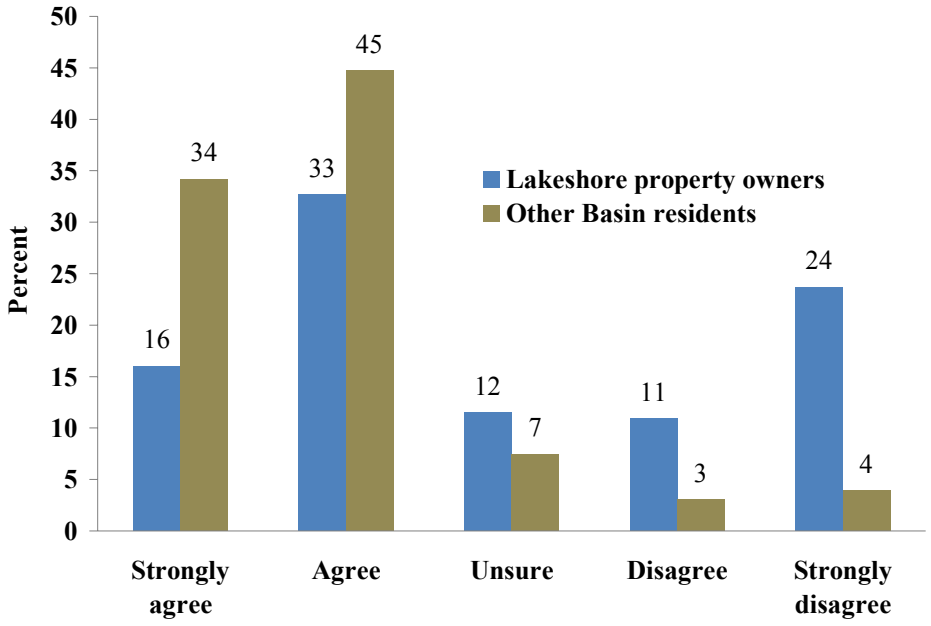
The second public response form (January 2006), asked Cowichan Basin residents for their thoughts on the proposed *Water Management Plan* vision and goals. A total of 152 response forms were received—a high number given that there were no open houses or supplementary advertising to inform people about the newsletter and response form. Responses indicated a high level of support for the proposed vision and goals.

3.3 Public input on draft *Water Management Plan*

In January 2007, the Forum presented information on the proposed objectives and actions for water management, including the Preferred Supply Alternative, to the public for review. More than 320 people attended public meetings, and 384 people provided comments on the response form. In addition, 182 lakeshore owners submitted special response forms designed to examine lakeshore issues.

Overall, there was considerable support for the proposed *Water Management Plan*, although the level of support varied across the Basin (see Figure 3). Respondents who live outside of the lake area were overwhelmingly in favour of the proposed Plan. Of respondents who do not own waterfront property, 79% are in support of the proposed Plan. For waterfront owners, this support drops to 49%. 7% of respondents who do not own waterfront property do not support the proposed Plan, while 35% of waterfront property owners do not support the proposed Plan. It is important to note that even among lakeshore owners, more people support the Plan than oppose it.

Figure 3
Overall support for the *Water Management Plan*



Of the 29 groups of proposed actions described in the response forms, 24 (83%) received support from 60% or more of the respondents. Only two actions were opposed by more than 20% of respondents: licensing, monitoring, and reporting ground water use, and raising the weir by 30 cm and installing pumps (the 'Preferred Supply Alternative'). The public also voiced concerns, suggestions, and words of support.

Concerns

- Licensing and monitoring well water will lead to increased bureaucracy and cost.
- Water metering will lead to privatization of water or public-private partnerships.
- Increasing weir height will exacerbate winter flood levels.
- Raising the weir will result in loss of beaches in summer with higher lake levels, and pumping will result in loss of access to docks and swimming areas.
- The proposed compensation package needs to be made clearer and needs to treat lakeshore owners as a group.
- The Plan does not adequately account for or address the impacts of logging in the upper watershed.
- Treated effluent should not be put in the river, and sewage treatment systems should be upgraded.
- 200-year floodplain mapping puts unreasonable restrictions on building around the lakeshore.
- Existing laws and bylaws are not being enforced, notably forestry regulations, the Riparian Areas Regulation, and other bylaws controlling development.

Suggestions

- Improve weir management to provide more certainty about lake levels and, perhaps, to avoid the need for weir raising or pumping.
- Find ways to further reduce water use at Catalyst Paper, such as scheduling mill maintenance shutdowns for the early fall.
- Stop or control development.

Support

- A good plan; get started immediately.
- An excellent compromise; a proactive approach.
- A step in the right direction.
- Important to adopt a far-sighted, comprehensive plan now to avoid dire water shortages.

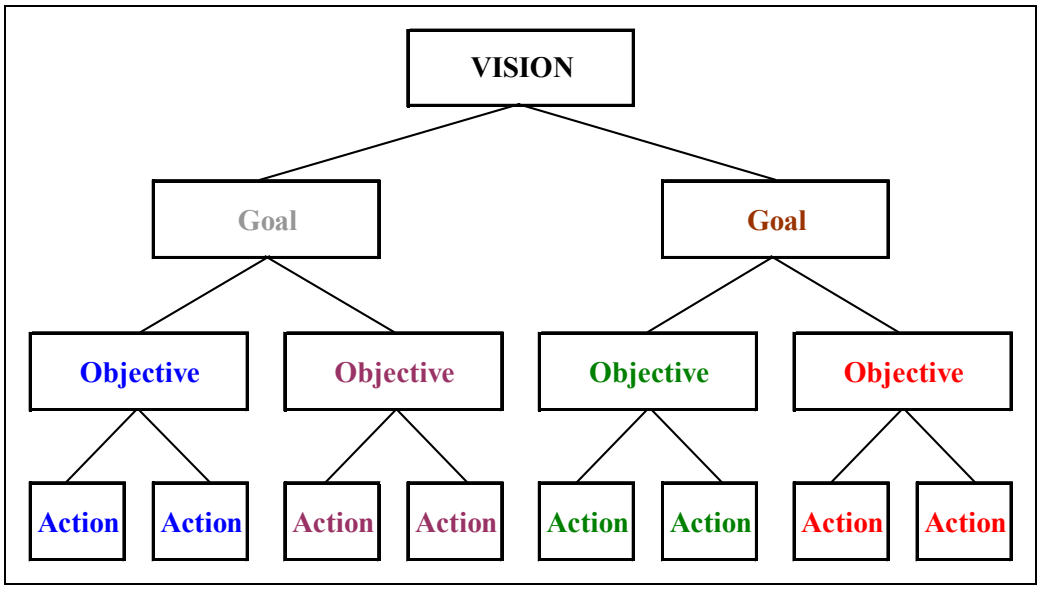
Following the public review, the draft *Water Management Plan* was revised to respond to comments received.

4.0 VISION, GOALS, OBJECTIVES, AND ACTIONS

4.1 Overview

The Water Management Forum developed a vision of a desirable future condition of water in the Basin. Goals were then developed, as broad statements of the steps needed to make the vision a reality. The goals were formulated to respond to the water values and issues raised by the Forum and the public (described in the separately published *Water Issues* report). Objectives and actions support the goals by providing specific, measurable outcomes that will contribute to achieving each goal. Figure 4 shows how the vision, goals, objectives, and actions relate to one another.

Figure 4
Specific and measurable actions for water management are crucial to achieving the vision



The Forum developed one vision, 6 goals, 23 objectives, and 89 actions for water management in the Cowichan Basin. All of the elements of the *Water Management Plan* are designed to advance toward the vision for water in the Basin. It is important that decisions made by regulatory agencies, local governments, First Nations, business, and residents be consistent with the vision, goals, and objectives for water management.

4.2 Vision

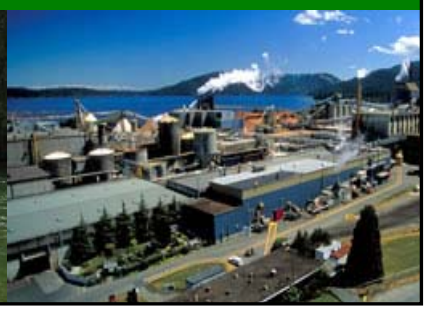
The Forum prepared a vision that captured the critical elements of water in the Basin. The vision is long-term and achievable, powerful and inspiring, and designed to motivate and influence a broad audience.

The Forum recognizes that balancing the ecological, social, and economic needs for water is essential to ensuring that the Cowichan Basin remains a wonderful place to live, play, and work. The Cowichan Basin community (residents, businesses, industry, farmers, government, and tourists) needs to work together and take responsibility for the conservation and wise management of water in the Basin. The vision reflects these priorities.

VISION FOR WATER IN THE COWICHAN BASIN

The Cowichan Basin community conserves and manages water to ensure reliable supplies for human use, thriving ecosystems, and a healthy economy.





4.3 Goals, objectives, and actions

REDUCE WATER DEMAND

Goal 1. Maximize efficiency of water use.

Objective 1a. Initiate improvements to water infrastructure.

ACTIONS

1a-1. Minimize leaks in major water distribution systems by developing and implementing a comprehensive leak detection and system maintenance program.

1a-2. Install water meters on new water connections and retrofit existing connections.

1a-3. Ensure provincial and federal grants for infrastructure are contingent on water metering.

1a-4. Work with the Ministry of Environment to require metering of water used under existing and future surface water licences and water extracted from existing and future wells.

1a-5. Provide incentives (e.g., tax credits, rebates) for replacement of existing plumbing fixtures with water efficient technology.

1a-6. Install water-saving plumbing fixtures (e.g., shower heads, toilets, faucets) in all new construction.

A typical residential water meter

WATER METERING

Metering is widely accepted as a necessary first step for effective water management, because meters:

- provide a method of collecting time-series data that can be used to identify trends in water consumption and factors contributing to these trends,
- aid in detecting leaks in water systems,
- make it possible to quantify how much water individuals and businesses are using, and
- enable the implementation of water pricing methods that promote water conservation.

Studies have shown that metered households that pay based on volume of water used typically use 20% to 50% less water than those charged a flat rate.

Objective 1b. Improve management of water demand in all sectors.

ACTIONS

1b-1. Create a consistent volume-based pricing structure throughout the Basin, and request that the Ministry of Environment apply similar mechanisms.

1b-2. Implement a conservation based sewer charge (i.e., link sewage treatment costs to water consumption).

1b-3. Implement a comprehensive demand management program in the Cowichan Basin that includes the following measures:

- 1b-3a. Ensure that residents, businesses, and industry employ water conservation measures (e.g., xeriscaping, water audits).
- 1b-3b. Promote the use of rainwater harvesting techniques (e.g., rain barrels, cisterns, dugouts, retention ponds) and greywater reuse.
- 1b-3c. Educate residents, business, industry, and decision makers about demand management.
- 1b-3d. Promote efficient agricultural water use techniques, such as drip irrigation instead of spray irrigation.

1b-4. Conduct independent water audits of Catalyst Paper's Crofton mill to investigate opportunities to enhance existing conservation measures.

VOLUME-BASED PRICING
Relates the amount consumers pay to the volume of water they use.
XERISCAPING
From the Greek word xeros, meaning dry. Landscaping that uses native and drought-tolerant plants, shrubs, and ground cover to replace the water-needy lawns common to many suburbs.
WATER AUDIT
A trained auditor to measures water use in a facility, and identifies cost-effective water-efficiency measures that reduce water use.

1b-5. Request that the Ministry of Environment Water Stewardship Division implement the following actions:

- 1b-5a. Adopt legislation requiring the licensing of wells and the reporting of volumes used.
- 1b-5b. For new or amended water licences, attach terms and conditions that require water conservation and reporting of volumes used.
- 1b-5c. Amend provincial legislation and guidelines governing water licences to allow licences to be issued for instream conservation without requiring diversion, works, or human use.
- 1b-5d. Seek opportunities to cancel unused consumptive water licences and do not re-allocate these volumes to other licensees.
- 1b-5e. Reserve unrecorded water in streams for the use of the Crown, for the purpose of conservation and downstream supply.

Objective 1c. Ensure local governments and institutions are leaders in water conservation.

ACTIONS

1c-1. Incorporate comprehensive water conservation strategies in Official Community Plans and other land use and development plans and policies.

1c-2. Ensure that local governments lead by example by using water conservation measures, such as xeriscaping and low-flow fixtures, to decrease water use by municipal and institutional operations.

1c-3. Develop and implement 'green building' policies (e.g., using LEED standards) that include water conservation and water reuse in the construction and retrofitting of public buildings and facilities.

1c-4. Adopt a program of regular water use efficiency audits for publicly-owned buildings and infrastructure.

WATER CENTRIC PLANNING

Enables governments to emphasize water stewardship in land use, development, or resource planning initiatives.

Objective 1d. Promote land use that increases water use efficiency.

ACTIONS

1d-1. Prepare and amend land use and community plans to promote land uses and development patterns that maximize water efficiency and protect Cowichan Basin water resources.

1d-2. Revise municipal and regional policies, regulations, and land use plans to include Low Impact Development and Smart Growth design principles.

1d-3. Develop and implement 'green building' policies (e.g., using LEED standards) that include water conservation and water reuse. Begin with institutional and commercial buildings (Action 1c-3) and eventually include all building types.

SMART GROWTH

Refers to a set of transportation and planning policies that benefit communities and preserve the natural environment. Smart growth advocates land use patterns that are compact, transit-oriented, walkable, bicycle-friendly, and include mixed-use development with a range of housing choices.

MANAGE WATER SUPPLY

Goal 2. Manage water supply to meet human needs and minimize impacts of low water levels.

Objective 2a. Store sufficient spring runoff to support human use and sustain river flows during summer and fall.

ACTIONS

2a-1. Increase the weir height by 30 cm and install pumps below the zero storage elevation to pump water from the Cowichan Lake to Cowichan River when required.

2a-2. Recommend that new licences for substantial withdrawals of surface water provide equivalent licensed storage.

Weir and boat lock

Objective 2b. Actively manage spring and summer water levels to minimize the potential for lakeside properties to be adversely affected.

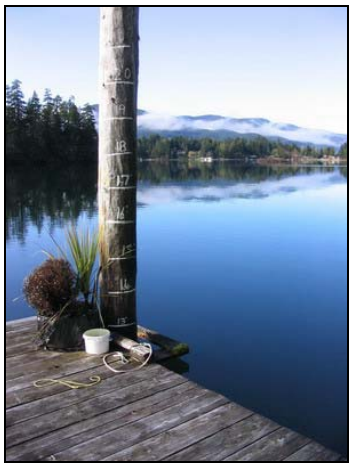
ACTIONS

2b-1. Revise the weir operation rule curve to include an upper and lower bound of managed water levels in the lake (a rule "band"), as described in Objective 3a.

2b-2. Operate the weir to store spring and summers inflows to the lake, within rule band limits.

2b-3. Store only sufficient water in Cowichan Lake needed to maintain ecological protection and support human use in the Cowichan Basin.

