

Working Draft to March 3/2010 (Further update complete mid-April)

CURRENT STATUS OF COWICHAN BASIN WATER MANAGEMENT PLAN RECOMMENDED ACTIONS

Recommended Actions	Primary (P) & Secondary (S) Responsibility	Recommended Targets	Annual Costs— Capital (C) or Operating (O) Low = <\$100,000 Mod = \$100,000-500,000 High = >\$500,000	Progress to Date Green = Done Yellow = On Track Orange = Slow Rose = Little or None	Priority
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.	P. CVRD, Muni's, water utilities S. E	Identify leaks by 2010. Repair 50% of leaks by 2012 and 90% by 2016.	C. Low O. Moderate	<ul style="list-style-type: none"> • CVRD maintains some leak detection equipment. • Reactive not proactive but some progress now being made. 	
1a-2. Install water meters on new water connections and retrofit existing connections.	P. CVRD, Muni's S. Water utilities	Meter 50% of currently unmetered community connections by 2010 and 100% by 2015.	C. Moderate O. Low	<ul style="list-style-type: none"> • Legislated/ongoing for new construction on community systems. • New CVRD service connections are metered. CVRD has approx. 45 separate systems. North Cowichan done. Lake Cowichan undertaking major program of installation. • City of Duncan has ongoing metering program. 	
1a-3. Ensure provincial and federal grants for infrastructure are contingent on water metering.	P Provincial, federal gov'ts S. CVRD, Muni's	All provincial infrastructure grants are contingent on metering by 2010.	C. Low O. Low	Currently in place and required for new infrastructure grants	

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1a-5. Provide incentives (e.g., tax credits, rebates) for replacement of existing plumbing fixtures with water efficient technology.	P. Muni's, CVRD S. Federal, provincial governments	• Replace 80% of existing plumbing fixtures with low-flow designs by 2015.	C. Moderate O. Low	Incentives for replacement of older fixtures to water saving ones available to residents on CVRD community water systems. Current programs in place for Muni's – ongoing.	
1a-6. Install water-saving plumbing fixtures (e.g., shower heads, toilets, faucets) in all new construction.	P. CVRD, Muni's S. Building contractors	• Use water-saving plumbing fixtures in 100% of new construction by 2010.	C. Moderate O. Low	Legislated in building code	
<p>• Objective 1b. Improve management of water demand in all sectors.</p>					
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.	P. MoE WSD S. CVRD, Muni's	• Meter 50% of water licences and wells by 2010 and 100% by 2015.	C. Moderate O. Low	Metering to be discussed under Water Act Modernization (WAM)	
1b-1. Create a consistent volume-based pricing structure throughout the Basin, and request that the Ministry of Environment apply similar mechanisms.	P. CVRD, Muni's S. MoE WSD	• 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.	C. Moderate O. Low	<ul style="list-style-type: none"> • All CVRD metered systems have paid average rates since inception. In 2004 began inclined Block Rate Structure billing for all metered systems. • N Cow has volume based incentive pricing structure. 	
1b-2. Implement conservation based sewer charge (i.e., link sewage treatment costs to water consumption).	P. Muni's S. CVRD	• Implement conservation sewer charge in 100% of jurisdictions with community sewage treatment by 2010.	C. Low O. Low	<ul style="list-style-type: none"> • CVRD water/sewer systems & budgets administered separately. Some progress at muni. level. • May be possibilities for metered sewage at major user level and then application of incentives. 	

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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).	P. CVRD, Muni's, utilities S. Businesses, homeowners	<ul style="list-style-type: none"> • 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. 	C. Low O. Low Should be cost effective if water is priced properly. Will require leg/reg.	<ul style="list-style-type: none"> • Catalyst currently working on conservation measures. • Conservation measures including xeriscaping techniques/suggested on websites. • CVRD working on inclusion in sub-division servicing bylaw. 	
1b-3b. Promote the use of rainwater harvesting techniques (e.g., rain barrels, cisterns, dugouts, retention ponds) and grey water reuse.	P. CVRD, Muni's, utilities S. Homeowners, farmers, building contractors	<ul style="list-style-type: none"> • 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 grey water systems. • Retrofit 5% of existing structures per decade to include grey water recycling systems. • Increase the proportion of agricultural operations and golf courses that are irrigated with grey water. • 100% of new construction had grey water reuse capability by 2015. 	C. Moderate O. Low	<ul style="list-style-type: none"> • Some work has been initiated – Staff have been directed to work on policy/funding mechanisms for these initiatives. 	

