

Drinking Water and Watershed Protection Action Plan



Report to the Board of the
Regional District of Nanaimo

by the Drinking Water-Watershed
Protection Stewardship Committee



October 2007



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Acronyms

DW-WP Committee or 'the Committee' – Drinking Water-Watershed Protection Stewardship Committee

DFO – Fisheries and Oceans Canada

MVIHES – Mid Vancouver Island Habitat Enhancement Society

MOE – BC Ministry of Environment

NRC – Natural Resources Canada

OCP – official community plan

'the Region' - geographical area of the Regional District of Nanaimo. Unless otherwise stated, this includes the 4 member municipalities (Nanaimo, Lantzville, Parksville and Qualicum Beach) and the 7 electoral areas.

RDN – Regional District of Nanaimo, the local government entity consisting of a Board of Directors (representing the the 4 member municipalities and 7 electoral area) support staff.

VIHA – Vancouver Island Health Authority

Drinking Water-Watershed Protection Stewardship Committee
**REPORT TO THE BOARD OF THE
REGIONAL DISTRICT OF NANAIMO**

October 2007

Table of Contents

Acknowledgements
Acronyms

1. Introduction..... 1
1.1 Background..... 1
1.2 The DW-WP Stewardship Committee 3
1.3 Purpose of this Report..... 3
1.4 The DW-WP Stewardship Committee Process..... 3

2. A Drinking Water–Watershed Protection Action Plan for the Region 5
Program 1: Public Awareness and Involvement..... 6
Program 2: Water Resources Inventory and Monitoring..... 9
Program 3: Land Planning and Development 12
Program 4: Watershed Management Planning 14
Program 5: Water Use Management..... 18
Program 6: Water Quality Management..... 21
Program 7: Climate Change 24

3. Implementing the DW-WP Action Plan..... 26
3.1 Draft Ten Year Timeline and Budget 26
3.2 First Five Years..... 26
3.3 Second Five Years..... 27

4. Funding the DW-WP Action Plan 28
4.1 Summary of Ten Year Budget 28
4.2 Potential Staffing 28
4.3 Short term/Transition Funding 28
4.4 Mid to Long-term Funding 28
4.5 Other Funding Sources..... 29

5. Getting the Action Plan Underway..... 30
5.1 Initial Tasks 30
5.2 Stakeholder Involvement in Initial Tasks..... 30
5.3 Transition Funding 30
5.4 Referendum..... 30

6. Summary of Recommendations.....	31
6.1 Recommendations to the RDN Board.....	31
6.2 Recommendations to the Vancouver Island Watershed Steering Committee.....	31
Attachment: Drinking Water-Watershed Protection Program Budget Timeline.....	32
Appendix 1: Terms of Reference of the DW-WP Stewardship Committee	33
Appendix 2: Detailed Budget for the DW-WP Action Plan	35

1. Introduction

“Every resident in the region requires a safe and sufficient supply of drinking water, a very sensitive, precious, finite natural resource.” (RDN Drinking Water Action Plan, 2004: 3)

“A sustainable region has a safe, sufficient supply of water ...{and} the ecosystems and ecological features are protected, healthy and productive in a sustainable region.” (RDN State of Sustainability Report, 2006: iii)

1.1 Background

Here on the “wet coast” of British Columbia, one might take a safe, sufficient supply of water for granted. That is a precarious assumption. The quantity and quality of surface and groundwater are affected directly by human activity, whether that is land development, resource extraction, water consumption or discharge of pollutants. All of these activities are on the rise in the Nanaimo Regional District (the Region). The resulting changes to quantity and quality of water can impact the health of the Region’s ecosystems as well as the social and economic stability of the Region.

The Regional District of Nanaimo (RDN) presently provides services in four key areas that affect water:

- **Regional growth management** – the Regional Growth Strategy establishes broad land use policies for the Region¹, including policy directives relating to environmental protection and drinking water sources.
- **Land use planning and regulation** - the RDN’s Community Planning Department is responsible for preparing official community plans (OCPs) and developing and implementing land use regulations for electoral areas A, C, E, F, G and H. OCPs contain objectives related to drinking water, such as designating development permit areas to limit the impacts of development near water bodies and to protect groundwater. Land use regulation includes zoning and land use bylaws that deal with applications for rezoning, subdivision, development permits, development variance permits and OCP amendments. With respect to drinking water protection, land use regulations can aim to limit the impacts of development on drinking water sources; establish standards for proof of potable water for community water systems and subdivisions; and establish development cost charges for works and improvements related to water infrastructure.
- **Drinking water utility services** – the RDN currently manages the water supply in seven Local Service Areas (Box 1), representing some 7000 residents or about 5.5% of the Region’s population. There are many other drinking water providers in the Region, including five local government entities, four private water utilities, two water user communities, some 34 unorganized other water systems, and an unknown number of private wells.
- **Arrowsmith Water Service** – the RDN participates with the City of Parksville and the Town of Qualicum Beach in the Arrowsmith Water Service, which is intended to provide a long-term, supplemental surface water supply from Englishman River for these participants.

Box 1: RDN Water Local Service Areas

Nanoose Bay Peninsula
Melrose Terrace
Englishman River
French Creek
Surfside
San Pareil
Decourcey

¹ Electoral Area B Gabriola Island is excluded, as land use planning for Gabriola is a function of the Islands Trust.

There are many other factors that affect watersheds and water supplies over which the RDN has little or no jurisdiction, including surface water allocation (licensing), pollution control, farming, forestry, roads and highways, and wilderness recreation. Responsibilities for managing these activities are dispersed among many agencies (Table 1), resulting in a patchwork of overlapping roles – but one in which no one agency has the overall authority for ensuring watersheds and drinking water supplies are protected.

Table 1: Responsibilities for activities affecting watersheds and drinking water

Jurisdiction	Who
Land use planning and regulation	RDN, 4 municipalities, Islands Trust
Water service provision	RDN, 4 municipalities, private purveyors, individual well owners
Surface water allocation/licensing	Ministry of Environment (MOE)
Pollutant discharge	Ministry of Environment
Drinking water (quality) protection	Ministry of Health and Vancouver Island Health Authority
Fisheries	Dept. of Fisheries and Oceans, MOE
Forestry	Ministry of Forests and Range
Transportation (highways, roads)	Ministry of Transportation, municipal governments
Agriculture	Ministry of Agriculture and Lands
Mining	Ministry of Energy, Mines and Petroleum Resources
Wilderness recreation	Ministry of Tourism, Sports and Arts
Watershed/aquifer protection	<i>No specific responsibility assigned under provincial or federal legislation</i>

Some action has been taken recently to address this issue. Under the Province's Drinking Water Action Plan and *Drinking Water Act*, the Regional Drinking Water Coordinator, with the support of the Vancouver Island Health Authority (VIHA), has established a Vancouver Island-wide Watershed Steering Committee.

Made up of staff from the six Regional Districts, the Islands Trust, VIHA, MOE and other provincial ministries, this Steering Committee is intended to facilitate coordinated regional and provincial actions related to watershed and drinking water protection. Six regional Technical Committees are also being formed to advise the Steering Committee on local drinking water and watershed issues. This initiative is setting a model for the rest of the Province.