2b-4. During the process of applying for a new water licence for the weir, assess impacts of water storage levels on lakeshore properties and implement appropriate compensation procedures and processes, as in Figure 7.



Measuring water levels at a Youbou dock

Weir gates

Objective 2c. Ensure that water storage decisions account for the potential effects of climate change.

ACTIONS

2c-1. Periodically assess the water management program in light of climate data and levels of demand.

Objective 2d. Protect surface and ground water resources from contamination that could reduce supply.

ACTIONS

BEST MANAGEMENT PRACTICES (BMPs)
Policies, practices, procedures, or structures implemented to mitigate the adverse effects development, agriculture, logging, and other land uses may have on water.

2d-1. Implement Best Management Practices (BMPs) for stormwater management and protection of ground water resources in the Cowichan Basin.

2d-2. Investigate and implement strategies to avoid or minimize the release of treated effluent directly to the Cowichan River (e.g., by applying it to forest of farm land), particularly during the summer.

2d-3. Maintain a minimum flow of 7 m^3/sec from June 15 until the end of the weir operating season, increasing to 8.5 m^3/sec by 2031, to protect the quality of Cowichan River water.

2d-4. Using incentives and enforcement of regulations, relocate septic fields susceptible to flooding to avoid contamination of lakes, streams, and the Cowichan River.

2d-5. Install community sewage treatment facilities in Youbou, Honeymoon Bay, Mesachie Lake, Bear Lake, and other lakeside and riverside settlements.

2d-6. Install sufficient boat sewage pumpouts on Cowichan Lake to serve current and future boating requirements.

2d-7. Enact and enforce regulations to protect ground water resources (e.g., road runoff, commercial, and agriculture operations).

2d-8. Design and implement pesticide reduction programs, including education and incentives, for homeowners, farmers, and golf courses.

2d-9. Identify and remediate areas of upland and riverbank erosion.

Lake Cowichan Sewage Treatment Plant

Objective 2e. Manage land and resources to avoid adverse effects on Basin hydrology (quantity and timing of runoff).

ACTIONS

2e-1. Minimize effects of land cover changes on Basin hydrology by ensuring land management meets or exceeds enacted regulations and bylaws.

2e-2. Using forestry, land cover, hydrology, and climate change research, identify potential improvements in watershed management and, if appropriate, recommend amendments to provincial regulation and local bylaws.

2e-3. Engage forest companies, the Ministry of Agriculture and Lands, the Ministry of Forests and Range, and other interests in collaborative development of land and resource use practices that protect the hydrology and water quality of the Cowichan Basin.

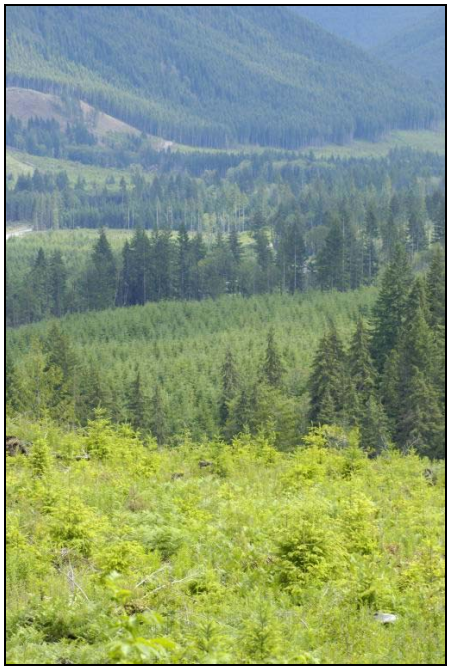
2e-4. Engage the community in developing and implementing land cover policies and other watershed management practices that protect the Basin's hydrology.

LAND COVER

Physical and biological materials on or above the soil surface, such as vegetation or pavement.

PRIVATE MANAGED FOREST LAND

Privately-owned managed forest land is governed by the *Private Managed Forest Land Act* (PMFLA), under the Ministry of Agriculture and Lands. A council composed of government and private landowner representatives administers regulations pertaining to forest practices on private managed forest land. The local government does not have jurisdiction over forestry activities on private managed forest land.



Multiple age class tree plantations in the Cowichan Basin

Harvested landscapes on the north shore of Cowichan Lake, February 2007

PROTECT AND ENHANCE ECOSYSTEMS

Goal 3. Ensure sufficient water is available to sustain aquatic and riparian ecosystems throughout the year.

Objective 3a. Meet the recommended fish conservation flows year round in the Cowichan River.

ACTIONS

3a-1. Maintain a spring flow of 20 to 30 m^3/sec from April 1 to May 1 and 15 to 30 m^3/sec from May 2 to June 15.

3a-2. Maintain a minimum flow of 7 m^3/s from June 15 until the end of the operating season to sustain ecological function, increasing to 8.5 m^3/sec by 2031 to compensate for the effects of increased demand and climate change.

3a-3. In wet summers, increase the release to 9 m^3/sec and, in dry summers, reduce flows to 4.5 m^3/sec if necessary and as determined by the weir operation rule band.

3a-4. Provide two pulses of water in the fall (last week in September and first week in October) of 16 m^3/sec for 30 hours each, designed to aid migrating salmon.

Objective 3b. Maintain, enhance, and restore aquatic and riparian habitats.

ACTIONS

3b-1. Identify, inventory, and map aquatic and riparian habitats and restoration opportunities.

3b-2. Develop land use policies and development patterns that protect, maintain, and enhance healthy aquatic and riparian ecosystems.

3b-3. Continue and expand habitat improvement projects, including spawning channel improvements and riparian restoration and replanting.

3b-4. Adopt or amend tree protection bylaws to strictly regulate tree cutting and vegetation clearing in riparian areas.

3b-5. Protect riparian habitat from adverse effects of logging, industrial, commercial, and residential development through enforcement of local and provincial regulations.

3b-5a. Ensure consistent enforcement of Riparian Areas Regulation setbacks and associated controls on development adjacent to streams, wetlands, lakes, and rivers by all levels of government.

3b-5b. Enforce compliance with the riparian protection elements of the Private Managed Forest Land Act and Council Regulation.

Riparian habitat along the Cowichan River

MANAGE STORMWATER AND FLOODING

Goal 4. Reduce the impacts of high water levels, respecting the importance of winter floods to natural systems.

Objective 4a. Establish adequate setbacks from Cowichan Lake and River to reduce potential flooding risks.

ACTIONS

4a-1. Extend coverage of 200-year floodplain mapping to include all areas of the Basin.

4a-2. Review current 200-year floodplain levels and update as required using state-of-the-art hydro-technical data and hydraulic analysis techniques.

4a-3. Continue to enforce bylaws that prohibit new development or deposit of fill below the 200-year flood level.

4a-4. Flood proof at-risk structures where practical.

Objective 4b. Increase the flood buffering capacity of floodplain and constricted channel areas.

ACTIONS

4b-1. Involve all municipalities and electoral areas in the preparation and implementation of a Flood and Drainage Management Plan (FDMP) for the Cowichan Basin to provide a coordinated approach to stormwater and flood management.

4b-2. Maintain the capacity of the Cowichan River channel to accommodate flood flows where it is obstructed by gravel, debris, or structures.

Flooding at the Town of Lake Cowichan

Objective 4c. Ensure drainage is adequate to allow tillage of farm fields in late spring.

ACTIONS

4c-1. Develop and implement a drainage improvement and control system for the Somenos and Quamichan sub-basins as part of the FDMP.

4c-2. Promote crop selection in the Somenos and Quamichan sub-basins that is appropriate for their soil and hydrologic conditions.

Objective 4d. Maintain winter water levels that are high enough to protect organic soils.

ACTIONS

4d-1. Maintain winter and spring inundation of low-lying areas of the Somenos and Quamichan sub-basins, to protect organic soils and to maintain ecological functions.

Objective 4e. Promote stormwater management that emphasizes infiltration and detention and minimizes impervious surfaces to avoid increases in peak flows.

ACTIONS

4e-1. Install appropriate stormwater management infrastructure based on Low Impact Development (reduced runoff, on-site infiltration) in new developments, and retrofit existing developments to reduce peak runoff consistent with the FDMP.

4e-2. Adopt subdivision or development services bylaws and Official Community Plan policies based on Low Impact Development principles.

LOW IMPACT DEVELOPMENT

Land planning and engineering design approach that maintains and enhances the pre-development precipitation, runoff, infiltration, and evaporation characteristics of the watershed.

INCREASE KNOWLEDGE AND AWARENESS

Goal 5. Educate, engage, and empower citizens in water management.

Objective 5a. Foster basin thinking among all water users in the Cowichan Basin and ensure they understand and support water management initiatives.

ACTIONS

5a-1. Develop and implement an on-going communications and outreach strategy to share information with the community through print and electronic media about the Basin and its valued water resources.

5a-2. Promote, support, and develop partnerships with non-government organizations in the implementation of the *Water Management Plan*.

5a-3. Develop education initiatives to enable elementary and secondary school students to understand important water issues and stewardship initiatives in their community.

5a-4. Engage the Cowichan Tribes in water management in ways that ensure cultural values are reflected in decisions.

BASIN THINKING

Basin thinking requires a perspective that considers the potential effects of our actions on the needs of other people and species, and on the complex functioning of watersheds.

It involves moving beyond upstream-downstream personal perspectives.

Objective 5b. Build trust among water users, managers, regulators, and residents through communication and involvement.

ACTIONS

5b-1. Seek opportunities to involve volunteers and form partnerships with nongovernmental organizations as the *Water Management Plan* is implemented.

5b-2. Engage Basin residents, government agencies, and decision-makers in an open and continuing dialogue about water management.

Objective 5c. Conduct regular monitoring of water related conditions in the Cowichan Basin and provide this information to the public.

ACTIONS

5c-1. Monitor and report on the volumes of water used annually, including wells, licences, and community sources.

5c-2. Require well monitoring and reporting as a condition of rural subdivision, rezoning, or building permit issuance.

5c-3. Implement state-of-the-art climatic and hydrologic (i.e., stream flow, lake level, aquifer) instrumentation and monitoring, and link to water management decisions in the Basin.

5c-4. Prepare annual reports on the status and effectiveness of *Water Management Plan* implementation, and make these reports available to the public.

Objective 5d. Conduct research to support knowledgeable decision-making and water management.

ACTIONS

5d-1. Collect and maintain data on aquifer capacity, aquifer recharge rate, ground water extraction, and the relationship of ground water pumping to base flow in the Cowichan River and other nearby streams, and make this information available to the public.

5d-2. Develop guidelines for use of ground water and management of aquifers.

5d-3. Study the use of water in Basin agriculture, to support measures that will increase the efficiency of irrigation and other water uses.

5d-4. Apply an adaptive approach to water management, by obtaining and reviewing research data on topics such as:

- effectiveness of demand management,
- climate change effects and responses,
- land use-water relationships, and
- ecological effects of water use and management.

IMPROVE GOVERNANCE OF WATER

Goal 6. Establish clear, accountable, and responsive water management decision processes and governance structures.

Objective 6a. Establish and fund a water management advisory council that represents Basin-wide interests, maintains on-going dialogue among stakeholders, and builds trust and ownership among the participants and the public.

ACTIONS

6a-1. Establish a Cowichan Basin Water Advisory Council (CBWAC) to guide the implementation of the *Water Management Plan* and improve the quality of water management decisions in the Cowichan Basin.

6a-2. Actively encourage regulatory agencies to increasingly base their water management decisions on CBWAC recommendations.

6a-3. Create secure and stable funding sources to support water management activities of the CBWAC.

6a-4. Designate a regional coordinator to oversee the development of the water management strategy and to help implement water reduction actions.

6a-5. Involve landowners, business, developers and other members of the public in Cowichan Basin water management decisions.

Objective 6b. Ensure decisions on restoration and research projects and funding continue to be guided by the Cowichan Stewardship Round Table.

ACTIONS

6b-1. Provide ongoing support for the work of the Cowichan Stewardship Round Table, including referring research and restoration decisions to the Round Table, and providing financial and staff resources.

Objective 6c. Ensure the costs of water management facilities and operations are shared fairly among responsible and benefiting parties.

ACTIONS

6c-1. Assess all water storage and demand management decisions on the basis of fair distribution of benefits and costs.

6c-2. Emphasize cost effectiveness in water management decisions in the Cowichan Basin.

5.0 IMPLEMENTATION STRATEGY

Many public comments on the draft *Water Management Plan* emphasized the desire to see rapid action to improve the management of water resources. The Forum has highlighted the urgency of resolving critical water use issues.

It is important to understand the challenges of implementing the *Water Management Plan*. Resolving the serious and complex water issues in the Cowichan Basin will require a diligently applied program over decades. Moreover, implementing the *Water Management Plan* requires coordinated action on a variety of fronts at the same time. Implementing just a few elements of the Plan will not work.

This implementation strategy suggests a direction for advancing the *Water Management Plan*. The strategy provides a broad outline; the details are left to future stages of the implementation program.

This section of the Plan examines several aspects of implementation:

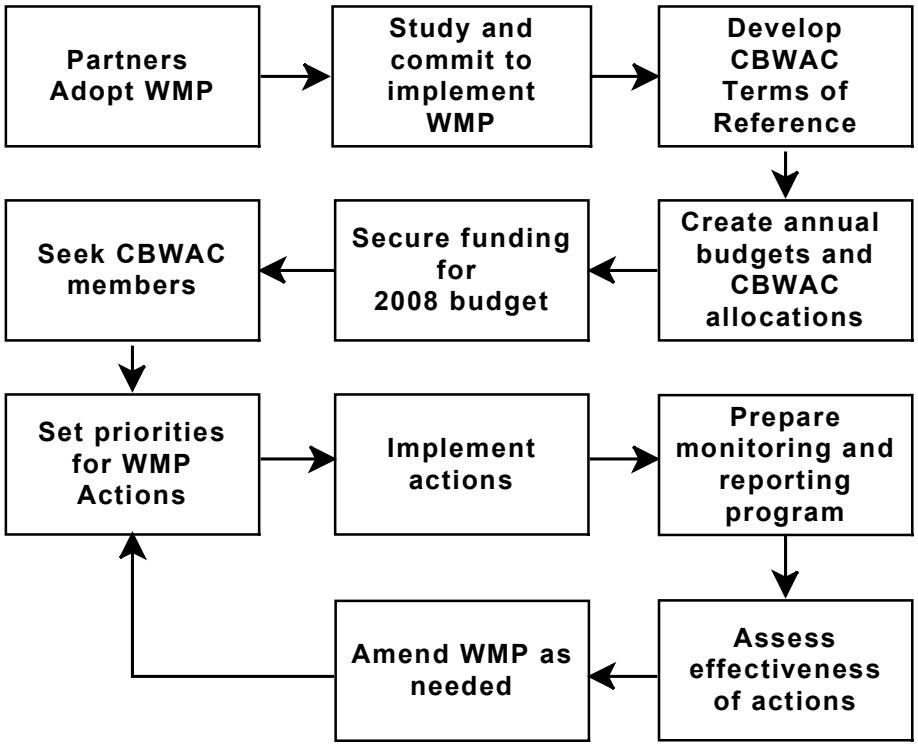
1. What are the major steps in moving from plan to action?
2. Who should be responsible for the actions?
3. What sequence of actions would be most logical in achieving plan goals?
4. How should concerns of owners of Cowichan Lake shoreline properties be addressed
5. How will we know if the plan is successfully managing water issues?
6. How much will water management cost?