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1b-3c. Educate residents, business, and industry about demand management.	P. CVRD, Muni's S. N/A	• All municipal and regional web sites contain information about demand management. • Increase the number of demand management brochures and workshops available to the public.	C. Low O. Low	<ul style="list-style-type: none"> • Have information on websites could be increased and N Cowichan has summer education program. • Requires a concerted plan 	.
1b-3d. Promote efficient agricultural water use techniques, such as drip irrigation instead of spray irrigation.	P. CVRD, Muni's S. MoAL	• 10% reduction in agricultural water use by 2010 and 20% by 2015.	C. Moderate O. Low	<ul style="list-style-type: none"> • No Mapping/data • No program in place 	
1b-4 Conduct Independent water audits of Catalyst Paper's Crofton Mill to investigate opportunities to enhance existing conservation measures.	P Catalyst Paper	<ul style="list-style-type: none"> • 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. 	C. Moderate O. Moderate	Some progress but audit has not been conducted..	
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.	P. MoE WSD S. CVRD, Muni's	<ul style="list-style-type: none"> • 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. 	C. High O. Moderate	<ul style="list-style-type: none"> • New wells are tagged and monitored for flow at drilling but no ongoing reporting is required. WAM may address. 	

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1b-5b. For new or amended water licences, attach terms and conditions that require water conservation and reporting of volumes used.	P. MoE WSD S. CVRD, Muni's	<ul style="list-style-type: none"> • Attach water conservation terms and conditions to 100% of new water licences by 2008. • Attach water conservation terms and conditions to 50% of existing licenses by 2010, and 100% by 2015. 	C. Low O. Low	<ul style="list-style-type: none"> • To be examined under WAM. Requires regional input. 	
1b-5c. Amend prov. legislation and guidelines governing water licences to allow licences for in stream conservation without requiring diversion, works, or human use.	P. MoE WSD S. CVRD, Muni's	<ul style="list-style-type: none"> • Amend legislation and guidelines by 2010. 	C. Low O. Low	To be explored under WAM –a Living Water Smart issue.	.
1b-5d. Seek opportunities to cancel unused consumptive water licences and do not re-allocate these volumes to other licensees.	P. MoE WSD S. CVRD	<ul style="list-style-type: none"> • Cancel 100% of unused consumptive water licenses annually. 	C. Low O. Low	<ul style="list-style-type: none"> • Requires Regional input. • Some unused licences are used as secondary or back-up sources of water. <p>CVRD currently in use, but will be maintained as precautionary measure.</p>	

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1b-5e. Reserve unrecorded water in streams for the use of the Crown, for the purpose of conservation and downstream supply.	P. MoE WSD S. CVRD, Muni's	Reserve all unrecorded water in streams by 2008.	C. Low O. Low	<ul style="list-style-type: none"> Linkage of WAM to protecting stream health and aquatic environments 	
<ul style="list-style-type: none"> 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.	P. CVRD, Muni's S. N/A	<ul style="list-style-type: none"> 100% of Official Community Plans in the Basin contain strong water conservation policies by 2010. 	C. Low O. Low	<ul style="list-style-type: none"> CVRD will address at OCP reviews Currently reviewed or under review in ongoing OCP update areas (North Cowichan, Town of Lake Cowichan, Duncan). 	?
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.	P. CVRD, Muni's S. Schools, community centres, arenas	<ul style="list-style-type: none"> Implement conservation strategies in local governments and institutions by 2008. <ul style="list-style-type: none"> 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. 	C. Moderate O. Low	CVRD little progress to report but now being considered. N Cowicahn has initiated numerous measures as has the JUB.	

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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.	P. CVRD, Muni's S. Developers, architects	<ul style="list-style-type: none"> All new and retrofit public buildings and facilities incorporate 'green building' policies, starting in 2008. 	C. Low O. Low	<ul style="list-style-type: none"> Multiple lenses e.g. GHG reduction and use of micro hydro penstock at Saltair for energy generation. No LEED or green building policy as of yet in CVRD or member munis but some progress being made recently. Pool was built to unofficial LEED silver standard. 	
1c-4. Adopt a program of regular water use efficiency audits for publicly-owned buildings and infrastructure.	P. CVRD, Muni's S. Schools, community centres, arenas	<ul style="list-style-type: none"> 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. 	C. Moderate O. Low	Some discussion	
<ul style="list-style-type: none"> 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.	P. CVRD, Muni's S. Developers, architects	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.	C. Low O. Low Should be no incremental cost—simply good planning.	<ul style="list-style-type: none"> Currently under review in ongoing OCP update areas, Duncan and North Cowichan on track 	