The RDN has a long-standing interest in drinking water protection throughout the Region. The Board identified Watershed/Drinking Water Protection as a priority in its *Strategic Plan for 2003-2005*. That initiative resulted in the Drinking Water Protection Action Plan in October 2004 that focused on actions that the RDN could take regarding drinking water protection in its seven water local service areas.

Facing the realities of a growing population, competing land uses and shrinking provincial resources, the Board has since recognized the need to take a broader perspective – to look at ways the RDN can address the protection of watersheds and drinking water in cooperation with the many other stakeholders in the Region.

It is important to emphasize that in taking a regional perspective on watersheds, there is no intent by the RDN to take over municipal or private purveyor water functions. Indeed, the RDN will need the cooperation of these entities, along with other agencies, stewardship organizations and the residents

of the Region, to identify and resolve potential problems before they happen, so that we all can enjoy safe, sustainable water supplies and healthy watersheds.

1.2 The DW-WP Stewardship Committee

The Board established the Drinking Water-Watershed Protection Stewardship Committee (DW-WPS Committee) in March 2006 to:

- a) Identify priority action items and initiatives for the long term, sustainable provision of water and the protection of surface and groundwater drinking water sources for RDN Electoral Area residents; and
- b) Provide recommendations to the Board regarding key drinking water and watershed protection activities to be considered for the 2007 budget.

Participation on the Committee was sought from a broad representation of key interests in water in the Region (Box 2). To fulfill its mandate, the Committee was expected to:

- Review, discuss and define key issues related to the long-term provision and protection of water as it relates to future development and land use decisions.
- Liaise with the Vancouver Island Health Authority Watershed Protection Steering Committee.
- Liaise with Electoral Area residents and the constituencies that they represent.
- Provide advice and feedback on consultation activities with the general public.

The focus of the Committee's work was on the Electoral Areas in the Region – but with the hope of interesting the Region's member municipalities in participating in some or all of the action items that pertain to them. The Terms of Reference and membership on the DW-WP Stewardship Committee are provided in Appendix 1.

1.3 Purpose of this Report

This report represents the culmination of over a year of work on the part of the DW-WP Stewardship Committee. It contains a recommended Action Plan for drinking water and watershed protection in the Region that includes:

- ▶ Prioritized Programs and Projects;
- ▶ Timeframe and budget; and
- ▶ Methods for funding the Action Plan.

This Action Plan is presented to the RDN Board for consideration in terms of both a long-term commitment and for immediate action under the 2008 budget.

1.4 The DW-WP Stewardship Committee Process

Facilitated by Lanarc Consultants Ltd., the DW-WP Stewardship Committee followed a five-step process:

1. **Issues** – Identify, group and categorize issues related to drinking water/watersheds in the Region.
2. **Objectives** – formulate Regional objectives for each of the issue categories.
3. **Actions** – identify potential actions to address each of the issues and objectives.

Box 2: Representation on the DW-WP Stewardship Committee

BC Ministry of Environment
Electoral Area residents
Islands Trust
Private Forest Lands Council
Private water purveyors
Stewardship community
Vancouver Island Health Authority
Water improvement districts
Well drilling industry
RDN Board and staff

4. **Rating** – assign a numerical rating to each of the actions, to provide an initial ‘prioritization’ that the Committee could then work with to produce the next step.
5. **Programs and Actions** – create a series of water/watershed-related programs each with specific actions or projects.

The Committee’s deliberations were also informed by presentations on topics that related directly to the programs and actions that it was creating. These topics included: water systems and administration in the RDN; basics of groundwater and aquifers; BC’s WaterBucket website; climate change in the Georgia Basin; and MOE’s Vancouver Island Water Quality Network.

Finally, a DW-WP Committee-specific website was created for internal use by the Committee. This housed a range of resources relating to drinking water and watershed protection. The Committee’s agendas, meeting minutes and draft materials were also posted here for general reference, in addition to being distributed directly to Committee members. As a new communication tool, the website saw limited use during the life of the Committee. However, it may provide the starting point for future web-based information on the Drinking Water-Watershed Protection Action Plan.



Xeriscaping workshop (Regional District of Nanaimo)

2. A Drinking Water–Watershed Protection Action Plan for the Region

Based on the Committee’s deliberations on issues, objectives and actions for drinking water and watershed protection, the following Action Plan is organized around seven programs:

1. Public awareness and involvement.
2. Water resources inventory and monitoring.
3. Management of land use and development.
4. Watershed management planning.
5. Management of water use.
6. Management of water quality.
7. Adapting to climate change.

For each program, there is a goal statement, one or more objectives, and a suite of “actions” or projects to be initiated over the next 10 years. Section 4 presents the timing of these programs and actions.

This Action Plan presents about 60 actions or projects across the seven programs, which may seem daunting to accomplish. In reviewing this Plan, it is important to keep in mind:

- The Action Plan is proposed to have a 10-year time horizon, with regular updates as actions are completed or revamped to better meet the Region’s objectives respecting drinking water and watershed protection.
- The actions range from promoting change in provincial legislation, to supporting volunteers in a range of activities, to developing Watershed Management Plans. In other words, there are many levels of financial and staff commitment.
- Furthermore, the RDN is not the sole participant for implementing the Action Plan. Many – if not most – of the actions are proposed to occur in partnership with other government agencies, the private sector and volunteers. As the previous section pointed out, responsibilities for watersheds and safe drinking water are shared among many players, and many of the proposed actions cannot move forward effectively without their cooperation. In the final chapter, the Committee directs its final recommendations to both the RDN Board and the VI Watershed Protection Steering Committee.

Program 1: Public Awareness and Involvement

A focus of this program is to promote public awareness ‘close to home’ through neighbourhood projects and readily accessible information. For example, a water conservation group has been formed in the Fairwinds neighborhood that has proposed setting up a weather station on a private property that is linked to the irrigation system. Information from the station would assist in determining when and for how long a lawn/garden would need to be watered. These types of local projects can provide the greatest ‘bang for buck’ in achieving change in public understanding.



Regional District of Nanaimo

Goal:

To promote awareness and stewardship of the watersheds and drinking water resources in the Region.

Objectives:

- To improve public awareness of where their water comes from – both surface and groundwater sources – and why it is important to protect watersheds.
- To change public water consumption patterns in the Region to reduce/stop wasting water.
- To influence land use practices to prevent wasting and contaminating water resources.
- To improve coordination among stakeholders in providing information on drinking water and watersheds in the Region.

Actions:

1A: The “WaterSmart” Program

- 1) Upgrade and expand the WaterSmart website to:
 - a) Incorporate user-friendly, graphical presentations of the water data and maps for the Region that are generated under Program 2, as they become available. One intent of this action is to allow residents and prospective buyers to look up information about water quality and quantity on an area-specific basis.
 - b) Merge water-related information from other parts of the RDN website (e.g., information about drinking water protection currently under the Growth Management link) and from the DW-WP internal website. The latter has background reports and links to other sites that may be of interest to website users.
 - c) Create a page for each information topic listed in Box 3.
- 2) Establish a WaterSmart Award and/or Certification program. This would be paired with an expanded WaterSmart Team program, in which summer students act as outreach coordinators of water conservation actions. The Award could take the form of a “stamp of approval”, a plaque or sign for homes and buildings that meet specified water stewardship criteria.
- 3) Incorporate stories into regular RDN publications, press releases and other publicity media. This could take the form of a 1-page release or flyer, produced quarterly, that provides updates on watershed management and conservation initiatives – to be provided to the media, published on the WaterSmart website and/or inserted in RDN newsletters, service bills or property tax notices. The RDN will encourage other water service suppliers in the Region to use and distribute this

information (see Program 5, action item 5B for further details on working cooperatively with water purveyors).