5.1 Major steps in moving from plan to action

Figure 5 shows a recommended set of steps in advancing the *Water Management Plan*. The following considerations may affect how the major steps are conducted.

Adopt the Water Management Plan. The funding partners that have some authority over water in the Cowichan Basin need to adopt the *Water Management Plan*. This core group is the CVRD, Ministry of Environment, Fisheries and Oceans Canada, Catalyst Paper Corporation, and the Cowichan Tribes. Because many actions require local government support, the City of Duncan, District of North Cowichan, and Town of Lake Cowichan should also adopt the Plan.

Figure 5
Major steps in *Water Management Plan* implementation



Study and commit to implement the Plan. Staff of the Partner agencies should convene and discuss means of implementing the Plan. Once these details have been discussed, it is important that the leadership of Partner agencies unequivocally commit to implement the Plan. This commitment will send a clear signal to agency staff, the public, and others that actions will be taken to convert the Plan to reality.

Develop CBWAC Terms of Reference. Before the CBWAC can be constituted, a Terms of Reference should be developed and accepted by the signatories to the Plan. The Terms of Reference should establish:

- the purpose and goals of the CBWAC,
- its mandate and limitations to its authority,
- who will be invited to be a member,
- how members will be selected and length of terms,
- how administrative responsibilities and technical support will be provided,
- how decisions will be made, and
- how costs will be divided, funds obtained, and expenditures monitored.

The *Water Management Plan* calls for the CBWAC to have an advisory role. Members of the public and some organizations strongly recommended that effective water management requires a locally-responsible water authority. The CBWAC could be initiated as an advisory body, with the intention of periodically examining the potential to assume increasing levels of authority and responsibility. The CBWAC is intended to replace the Ad Hoc Cowichan River Committee, which has guided operation of the Cowichan Lake weir in recent years. The members of the committee (Catalyst Paper, MoE, DFO, others) are represented on the CBWAC.

Create annual budgets and CBWAC allocations. Once the priorities for action are set in terms of urgency and logical sequence, the CBWAC needs to estimate costs for the suite of actions and assemble a budget. It is recommended that multi-year budgets be created, to allow longer-term planning for water management initiatives. An important part of the budgeting stage is to identify opportunities for funding of specific actions by special-purpose government programs or from non-profit organizational donations. Finally, the allocation of costs among the CBWAC member organizations needs to be determined, ensuring a fair distribution of costs and benefits in the Basin.

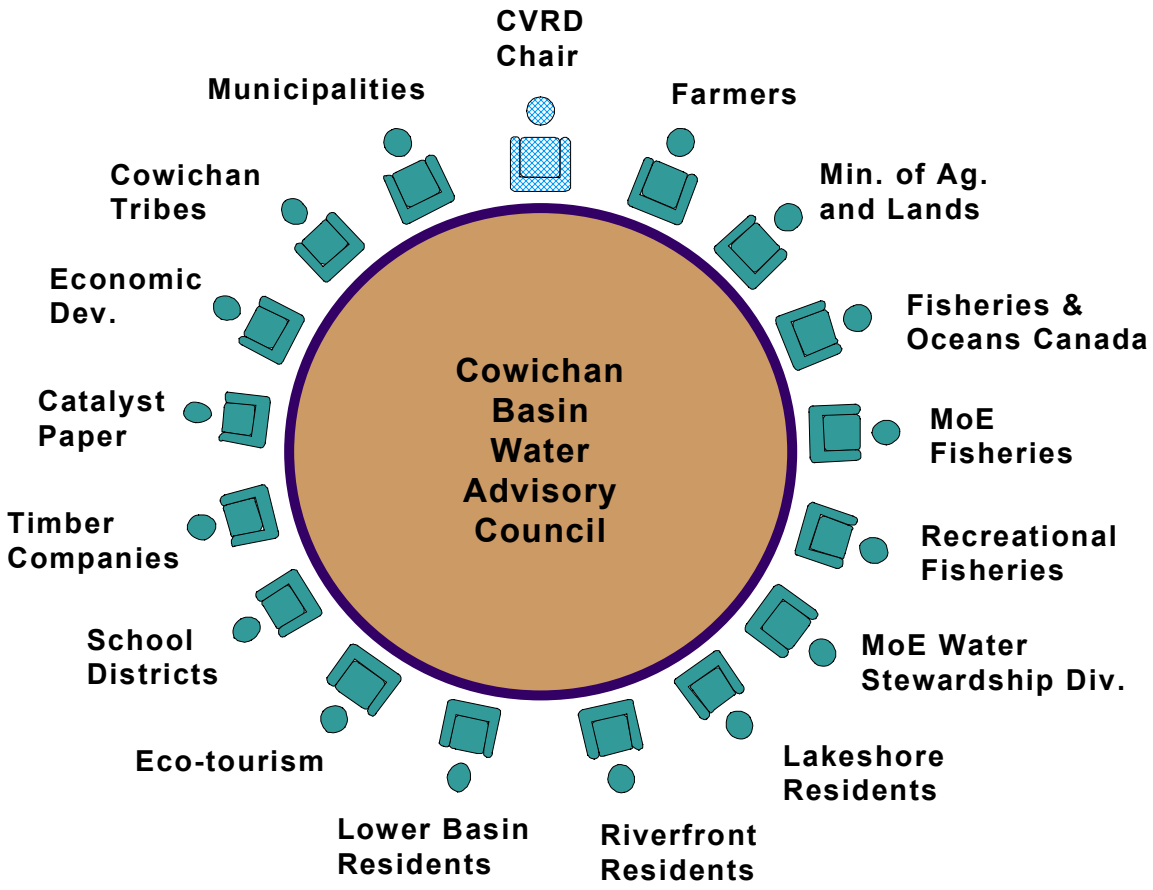
Secure funding for the 2008 budget. The government and industry CBWAC members need to seek funding from their respective organizations, in keeping with the formulas and priorities set by the CBWAC. This step will be an important test of the commitment of the various parties to water management in the Cowichan Basin.

Seek CBWAC members. Applying the method adopted for selecting CBWAC members, an initial Council should be created. The CVRD should assume primary responsibility for administering the selection process, scheduling and hosting the inaugural meeting, and providing long-term secretariat and administrative services to the CBWAC. Figure 6 represents a potential structure for the CBWAC, showing the CVRD with a major coordinating, administrative, and leadership role, and a variety of other potential categories of members. The CVWAC and its individual members report to their parent organizations.

Set priorities for WMP actions. This implementation strategy suggests priorities for major groups of actions and a recommended sequence of actions (Figure 7). One of the CBWAC's first tasks needs to be priority setting, making reference to the guidance provided in this Plan and considering the members' capacity to undertake a potentially wide range of tasks.

Implement actions. Once the funding is in place, actions can begin to be taken, in keeping with the priorities established by the CBWAC and its members. Some actions may be administered directly by participating organizations (e.g., water meters installed by a municipality), whereas others may be administered by the CBWAC (e.g., designing and conducting regional water monitoring and reporting).

Figure 6
Major groups to be represented on the Cowichan Basin Water Advisory Council



Prepare monitoring and reporting program. To fill the knowledge gaps identified during preparation of the *Water Management Plan* and to ensure that actions taken to manage water are effective and efficient, the CBWAC should develop and administer a broad program of monitoring of physical parameters (e.g., volumes of water moving through the Cowichan Basin) and human decisions and actions (e.g., changes in water use patterns, effects of land use planning decisions on water use). For some behavioural variables, statistically valid public or group surveys may be needed. The results of this monitoring work should be regularly reported to the public, using a cost-effective balance of electronic and print distribution.

Assess effectiveness of actions. The public response forms indicated a high level of concern about the cost of the proposed actions and the effect of water management decisions on property, the economy, and the environment. Using the results of the monitoring program, the effectiveness of the water management program should be assessed.

Amend the Water Management Plan as needed. Using the monitoring and assessment results, the CBWAC should implement a periodic review of the *Water Management Plan*, the proposed actions, and methods of delivery. The review should consider changes in the environment, society, technology, and public values. The *Water Management Plan* should be amended if necessary to ensure that progress is being made toward the vision of water in the Basin. Substantive amendments to the *Water Management Plan* should involve a thorough process of public involvement.

5.2 Responsibility for implementing the actions

Implementing most of the actions described in the *Water Management Plan* will be the responsibility of one or more of the members of the CBWAC. As a general rule, responsibility for an action will be determined by answering three questions:

1. Who has legal authority over the resource or topic that is the subject of the action?
2. Who benefits most from the action?
3. Who has the financial or staff capacity to implement the action?

As an aid in making decisions about responsibility for water management actions, Table 1 summarizes the primary water-related authority or responsibility of likely participants in the Cowichan Basin's water management program.

Table 1
Major responsibilities of potential participants in water management

Participant	Primary water-related responsibilities
MOE-Water Stewardship Division	Water Act administration Water licensing Ground water studies and protection Dikes and flood protection measures Dam safety Instrumentation
Fisheries and Oceans Canada	Fisheries Act administration Research and studies into water and fish issues Riparian Area Regulation signatory
MOE Fisheries Management Section	Fish and fish habitat management Riparian Area Regulation signatory
CVRD and municipalities (including water utilities)	Land use planning Represent local residents Operate water utilities Stormwater management

Participant	Primary water-related responsibilities
CVRD and municipalities (including water utilities) cont.	Implement demand management programs Summer water use restrictions Liquid waste management and treatment plant operation Floodplain mapping Obtain and distribute water Meter and bill for water use Maintain infrastructure Dike maintenance Riparian Area Regulation Bylaws
Cowichan Tribes	Protect rights and title to water and fish Traditional stewardship of the resource
Catalyst Paper Corporation	Maintain and operate weir Fulfill terms of water licences
Forest companies	Forest practices in the Cowichan Basin
Agricultural producers	Irrigation and drainage Particular interests in Quamichan and Somenos sub-basins
School districts	Education—environmental science, sustainability, citizenship
Cowichan Restoration Roundtable	Ecological restoration projects
Pacific Salmon Commission	Fisheries research and conservation
Basin residents and businesses	Private withdrawal of surface and ground water Eco-tourism, recreational, other water-dependent businesses Management of lakefront and riverside properties Development and management of land in the Basin

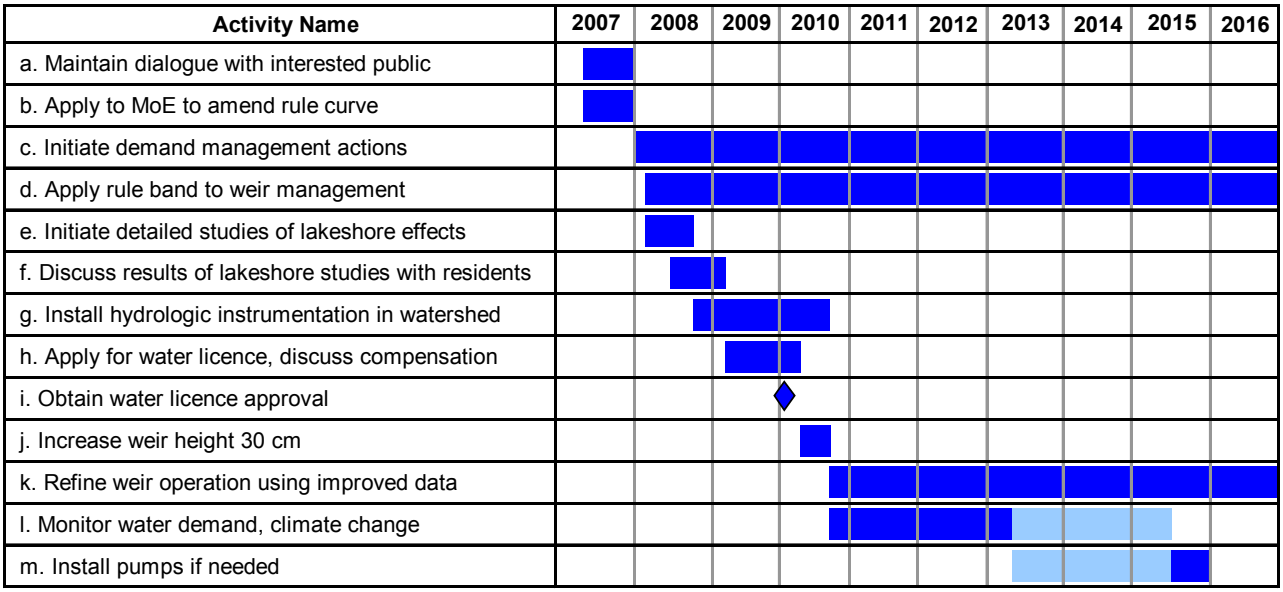
As actions are identified for implementation, responsibilities should be assigned for funding, conducting the work, communications, public involvement (if appropriate), and monitoring.

5.3 Sequence of actions to achieve Plan goals

One of the CBWAC's first tasks will be to set priorities among the *Water Management Plan* actions. Certain technical and public perception considerations suggest that the following sequence of actions should be pursued (Figure 7). The timelines are approximate only, and should be considered as guidelines for more detailed planning by the CBWAC.

The light-coloured timeline bars for monitoring demand and climate change and installing pumps represent scheduling flexibility. If the water supply and demand conditions warrant, the pumps could be installed as early as 2012. If changes in weir height and operation provide sufficient water supply year-round, then the pump installation could be deferred to 2015 or later.

Figure 7
General sequence and timeline of major water management actions



The logic supporting the proposed sequence includes the following.

- It is important to maintain a dialogue between the water management Partners and members of the public that have expressed an interest in water management.
- The "rule band" and weir operation protocol of upper and lower limits on lake levels and river flow should be implemented in the first operating season after the Plan is approved. Catalyst Paper will need to apply to the regional water manager to amend the existing rule curve.
- Demand management has strong public support, but it takes an extended period of time to successfully reduce water use among the public, businesses, and institutions. Hence, an early start on demand management is appropriate.
- Once detailed study of lakeshore margins has been completed, owners of lakeshore properties should be engaged in a discussion of potential impacts, mitigation, and compensation.
- Instrumentation should be installed at key locations in the watershed to monitor rainfall, snow accumulation, and runoff. Automated lake level monitoring (automated river flow monitoring already exists) and weir operating equipment should be installed. Once results of the monitoring are available, more precise operation of the weir should be instituted to optimize water storage, following the rule band.
- An application for a water licence for the weir and pumps should be submitted to the BC Ministry of Environment Water Stewardship Division. Following the steps provided in this Plan (Figure 8), the licence applicant(s) should continue discussions of lakeshore effects with property owners, and examine the need for, and nature of, compensation for property effects. Agreement should be sought with property owners on compensation for lakeshore effects.