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1d-2. Revise municipal and regional policies, regulations, and land use plans to include Low Impact Development and Smart Growth design principles.	P. CVRD, Muni's S. Developer s, architects	• Revise relevant plans and policies by 2009.	C. Low O. Low	• Ongoing in OCP review processes and development of subdivision servicing bylaw for CVRD.	
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.	P. CVRD, Muni's S. Develop ers, architects	• 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.	C. Moderate O. Low Should be self funding	• Little progress to report.	
<ul style="list-style-type: none"> GOAL 2. MANAGE WATER SUPPLY TO MEET HUMAN NEEDS AND MINIMIZE IMPACTS OF LOW WATER LEVELS. 					
<ul style="list-style-type: none"> 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.	P. Catalyst Paper S. MoE WSD	• 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.	C. High O. Moderate Estimates prepared as part of plan.	<ul style="list-style-type: none"> Raising weir not endorsed by CVRD. No work on pumps 	

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2a-2. Recommend that new licences for substantial withdrawals of surface water provide equivalent licensed storage	P. MoE WSD S. CVRD	• 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.	C. High O. Low Cost of doing business increment.	No progress to report. May be WAM issue.	
<ul style="list-style-type: none"> 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.	P. CBWAC S. MoE WSD, Catalyst Paper	Comprehensively examine the water management program every decade beginning in 2016.	C. Moderate O. Low	No progress to report.	
<ul style="list-style-type: none"> Objective 2b. Actively manage spring and summer water levels to minimize the potential for lakeside properties to be adversely affected. 					
2b-4. Assess impacts of water storage levels on lakeshore properties and implement appropriate compensation procedures and processes, as in Figure 7.	P. Catalyst Paper S. MoE WSD	• All affected property owners have an opportunity to discuss potential water storage effects and potential compensation with the weir license holder. • All affected property owners feel that they have been fairly treated by the license holder.	C. High O. Low	<ul style="list-style-type: none"> • CVRD LIDAR data collected for lakeshore analysis – analytical work proceeding in early 2010. • Will provide info for informed decisions 	

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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.	P. Catalyst Paper S. MoE WSD, CBWAC	• Apply to the MOE WSD for a license 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.	C. Low O. Low	<ul style="list-style-type: none"> • MoE work on revised input model • Rule curve managed by province with local feedback and recommendations. 	
2b-2. Operate the weir to store spring and summer inflows to the lake, within rule band limits.	P. Catalyst Paper S. MoE WSD, CBWAC	• 80% of lake inflows are captured during the weir’s control period without exceeding the rule band by 2011.	C. Low O. Low	<ul style="list-style-type: none"> • See 1 above • Recommendations and management rule curve developed as interim measure by ad-hoc committee 	
2b-3. Store only sufficient water in Cowichan Lake needed to maintain ecological protection and support human use in the Cowichan Basin.	P. Catalyst Paper S. MoE WSD, CBWAC	• 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.	C. Low O. Low	<ul style="list-style-type: none"> • See 1 above • Level of lake determined by province 	
<ul style="list-style-type: none"> • Objective 2d. Protect surface and ground water resources from contamination that could reduce supply. 					

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2d-1. Implement Best Management Practices (BMPs) for stormwater management and protection of ground water resources in the Cowichan Basin.	P. CVRD, Muni's S. Developers, forestry companies, farmers, business and home owners	<ul style="list-style-type: none"> • 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, & other institutions are aware of, & apply, water management BMPs by 2012. • 25% of existing businesses implement storm water BMPs by 2010, increasing to 100% by 2016. • 100% of new businesses have 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 & managers of roads & hwys implement measures to protect water resources from road runoff by 2010. 	C. High O. Low	Early progress on BMP development and policy. Inventories occurring. Additional resources required for fine resolution at site level and to maintain momentum	
2d-2. Investigate and implement strategies to avoid or minimize the release of treated effluent directly to the Cowichan River.	P. Joint Utilities Board, Town of Lake Cowichan S. CVRD	<ul style="list-style-type: none"> • 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. 	C. High O. Low	<ul style="list-style-type: none"> • Joint Utilities Board review initiated. Central Sector Liquid Waste Mgt plan has been amended to include this option. • Cowichan Tribes undertaking infrastructure review dealing with some non point source impacts. 	