- 4) Support data collection and reporting on the status of water resources in the Region as part of the "State of Sustainability" report, and make that portion of that report available on the WaterSmart website.
- 5) Launch a WaterSmart "mobile unit" that would deliver WaterSmart services to local communities, neighbourhoods and residents. The RDN could seek private sponsorship for a 'green', fuel-efficient vehicle that could be used by the WaterSmart Team and volunteers to provide information and outreach at community events and in local neighborhoods, as well as to assist with stream stewardship activities.

1B: Coordinated Information and Education Resources

- 6) Keep building a collaborative relationship with MOE, VIHA, and DFO by:
 - a) establishing a coordinating committee or task force with the responsibility to compile, review and coordinate information resources (brochures, reports, websites, etc.) and determine who, where and how a central source of information could be established.
 - b) developing school modules and teacher assistance packages on watershed protection coordinated with Intended Learning Outcomes in the BC teaching curriculum. Could be coordinated with development of curriculum designed to educate contractors and professionals in the water and groundwater industry.
 - c) organizing an information program on water quality impacts of common sources of contamination (e.g. agriculture, auto industry, pesticide use, etc.)
 - d) developing an information program on water quality needs and testing for private well owners.

Box 3: WaterSmart Information Topics

Efficient water use – in the house and garden, commercial and institutional applications
Water efficient irrigation systems and xeriscaping
WaterSmart Team activities and WaterSmart Awards
Water sources of the Region - maps, status
Water quality – common sources of contamination, what to do about it
Low impact development measures – why, what, where, how
Rainwater collection – methods, uses, treatment
Water pricing – the obvious as well as hidden costs of water
Private wells –water quantity and quality testing; roles and responsibilities of well owners
Graywater use – methods, uses, treatment
Dual plumbing systems – for graywater and rainwater
Effects of climate change on water supply and water quality – RDN actions, what individuals can do about it.

1C: Demonstration Projects

- 7) Encourage developers to provide demonstrations on their development sites of any of the following alternative technologies that can reduce water demand, protect water resources AND reduce development costs:
 - a) graywater and/or rainwater collection and treatment;
 - b) graywater reuse and/or rainwater use for garden watering or within the residence for toilet flushing, laundry (including related dual plumbing);
 - c) rainwater use for domestic/drinking water;
 - d) pervious surfaces for driveways, walkways, etc.;

- e) other methods for promoting rainwater infiltration (rain leader disconnects, rain gardens, swales, etc.).
 - f) xeriscaping or low-impact landscaping.
- 8) Capitalize on existing residences, commercial or institutional developments that are using any of these alternative technologies to showcase their application. These establishments could be recognized through the WaterSmart Award program recommended above. Learning from Salt Spring Island's successful "water conservation" tour, they could be invited to participate in a RDN "alternative technologies" tour to allow participants to learn about the installation and operation of these technologies.
 - 9) Down the road, the RDN could also initiate a demonstration project in a mainstream location that incorporates a range of alternative technologies. Measures for monitoring the long-term net benefit of the technologies being demonstrated should be incorporated in the design of the project. Seek partnerships and contributions from local businesses, stewardship groups and granting agencies in planning and constructing the project.

1D: Support for Volunteers and Non-profit Organizations

Stewardship groups and volunteers play a pivotal role in developing materials and 'getting the message out' in a cost-effective and people-friendly way. They also contribute substantially to the collection of water quality and quantity data in the field, and liaising between government and residents on water-related concerns.

- 10) Support stewardship group-based 'outreach' programs that provide advice to businesses and landowners on how to minimize the potential for contaminating watersheds and water supplies, use water efficiently, and protect watersheds. For example, the Mid Vancouver Island Habitat Enhancement Society organized business outreach programs (Automotive Stewardship, Auto/Marine Stewardship and Clean Water Initiative) aimed at encouraging water stewardship in the Parksville/ Englishman River watershed area. Similarly, the Community Animation Project of the Arrowsmith Watersheds Stewardship Team undertook several public programs to encourage watershed stewardship. Support for these types of activities could be in the form of equipment or office support; additionally, a percentage of the annual Water Action Plan budget could be allocated to a grant program to which volunteers could apply for financial assistance.
- 11) Facilitate communication among nongovernmental organizations to promote better coordination of their watershed protection activities, monitoring programs and public outreach. This could take the form of annual/semi-annual networking meetings hosted by the RDN with invitations to stewardship groups, community associations, etc. to present their projects for information and discussion.
- 12) Request that the RDN Board review its policies regarding support to volunteer members for basic expenses (mostly travel and/or printing of electronically sent documents) to participate in RDN committees.

Program 2: Water Resources Inventory and Monitoring

Goal:

To improve information about the Region's water resources in terms of both quality and quantity, in support of better land use decisions and public understanding.

Objectives:

- To compile and map existing information on water resources in the Region in collaboration with BC Environment (MOE), the Vancouver Island Health Authority (VIHA), Natural Resources Canada (NRC) and other organizations involved in data gathering and mapping.
- To improve the stream monitoring systems for measurement of water flows, levels and temperatures.
- To improve the groundwater monitoring system for determining the extent of aquifers and measuring water levels and quality.
- To make information about the Region's water resources readily available and understandable to decision-makers (for use in Programs 3-7) and the public (Program 1).



DGV Engineering Services Ltd.

Actions:

2A: Compilation and Mapping of EXISTING Data

The RDN is participating in the Vancouver Island Water Resource Vulnerability Mapping Project with MOE, NRC, Malaspina University-College, the Cowichan Valley Regional District and Islands Trust. This project is "an interdisciplinary, collaborative initiative aimed at developing a geographically based information system to characterize intrinsic water resource vulnerability (to contamination), as well as to identify sources of such contamination". The focus for now is on aquifers, with a timeline of two years to complete data gathering and mapping for the RDN. Results of the project should assist achieving action 1 below, as well as identify who will be the long-term manager of these data.

- 1) Based on data and maps available from the provincial (MOE) and federal government (Environment Canada), compile and map in the RDN's mapping system the locations in the Region of the following*:
 - a) stream/surface water monitoring systems, weather stations and snowpack monitoring stations.
 - b) surface water intakes and sewer outfalls.
 - c) groundwater monitoring wells.
 - d) watershed/ basin and sub-basin boundaries, where possible.
 - e) known aquifer boundaries and aquifer classification.
 - f) known well locations; include well depth and groundwater level in accompanying GIS database (metadata) where reasonably accurate information is available.

*Several local stewardship groups have been monitoring water flows, levels and/or temperatures in certain watersheds. Their data could also be incorporated into this Regional mapping exercise, and these groups provided ready access to the compiled information.

- 2) Overlay the above maps on a community/population base map to begin to interpret geographical relationships between water sources and water demand.
- 3) Map known and potential aquifer recharge areas, discharge areas (including locations of springs) and overlay on the above maps to begin to interpret relationships of surface water basins to aquifer recharge areas.