- Once a water licence is issued for the weir and pumps, work on the weir should start during the next low water period. It may not be necessary to install the pumps right away. The rule band and operating instructions should be re-examined as part of the detailed engineering design that would accompany weir raising.
- With the installation of instrumentation and raising of the weir, conditions in the Cowichan Basin should be tracked for several years. The effects of other water management actions (particularly demand management and improved watershed management) and of climate change should be monitored to determine if adequate water is available to meet the goals of the *Water Management Plan*. If so, installation of the pumps may be delayed. If, however, water shortages continue to threaten the Cowichan system, the pumps should be installed as soon as possible.

The CBWAC may develop an alternative sequence of water management actions, based on their review of priorities and opportunities.

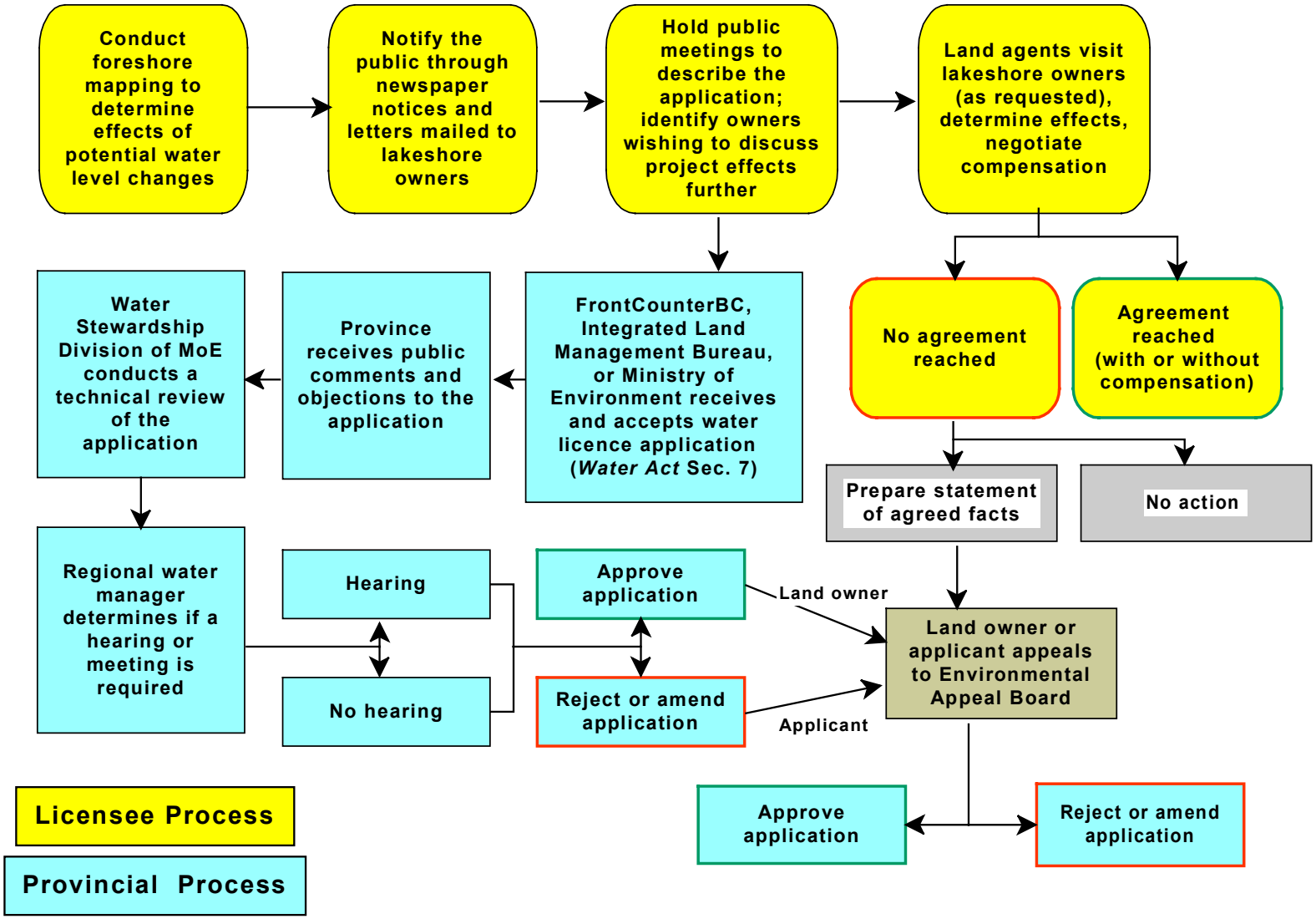
5.4 Addressing concerns of Cowichan Lake shoreline property owners

Everyone in the Cowichan Basin is, or will be, affected in some way by water management. Some lakeshore residents believe that they will be affected more directly than others by implementation of the *Water Management Plan*, particularly by changes to water storage in Cowichan Lake.

To address the concerns raised by lakeshore property owners, the Water Management Forum developed a specific process to be followed by applicants for a water licence for the weir and pumps (Figure 8). The proposed process includes some of the requirements established by the BC Ministry of Environment Water Stewardship Division, plus additional steps that are specific to the application for a water licence for the weir and pumps. In particular, the applicant would need to conduct further detailed study of lakeshore effects of the weir and pumps, and then engage the community in a discussion of the research findings and concerns of the lakeshore owners. The licence applicant also would need to offer to meet with lakeshore owners that are potentially affected by the changes to the weir and installation of pumps. The intent of these meetings is to determine effects on specific properties, and to discuss the desire for, nature of, and level of potential compensation. Compensation may not only be money, but could include altering docks, placement of fill, or other actions as agreed by the licence applicant and property owners.

It is important to note that the offer of compensation to an affected landowner is required under the Water Act and under the terms of this *Water Management Plan*. It is also important to recognize that compensation expectations need to be reasonable, and reflect the actual effects of changes to spring and summer lake levels.

Figure 8
A process for lakeshore property owner involvement in the water licence application procedure



5.5 Successful management of water issues

The *Water Management Plan* is based on the best available information at the time of preparation. The complex suite of recommended actions may have unintended consequences, as well as the expected water management benefits. Monitoring is a critical element in the *Water Management Plan*. The results and effectiveness of actions must be monitored and reported, and the Plan amended if necessary.

For each proposed action, one or more "targets" have been established (Table 2). These targets represent levels of performance that would indicate the action's success in resolving a water management issue. If specific values or levels of performance could not be defined at this time, qualitative targets were developed to identify positive directions or trends that an action could induce.

The monitoring program should have two elements.

- Examining the effectiveness of Plan implementation. (Are the actions being implemented?)
- Determining the effectiveness of the actions in improving water management. (Are the vision, goals, objectives being met?)

Monitoring specific actions should be conducted following the completion of projects undertaken by the CBWAC or its members. This monitoring should occur as soon as the specific initiative has been completed or when its effects can legitimately be assessed. Lessons from this project-level monitoring should be used to improve the design and conduct of future projects. Monitoring could be conducted by the participants in the project (self-assessment) or by independent assessors (peer review).

Assessing the effectiveness of the Plan in improving water management should be conducted at regular intervals, and should examine the progress being made toward the objectives, goals, and vision. The public should be involved in these assessments to the extent appropriate. The audience for the *Water Management Plan* reviews includes members of the CBWAC, the public, and funding agencies.

5.6 Cost of water management

The *Water Management Plan* is a strategic document. With some exceptions, the cost of specific action items has not been developed in detail. As government funding programs are announced, opportunities will arise for sharing or offsetting costs of the actions.

To provide some guidance to the relative costs of the actions, Table 2 includes a cost category estimate for capital works and for annual operating costs. The categories are:

Low, less than $100,000
Moderate, $100,000 to $500,000
High, more than $500,000

When the CBWAC creates annual and multi-year budgets, more precise costing of the actions should be undertaken.

The capital cost for the Preferred Supply Alternative (weir and pumps) was estimated at $3 million. The costs are provided in 2006 dollars, and may need to be adjusted if expenditures are deferred to the future. The cost estimates are for capital works only, and do not include the costs of compensation for owners of affected properties or for environmental restoration or compensation if habitat is adversely affected.

As budgets are prepared and funding sought, it is important to note that there are costs of not managing water in the Cowichan Basin. For decades, we have not considered the environmental or social costs of our allocation and use of water, and have allowed the ecosystem to subsidize our practices. We now have a better understanding of the environmental effects of our actions and the changes society must make to improve water management. We must be prepared to make the investments required to manage the resource wisely, so that adequate supplies of clean water will be available today and in the future.

Table 2
Targets for evaluating and responsibility, timing, and annual costs for implementing the actions for water management

Recommended Actions	Recommended Targets	Primary (P) and Secondary (S) Responsibility	Timing (years or ongoing)	Annual Costs—Capital (C) or Operating (O) Low = <$100,000 Mod = $100,000-500,000 High = >$500,000
GOAL 1. MAXIMIZE EFFICIENCY OF WATER USE.				
Objective 1a. Initiate improvements to water infrastructure.				
1a-1. Minimize leaks in major water distribution systems by developing and implementing a comprehensive leak detection and system maintenance program.	• Identify leaks by 2010. Repair 50% of leaks by 2012 and 90% by 2016.	P. CVRD, municipalities, water utilities S. Businesses, homeowners	2008 – 2015, then periodic checks	C. Low O. Moderate
1a-2. Install water meters on new water connections and retrofit existing connections.	• Meter 50% of currently unmetered community connections by 2010 and 100% by 2015.	P. CVRD, municipalities S. Water utilities	2008 – ongoing	C. Moderate O. Low
1a-3. Ensure provincial and federal grants for infrastructure are contingent on water metering.	• All provincial infrastructure grants are contingent on metering by 2010.	P. Provincial, federal governments S. CVRD, municipalities	2008 – ongoing	C. Low O. Low
1a-4. Work with the Ministry of Environment to require metering of water used under existing and future surface water licences and water extracted from existing and future wells.	• Meter 50% of water licences and wells by 2010 and 100% by 2015.	P. MoE WSD S. CVRD, municipalities	2008 – ongoing	C. Moderate O. Low
1a-5. Provide incentives (e.g., tax credits, rebates) for replacement of existing plumbing fixtures with water efficient technology.	• Replace 80% of existing plumbing fixtures with low-flow designs by 2015.	P. Municipalities, CVRD S. Federal, provincial governments	2008 – ongoing	C. Moderate O. Low
1a-6. Install water-saving plumbing fixtures (e.g., shower heads, toilets, faucets) in all new construction.	• Use water-saving plumbing fixtures in100% of new construction by 2010.	P. CVRD, municipalities S. Building contractors	2008 – ongoing	C. Moderate O. Low

Note:
CVRD = Cowichan Valley Regional District
MoE WSD = Ministry of Environment Water Stewardship Division

Recommended Actions	Recommended Targets	Primary (P) and Secondary (S) Responsibility	Timing (years or ongoing)	Annual Costs—Capital (C) or Operating (O) Low = <$100,000 Mod = $100,000-500,000 High = >$500,000
Objective 1b. Improve management of water demand in all sectors.				
1b-1. Create a consistent volume-based pricing structure throughout the Basin, and request that the Ministry of Environment apply similar mechanisms.	• Pricing structure is consistent throughout the Basin by 2010. • Achieve a trend of decreasing per capita water use trend three years after new rate structures are introduced.	P. CVRD, municipalities S. MoE WSD	2009 – 2010, then periodic reviews	C. Moderate O. Low
1b-2. Implement a conservation based sewer charge (i.e., link sewage treatment costs to water consumption).	• Implement conservation sewer charge in 100% of jurisdictions with community sewage treatment by 2010.	P. Municipalities S. CVRD	2009 – 2010	C. Low O. Low
1b-3. Implement a comprehensive demand management program in the Cowichan Basin that includes the following measures: 1b-3a. Ensure that residents, businesses, and industry employ water conservation measures (e.g., xeriscaping, water audits).	• Increase the number of individuals that employ innovative water conservation measures. • 5% reduction in water consumption by commercial and industrial users by 2008, with subsequent reductions of 5% per year. • 100% of new businesses that are heavy water users have water conservation or storage plans to offset water use by 2010.	P. CVRD, municipalities, utilities S. Businesses, homeowners	2008 – ongoing	C. Low O. Low

Recommended Actions	Recommended Targets	Primary (P) and Secondary (S) Responsibility	Timing (years or ongoing)	Annual Costs—Capital (C) or Operating (O) Low = <$100,000 Mod = $100,000-500,000 High = >$500,000
1b-3b. Promote the use of rainwater harvesting techniques (e.g., rain barrels, cisterns, dugouts, retention ponds) and greywater reuse.	• 10% of households have purchased rain barrels or cisterns by 2010, and 25% by 2015. • Increase the number of farms that use dugouts or retention ponds for storage by 50% by 2010. • 2% per year decrease in inflow volumes to treatment plants as a result of greywater systems. • Retrofit 5% of existing structures per decade to include greywater recycling systems. • Increase the proportion of agricultural operations and golf courses that are irrigated with greywater. • 100% of new construction had greywater reuse capability by 2015.	P. CVRD, municipalities, utilities S. Homeowners, farmers, building contractors	2008 – ongoing	C. Moderate O. Low
1b-3c. Educate residents, business, and industry about demand management.	• All municipal and regional web sites contain information about demand management. • Increase the number of demand management brochures and workshops available to the public.	P. CVRD, municipalities S. N/A	2008 – ongoing	C. Low O. Low
1b-3d. Promote efficient agricultural water use techniques, such as drip irrigation instead of spray irrigation.	• 10% reduction in agricultural water use by 2010 and 20% by 2015.	P. CVRD, municipalities S. MoAL	2008 – ongoing	C. Moderate O. Low
1b-4. Conduct independent water audits of Catalyst Paper's Crofton mill to investigate opportunities to enhance existing conservation measures.	• Conduct the first water audit by 2008. • Conduct a water audit every 3 years, thereafter. • 5% reduction in Catalyst Paper water use by 2009 and 10% by 2015.	P. Catalyst Paper S. N/A	2008 – ongoing	C. Moderate O. Moderate