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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.	P. Catalyst Paper, MoE WSD S. Joint Utilities Board, Town of Lake Cowichan	• Treated effluent quality complies with waste discharge permits 100% of the time by 2008.	C. Low O. Low	Currently not possible during dry summers	
2d-4. Using incentives and enforcement of regulations, relocate septic fields susceptible to flooding to avoid contamination of lakes, streams, and the Cowichan River.	P. CVRD, Muni's S. Homeowners	• Identify septic fields susceptible to flooding by 2008. • Remove 50% of septic fields susceptible to flooding by 2012 and 100% by 2020.	C. High O. Low	<ul style="list-style-type: none"> • No progress to support. • LIDAR analysis will aid identifying problem areas. 	
2d-5. Install community sewage treatment facilities in Youbou, Honeymoon Bay, Mesachie Lake, Bear Lake, and other lakeside and riverside settlements.	P. CVRD S. N/A	• 50% of sewage receives community treatment by 2012 and 100% by 2018.	C. High O. Moderate	<ul style="list-style-type: none"> • Applied for infrastructure grant for Mesachie/Bear Lake. Not yet funded. Works pending funding. • Completed comprehensive study for joint sewer system for Honeymoon Bay and Mesachie Lake. 	
2d-6. Install sufficient boat sewage pumpouts on Cowichan Lake to serve current and future boating requirements.	P. CVRD, Town of Lake Cowichan S. Marina operators	• Install four boat sewage pump-outs on Cowichan Lake by 2012.	C. Moderate O. Moderate	Power boat and houseboat use increasing on lakes with corresponding lack of facilities. High coliforms reported at marina.	

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2d-7. Enact and enforce regulations to protect ground water resources (e.g., road runoff, commercial, and agriculture operations).	P. MoE WSD, MoE EPD S. CVRD, Muni's	<ul style="list-style-type: none"> Local governments, provincial agencies, Crown Corporations, and First Nations phase out the use of pesticides by 2012. 	C. Moderate O. Low	<ul style="list-style-type: none"> MoE (EPD, Nanaimo) has commenced a water quality monitoring program at sampling sites within Cowichan Lake and selected influent tributaries (contact is Deb Epps, RPBio.). MoE has developed some codes of practice under EMA. CVRD has no regulations in this area 	
2d-8. Design and implement pesticide reduction programs, including education and incentives, for homeowners, farmers, and golf courses.	P. MoE EPD, CVRD, Muni's S. Homeowners, farmers	<ul style="list-style-type: none"> 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. 	C. Moderate O. Low	<ul style="list-style-type: none"> CVRD pesticide policy (not enacted) Cowichan Tribes has a regional Pesticide Policy No incentive program currently underway 	.

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2d-9. Identify and remediate areas of upland and riverbank erosion.	P. DFO, MoE Fisheries S. Local stewardship groups	<ul style="list-style-type: none"> Continue work on the Stoltz Slide and other areas of concern. 	C. High O. Moderate	<ul style="list-style-type: none"> Sediment management and erosion control continues to be a very high priority of the Cowichan Stewardship Roundtable, and >\$1M has been spent since 2006 on related projects (principally at Stoltz Bluff). Included in the Cowichan Recovery Plan and updated annually by the Cowichan Stewardship Roundtable. Cowichan Koksilah integrated flood management plan includes identification of priority areas and required remediation. 	
<ul style="list-style-type: none"> 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.	P. Private Managed Forest Land Council, PMFLC, MoAL, forestry companies S. CVRD, Munis, CWB	Reduce violation of relevant acts and regulations and bylaws to zero by 2009.	C. Moderate O. Moderate	<ul style="list-style-type: none"> Province of BC has committed resources to analyse hydrological impacts on upland areas on Lake Cowichan inputs. CVRD currently has not pursued policy or regulation in this area. PMFLC requires a summary management plan which may or may not include hydrological impacts for lands currently zoned forestry and taxed at a forestry rate. 	