2B: Additional or NEW Data Collection

- 4) Surface water sources:
 - a) Prepare tables/graphs from existing data to show trends. Identify data gaps and set priorities for adding new stream monitoring sites and/or snowpack monitoring sites, and for upgrading existing sites. To effectively assess changes in stream flow and the effects of water use may require continuous monitoring. Relatively inexpensive stream data loggers that record water level and temperature at every 10 minutes (or less) are available for this purpose. Some streams may require multiple monitoring sites to identify the impact of water demands in various stream sections.
 - b) Coordinate and support volunteers to operate and maintain stream monitoring sites throughout the year. Volunteers can assist staff by measuring stream flows, downloading data loggers and most importantly, visually monitor stream changes (erosion, sediment deposition, channel changes) on a monthly basis and after major events. Local hiking clubs could assist in monitoring snow pack conditions and related monitoring sites.
- 5) Groundwater sources:
 - a) Identify gaps and priorities in the monitoring coverage of aquifers.
 - b) From the map of existing wells, identify public or private wells that could be monitored on a volunteer basis to fill data gaps. Install water level loggers in identified wells; hire summer students who can teach well owners how to monitor well levels. Assess if the network of water level loggers could be remotely monitored through the SCADA system. Ask MOE if monitoring data from these water level loggers could be added to the provincial network.
 - c) Alternatively, because 'working' wells may introduce too much variability to be useful in monitoring ambient groundwater conditions, it may be necessary to install dedicated monitoring wells in critical areas where groundwater data are poor and/or conduct geophysical surveys from the surface to obtain hydrogeological information. These new monitoring wells could be installed in advance by the RDN, or made a requirement of new development when proposed in these critical areas.
- 6) In critical areas, identify all rural homeowners that are not on a communal water system and send them a questionnaire asking for information on their water source. Tabulate the responses and follow up with telephone calls, second mail outs and/or selected site visits if needed.

2C: Water Quality Monitoring

Defining the state of water quality in the Region can be expensive, so it is important to first understand trends in water quality issues, identify potential sources of water quality risks, and select indicators carefully to make best use of monitoring resources. There are two existing programs that can provide cooperative opportunities:

- *With respect to surface water, the MOE has an ongoing program for establishing water quality objectives for important waterways province-wide. More locally, MOE and Environment Canada are working on a joint project to monitor trends in water quality for a number of sources on Vancouver*

Island, including the Englishman River. The sources of interest are being sampled for general water chemistry, metals and bacteriological analysis.

- For groundwater, the RDN's participation in the Vancouver Island Water Resource Vulnerability Mapping Project may play an important role in identifying trends in groundwater quality and what needs to be monitored in the long term.
- 7) In collaboration with the MOE, identify priority waterways and applicable water quality indicators (based on the Province's water quality criteria) for the RDN. Similarly, in coordination with the Vancouver Island Water Resource Vulnerability Mapping Project, identify groundwater quality problem areas and key indicators to be monitored to address these problems. In partnership with these agencies, establish a monitoring program in the priority waterways and groundwater areas and develop water quality objectives, where applicable.

2D: Data Response Systems

- 8) Through the Vancouver Island Watershed Steering Committee and the future Regional Watershed Technical Committee, identify:
- a) the critical or problem areas in the Region from a water management perspective;
 - b) key water-related indicators (e.g., stream base flows or temperatures, groundwater levels, water quality in indicator wells, etc.) and their "threshold" levels in these problem areas;
 - c) which agency can and should take action when these thresholds are exceeded, and the nature of the action to be taken. These actions may range from advising well owners to boil water to restricting water withdrawal by water licensees.



Flow monitoring (Michele Deakin)

Program 3: Land Planning and Development

This program is guided by the general principle of “no net loss” of pre-development watershed features and functions (such as surface water flows, groundwater levels, etc.) at the watershed level. This means that through land use planning, areas of high development would try to be balanced with retention of natural areas in an effort to maintain the biophysical balance within any given watershed. The Actions are directed to the RDN, but apply equally to the Islands Trust in its land use planning and regulatory role on Gabriola Island.

Goal:

To use the information gathered through Program 2 to protect the Region's watersheds and water resources in land use planning and development decisions.

Objectives:

- To protect drinking water through the Regional Growth Strategy, OCP policies and designations, and zoning bylaws.
- To ensure that new development provides proof of adequate and sustainable, good quality drinking water.
- To ensure that new development minimizes impacts on surface and groundwater resources.
- To prioritize and develop long-term management plans for watersheds.

Actions:

3A: Land Development (Engineering) Standards

Many local governments are adopting “low impact development” (LID) standards to reduce the impacts of urban development on watersheds by managing storm/rainwater in ways that mimic nature - infiltrate, filter, store, evaporate, and retain rainfall runoff close to its source. These innovative approaches to rainwater management have obvious benefits to both surface and underground sources of drinking water as well as for the well-being of streams and water bodies. LID standards are appropriate alternatives to traditional engineering approaches to managing rainwater where site conditions (soil types, slope conditions, etc.) support their use.

- 1) Prepare and adopt “low impact development” (LID) standards for:
 - Rain gardens
 - Pervious paving for driveways and parking
 - Infiltration swales
 - Absorbent soils and landscapes
 - Rainwater leader exfiltration trenches or soakaways
 - Reduced road widths (from typical urban standards) for local streets
 - Green roof.

These standards may be prescriptive or performance based. Adopting such standards will support the use of these measures as environmentally-friendly alternatives to traditional methods of managing rainwater.

- 2) After a reasonable period of time of voluntary implementation, move to make the use of these alternate engineering standards mandatory.



Infiltration swale (Lanarc Consultants Ltd.)

3B: Development Application Review

- 3) Within the RDN's range of authority, review and revise the application requirements for rezoning, subdivision, development permits and building permits for large developments to:
 - a) Require an aquifer impact assessment for all proposed wells or well clusters; and
 - b) Require all development applications over a specified size to provide an analysis of impacts on surface and groundwater sources, such as impacts on infiltration flows, effects of proposed wells on downstream surface flows, etc.
- 4) Provide the authority in the appropriate bylaws to refuse building or development if the impacts are unacceptable. Examples of criteria for determining "unacceptable" impacts might include: exceeding a maximum total impervious surface area for a watershed or sub-basin; no effort to incorporate water efficiency technologies; reductions in stream flows below a standard level required for fish habitat; etc.
- 5) Within the RDN's range of authority, review and strengthen regulatory requirements regarding proof of adequate and sustainable, good quality drinking water supplies in applications to rezone or subdivide. Include measures to assign responsibility to the developer or landowner(s) for monitoring the adequacy of water supplies over time (e.g., 10 years), and for providing alternate water sources and/or impose additional water conserving measures should water supplies prove to be inadequate.
- 6) Provide information and training for RDN staff and subdivision approving officers in watershed management, rainwater management (LID methods) and efficient water use.

3C: Development Charges

- 7) Examine options for establishing fees or charges for water management for new development. These fees would represent a developer's contribution to managing the watershed or aquifer supplying the proposed development and could become part of funding sources for an RDN water function.
- 8) Explore incentives for developers who apply LID and/or water conserving methods in their developments.

3D: Planning Tools

- 9) Review existing zoning for rural subdivisions, and refine the requirements in these zones with respect to drinking water protection (e.g. include special land use requirements for parcels in aquifer recharge areas).
- 10) Examine the drinking water implications of any proposed changes to Urban Containment Boundaries in reviews of the Growth Management Strategy.
- 11) Undertake aquifer impact assessments when considering changes in Urban Containment Boundaries or significant density changes in Electoral Area OCPs, or in municipalities in the Region that would affect aquifers in Electoral Areas.