Note:
MoAL = Ministry of Agriculture and Lands

Recommended Actions	Recommended Targets	Primary (P) and Secondary (S) Responsibility	Timing (years or ongoing)	Annual Costs—Capital (C) or Operating (O) Low = <$100,000 Mod = $100,000-500,000 High = >$500,000
1b-5. Request that the Ministry of Environment Water Stewardship Division implement the following actions: 1b-5a. Adopt legislation requiring the licensing of wells and the reporting of volumes used.	• Adopt legislation by 2012. • 25% of private well owners monitor and report their water consumption by 2010, increasing to 100% by 2020. • Characterize ground water volumes and recharge rates in all Cowichan Basin aquifers by 2010.	P. MoE WSD S. CVRD, municipalities	2008 – ongoing	C. High O. Moderate
1b-5b. For new or amended water licences, attach terms and conditions that require water conservation and reporting of volumes used.	• Attach water conservation terms and conditions to 100% of new water licences by 2008. • Attach water conservation terms and conditions to 50% of existing licences by 2010, and 100% by 2015.	P. MoE WSD S. CVRD, municipalities	2008 – 2015	C. Low O. Low
1b-5c. Amend provincial legislation and guidelines governing water licences to allow licences to be issued for instream conservation without requiring diversion, works, or human use.	• Amend legislation and guidelines by 2010.	P. MoE WSD S. CVRD, municipalities	2008 – 2010	C. Low O. Low
1b-5d. Seek opportunities to cancel unused consumptive water licences and do not re-allocate these volumes to other licensees.	• Cancel 100% of unused consumptive water licences annually.	P. MoE WSD S. CVRD	2008 – ongoing	C. Low O. Low
1b-5e. Reserve unrecorded water in streams for the use of the Crown, for the purpose of conservation and downstream supply.	• Reserve all unrecorded water in streams by 2008.	P. MoE WSD S. CVRD, municipalities	2008	C. Low O. Low

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Objective 1c. Ensure local governments and institutions are leaders in water conservation.				
1c-1. Incorporate comprehensive water conservation strategies in Official Community Plans and other land use and development plans and policies.	• 100% of Official Community Plans in the Basin contain strong water conservation policies by 2010.	P. CVRD, municipalities S. N/A	2008 – 2010	C. Low O. Low
1c-2. Ensure that local governments lead by example by using water conservation measures, such as xeriscaping and low-flow fixtures, to decrease water use by municipal and institutional operations.	• Implement conservation strategies in local governments and institutions by 2008. • Apply water reduction strategies to 100% of gardens and 50% of turf areas of local governments and institutions by 2008. • Apply water reduction strategies to 100% of turf areas of local governments and institutions by 2012.	P. CVRD, municipalities S. Schools, community centres, arenas	2008 – 2012	C. Moderate O. Low
1c-3. Develop and implement 'green building' policies (e.g., using LEED standards) that include water conservation and water reuse in the construction and retrofitting of public buildings and facilities.	• All new and retrofit public buildings and facilities incorporate 'green building' policies, starting in 2008.	P. CVRD, municipalities S. Developers, architects	2008 – ongoing	C. Low O. Low
1c-4. Adopt a program of regular water use efficiency audits for publicly-owned buildings and infrastructure.	• Conduct water audits at all publicly owned buildings by 2009. • Reduce water use at municipal and regional buildings by 5% by 2008, 15% by 2015, and 25% by 2020.	P. CVRD, municipalities S. Schools, community centres, arenas	2008 – 2025	C. Moderate O. Low
Objective 1d. Promote land use that increases water use efficiency.				
1d-1. Prepare and amend land use and community plans to promote land uses and development patterns that maximize water efficiency and protect Cowichan Basin water resources.	• Include water management policies in 50% of land use and community plans by 2009, and 100% by 2012. • Include water conservation as a criterion in 50% of land use decisions by 2008, increasing to 100% by 2010. • Increase the average number of connections per kilometre of water distribution line.	P. CVRD, municipalities S. Developers, architects	2008 – 2012	C. Low O. Low

Recommended Actions	Recommended Targets	Primary (P) and Secondary (S) Responsibility	Timing (years or ongoing)	Annual Costs—Capital (C) or Operating (O) Low = <$100,000 Mod = $100,000-500,000 High = >$500,000
1d-2. Revise municipal and regional policies, regulations, and land use plans to include Low Impact Development and Smart Growth design principles.	• Revise relevant plans and policies by 2009.	P. CVRD, municipalities S. Developers, architects	2008 – 2009	C. Low O. Low
1d-3. Develop and implement 'green building' policies (e.g., using LEED standards) that include water conservation and water reuse. Begin with institutional and commercial buildings (Action 1c-3) and eventually include all building types.	• 50% of local government jurisdictions have adopted green building policies by 2010, and 100% by 2015. • Increase the number of buildings applying green building principles.	P. CVRD, municipalities S. Developers, architects	2008 – 2015	C. Moderate O. Low

Recommended Actions	Recommended Targets	Primary (P) and Secondary (S) Responsibility	Timing (years or ongoing)	Annual Costs—Capital (C) or Operating (O) Low = <$100,000 Mod = $100,000-500,000 High = >$500,000
GOAL 2. MANAGE WATER SUPPLY TO MEET HUMAN NEEDS AND MINIMIZE IMPACTS OF LOW WATER LEVELS.				
Objective 2a. Store sufficient spring runoff to support human use and sustain river flows during summer and fall.				
2a-1. Increase the weir height by 30 cm and install pumps below the zero storage elevation to pump water from the Cowichan Lake to Cowichan River when required.	• Achieve river flows that do not fall below 7 m^3/sec during the year, increasing to 8.5 m^3/sec by 2031 to account for climate change and growth in demand. • Annual storage satisfies requirements 19 years out of 20 from 2007 to 2031.	P. Catalyst Paper S. MoE WSD	2010 – weir 2013 – pumps	C. High O. Moderate
2a-2. Recommend that new licences for substantial withdrawals of surface water provide equivalent licensed storage.	• Achieve no net loss of habitat in the sub-regional area as a result of water storage by 2010. • 100% of new licensed large-volume withdrawal is supported by storage by 2010.	P. MoE WSD S. CVRD	2008 – ongoing	C. High O. Low
Objective 2b. Actively manage spring and summer water levels to minimize the potential for lakeside properties to be adversely affected.				
2b-1. Revise the weir operation rule curve to include an upper and lower bound of managed water levels in the lake (a rule "band"), as described in Objective 3a.	• Apply to the MOE WSD for a licence to allow the weir to be operated under the "rule band" by 2008. • Lake levels remain between the upper and lower bounds of the "rule band" during periods when the weir is operated. • The provincial water manager receives few complaints from lakeside and riverside property owners regarding effects of water storage and release. • Install computer control of weir operation by 2010.	P. Catalyst Paper S. MoE WSD, CBWAC	2008 – ongoing	C. Low O. Low
2b-2. Operate the weir to store spring and summer inflows to the lake, within rule band limits.	• 80% of lake inflows are captured during the weir's control period without exceeding the rule band by 2011.	P. Catalyst Paper S. MoE WSD, CBWAC	2010 – ongoing	C. Low O. Low

Note:
CBWAC = Cowichan Basin Water Advisory Council

Recommended Actions	Recommended Targets	Primary (P) and Secondary (S) Responsibility	Timing (years or ongoing)	Annual Costs—Capital (C) or Operating (O) Low = <$100,000 Mod = $100,000-500,000 High = >$500,000
2b-3. Store only sufficient water in Cowichan Lake needed to maintain ecological protection and support human use in the Cowichan Basin.	• Need for increased water supply is proven before applications are made to store additional water in Cowichan Lake. • Spring and summer lake levels are adequate to store water for downstream uses without adversely affecting lakeshore properties.	P. Catalyst Paper S. MoE WSD, CBWAC	2008 – ongoing	C. Low O. Low
2b-4. During the process of applying for a new water licence for the weir, assess impacts of water storage levels on lakeshore properties and implement appropriate compensation procedures and processes, as in Figure 7.	• All affected property owners have an opportunity to discuss potential water storage effects and potential compensation with the weir licence holder. • All affected property owners feel that they have been fairly treated by the licence holder.	P. Catalyst Paper S. MoE WSD	2008 – ongoing	C. High O. Low
Objective 2c. Ensure that water storage decisions account for the potential effects of climate change.				
2c-1. Periodically assess the water management program in light of climate data and levels of demand.	• Comprehensively examine the water management program every decade beginning in 2016.	P. CBWAC S. MoE WSD, Catalyst Paper	Every decade from 2016	C. Moderate O. Low

Recommended Actions	Recommended Targets	Primary (P) and Secondary (S) Responsibility	Timing (years or ongoing)	Annual Costs—Capital (C) or Operating (O) Low = <$100,000 Mod = $100,000-500,000 High = >$500,000
Objective 2d. Protect surface and ground water resources from contamination that could reduce supply.				
2d-1. Implement Best Management Practices (BMPs) for stormwater management and protection of ground water resources in the Cowichan Basin.	• Prepare a package of BMPs that are applicable to the Cowichan Basin by 2009. • 80% of Cowichan Basin residents, businesses, local governments, provincial and federal agencies, and other institutions are aware of, and apply, water management BMPs by 2012. • 25% of existing businesses implement stormwater BMPs by 2010, increasing to 100% by 2016. • 100% of new businesses have water pollution control designs that eliminate pollution releases by 2010. • 100% of new developments on sensitive aquifers are designed to protect ground water by 2010. • 20% of existing developments on sensitive aquifers are retrofitted to protect ground water by 2009, 80% by 2012, and 100% by 2020. • Implement a ground water protection program for farmlands by 2009. • Owners and managers of roads and highways implement measures to protect water resources from road runoff by 2010.	P. CVRD, municipalities S. Developers, forestry companies, farmers, business and home owners	2008 – ongoing	C. High O. Low
2d-2. Investigate and implement strategies to avoid or minimize the release of treated effluent directly to the Cowichan River (e.g., by applying it to forest of farm land), particularly during the summer.	• Conduct thorough examinations of opportunities for ground application of treated effluent by 2010. • Maximize the proportions of treated effluent applied to land rather than released to the river by 2015.	P. Joint Utilities Board, Town of Lake Cowichan S. CVRD	2008 – 2015	C. High O. Low

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2d-3. Maintain a minimum flow of 7 m^3/sec from June 15 until the end of the weir operating season, increasing to 8.5 m^3/sec by 2031, to protect the quality of Cowichan River water.	• Treated effluent quality complies with waste discharge permits 100% of the time by 2008.	P. Catalyst Paper, MoE WSD S. Joint Utilities Board, Town of Lake Cowichan	2008 – ongoing	C. Low O. Low
2d-4. Using incentives and enforcement of regulations, relocate septic fields susceptible to flooding to avoid contamination of lakes, streams, and the Cowichan River.	• Identify septic fields susceptible to flooding by 2008. • Remove 50% of septic fields susceptible to flooding by 2012 and 100% by 2020.	P. CVRD, municipalities S. Homeowners	2008 – 2020	C. High O. Low
2d-5. Install community sewage treatment facilities in Youbou, Honeymoon Bay, Mesachie Lake, Bear Lake, and other lakeside and riverside settlements.	• 50% of sewage receives community treatment by 2012 and 100% by 2018.	P. CVRD S. N/A	2009 – 2018	C. High O. Moderate
2d-6. Install sufficient boat sewage pumpouts on Cowichan Lake to serve current and future boating requirements.	• Install four boat sewage pumpouts on Cowichan Lake by 2012.	P. CVRD, Town of Lake Cowichan S. Marina operators	2008 – 2012	C. Moderate O. Moderate
2d-7. Enact and enforce regulations to protect ground water resources (e.g., road runoff, commercial, and agriculture operations).	• Local governments, provincial agencies, Crown Corporations, and First Nations phase out the use of pesticides by 2012.	P. MoE WSD, MoE EPD S. CVRD, municipalities	2008 – ongoing	C. Moderate O. Low
2d-8. Design and implement pesticide reduction programs, including education and incentives, for homeowners, farmers, and golf courses.	• Local governments enact programs and regulations to encourage the use of more environmentally friendly products by homeowners and farmers by 2009. • Local governments enact programs and regulations to reduce application of non-environmentally friendly products to turf grass on all golf courses and playfields by 20% by 2008 and increase to 100% by 2015.	P. MoE EPD, CVRD, municipalities S. Homeowners, farmers	2008 – 2015	C. Moderate O. Low

Note:
MoE EPD = Ministry of Environment Environmental Protection Division

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2d-9. Identify and remediate areas of upland and riverbank erosion.	• Continue work on the Stoltz Slide and other areas of concern.	P. DFO, MoE Fisheries S. Local stewardship groups	2008 – ongoing	C. High O. Moderate
Objective 2e. Manage land and resources to avoid adverse effects on Basin hydrology (quantity and timing of runoff).				
2e-1. Minimize effects of land cover changes on Basin hydrology by ensuring land management meets or exceeds enacted regulations and bylaws.	• Reduce violation of relevant acts and regulations and bylaws to zero by 2009.	P. Private Managed Forest Land Council, MoAL, forestry companies S. CBWAC	2008 – ongoing	C. Moderate O. Moderate
2e-2. Using forestry, land cover, hydrology, and climate change research, identify potential improvements in watershed management and, if appropriate, recommend amendments to provincial regulation and local bylaws.	• Increase the level of monitoring and research of private and Crown forest practices to achieve a better understanding of forestry activities by 2010. • Review and amend Acts and bylaws by 2009.	P. Private Managed Forest Land Council, MoFR, MoAL, forestry companies S. CBWAC	2008 – 2010	C. Low O. Moderate
2e-3. Engage forest companies, the Ministry of Agriculture and Lands, the Ministry of Forests and Range, and other interests in collaborative development of land and resource use practices that protect the hydrology and water quality of the Cowichan Basin.	• Develop improved forest practices by 2009 and implement by 2010.	P. CBWAC, MoFR, MoAL, forestry companies S. CVRD, municipalities	2008 – ongoing	C. Low O. Low
2e-4. Engage the community in developing and implementing land cover policies and other watershed management practices that protect the Basin's hydrology.	• Prepare improved land cover policies and other watershed management practices by 2009 and fully implement them by 2011.	P. CBWAC S. Forestry companies	2008 – 2011	C. Low O. Low

Note:
DFO = Department of Fisheries and Oceans Canada
MoFR = Ministry of Forests and Range

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GOAL 3. ENSURE SUFFICIENT WATER IS AVAILABLE TO SUSTAIN AQUATIC AND RIPARIAN ECOSYSTEMS THROUGHOUT THE YEAR.				
Objective 3a. Meet the recommended fish conservation flows year round in the Cowichan River.				
3a-1. Maintain a spring flow of 20 to 30 m^3/sec from April 1 to May 1 and 15 to 30 m^3/sec from May 2 to June 15.	• 100% of important trout and steelhead spawning habitats, including side channels, are accessible to fish during key life stages. • Meet fish conservation target flows 95% of the time to 2031. • Supply red and blue listed species habitat with sufficient quantities of water year-round by 2010.	P. Catalyst Paper, MoE WSD S. DFO, MoE Fisheries	2008 – ongoing	C: Low O: Low
3a-2. Maintain a minimum flow of 7 m^3/s from June 15 until the end of the operating season to sustain ecological function, increasing to 8.5 m^3/sec by 2031 to compensate for the effects of increased demand and climate change.				
3a-3. In wet summers, increase the release to 9 m^3/sec and, in dry summers, reduce flows to 4.5 m^3/sec if necessary and as determined by the weir operation rule band.				
3a-4. Provide two pulses of water in the fall (last week in September and first week in October) of 16 m^3/sec for 30 hours each, designed to aid migrating salmon.	• Have sufficient water available to provide fall migration pulse flows 2 years out of 3.	P. Catalyst Paper, MoE WSD S. DFO, MoE Fisheries	2008 – ongoing	C: Low O: Low
Objective 3b. Maintain, enhance, and restore aquatic and riparian habitats.				
3b-1. Identify, inventory, and map aquatic and riparian habitats and restoration opportunities.	• Complete an inventory of important habitats by 2010.	P. CVRD, municipalities, DFO, MoE ESD S. Local stewardship groups	2008 – ongoing	C: Moderate O: Low