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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.	P. Private Managed Forest Land Council, MoFR, MoAL, forestry companies S. CBWAC	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.	C. Low O. Moderate	No progress to report.	
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.	P. CBWAC, MoFR, MoAL, forestry companies S. CVRD, Muni's	<ul style="list-style-type: none"> Develop improved forest practices by 2009 and implement by 2010. 	C. Low O. Low	<ul style="list-style-type: none"> On-going discussions between Steering Committee members of Living Rivers – Georgia Basin/Vancouver Island and private forest companies operating in watershed. Focused on current practices, riparian and stream protection, and fish habitat restoration. Currently reviewing the need to apply a development permit process on Forestry lands not under PMFL CVRD hosted preliminary discussions with other local government and land managers to discuss increasing requirements in this area under a forestry and land use policy 	

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2e-4. Engage the community in developing and implementing land cover policies and other watershed management practices that protect the Basin's hydrology.	P. CBWAC S. Forestry companies	<ul style="list-style-type: none"> Prepare improved land cover policies and other watershed management practices by 2009 and fully implement them by 2011. 	C. Low O. Low	No progress to report	
<ul style="list-style-type: none"> GOAL 3. ENSURE SUFFICIENT WATER IS AVAILABLE TO SUSTAIN AQUATIC AND RIPARIAN ECOSYSTEMS THROUGHOUT THE YEAR. 					
<ul style="list-style-type: none"> 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.	P. Catalyst Paper, MoE WSD S. DFO, MoE Fisheries	<ul style="list-style-type: none"> 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. 	C: Low O: Low	Limited current volumetric opportunities	
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.				Limited current volumetric opportunities	

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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.				Limited current volumetric opportunities	
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.	P. Catalyst Paper, MoE WSD S. DFO, MoE Fisheries	Have sufficient water available to provide fall migration pulse flows 2 years out of 3.		Only as possible under current volumetric opportunities – 2 out of 3 years	
<ul style="list-style-type: none"> Objective 3b. Maintain, enhance, and restore aquatic and riparian habitats. 					
3b-1. Identify, inventory, and map aquatic and riparian habitats and restoration opportunities.	P. CVRD, Muni's, DFO, MoE ESD S. Local stewardship groups	Complete an inventory of important habitats by 2010.	C: Moderate O: Low	<ul style="list-style-type: none"> Included in the Recovery Plan & updated annually by Roundtable. Lower Cowichan Koksilah Integrated Flood mapping program has recos regarding riparian habitats & opportunities CVRD has applied for inventory funding from the province. Cowichan Tribes has provided orthophoto coverage of region as a first step in this initiative. LIDAR of Lake Cowichan avail. if funds for a RAR of lake foreshore 	

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3b-2. Develop land use policies and development patterns that protect, maintain, and enhance healthy aquatic and riparian ecosystems.	P. CVRD, Muni's S. Developers	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.	C: Moderate O: Low	<ul style="list-style-type: none"> • RAR, and new proposed subdivision servicing bylaw. OCP reviews ongoing. • CVRD developed a developer's outreach component of its evolving storm water management policy. 	
3b-3. Continue and expand habitat improvement projects, including spawning channel improvements and riparian restoration and replanting.	P. DFO, MoE Fisheries S. Cowichan Stewardship Round Table	• 80% of streamside and lakeside areas have intact native vegetation by 2010 and 90% by 2018.	C: Moderate O: Moderate	<ul style="list-style-type: none"> • Roundtable leads ongoing watershed and fish habitat restoration work as per priorities in the Cowichan Recovery Plan. A significant amount of ongoing work is budgeted for the 47km of mainstem river below Cowichan Lake, i.e., new/upgraded side-channels, spawning gravel placements, Stoltz sediment maintenance, and funds for water management plan implementation. • Opportunities may be available as a component of the lower Cowichan Flood planning process to use identified areas as biodiversity reserves of ecosystem credit banking 	

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3b-4. Adopt or amend tree protection bylaws to strictly regulate tree cutting and vegetation clearing in riparian areas.	P. CVRD, Muni's S. Developer s, landowners	• Protect 80% of trees in riparian areas by 2008 and 100% by 2012.	C: Low O: Low	<ul style="list-style-type: none"> • Included in Riparian Area Regulation (RAR) legislation to some extent but regulation very difficult. May have to look at other tools and incentives to develop wider buy in and public support. 	
3b-5. Protect riparian habitats from adverse effects of logging, industrial, commercial, and residential development through enforcement of local and provincial regulations.	P. CVRD, Muni's S. Developer s, forestry companies, business and home owners	• Manage 75% of riparian areas to protect aquatic ecosystems by 2010, and 100% by 2015.	C: Low O: Low	<ul style="list-style-type: none"> • Included in RAR legislation for residential, commercial and industrial development not forestry or agriculture • Enforcement and ticketing bylaw does not include environmental enforcement therefore a working relationship with MOE and DFO is necessary. 	
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.	P. CVRD, Muni's S. Developers, landowners	• Apply the RAR to 100% of streamside developments by 2008.	C: Low O: Moderate	<ul style="list-style-type: none"> • Enforcement and ticketing bylaw does not include environmental enforcement therefore need working relationship with MOE and DFO. • DFO not able to commit resources to enforcement or legal proceedings • Education and capacity development for regional staff provided to ensure consistency of RAR application and requirements. Ongoing work with MOE and DFO ensures communication and support. 	