Program 4: Watershed Management Planning

Watershed planning can be considered a sub-set of land use planning, but given its significance to drinking water and watershed protection, the Committee felt that it warranted its own program.

There are more than 50 watersheds in the Region, as well as 30 known aquifers in coastal areas and many more unmapped aquifers in the uplands (Figure 1). It is therefore not practical to complete watershed management plans for all of these watershed and aquifers at once.



Watershed model of Parksville (Faye Smith)

Goal:

To prioritize and protect watersheds in the Region according to their ecological and drinking water values.

Objectives:

- To make efficient use of limited staff and funding resources by setting up a system for prioritizing watersheds for planning purposes.
- To undertake watershed management planning on a priority basis over the next 10 years.
- To involve all stakeholders with an interest in any particular watershed in the planning of that watershed.
- To incorporate the results of watershed plans into land and resource use decisions.

Actions:

4A: Watershed Prioritization

1) Identify and prioritize watersheds (and/or aquifers) that are candidates for Watershed Management Plans. It is recommended that the prioritization take an approach that combines watershed significance with 'at risk' factors, whereby watersheds would be assessed against criteria such as:

- Size, rate and type of land use change / development pressure.
- Existing or future hazardous land uses – high risk of surface or groundwater contamination.
- Natural hazard risk: e.g., flooding, bank erosion, land slippage, etc.
- Drinking water source.
- Source of water for local food production.
- Overlaps or contains significant aquifer recharge areas.
- Significant fisheries and or wildlife value; e.g., major source of base flow for fish-bearing streams.
- Area or land use is under jurisdiction authority or significant influence of the RDN.
- Funding availability to support development of the watershed management plan.

The prioritization process should consider both the 'relative importance' of the resource being impacted, and the 'severity and consequences' of the impact. Those areas with both high importance and existing or potential high impact would become first priorities for Watershed Management Plans.

The prioritization should be a “knowledge-based” process that would engage experts and officials with local knowledge to work together in identifying and prioritizing watersheds or parts of watersheds. For example, workshop sessions might be held with specialists with local knowledge in biology/ecology, engineering/hydrology, agriculture, forestry, wilderness recreation and land use planning. These interdisciplinary roundtable sessions would identify the watersheds with high value natural resources, potential changes in land use or development that may affect these natural resources, and the relative scope or degree of the potential risks. Areas at high risk can be identified at the workshops by mapping and comparing proposed land use or development changes to existing high-value resources. These high-risk areas may be all of a watershed, a small drainage basin within a watershed, or may cross watershed boundaries.

4B: Watershed Management Planning

- 2) A two-tiered approach to watershed management planning is recommended:
 - a) **Basic** watershed protection requirements should be applied to all areas under the jurisdiction or influence of the RDN; e.g., sediment and erosion control during construction, or measures to avoid or mitigate hydrocarbon spills, etc. Such actions would not require an area-specific Watershed Management Plan.
 - b) For identified ‘At-Risk’ areas within the region, **customized** watershed management actions would be identified through detailed Watershed Management Plans; e.g. measures to protect or restore high value fish habitat during development, or identification of key aquifer recharge, drinking water or base flow source areas and measures to protect these resources, etc.

The scope and focus of a Watershed Management Plan should be considered carefully at the time that the terms of reference are developed for each Watershed Management Plan. There are many different models of Watershed Plans to consider - for example:

- Integrated watershed management plans – typically focused on urban storm/rainwater and aquatic habitat (e.g., Wexford Creek IWMP in Nanaimo; Hyde Creek IWMP in Coquitlam)
- Water use/supply management plans - e.g., Nanaimo River Water Management Plan (1980s), Cowichan Basin Water Management Plan (2007), Okanagan Basin (in progress).
- Fisheries/habitat restoration plans - e.g., Englishman River Watershed Recovery Plan.
- Groundwater management plans - e.g., the Hoppington Aquifer Plan in Langley.
- Water-centric planning – this concept of planning is discussed at www.waterbucket.ca/wcp/.

As a starting point, Watershed Management Plans should use the information compiled under Program 2 to address the following (the emphasis on these plan components may vary from watershed to watershed):

- c) Ecosystem and habitat needs – e.g., base flow for fish and endangered wildlife; critical habitats, buffers and leave areas (e.g. riparian areas, nest tree buffers), and recommended habitat restoration or enhancement.
- d) Water quality maintenance of both surface and groundwater.
- e) Hydrological quantity and flow changes to both surface and groundwater.
- f) Potential drinking water sources, and the effects of existing or future development on their water quality and quantity, and their protection from these effects.
- g) Water use levels, the need for water conserving measures and the nature of those measures for that watershed.

- h) Maintenance of pre-development stream hydrology, addressing peak flows, flow volume, instream erosion and sedimentation risks.
- i) Terrain constraints, risks of landslide or erosion.
- j) Pollutant source control and non-point sources, including nutrient management, erosion and sediment control.
- k) Quantifiable targets for various key indicators - e.g. benthic index of biological integrity, riparian forest integrity, fish counts, species presence, rainfall capture, water quality, etc.
- l) The relationship and location of various land uses (taking cumulative effects into account) to mitigate impacts on the watershed(s).
- m) Storm/rainwater management, including recommended best management practices or low impact development measures to achieve recommended targets.
- n) Monitoring and compliance programs, processes for reporting and adaptive management to changing conditions.