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3b-2. Develop land use policies and development patterns that protect, maintain, and enhance healthy aquatic and riparian ecosystems.	• Reverse the current declining trend and increase fish populations annually in Basin streams and lakes. • Protect 50% of identified environmentally important areas by 2015 and 100% by 2030. • Reduce the number of rural subdivision lots created annually for non-rural uses to zero by 2010.	P. CVRD, municipalities S. Developers	2008 – 2030	C: Moderate O: Low
3b-3. Continue and expand habitat improvement projects, including spawning channel improvements and riparian restoration and replanting.	• 80% of streamside and lakeside areas have intact native vegetation by 2010 and 90% by 2018.	P. DFO, MoE Fisheries S. Cowichan Stewardship Round Table	2008 – 2018	C: Moderate O: Moderate
3b-4. Adopt or amend tree protection bylaws to strictly regulate tree cutting and vegetation clearing in riparian areas.	• Protect 80% of trees in riparian areas by 2008 and 100% by 2012.	P. CVRD, municipalities S. Developers, landowners	2008 – 2012	C: Low O: Low
3b-5. Protect riparian habitats from adverse effects of logging, industrial, commercial, and residential development through enforcement of local and provincial regulations.	• Manage 75% of riparian areas to protect aquatic ecosystems by 2010, and 100% by 2015.	P. CVRD, municipalities S. Developers, forestry companies, business and home owners	2008 – 2015	C: Low O: Low
3b-5a. Ensure consistent enforcement of Riparian Areas Regulation setbacks and associated controls on development adjacent to streams, wetlands, lakes, and rivers by all levels of government.	• Apply the RAR to 100% of streamside developments by 2008.	P. CVRD, municipalities S. Developers, landowners	2008	C: Low O: Moderate
3b-5b. Enforce compliance with the riparian protection elements of the Private Managed Forest Land Act and the Private Managed Forest Land Council Regulation.	• Reduce violation of relevant acts and regulations to zero by 2008.	P. Private Managed Forest Land Council S. CBWAC	2008 – ongoing	C: Low O: Low

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GOAL 4. REDUCE THE IMPACTS OF HIGH WATER LEVELS, RESPECTING THE IMPORTANCE OF WINTER FLOODS TO NATURAL SYSTEMS.				
Objective 4a. Establish adequate development setbacks from Cowichan Lake and River to reduce potential flooding risks.				
4a-1. Extend coverage of 200-year floodplain mapping to include all areas of the Basin.	• All areas of the Basin have 200-year floodplain mapping by 2012.	P. MoE EPD S. CBWAC	2010 – 2012	C: Moderate O: Low
4a-2. Review current 200-year floodplain levels and update as required using state-of-the-art hydro-technical data and hydraulic analysis techniques.	• Update existing 200-year floodplain levels by 2010.	P. MoE EPD S. CBWAC	2008 – 2010	C: Low O: Low
4a-3. Continue to enforce bylaws that prohibit new development or deposit of fill below the 200-year flood level.	• No new development or infilling occurs below the 200-year flood levels by 2008. • The floors of all new habitable structures are above defined flood levels by 2008.	P. CVRD, municipalities S. Developers, landowners	2008 – ongoing	C: Low O: Low
4a-4. Flood proof at-risk structures where practical.	• Decrease the numbers of structures vulnerable to flooding.	P. CVRD, municipalities S. MoE EPD	2008 – ongoing	C: High O: Low
Objective 4b. Increase the flood buffering capacity of floodplain and constricted channel areas.				
4b-1. Involve all municipalities and electoral areas in the preparation and implementation of a Flood and Drainage Management Plan (FDMP) for the Cowichan Basin to provide a coordinated approach to stormwater and flood management.	• Complete the FDMP by 2010. • Implement the FDMP in 100% of the Basin by 2012. • Involve all Basin municipalities and electoral areas in the preparation and implementation of the FDMP.	P. CVRD, municipalities S. Cowichan Tribes	2008 – 2012	C: High O: Low

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4b-2. Maintain the capacity of the Cowichan River channel to accommodate flood flows where it is obstructed by gravel, debris or structures.	• Remove gravel and debris from aggrading portions of the Cowichan River channel to reduce bedload. • Reduce the volume of gravel deposited in floodplain areas each year as per the FMP. • Increase the flow capacity at bridge crossings to accommodate flood flows and gravel transport.	P. CVRD, municipalities S. Cowichan Tribes	2008 – ongoing	C: Low O: High
Objective 4c. Ensure drainage is adequate to allow tillage of farm fields in late spring.				
4c-1. Develop and implement a drainage improvement and control system for the Somenos and Quamichan sub-basins as part of the FDMP.	• Increase the number of days between May 15 and September 15 that fields are dry enough to allow tillage. • Increase the agricultural productivity of each sub-basin that is farmed. • Spring flooding does not reduce financial returns of farmland in the Somenos and Quamichan sub-basins.	P. MoAL, municipalities, S. Farmers	2008 – ongoing	C: Moderate O: Low
4c-2. Promote crop selection in the Somenos and Quamichan sub-basins that is appropriate for their soil and hydrologic conditions.	• Plant moisture tolerant crops in 100% of farmed portions of low lying areas of the Somenos and Quamichan sub-basins by 2010.	P. Farmers S. MoAL	2008 – 2010	C: Moderate O: Low
Objective 4d. Maintain winter water levels that are high enough to protect organic soils.				
4d-1. Maintain winter and spring inundation of low-lying areas of the Somenos and Quamichan sub-basins, to protect organic soils and to maintain ecological functions.	• Low-lying areas of the Somenos and Quamichan sub-basins are flooded from November to March. • Stabilize or increase the numbers of waterfowl using the Somenos and Quamichan sub-basins each fall and winter.	P. Municipalities S. Farmers, Cowichan Tribes, MoAL	2008 – ongoing	C: Low O: Low

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Objective 4e. Promote stormwater management that emphasizes infiltration and detention and minimizes impervious surfaces to avoid increases in peak flows.				
4e-1. Install appropriate stormwater management infrastructure based on Low Impact Development (reduced runoff, on-site infiltration) in new developments and retrofit existing developments to reduce peak runoff consistent with the FDMP.	• Decrease the proportion of development using conventional storm drains. • Implement Low Impact Development techniques for 100% of new development by 2009. • Retrofit 10% of existing development per year to Low Impact Development techniques.	P. CVRD, municipalities S. Developers, landowners	2008 – ongoing	C: Moderate O: Low
4e-2. Adopt subdivision or development services bylaws and Official Community Plan policies based on Low Impact Development principles.	• Implement bylaws and OCP policies by 2008. • Adopt Greenway Bylaws that support low impact use of seasonally inundated land.	P. CVRD, municipalities S. Developers	2008 – ongoing	C: Low O: Low

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GOAL 5. EDUCATE, ENGAGE, AND EMPOWER CITIZENS IN WATER MANAGEMENT.				
Objective 5a. Foster basin thinking among all water users in the Cowichan Basin and ensure they understand and support water management initiatives.				
5a-1. Develop and implement an on-going communications and outreach strategy to share information with the community through print and electronic media about the Basin and its valued water resources.	• Increase the number of water related media stories per year published or aired in the Cowichan Basin • Maximize the level of public support for planning, regulatory, and other water management initiatives. • Increase the public understanding of water and water management, measured through public surveys. • Minimize the number of resident complaints about water issues.	P. CBWAC S. Local media	2008 – ongoing	C: Low O: Moderate
5a-2. Promote, support, and develop partnerships with non-government organizations in implementation of the *Water Management Plan.*	• Annually increase the number of partnerships with NGOs.	P. CBWAC S. Non-governmental organizations	2008 – ongoing	C: Low O: Low
5a-3. Develop education initiatives to enable elementary and secondary school students to understand important water issues and stewardship initiatives in their community.	• Increase the number of elementary and secondary students offered programs dealing with water in the Basin. • Increase the number of schools that include principles of water management and water stewardship as part of school curriculum.	P. CBWAC S. School Districts	2008 – ongoing	C: Low O: Moderate
5a-4. Engage the Cowichan Tribes in water management in ways that ensure cultural values are reflected in decisions.	• 80% of residents are aware of the cultural values associated with water in the Cowichan Basin by 2012.	P. Cowichan Tribes S. CBWAC	2008 – 2012	C: Low O: Low

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Objective 5b. Build trust among water users, managers, regulators, and residents through communication and involvement.				
5b-1. Seek opportunities to involve volunteers and form partnerships with nongovernmental organizations as the *Water Management Plan* is implemented.	• Increase the number of volunteers and NGOs engaged in WMP implementation.	P. CBWAC S. NGOs	2008 – ongoing	C: Low O: Low
5b-2. Engage Basin residents, government agencies, and decision-makers in an open and continuing dialogue about water management.	• Increase the number of communication opportunities and information exchange with the public.	P. CBWAC S. Public, other groups	2008 – ongoing	C: Low O: Low
Objective 5c. Conduct regular monitoring of water related conditions in the Cowichan Basin and provide this information to the public.				
5c-1. Monitor and report on volumes of water used annually, including wells, licences, and community sources.	• Annual monitoring covers 100% of water uses in the Cowichan Basin by 2015.	P. CBWAC S. MoE WSD	2009 – ongoing	C: Moderate O: Low
5c-2. Require well monitoring and reporting as a condition of rural subdivision, rezoning, or building permit issuance.	• 100% of rezoning and building permit issuances require well monitoring and reporting by 2010.	P. CVRD S. Municipalities	2008 – ongoing	C. Low O. Low
5c-3. Implement state-of-the-art climatic and hydrologic (i.e., stream flow, lake level, aquifer) instrumentation and monitoring, and link to water management decisions in the Basin.	• Install state-of-the-art instrumentation and monitoring by 2010. • Link monitoring information to water management decisions and weir operation.	P. MoE WSD, Catalyst Paper S. CBWAC	2008 – ongoing	C: High O: Low
5c-4. Prepare annual reports on the status and effectiveness of *Water Management Plan* implementation, and make these reports available to the public.	• Prepare annual monitoring and performance reports for the Cowichan Basin beginning in 2010.	P. CBWAC S. Utilities, Catalyst Paper, water users	2010 – ongoing	C: Low O: Low

Recommended Actions	Recommended Targets	Primary (P) and Secondary (S) Responsibility	Timing (years or ongoing)	Annual Costs—Capital (C) or Operating (O) Low = <$100,000 Mod = $100,000-500,000 High = >$500,000
Objective 5d. Conduct research to support knowledgeable decision-making and water management.				
5d-1. Collect and maintain data on aquifer capacity, aquifer recharge rate, ground water extraction, and the relationship of ground water pumping to base flow in the Cowichan River and other nearby streams, and make this information available to the public.	• Prepare a technical report on the status of aquifers in the Cowichan Basin by 2010 and every 5 years thereafter. • Increase the number of media articles about the status of aquifers.	P. MoE WSD S. CVRD, municipalities, local media	Every 5 years from 2010	C: Low O: Low
5d-2. Develop guidelines for use of ground water and management of aquifers.	• Prepare and implement ground water management guidelines based on the technical report by 2011.	P. MoE WSD S. CVRD, municipalities	2009 – 2011	C: Low O: Low
5d-3. Study the use of water in Basin agriculture, to support measures that will increase the efficiency of irrigation and other water uses.	• Conduct agricultural water use and conservation study by 2009.	P. CVRD S. MoAL	2009 – 2011	C: Low O: Moderate
5d-4. Apply an adaptive approach to water management, by obtaining and reviewing research data on topics such as: - effectiveness of demand management, - climate change effects and responses, - land use-water relationships, and - ecological effects of water use and management.	• Increase the proportion of identified water management issues subject to research studies. • Increase the number of water-related research proposals that are fully funded.	P. CBWAC S. MoE WSD, Universities	2008 – ongoing	C: Low O: Low

Recommended Actions	Recommended Targets	Primary (P) and Secondary (S) Responsibility	Timing (years or ongoing)	Annual Costs—Capital (C) or Operating (O) Low = <$100,000 Mod = $100,000-500,000 High = >$500,000
GOAL 6. ESTABLISH CLEAR, ACCOUNTABLE, AND RESPONSIVE WATER MANAGEMENT DECISION PROCESSES AND GOVERNANCE STRUCTURES.				
Objective 6a. Establish and fund a water management advisory council that represents Basin-wide interests, maintains on-going dialogue among stakeholders, and builds trust and ownership among the participants and the public.				
6a-1. Establish a Cowichan Basin Water Advisory Council (CBWAC) to guide the implementation of the *Water Management Plan* and improve the quality of water management decisions in the Basin.	• Create the CBWAC by the end of 2007. • Increase the number of water management decisions in which the CBWAC is involved.	P. CVRD S. Other *Water Management Plan* partners	2007	C: Low O: Low
6a-2. Actively encourage regulatory agencies to increasingly base their water management decisions on CBWAC recommendations.	• Increase the number of agencies that involve the CBWAC in their decision processes. • Increase the proportion of decisions made by regulators that are consistent with direction from the CBWAC.	P. CBWAC S. Regulatory agencies	2008 – ongoing	C: Low O: Low
6a-3. Create secure and stable funding sources to support water management activities of the CBWAC.	• The CBWAC has funding to meet 85% of identified water management needs in all years.	P. CBWAC S. N/A	2008 – ongoing	C: Low O: Moderate
6a-4. Designate a regional coordinator to oversee the development of the water management strategy and to help implement water reduction actions.	• Designate a regional water management coordinator by 2007.	P. CVRD S. Municipalities	2007 – ongoing	C. Low O. Moderate
6a-5. Involve landowners, business, developers and other members of the public in Cowichan Basin water management decisions.	• Surveys reveal that landowners, businesses, developers, and the public are satisfied with their involvement in water management decisions.	P. CBWAC S. Public, business, developers, landowners	2010 – ongoing	C: Low O: Low
Objective 6b. Ensure decisions on restoration and research projects and funding continue to be guided by the Cowichan Stewardship Round Table.				
6b-1. Provide ongoing support for the work of the Cowichan Stewardship Round Table, including referring research and restoration decisions to the Round Table, and providing financial and staff resources.	• Increase the number of restoration and research projects that are guided by the Cowichan Stewardship Round Table.	P. Cowichan Stewardship Round Table S. CBWAC	2010 – ongoing	C: Low O: Moderate