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3b-5b. Enforce compliance with the riparian protection elements of the Private Managed Forest Land Act and the Private Managed Forest Land Council Regulation.	P. Private Managed Forest Land Council S. CBWAC	• Reduce violation of relevant acts and regulations to zero by 2008.	C: Low O: Low	<ul style="list-style-type: none"> • Living Rivers' and steering committee members continue to meet with private forest company officials to discuss the need for increased riparian/stream protection in private forest land logging operations. Future discussions could include specific operations in the Cowichan watershed, where public concerns were raised during the Plan development. • In current discussion with PMFL where jurisdictional overlaps exist. 	
<ul style="list-style-type: none"> • GOAL 4. REDUCE THE IMPACTS OF HIGH WATER LEVELS, RESPECTING THE IMPORTANCE OF WINTER FLOODS TO NATURAL SYSTEMS. 					
<ul style="list-style-type: none"> • <i>Objective 4a. Establish adequate development setbacks from Cowichan Lake and River to reduce potential flooding risks.</i> 					
4a-1. Extend coverage of 200-year floodplain mapping to include all areas of the Basin.	P. MoE EPD S. CBWAC	All areas of the Basin have 200-year floodplain mapping by 2012.	C: Moderate O: Low	Lower Cowichan/Koksilah completed. Needs to be incorporated into new bylaws	

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4a-2. Review current 200-year floodplain levels and update as required using state-of-the-art hydro-technical data and hydraulic analysis techniques.	P. MoE EPD S. CBWAC	Update existing 200-year floodplain levels by 2010.	C: Low O: Low	<ul style="list-style-type: none"> Ongoing floodplain analysis of the Lower Cowichan River to determine flood levels, incorporate climate change variables, and support BMPS. Lake Cowichan LIDAR flight completed in 2008. Analysis underway. 	
4a-3. Continue to enforce bylaws that prohibit new development or deposit of fill below the 200-year flood level.	P. CVRD, Muni's S. Developers, landowners	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.	C: Low O: Low	<ul style="list-style-type: none"> No fill deposit bylaws in place. Development currently allowed within 200 year floodplain level with sign off from engineer. 	
4a-4. Flood proof at-risk structures where practical.	P. CVRD, Muni's S. MoE EPD	Decrease the numbers of structures vulnerable to flooding.	C: High O: Low	No progress to report	
<ul style="list-style-type: none"> Objective 4b. Increase the flood buffering capacity of floodplain and constricted channel areas. 					
4b-1. Involve all Muni's 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.	P. CVRD, Muni's S. Cowichan Tribes	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.	C: High O: Low	<ul style="list-style-type: none"> Analytical program completed for the lower Cowichan Koksilah to develop a integrated management plan. Does not include rainwater/storm water components Linkages to Liquid Waste Management? 	

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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.	P. CVRD, Muni's S. Cowichan Tribes	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.	C: Low O: High Possible revenue generator.	Recommendation in management plan. No program in place to maintain, manage and monitor.	
<ul style="list-style-type: none"> • 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 integrated FDMP	P. MoAL, Muni's, S. Farmers	• 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.	C: Moderate O: Low	Recommendation included in the integrated management plan for the lower Cowichan	
4c-2. Promote crop selection in the Somenos and Quamichan sub-basins that is appropriate for their soil and hydrologic conditions.	P. Farmers S. MoAL	• Plant moisture tolerant crops in 100% of farmed portions of low lying areas of the Somenos and Quamichan sub-basins by 2010	C: Moderate O: Low	<ul style="list-style-type: none"> • MAL study re appropriate crop selection for this area completed in 2007. • Flood plain analysis recommends potential resource shifting and use of agricultural areas for flood management that will support long term agricultural opportunities and wildlife management • . 	