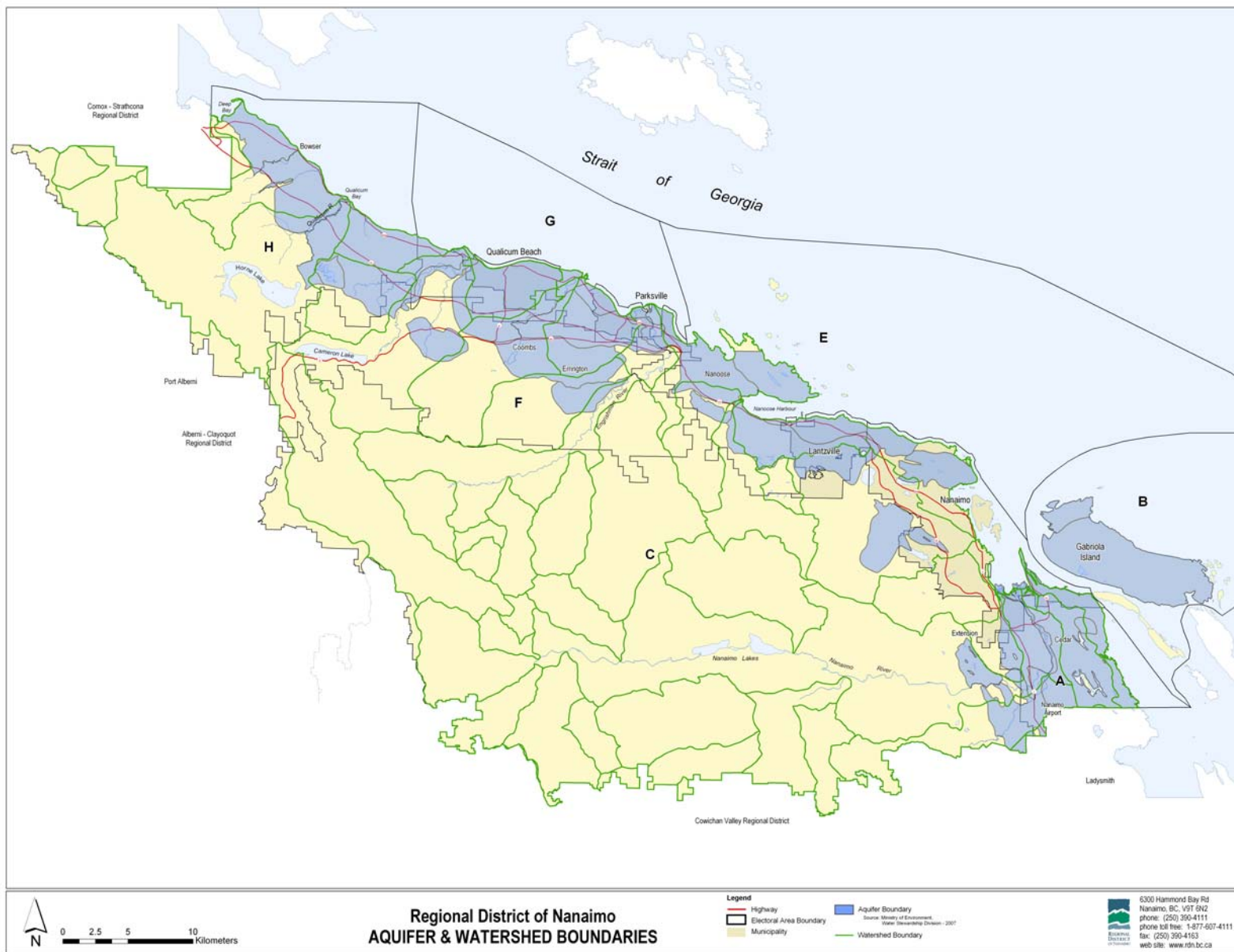
All Watershed Plans should recommend changes to applicable bylaws and standards that would guide future development in response to objectives and policies of the Plan.

4C: Support Local Food Production

Local food production has many benefits. With respect to climate change, it reduces the need for long-distance transportation and the associated greenhouse gas emission. Farmland within and around urban areas can contribute to better urban air quality and increased local evapotranspiration, reducing the urban heating effect. Local food production can provide local employment as well as a better understanding of food production, nutrition and hence, a healthier population. With appropriate technology, wastewater from urban centers can be used to irrigate hayfields, and rainwater catchment can supply food crops – proximity to urban areas can help to make the infrastructure economically feasible.

- 3) Ensure that water for local food production is a consideration in watershed management planning.

Figure 1: Watershed boundaries and known aquifers in the Region



Program 5: Water Use Management

The RDN operates seven “water local service areas” for which it manages water supplies, but there are also numerous improvement districts, volunteer water boards and private water purveyors in the Region with responsibility for providing water services. There are also several large single commercial and industrial water users with their own water systems. The RDN has no administrative or regulatory authority over these other water service providers, but wants to work cooperatively with them in achieving the Region-wide goals of efficient water use and highest standards in drinking water quality.



Graywater planter (Aquarian Systems Inc.)

Goal:

To promote efficient water use in all sectors of the Region.

Objectives:

- To encourage the efficient and sustainable operation of water service systems in the Region.
- To promote water pricing that reflects the value of water management and promotes efficient water use.
- To support the use of alternative water sources such as graywater and rainwater harvesting, where feasible, and to reduce regulatory barriers to their appropriate use.

Actions:

5A: Water Conservation Plans

Unlike watershed management plans, water conservation plans are targeted at water supply systems and their operators, with the intention of bringing conservation into the mainstream of water utility planning and operation. The U.S. Environmental Protection Agency has established guidelines for generating water conservation plans² that are gaining interest in BC. The RDN wishes to apply a similar framework to its water local service areas, and eventually, throughout the Region.

- 1) Develop a Water Conservation Plan for the RDN water local service areas based on the EPA Water Conservation Plan Guidelines or similar water conservation plan models. It is envisioned that the Plan would provide a common set of goals and strategies, but would also address characteristics that are unique to individual service areas as required. A Water Conservation Plan should also examine not only more efficient use of conventional water supplies but also the potential use of rainwater and graywater as replacement water sources (see action 5C).
- 2) Based on the experience in generating a Plan for the water local service areas, generate a template for Water Conservation Plans that could be used in other parts of the Region, and work with water purveyors to apply the template to their water supply systems (see action 5B).

5B. Cooperation among Community Water Supply Systems

- 3) Work with operators of water supply systems to achieve long-term sustainability of all water systems in the Region. The recommended approach is to establish a Water Purveyor Working Group, sponsored by the RDN. The intent of this Group would be to provide a forum for

² U.S. EPA, *Water Conservation Plan Guidelines*, August 1998 - <http://www.epa.gov/watersense/pubs/guide.htm>

discussion and the exchange of ideas to assist water purveyors in the Region. The committee would be open to anyone providing potable water for human consumption or users that consume large amounts of water (golf courses, commercial/industrial users, etc.), and would be comprised of members interested in providing safe and sustainable water and in working with others to achieve those goals. It would likely meet 2-3 times per year. Issues that could be addressed include:

- a) Water pricing structures to promote efficient water use by reflecting the 'full value' of water and avoiding the need to 'sell more water' in order to cover operational and administrative costs. Measures to promote include: installation of water meters where they do not exist; implementing "tiered" pricing systems with seasonal or daytime/night-time rates; etc.
- b) Measures to catch excessive water usage and significant water leaks at the individual connection level in a timely fashion.
- c) Conducting regular "water audits" that compare water production with water consumption; where significant differences occur, look for leaks in the system through pressure testing. A 10-15% loss is typical. (Note that under VIHA permitting of water service systems, pressure testing is a standard requirement of all newly installed systems.)
- d) Ensure that all operators are certified under the provincial Environmental Operator Certification Program.
- e) Identify contamination risks to community wellheads, and complete a wellhead protection program on a priority basis.
- f) Instigate a Cross Connection Control and monitoring strategy in the Region, providing information to residents on the importance of this strategy.
- g) Collaborate on water conservation incentive programs (see 4D).

5C: Rainwater and Graywater Use

Rainwater and graywater (domestic wastewater from tubs, showers, sinks or washing machines, but not water from toilets that contains human waste) can be viable water sources, but depending on the use, may require appropriate collection and treatment measures. Graywater can carry high levels of human contaminants, and therefore requires some form of treatment (e.g., filtration through sand or soil, biodegradation, etc.) prior to its use, even if that use is only for toilet flushing or garden watering. For that reason, graywater use is regulated in much the same way as on-site sewage disposal under the Health Act. Cisterns for rainwater collection are in wide use in many drier rural areas in BC, but regulation of their installation and maintenance is inconsistent. Like well water, without proper collection and management practices, water from cisterns can pose health hazards.

Nonetheless, with the applicable measures taken to ensure its safe use, rainwater and graywater can be significant sources of water – as is apparent in many dry parts of the world that have exploited these sources for many years on an individual and community scale.