Recommended Actions	Recommended Targets	Primary (P) and Secondary (S) Responsibility	Timing (years or ongoing)	Annual Costs—Capital (C) or Operating (O) Low = <$100,000 Mod = $100,000-500,000 High = >$500,000
Objective 6c. Ensure the costs of water management facilities and operations are shared fairly among responsible and benefiting parties.				
6c-1. Assess all water storage and demand management decisions on the basis of fair distribution of benefits and costs.	• 90% of people and groups affected by water management decisions feel that the balance of their costs and benefits are fair and equitable.	P. CBWAC S. Public, other groups	2010 – ongoing	C: Low O: Low
6c-2. Emphasize cost effectiveness in water management decisions in the Cowichan Basin.	• Cost-effectiveness is considered in 100% of water management decisions by 2010.	P. CBWAC S. Other water management agencies and organizations	2010	C: Low O: Low

APPENDIX A
PLANNING PROCESS

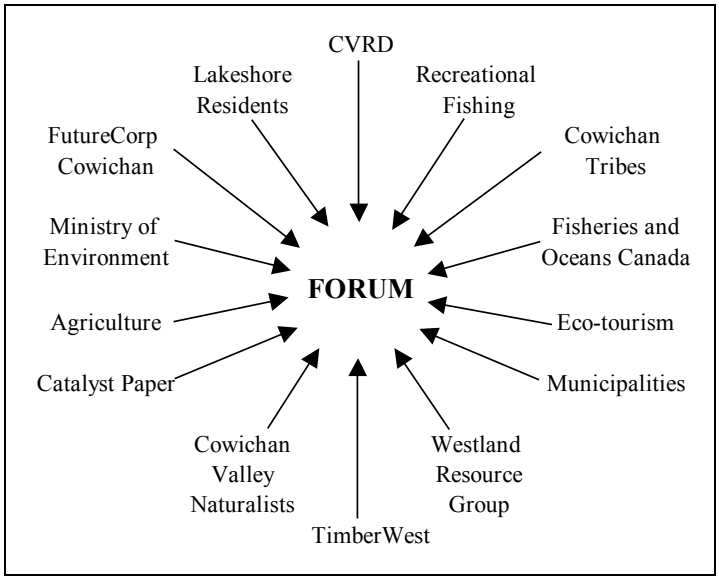
Cowichan Basin Water Management Forum

As part of the planning process, a multi-party *Cowichan Basin Water Management Forum* (the Forum) was created to represent community, business, environmental, government, and First Nations interests in the Basin. The Forum ensured that a wide range of viewpoints were represented and included in the development of the *Water Management Plan*. The Terms of Reference for the Forum is included in Appendix B.

Member selection process

The Forum member selection process was undertaken in February 2005. A letter was sent to various organizations recognized as having a special interest in water management, inviting them to recommend a candidate to participate as a volunteer member of the Forum. To solicit the general public, a "Call for Members" advertisement was placed in the local newspapers and broadcast on the local radio station. Candidates were asked to submit a brief letter outlining their interest in water management and relevant background information. To keep the size of the Forum manageable, membership was limited to 25 successful candidates representing a broad range of interests. The Forum members were also chosen to ensure representation of the various geographic areas of the Basin, from the shores of Cowichan Lake, the banks of the Cowichan River, the Somenos and Quamichan sub-basins, and the Cowichan Estuary. Figure A-1 displays the interest groups represented on the Forum.

Figure A-1
Interest groups represented on the Cowichan Basin Water Management Forum



Forum activities

The Forum met nine times during the planning process. A summary of the topics covered at the meetings is included in Appendix C. Members of the Forum were also involved in the public outreach component of the *Water Management Plan* project, giving presentations at various community functions, conducting interviews with local media, and attending the June 2005 and January 2007 open houses and public meetings (described in Section 2.3.1).

The Forum members were responsible for keeping the groups they represented informed and up-to-date during the planning process, and to share their organizations' concerns or comments with the Forum.

Forum members talk with a lakeshore property owner (above) and visit the Cowichan River (below).

Public outreach

Broad public, agency, and First Nations acceptance was sought for the management of water in the Cowichan Basin. Such acceptance can only be gained through meaningful involvement of affected groups and the public in the development of the *Water Management Plan*.

Objectives of the public outreach strategy

The objectives of the public outreach strategy were as follows.

1. **Awareness.** Ensure that residents and decision makers have an accurate understanding of the roles, uses, and values of water in the Basin.
2. **Education.** Ensure that residents and decision makers know about the water issues facing the Basin and understand that these issues will be affected by increasing demand and climate change trends.
3. **Input.** Enable residents and decision makers to provide input into the development of the *Water Management Plan*.
4. **Support.** Gain community support for the *Water Management Plan* through awareness, education, and input.

Components of public outreach

Public outreach was conducted for the *Water Management Plan* project using a wide variety of print and electronic mediums.

Newsletters and response forms

Newsletters were delivered in the Cowichan Valley Citizen newspaper to households in the Basin in June 2005, January 2006, and January 2007. The first newsletter described water issues in the Cowichan Basin, the second provided information on the proposed goals and objectives for water management, and the third described the proposed actions and water supply alternative. The newsletters included a response form for the public to provide comments and suggestions.

Filling out a response form at the open house

Open houses and public meetings

The open houses and meetings provided an opportunity for people to learn more about water in the Cowichan Basin and the *Water Management Plan*, ask questions, share their ideas with Forum members and the consultant team, and fill out response forms. The first series of open houses, which focused on water and water issues in the Cowichan Basin, were held in June 2005 in Youbou, Honeymoon Bay, and Duncan. The second series of open houses, held in January 2007 in Lake Cowichan, Duncan, and Youbou, included a public meeting component to discuss the proposed actions for water management and the supply alternative developed by the Forum.

Discussing water management at an open house.

Website

The CVRD hosted a website for the *Water Management Plan* project that was updated frequently throughout the planning process. Materials prepared by the Forum and consulting team were posted on the website, including newsletters and response forms, open house display boards, technical studies, and press releases. The website also provided the public with links to the funding partners' websites, contact information for the CVRD and Westland, and the opportunity to join the Project distribution list.

Distribution List

A distribution list that included over 250 residents, local politicians, schools, environmental organizations, businesses, and water purveyors was compiled during the planning process. Newsletters and response forms, announcements about open houses, and press releases were distributed to people and organizations in the database.

Local media

The local media was instrumental in providing information about the *Water Management Plan* to the public. Press releases, media advisories, and paid advertisements were prepared for newspapers and radio at various stages of the Project. The Forum worked with local newspapers to run a series of special articles on water values and issues in the Cowichan Basin. Shaw Cable also covered the *Water Management Plan* project by producing a series of three-minute clips that aired on The Daily and assisting in the development of an animation about the structure and function of the weir.

Local events and presentations

The Forum was actively involved in public outreach. Display boards were set up at Lake Days in June 2005, held in Lake Cowichan. Members of the Forum gave presentations to various interest groups throughout the planning process, including the local Rotary Club and Probus Club, Advisory Planning Commissions, and the Duncan West Ratepayers Association.

Forum members with display boards at Lake Days in June 2005

Identifying water issues in the Cowichan Basin

Understanding water issues in the Cowichan Basin was a crucial step in the planning process. The Forum and consulting team spent many months conducting background research and gathering public input to ensure all of the main issues were identified.

Background research

Numerous background documents and technical studies were reviewed to gain an understanding of the biophysical, human and cultural, and water supply and demand characteristics of the Basin. The documents also provided a starting point for preliminary identification of potential water issues in the Basin. Documents and studies reviewed included:

- local government documents including Official Community Plans, zoning bylaws, and liquid waste management plans;
- mapping and orthophotography from the CVRD, municipalities, and provincial sources;
- provincial government documents from Ministry of Environment and Ministry of Agriculture and Lands;
- federal government documents from Fisheries and Oceans Canada, Heritage Canada, and Navigable Waters Canada;
- water use information from local utilities and Catalyst Paper;
- previous studies conducted in the Cowichan Basin, including the Somenos Management Plan, the Ecological Strategies for the Cowichan Estuary document, and the Cowichan-Koksilah *Water Management Plan*;
- previous engineering studies conducted for the Cowichan Lake weir;
- various climate change studies; and
- numerous case studies in demand management.

Responding to water issues in the Cowichan Basin

Once the main water issues were confirmed by the public, the Forum compiled the Water Issues report. The report organizes the complex water issues in a clear and logical format and provides an overview of the conditions in the Basin. Using the information in the Water Issues report, the Forum developed a proposed vision for water and goals for water management. The public was invited to comment on the vision and goals in January 2006.

Water Issues and Water Facts reports

The Water Issues report was released in December 2005. The report provides information to aid understanding of the use and management of water in the Cowichan Basin. The report contains an overview of physical and cultural conditions in the Cowichan Basin, and summarizes issues affecting the supply of, and demand for, water. Most of the report contains facts or generally

accepted information about the surface and ground water in the Basin – where it comes from, how it is used, and how much is needed. Today's needs and those of the next 25 years are estimated, and water use issues raised by the public and the Water Management Forum are summarized. The report also discusses climate change effects on future water supply and demand. The Water Issues report is accompanied by Water Facts, an addendum with more detailed technical information about water in the Basin.

Developing a vision and goals

The first step in responding to water issues in the Cowichan Basin was to develop a common vision for water management. The Forum worked together over several meetings to prepare a draft vision that describes a desirable future condition of the Basin (see Section 3.0).

Next, the Forum classified the issues identified through the first stage of public consultation into six broad categories and developed goals to address each category. The categories were as follows.

1. Reduce water demand.
2. Ensure reliable water supply.
3. Protect and enhance ecosystems.
4. Reduce the impacts of flooding and improve stormwater management.
5. Increase knowledge and awareness of water issues and management.
6. Improve governance of water.

The Forum developed a vision and goals to respond to water issues in the Basin.

Preparing the draft *Water Management Plan*

After public input was received on the vision and goals, the Forum began developing objectives and actions for each goal. Throughout this process the Forum realized that some of the objectives for demand management and supply augmentation required additional technical study to determine the feasibility of the potential actions. These technical studies were conducted between January and September 2006.

Studying demand management

In December 2005, Westland Resource Group Inc. completed a study by that estimated how much water could be saved in the Cowichan Basin by reducing water consumption through conservation and other measures. The study examined universal metering and volume-based pricing, education, leak detection and repair, xeriscaping[1], appliance replacement programs, and improved agricultural irrigation methods. The report was posted on the *Water Management Plan* website for public review.

Demand management is the development and implementation of policies and programs designed to influence the amount, composition, and timing of water demand. An important goal of demand management is to reduce waste and improve efficiency of water. Demand management is intended to mitigate the burdens of human water use on municipal finances, infrastructure, and aquatic ecosystems.

Currently, demand management in the Cowichan Basin is limited and unevenly implemented. Approximately 45% of municipal water connections in the Basin are metered and users are charged a volume-based rate. Demand management measures throughout the Basin include watering restrictions during the summer months and low-flush toilet rebate programs. The CVRD and the District of North Cowichan websites contain educational information about water conservation. North Cowichan has the only Official Community Plan in the Basin that discusses demand management through conservation programs.

Case studies and documents were reviewed to estimate potential water savings through demand management and approximate cost to implement high, moderate, and low demand reduction in the Cowichan Basin. Potential demand management measures for the Cowichan Basin were identified as including:

- efforts to change consumers' attitudes and behaviour towards the use of water through information and education, water policy, water use permits, water restrictions, plumbing codes, and regulations and bylaws;
- monetary incentives for efficient water use such as rebates, tax credits, and disincentives for high levels of consumption such as fee increases, penalties and fines; and
- structural and operational improvements such as water efficient fixtures, landscape efficiency, metering, leak detection and repair, water audits, recycling and reuse, and water saving irrigation practices.

[1] Xeriscaping: drought-tolerant landscaping practices.

The study found that even an aggressive demand management program could not save enough water to ensure a sufficient supply for future needs. Also, although small-scale water savings could be seen quickly through some demand management measures, it would take years for substantial water savings to be realized. Some water issues facing the Cowichan Basin (i.e., low summer water levels in the Cowichan River) require immediate solutions, making supply management a necessary component of the *Water Management Plan*. Regardless, demand management is an integral part of the Plan because it ensures long-term sustainability of the water resources in the Basin.

Assessing supply alternatives

The Forum examined many supply alternatives to provide increased supply of water in late summer and early fall, when the level of Cowichan Lake is low, while minimizing impacts on lakeshore and riverside residents. Project engineers and planners, Forum members, and the public recommended the supply alternatives to be examined. Alternatives were only considered to be feasible if they were determined to be consistent with the vision and goals of the *Water Management Plan*.

Some supply alternatives were deemed not to be feasible after technical information was gathered and reviewed. These alternatives and the reason for their rejection are described in Table A-1. Note the high costs for storage. For comparison, the construction cost of raising the weir by 30 cm and installing pumps to supply sufficient water would be 26,000 per million m^3.

Table A-1
Supply management alternatives that were deemed not feasible and the reasons for their rejection

Supply Management Alternative	Reason for Rejection	Unit Construction Cost ($/million m^3 of storage)
Small upland reservoirs	Putting small (1 m) dams on 18 lakes in the Basin would not supply sufficient water, and would have significant environmental impacts.	$800,000
Large upland reservoirs	Creating two large reservoirs on Holt and Shaw Creeks was rejected because of environmental impacts, especially downstream of the dams, and very high costs.	$1,400,000
Transfer water from Nitinat basin	This option would require damming the Nitinat River and diverting water into the Cowichan Basin. It was rejected because of high cost and unacceptable environmental impacts to both basins.	1,000,000
Divert Water from Chemainus basin	The Chemainus system lacks sufficient water to supply users in both basins.	No cost estimate prepared as option not technically feasible

The Forum conducted an in-depth technical review and assessment of five supply alternatives.

- Supply Alternative A: using electric pumps installed near the boat lock to pump water from the lake to the river during dry periods.
- Supply Alternative B: low level release (accessing an additional 30 cm of Cowichan Lake storage by opening the weir boat lock, which is lower than the weir gates, and dredging upstream portions of the river).
- Supply Alternative C: raising the weir 30 cm (1 foot) AND operating pumps installed near the boat lock to pump water from the lake to the river during dry periods.
- Supply Alternative D: raising the weir by 48 cm (1.6 feet).
- Supply Alternative E: raising the weir by 88 cm (2.9 feet).

The alternatives were compared to each other and to the "base case" (status quo) scenario using a Multiple Accounts Evaluation (MAE). MAE is an analysis method that uses both quantitative and qualitative indicators to rate each alternative. The indicators were organized under five "accounts" – (1) sufficient water supply for all users to 2031, (2) environment, (3) social and cultural, (4) economic, and (5) government. There is no ranking or weighting involved in the MAE method. Decision makers use the results to organize information before making choices.

The results of the MAE were summarized in a tradeoffs table (Table A-2) to enable the Forum to determine which supply alternative offers the best combination of meeting water supply needs for people and ecosystems, while minimizing potential impacts on lakeshore and riverside residents. The Forum selected Alternative C, raising the weir 30 cm and pumping water from the lake to the river when water levels are very low, as the 'Preferred Supply Alternative' to be presented to the public.