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<ul style="list-style-type: none"> 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.	P. Muni's S. Farmers, Cowichan Tribes, MoAL	<ul style="list-style-type: none"> 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. 	C: Low O: Low	Recommended in integrated flood management plan for lower river	
<ul style="list-style-type: none"> 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.	P. CVRD, Muni's S. Developers, landowners	Decrease the proportion of development using conventional storm drains. <ul style="list-style-type: none"> Implement Low Impact Development techniques for 100% of new development by 2009. Retrofit 10% of existing development per year to Low Impact Development techniques. 	C: Moderate O: Low	Ambitious target. Transition occurring. BMPs currently under review. Water centric planning/training program for staff and outreach for developers. Munis doing a good job re OCPs	
4e-2. Adopt subdivision or development services bylaws and Official Community Plan policies based on Low Impact Development principles.	P. CVRD, Muni's S. Developers	<ul style="list-style-type: none"> Implement bylaws and OCP policies by 2008. Adopt Greenway Bylaws that support low impact use of seasonally inundated land. 	C: Low O: Low	Progress on OCPs and supporting bylaws required..	

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<ul style="list-style-type: none"> GOAL 5. EDUCATE, ENGAGE, AND EMPOWER CITIZENS IN WATER MANAGEMENT 					
<ul style="list-style-type: none"> 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.	P. CWB S. Local media	<ul style="list-style-type: none"> 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. 	C: Low O: Moderate	<ul style="list-style-type: none"> Draft communications plan in prep Ongoing, currently in process of web based information exchange – through water bucket and stewardship center. When CVRD web page updated may be possible to do more... Tentative agreement for weekly watershed articles Catalyst Paper maintains a web page with current water basin information. Living Rivers – prepared to provide some funding for public education initiatives supporting implementation of the CBWMP. 	
5a-2. Promote, support, and develop partnerships with non-government organizations in implementation of the <i>Water Management Plan</i> .	P. CWB partners S. Non-governmental organizations	Annually increase the number of partnerships with NGOs.	C: Low O: Low	Ongoing partnership development through roundtables co chaired by CVRD/Living Rivers and other NGOs; Living Rivers has been a major supporter	

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5a-3. Develop education initiatives to enable elementary and secondary school students to understand important water issues and stewardship initiatives in their community.	P. CBWAC S. School Districts	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.	C: Low O: Moderate	Little progress – may be able to use material developed by CRD	
5a-4. Engage the Cowichan Tribes in water management in ways that ensure cultural values are reflected in decisions.	P. Cowichan Tribes S. CWB	<ul style="list-style-type: none"> 80% of residents are aware of the cultural values associated with water in the Cowichan Basin by 2012. 	C: Low O: Low	<ul style="list-style-type: none"> Recommendation may need rewording. Cowichan Tribes is a strong partner at Roundtable and on Board. S 	
<ul style="list-style-type: none"> 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 <i>Water Management Plan</i> is implemented.	P. CWB, partners S. NGOs	<ul style="list-style-type: none"> Increase the number of volunteers and NGOs engaged in WMP implementation. 	C: Low O: Low	Ongoing	
5b-2. Engage Basin residents, government agencies, and decision-makers in an open and continuing dialogue about water management.	P. CWB, partners S. Public, other groups	<ul style="list-style-type: none"> Increase the number of communication opportunities and information exchange with the public. 	C: Low O: Low	Ongoing; watershed tours, communications plan etc.	

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<ul style="list-style-type: none"> 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.	P. CWB, partners S. MoE WSD	• Annual monitoring covers 100% of water uses in the Cowichan Basin by 2015.	C: Moderate O: Low	<ul style="list-style-type: none"> No progress to report. 	
5c-2. Require well monitoring and reporting as a condition of rural subdivision, rezoning, or building permit issuance.	P. CVRD S. Muni's	• 100% of rezoning and building permit issuances require well monitoring and reporting by 2010.	C. Low O. Low	<ul style="list-style-type: none"> No progress to report. 	
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.	P. MoE WSD, Catalyst Paper S. CBWAC	• Install state-of-the-art instrumentation and monitoring by 2010. • Link monitoring information to water management decisions and weir operation.	C: High O: Low	<ul style="list-style-type: none"> Water Survey gauge at Cow Lake now online. Multiple provincial funding requests and proposals developed for other components but no success as yet. 	
5c-4. Prepare annual reports on the status and effectiveness of <i>Water Management Plan</i> implementation, and make these reports available to the public.	P. CWB S. Utilities, Catalyst Paper, water users	• Prepare annual monitoring and performance reports for the Cowichan Basin beginning in 2010.	C: Low O: Low	<ul style="list-style-type: none"> Full report required January 15/2011. Need to explore linkage to Environment Commission's SOE report 	
<ul style="list-style-type: none"> Objective 5d. Conduct research to support knowledgeable decision-making and water management. 					
5d-1. Collect & maintain data on aquifer capacity, aquifer recharge rate, ground water extraction, & the relationship of ground water pumping to base flow in the Cowichan River & other nearby streams, & make this info. available to the public.	P. MoE WSD S. CVRD, Muni's, local media	• 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.	C: Low O: Low	Province currently undertaking a aquifer vulnerability mapping exercise for the region.- Have classified aquifers and are monitoring	