- 4) Investigate water supply and distribution systems in other jurisdictions (e.g., Europe, Australia, USA) that separate drinking water from non-potable water at the utility level, for examples that might be considered in building new systems or system extensions in the Region.
- 5) Work with the RDN's bylaws and with building inspectors to identify barriers to the application of dual plumbing and graywater/rainwater reuse where appropriate, and work towards removing those barriers by providing applicable standards.
- 6) After a reasonable learning and assessment period, move to require use of rainwater and/or graywater reuse in key water shortage areas.

- 7) In collaboration with MOE, VIHA and Malaspina University-College, develop training for local contractors and builders on dual plumbing installation.
- 8) Lobby the senior government to include dual plumbing in their Building Codes, and to offer related training.

5D: Incentive Programs

- 9) Research and prioritize efficient water use incentive programs based on their effectiveness ('bang for buck') in reducing water demand – e.g., subsidies for small technologies (e.g., \$25 rain barrels), "challenge grants" (i.e., fund 10-50% of cost up to a maximum amount), reductions in water rates for users that reduce their demand on water mains.
- 10) In areas of existing or potential water shortage, consider "challenge grants" for:
 - a) Xeriscape planting schemes (institutional, commercial, residential).
 - b) Conversion to waterless urinals (institutional, commercial).
 - c) Conversion to low flush/dual flush toilets, low flow showerheads and other low water-use appliances (institutional, commercial, residential).
 - d) Installation of water-efficient irrigation systems (institutional, commercial, residential).

5E: Water Use Regulation

The use of surface water is licensed under the provincial Water Act. Water licences specify the type of use and set limits on water volumes that can be withdrawn from the water source. However, several waterways in the RDN are suspected to be over-allocated or subject to unlicensed water withdrawal.

Unlike surface water, the Province does not require a licence for groundwater use or extraction.³ In the absence of provincial licensing, some local governments have attempted to protect groundwater supplies through land use regulation. For example, Gabriola Island requires commercial water suppliers to obtain temporary use permits as a form of land use.

- 11) Request the Province to analyze existing water licences on waterways in the Region that are subject to critically low flows, and to: a) require metering and reporting of withdrawals; and b) consider reducing or terminating high-volume licenses unless proof of need can be validated.
- 12) Urge the Province to complete their groundwater protection review and bring forward the necessary legislative changes for regulating the extraction and use of groundwater from all types of wells.
- 13) In the absence of applicable Provincial legislation, develop methods for regulating commercial use of private wells through zoning regulations and/or business licensing.



Rainwater collection cisterns (Aquarian Systems Inc.)

³ The Province does require an Environmental Assessment Certificate under the *Environmental Assessment Act* for projects proposing one or more wells with a combined extraction rate of 75 litres or more per second (about 990 imperial gallons per minute). These are very high production wells, and not the typical wells for private or community use that individually and cumulatively have impacts on aquifers.

Program 6: Water Quality Management

There are many aspects of water quality management – from protecting the source to keeping the distribution system and water ‘at the tap’ clean. This program is concerned with source control, as this is where watershed management plays an important role. Other RDN operational policies and practices address distribution and end-of-pipe matters. Note that inventory and monitoring of water quality are covered in Program 2.



Regional District of Nanaimo

Goal

To protect the quality of water at source – whether surface or groundwater.

Objectives:

- To gain a better understanding of the status of drinking water quality in the Region.
- To identify and help to manage the risks of contamination to drinking water sources.
- To influence human activities – residential, commercial and industrial activities, agriculture, forestry, recreation and tourism - to protect watersheds and prevent contamination of water sources.
- To improve the management of water quality in private wells in the Region.

Actions:

6A: Contaminant Management

- 1) In collaboration with the Vancouver Island Water Resource Vulnerability Mapping Project, create a list of land uses that occur in the Region that have a high probability of introducing contaminants to groundwater or surface water sources, and map their location. Identify information resources on how these land uses can avoid contamination and distribute to these landowners.
- 2) Over time, and in collaboration with MOE’s contaminant management division, develop methods for requiring high-risk land users to manage contaminants in a prescribed manner.

6B: Agriculture and Forestry

Forestry and agriculture are significant sectors in the Region; however, the RDN has no jurisdiction over these land uses. Poor agricultural and forestry practices can threaten watersheds and drinking water supplies in greater volumes and over larger areas. To date, the RDN has had little interaction with provincial authorities in these two realms, but drinking water and watershed health issues are triggering greater collaboration.

- 3) Through the Vancouver Island Watershed Steering Committee and a future Regional Watershed Technical Committee, meet with regional staff from the Ministry of Forests and Ministry of Agriculture and Lands to find ways of effectively influencing farming and forestry operations to protect water sources from contamination and to steward watersheds in the Region. This may involve tailoring information programs that these Ministries already have in place on a province-wide basis to the particular circumstances in the RDN, and collaborating on education and incentive programs for local farmers and forest managers.

6C: Private Water Well Safety

Currently, the provincial Ground Water Protection Regulation sets requirements regarding well construction, protection and deactivation to protect aquifers and groundwater quality. Phase 2 in development of the Regulation will apparently require water quality sampling of all new wells at the time of construction; phase 3 is aimed at creating Ground Water Management Zones in which drilling will be further regulated where aquifers are shown to be under threat. The DW-WP Committee would like to see some action taken with respect to water quality testing in existing private wells. The Committee sees this an opportunity to allow monitoring of groundwater quality using private wells, while at the same time, helping private well owners test the quality of their water.

- 4) Support the creation of Ground Water Management Zones (GWMZ) in areas with groundwater problems. As part of that initiative, encourage the Province to establish requirements for water quality testing of private wells in GWMZ's in the short term, and province-wide in the long term. Any program that requires water quality testing should include incentives and possibly subsidies for more advanced testing where this may be necessary.
- 5) Initiate a pilot well monitoring project that would test water from a limited number of private wells. The pilot could be based on annual sampling of basic water quality parameters (e.g., total dissolved solids, electrical conductivity, pH, alkalinity, hardness, chloride, fluoride, nitrate, sulphate, arsenic, boron, iron, etc.) for 100-200 wells over a 5-6 year period, after which water quality trends and project criteria would be assessed to determine if the monitoring program should continue and if so, what changes are needed to the sampling regime. To be eligible, wells should have a well log (construction record), a sampling tap close to the water source (in the wellhead area) or the ability to have one installed, and be readily accessible to sampling staff or contractors. Sampling costs are estimated at \$100-300/well/year; setting up the project and follow-up analysis could potentially be cost-shared with MOE and/or VIHA.

6D: On Site Sewage Disposal

Failing on-site sewage systems are perceived as a threat to environmental and human health on a localized basis, especially to private or public wells that may be located in the same area. There are various types of on-site sewage disposal, from traditional septic tanks and fields to package treatment plants. The Ministry of Health is responsible for regulating the installation, repair and alteration of on-site sewage systems up to 22,700 litres (daily flows) under the Health Act and the Sewerage System Regulation. Under the Regulation, new systems are required to have maintenance programs. Regional Health Officers may investigate an on-site system that is suspected of posing a health hazard, but these inspections are largely complaint driven.

In June 2007, the RDN Board approved the development of a public information and education program for onsite sewage disposal systems with a 2008 budget of \$25,000, to be funded by an increase in septage tipping fees.