Developing objectives and actions

Once the technical studies were complete and the MAE analysis conducted, the Forum had enough information to finish preparing the objectives and actions, and the *Water Management Plan* began to take shape.

Table A-2
Tradeoffs table used to compare the strengths and weaknesses of the five feasible supply alternatives

Alternative	Strengths	Weaknesses	Conclusion
A – Pump water from the lake to the river during dry periods (using electric pumps installed in the weir near the boat lock).	Can maintain river flows in drought years without raising the weir. Only needed during dry years.	No pulse flows for fish migration. Potential effects on lakeshore due to drawdown. High cost of installing pumps. Pumps power failure would halt river flows.	Provides 'insurance' against effects of drought, but high risk of fish pulse failure.
B – Low level release— modify the weir structure and dredge 300 m of the Cowichan River to allow water from the lake to be drawn down an additional 50 cm.	Can maintain river flows in drought years without raising the weir. Increased reliability of pulses for fish migration. Reliable gravity-based system.	Damage to aquatic and riparian habitat during construction (dredging river) and operation (smaller channel in summer). Risk of erosion of excavated channel banks and need for repeat dredging. Potential increase in winter flood flows downstream of weir. Effects of drawdown on riverside properties every summer and on lakeshore properties during fall drought periods.	Impacts to aquatic habitat and waterfront properties outweigh benefits of improved flows and reliability of fish pulses.
C – Raise the weir by 30 cm (1 ft) and pump water from Cowichan Lake into the River during dry periods.	Improved storage to maintain flows during drought. Slightly improved reliability of pulses for fish migration. Pumping only needed during dry years. Weir is raised only modestly.	Potential effects on lakeshore properties due to small increase in water levels during weir operation and drawdown during pump operation. High cost of installing pumps. Pump power failure would halt river flows.	Reasonable balance of impacts and benefits. Fish pulses not available in dry years.
D – Raise the weir by 48 cm (1.6 ft).	Improved fall flows. Improved reliability of pulses for fish migration. Cost-effective method of increasing storage.	Greater potential effects on lakeshore properties due to a moderate increase in water levels during weir operation. Inadequate storage for pulse flows in some years.	Economical way of increasing storage but has increased summer lakeshore effects.
E – Raise the weir by 88 cm (2.9 ft).	Greatly increased storage. Pulse flows for fish migration possible in all years. Most cost-effective method of increasing storage.	Greatest potential effects on lakeshore properties due to significantly increased water levels during weir operation. Weir may need to be rebuilt to accommodate 88 cm raising.	Provides the greatest benefits, but also has significant summer lakeshore effects.

APPENDIX B
WATER MANAGEMENT FORUM TERMS OF REFERENCE

Introduction

A *Water Management Plan* is being developed for the Cowichan Basin. In recent years, lake levels and river flows have fallen during the summer, threatening ecological and recreational values and other beneficial downstream uses. An informal group of regulatory agencies has been making flow management decisions during drought crises, but this approach is inadequate to deal with broader, long-term issues. The *Water Management Plan* will provide a comprehensive approach to water management issues in the Basin, covering a wide range of topics, including water demand, flows, drought, storage options, land use, economic analysis, and ecological issues, including fisheries.

A multi-party *Cowichan Basin Water Management Forum* (Forum) has been formed to represent community interests from around Cowichan Lake and downriver to the Estuary. The Forum will work to develop a shared vision of water management in the Cowichan Basin and ensure that a full range of water management and related issues are addressed.

An Administration Committee, comprised of representatives from the organizations funding the *Water Management Plan* (Cowichan Valley Regional District, Cowichan Tribes, Fisheries and Oceans Canada, NorskeCanada, and Land and Water BC Inc.), will meet separately as required to deal with administrative issues (project funding, etc.).

Purposes

The purposes of the Forum are to:

- ensure that a wide range of viewpoints are represented and included in the development of the *Water Management Plan*; and
- provide information, advice, and recommendations regarding the development of the Watershed Management Plan.

Roles

Members of the Forum will:

1. Become and remain familiar with water management issues, facts, policies, and interests in the Cowichan Basin;
2. Exchange and share information relevant to the development of a *Water Management Plan* for the Basin with other participants in the planning process, based on their individual expertise and knowledge, and that of organizations that they represent;

3. Bring to the attention of the consultant team (Westland Resource Group) information that could affect the content of the *Water Management Plan*, or that could influence the process of Plan preparation;
4. Review and comment on draft materials circulated during preparation of the Plan;
5. Discuss the development of the *Water Management Plan* with members of their organization, neighbourhood, or community of interest, to ensure that interested and affected people understand water issues, the Plan and its content;
6. Assist in identifying and developing opportunities for public input in the planning process (newsletter, comment forms, and open houses, other activities);
7. Respect all points of view held by Forum members, particularly when members are in disagreement; and
8. Make best efforts to attend Forum meetings and other relevant planning functions, such as public open houses.

When required, decisions will be made through discussion and consensus. In the case of widely divergent opinions, the consultants will seek solutions that best meet the needs of the project and the people of the Basin.

Geographic Area

The "Cowichan Basin" is defined as the area draining into Cowichan Lake, the Cowichan River, and the Somenos Basin. This system drains into the Cowichan Estuary. The area includes the municipalities of the Town of Duncan and the Town of Lake Cowichan, the District of North Cowichan, and several unincorporated areas of the Cowichan Valley Regional District. Part of the Basin is on land controlled by the Cowichan Tribes, and much of the Basin is the Tribes' traditional territory.

Meetings

Meetings will be held every 2–4 months, at critical stages of the development of the *Water Management Plan*. Meetings will be held at the call of the consulting team.

Agendas will be circulated before the meetings, and members are welcome to suggest agenda items that are relevant to the development of the *Water Management Plan*. Agendas will be set by Westland Resource Group, which will also be responsible for facilitating the meetings.

Membership

The membership of the Forum is intended to represent a range of residents, business interests, environmental interests and governments (including First Nations), including representatives from different parts of the Basin.

APPENDIX C
WATER MANAGEMENT FORUM MEETING SUMMARY

Meeting Date	Topics
April 14, 2005	• Background to *Water Management Plan* • Purpose of Cowichan Basin Water Management Forum • Introduction to water in the Basin • Field trip to various locations in the Basin • Preliminary discussion of issues, priorities, and tradeoffs in the Basin • Proposed public involvement process
September 15, 2005	• Project progress and status report • Review and discussion of Water Issues report • Approaches to setting goals and a vision for water in the Basin • Discussion of goals • Discussion of vision for water • Preliminary consideration of alternative water management strategies
September 29, 2005	• Update on Water Issues report • Communicating the Water Issues report to the public • Group sessions on vision and goals • Description and discussion of WMP structure and content • Information about the Multiple Accounts Evaluation (MAE) • Group sessions on objectives, actions, and targets • Group session on water management alternatives
November 2, 2005	• Update on Water Issues and Water Facts reports • Update on outreach elements • Confirmation of vision, refinement of goals and objectives • Plenary discussion on water management actions and targets • Update on water management alternatives – technical studies
December 21, 2005	• Presentations on laws and regulations affecting water management in the Cowichan Basin: – Larry Barr – Water Act, – John Baldwin - Dam safety, – Pat Lapcevic – Ground water, – Steve Lorimer – Forestry related regulations – Tom Anderson – Local conservation regulations and programs • Rationale for and content of Water Management Alternatives • Introduction to the proposed Multiple Accounts Evaluation (MAE) framework • Discussion of criteria for MAE • Description and discussion of public involvement and publicity for Water Management Alternatives

Meeting Date	Topics
September 27, 2006	• Overview of the proposed content of the *Water Management Plan* • Description and discussion of supply augmentation alternatives • Discussion of Multiple Accounts Evaluation (MAE) of supply alternatives
October 5, 2006	• Review of revised MAE of alternatives and description of the preferred alternative • Forum review and comment on non-supply related WMP elements • Presentation and discussion of public involvement program elements and roles of Forum members in public review of draft *Water Management Plan* • Forum approval of draft *Water Management Plan* organization and format
December 12, 2006	• Discussion of lakeside resident's issues and resolution • Review of Newsletter and Response Form #3 • Update on website • Open house and public meeting planning • Sign-off on MAE table version for website, newsletter, OH boards
March 16, 2007	• Discussion of January public consultation results • Review of draft *Water Management Plan*

APPENDIX D
DRAFT TERMS OF REFERENCE FOR THE COWICHAN BASIN WATER ADVISORY COUNCIL

Introduction

A *Water Management Plan* has been developed for the Cowichan Basin. The Plan provides comprehensive guidance to water management in the Basin. The *Water Management Plan* recommends the creation of a multi-party Cowichan Basin Water Advisory Council (CBWAC) to oversee plan implementation.

Purpose of the Cowichan Basin Water Advisory Council

The purpose of the Cowichan Basin Water Advisory Council (CBWAC) is to assist with and coordinate the efforts of the regional district, municipalities, provincial agencies, federal departments, and other parties in implementing the *Water Management Plan*. The CBWAC will undertake activities that include but are not limited to:

- being an advocate for water management and full implementation of the *Water Management Plan*,
- advising regulators on issuance or amendment of water licences,
- determining weir operation parameters (thereby replacing the ad hoc committee),
- advising municipalities and the CVRD on water-related implications of land use decisions and planning policies,
- advising provincial resource agencies on forestry, agriculture, mining, highways, and other developments that have the potential to affect water,
- designing and, in some cases, implementing water conservation projects,
- leading efforts to increase public awareness of water issues,
- monitoring the achievement of *Water Management Plan* goals and objectives,
- setting priorities for *Water Management Plan* actions,
- developing budgets and seeking funding to support implementation of Plan actions,
- taking responsibility of adaptive water management and proposing amendments to the *Water Management Plan*,
- lobbying government for changes to water-related legislation, and
- promoting partnerships to help achieve *Water Management Plan* goals.

Membership

The CBWAC should consist of about 20 people, ideally comprised of representatives from the following organizations or special interest groups:

- Cowichan Valley Regional District (Chair),
- District of North Cowichan,
- City of Duncan,
- Town of Lake Cowichan,
- Catalyst Paper Corporation,
- Cowichan Tribes,
- TimberWest,
- Ministry of Agriculture and Lands,
- Ministry of Environment, Fish and Wildlife Branch,
- Ministry of Environment, Water Stewardship Division,
- Fisheries and Oceans Canada,
- FutureCorp Cowichan,
- School Districts,
- public representative for recreational fishing interests,
- public representative for agricultural interests,
- public representative for recreational interests,
- public representative for lakeshore property owner interests,
- public representative for riverside property owner interests, and
- public representative for lower Basin interests.

The CBWAC will function as a Regional Board advisory committee and a Board member will act as Chair. Membership will be drawn from candidates invited to sit on the CBWAC. The CVRD will advertise for public volunteers, and will invite government agencies to nominate members.

The Regional Board will endorse all proposed CBWAC members prior to appointment. Selection criteria for members of the CBWAC will include:

- a commitment to implement the *Water Management Plan*,
- for agencies, a responsibility or authority pertaining to water management,
- for public members, property ownership or residency in the Cowichan Basin,
- willingness and ability to commit the necessary time to attend CBWAC meetings and to conduct CBWAC business,
- demonstrated interest in and knowledge of the Cowichan Basin,

- ability to work toward consensus with people who hold different interests and opinions about the future of the Cowichan Basin,
- skills and experience related to water management topics are helpful, but not required, and
- skills and experience related to the roles and responsibilities associated with an Advisory Committee are helpful, but not required.

Terms of Appointment

CBWAC members will serve for two years, and may sit for multiple terms. In order to avoid a complete change in committee members at the same time every two years, and to ensure continuity over time, appointments will be staggered. Membership will be voluntary, with expenses associated with attending meetings or fulfilling member responsibilities paid by the CBWAC.

Responsibilities

CBWAC members should assume the following responsibilities:

- become and remain familiar with water management issues, facts, policies, and interests in the Cowichan Basin;
- respect all points of view held by CBWAC members, particularly when members are in disagreement;
- make best efforts to attend CBWAC meetings and other relevant planning functions;
- share information relevant to water management with other participants on the CBWAC, based on their individual expertise and knowledge, and that of agencies, organizations, or interests they represent;
- discuss the *Water Management Plan* with members of their organization, neighbourhood, or community of interest, to ensure that interested and affected people understand water issues, the Plan and its content, and to enhance and expand understanding of water issues and management;
- identify opportunities and facilitate the development of partnerships among government, community, and business;
- promote coordination, clarify priorities, and help resolve issues among government agencies;
- identify funding sources and participate in the preparation of grant applications,
- review engineering, environmental, planning, and consulting documents as appropriate,
- identify and develop opportunities for public input in the water management decisions; and
- support and advance monitoring and evaluation of conditions and trends to ensure the goals and objectives of the *Water Management Plan* are being met.

Decision Making

CBWAC members will jointly seek outcomes that advance the full and complete implementation of the *Water Management Plan*. Members may represent the interests and values of their constituents or parent organizations, but not to the detriment of Plan implementation. Agencies, including regulators, who sit on the CBWAC must agree to seriously consider Council recommendations before issuing licences or permits, or making other decisions that affect water. If decisions are made that run counter to CBWAC recommendations, then the agency or organization will explain the rationale for the decision to the CBWAC in writing.

CBWAC decisions will be made through discussion, informed consent, or consensus.

> Consensus means an agreement that all participants can tolerate. The participants may not agree with every aspect of the decision, but taken as a whole, a decision based on consensus reflects common major interests and satisfies individual concerns of participants to the extent that they can support it. Informed consent implies a lower level of agreement, but all participants agree to not oppose the decision.

Areas of disagreement will be documented in the CBWAC meeting notes on decisions that resolve most but not all of the issues being addressed. The CBWAC may seek mediation or other dispute resolution support if necessary.

APPENDIX E
LIST OF DELIVERABLES

Public Consultation

Newsletters and Response Forms

Newsletter #1 Water, A Precious and Limited Resource
Newsletter #2 Summer Water Demand Outstrips Supply
Newsletter #3 A Plan for the Future of our Water

Open House Display Boards

Open House Display Boards June 2005
Open House Display Boards January 2007

Public Input

Report on Public Input, June 2005
Report on Public Input, January 2006
Report on Public Input, January 2007

Media

Animation of weir operation
Press releases
Shaw "The Daily" segments

Presentations

January 2007 public presentation

Distribution List

Excel spreadsheet of distribution list compiled during the planning process

Website

CVRD-hosted *Water Management Plan* website

Technical Studies

Water Issues and *Water Facts* reports, October 2005
Assessment of Water Supply Alternatives, December 2005
Potential Water Savings from Demand Management, December 2005 (revised December 2006)
Cowichan Lake Shoreline Effects Assessment, March 2006
Cowichan River Snorkel Survey Report, May 2006
Cowichan Lake Outlet Snorkel Survey Report, July 2006
Feasibility Study for the Lowering of Cowichan Lake Outlet, September 2006
Cowichan Lake Weir Pumping Feasibility Study, September 2006