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5d-2. Develop guidelines for use of ground water and management of aquifers.	P. MoE S. CVRD, Muni's	• Prepare and implement ground water management guidelines based on the technical report by 2011.	C: Low O: Low	Ground water well head protection tool kit exists MoE has classified a number of aquifers 2 dimensional size, vulnerability and degree of development but not guidelines for managing them.	
5d-3. Study the use water in Basin agriculture, to support measures that will increase the efficiency of irrigation and other water uses.	P. CVRD S. MoAL	• Conduct agricultural water use and conservation study by 2009.	C: Low O: Moderate	TBD; Need to link up with Agricultural Plan.	
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, - ecological effects of water use and management.	P. CWB. partners S. MoE WSD, Universities	Increase the proportion of identified water management issues subject to research studies. • Increase the number of water-related research proposals that are fully funded.	C: Low O: Low	• TBD; Benefits of linking up with a university?	

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<ul style="list-style-type: none"> GOAL 6. ESTABLISH CLEAR, ACCOUNTABLE, AND RESPONSIVE WATER MANAGEMENT DECISION PROCESSES AND GOVERNANCE STRUCTURES. 					
<ul style="list-style-type: none"> 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 Watershed Board (CWB) to guide the implementation of the <i>Water Management Plan</i> and improve the quality of water management decisions in the Basin.	P. CVRD S. Other <i>Water Management Plan</i> partners	<ul style="list-style-type: none"> • Create the CBWAC by the end of 2007. • Increase the number of water management decisions in which the CBWAC is involved. 	C: Low O: Low	Done. January 2010.	
6a-2. Actively encourage regulatory agencies to increasingly base their water management decisions on CWB recommendations.	P. CWB S.	<ul style="list-style-type: none"> • Increase the number of agencies that involve the CWB in their decision processes. • Increase the proportion of decisions made by regulators that are consistent with direction from the CWB 	C: Low O: Low	TBD; Strong linkages to Goal 5.	
6a-3. Create secure and stable funding sources to support water management activities of the CBWAC.	P. CWB S. N/A	<ul style="list-style-type: none"> • The CBW has funding to meet 85% of identified water management needs in all years. 	C: Low O: Moderate	TBD	
6a-4. Designate a regional coordinator to oversee the development of the water management strategy and to help implement water reduction actions.	P. CVRD S. Muni's	<ul style="list-style-type: none"> • Designate a regional water management coordinator by 2007. 	C. Low O. Moderate	Done; Funding time bounded.	

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6a-5. Involve landowners, business, developers and other members of the public in Cowichan Basin water management decisions.	P. CWB S. Public, business, developers, landowners	• Surveys reveal that landowners, businesses, developers, and the public are satisfied with their involvement in water management decisions.	C: Low O: Low	Strong linkages to Goal 5 - outreach	
<ul style="list-style-type: none"> 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.	P. Cowichan Stewardship Round Table S. CWB	Increase the number of restoration and research projects that are guided by the Cowichan Stewardship Round Table.	C: Low O: Moderate	Living Rivers (LR) and CVRD are supporting with staff (co-chairs) and for secretarial duties. Support time bounded	
<ul style="list-style-type: none"> 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.	P. CBWAC S. Public, other groups	90% of people and groups affected by water management decisions feel that the balance of their costs and benefits are fair and equitable.	C: Low O: Low	No progress from watershed perspective as yet.	
6c-2. Emphasize cost effectiveness in water management decisions in the Cowichan Basin.	P. CBWAC S. Other water management agencies and organizations	Cost-effectiveness is considered in 100% of water management decisions by 2010.	C: Low O: Low	No progress from watershed perspective as yet.	