- 6) In collaboration with VIHA, the Vancouver Island Watershed Steering Committee and local stewardship organizations, identify areas of concern with respect to failing on-site sewage systems, and develop an information program on "best management practices" for operating and maintaining these systems that can be delivered to residents in these areas. This could take the

form of information bulletins and local information sessions - e.g., the “septic socials”⁴ that were offered in the Baynes Sound area in the Comox-Strathcona Regional District. Other aspects of an information program could include:

- a) Surveys of local residents in suspected problem areas to gain a sense of the nature and extent of on-site sewage issues.
- b) A coordinated complaint/referral process wherein the identity of complainants may remain anonymous if desired.
- c) Improved follow-up to installation of new systems to assure quality control.
- d) An incentive program for annual monitoring and maintenance of older on-site systems; or alternatively, consider adopting regulations for mandatory maintenance and reporting.



DGV Engineering Services Ltd.

⁴ Septic Socials were part of a septic system education program between 1996-1999, conducted by the Comox Valley Citizen Action on Recycling and the Environment and Project Watershed. In addition to public education, 87 septic systems were inspected and/or pumped. The idea of septic socials was later copied in other parts of the CSRD.

Program 7: Climate Change

Climate change is permeating almost every aspect of government decision-making. The potential impacts on watersheds could be profound – from bigger floods in winter to deeper droughts in summer.

The RDN has released a “Corporate Climate Change Plan 2007” in which it sets out ways and means by which it, as a corporate entity, can reduce its greenhouse gas emissions by 4% over 2004 levels by 2012. The report details the measures that the RDN can take to reduce energy consumption, and thereby greenhouse gas emissions, in buildings, lighting, water and wastewater operations, the vehicle fleet and corporate waste management.

Objectives:

- To assess and adapt to the potential impacts of climate change on water sources and supplies in the Region.
- To promote actions that will reduce the Region’s contribution to climate change.

Actions:

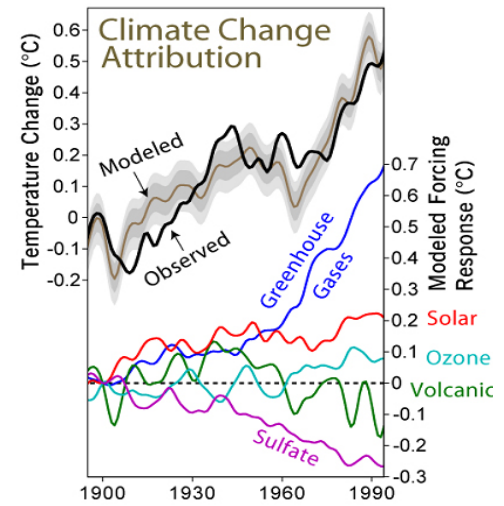
7A: Follow the Science

- 1) Monitor the evolving science on the relationship of climate change to water quantity and quality, and the health of watersheds.

7B: Land and Water Use Adaptation

Taking action to reduce greenhouse gas emissions is one way of tackling climate change. This will help to slow the process, but it won’t stop it. It is equally important to anticipate what the effects of climate change will be – in this case, on the Region’s watersheds and water sources - and develop the means of dealing with them.

- 2) Develop a strategy that identifies the potential impacts of climate change on aquifers and watersheds and/or water service areas in the Region and measures for reducing the RDN’s contribution to greenhouse gases, but also to adapting to anticipated changes. The study should involve local residents in identifying risks and developing adaptation tools. Some of the adaptations to be considered include:
 - Vulnerabilities – to flooding, runoff, erosion and other geotechnical hazards, drought.
 - Adapting to less water – e.g., protecting water quality will be even more important as the relative impact of pollutants rises.
 - Adapting to increased storminess - increased vulnerability to contamination from flooding and runoff events.
 - Drought resistance – ways of putting more water into the ground as a preventative strategy; e.g., infiltrating rainwater into the ground to recharge aquifers, thereby improving water supply during prolonged dry periods.
 - Identifying potential development areas least vulnerable to climate change based on availability of water, low potential for flooding and landslip, etc.



(Howard Stiff)

- Protection of riparian vegetation and wetlands – beyond preserving fish habitat, to protecting water supplies and managing rainwater runoff.
- Climate change-adaptive building requirements – increased setbacks, shading and sun orientation, window strength and size, shutters and overhangs, graywater separation, rainwater collection.
- Potential long term shifts in population from highly vulnerable areas (low-lying coastal areas, drought-prone areas) to less vulnerable areas.

7C: Assessing Local Hydro-climatic Balance

In addition to greenhouse gas emissions, many of the land use practices that are taken for granted - draining surface water into pipes, extracting ground water from aquifers, creating large impervious surfaces, eliminating wetlands and reducing the amount of forest land - can affect regional as well as global climates. These land use activities disrupt and even eliminate evapotranspiration from the earth's surface, which in turn alters the thermal balance in the atmosphere, and the hydro-climatic recycling of water. The loss of water/moisture stored in soil, plants and trees can reach a critical level. At that point, there becomes less and less water/moisture available to maintain the hydro-climatic recycling process. The compounding effect can cause local droughts and in turn increased temperatures, reduced groundwater levels, lower river and lake levels, die-off of trees and vegetation, increased wildfires, and extreme weather events.

Maintaining a more sustainable hydro-climatic balance relies on incorporating these considerations into the Programs described in this Action Plan.

- 3) Incorporate consideration of local and regional hydro-climatic balance in the following:
- Improved data collection and evaluation of changes to groundwater, surface water, and available evapotranspiration moisture levels (Program 2).
 - Public awareness and education for government officials, planners, engineers, developers, forestry and agricultural professionals (Program 1).
 - Best management practices to maintain the balance between land use and hydro-climatic changes (Programs 3-6), including: improved storm-water management and utilization techniques; creating more water infiltration capacity to maintain groundwater levels (LID measures); balancing water usage with the recharge or recovery rate; encourage water conservation, and re-vegetation and planting trees.

3. Implementing the DW-WP Action Plan

“Water is and will remain the great equalizer. Money cannot buy survival in a world without water.” (J. MacLeod, DW-WP Stewardship Committee member)

3.1 Draft Ten Year Timeline and Budget

The seven programs described in section 2 have been organized into a draft ten-year timeline and budget in the attached spreadsheet ‘DW-WP Budget Timeline’. Supporting details for these figures are included in Appendix 2.

The intent is to instigate all seven programs between 2008 and 2017. The programs would be phased in a logical process, with an attitude of:

Look for early successes – actions that have maximum benefit for minimum cost.

3.2 First Five Years

The first five years would start all programs, but emphasize:

- Public awareness:
 - WaterSmart website, awards and outreach.
 - Coordinating public information programs with senior agencies.
 - Supporting volunteer organizations.
- Water resources inventory & data:
 - Compiling and mapping existing data.
 - Starting programs for new data collection.
- Land development management:
 - Better practices for land use and engineering design.
 - Updating development review processes and planning tools.
- Watershed management planning:
 - Complete a process to identify Watershed Management Plan priorities.
 - Complete ‘basic’ watershed protection guidelines.
- Water use management:
 - Establish a Water Conservation Plan for the water local service areas.
 - Promote cooperation with operators of community water supply systems.
 - Promote rainwater and graywater technologies.
- Water quality management:
 - Start a private well monitoring pilot project.
 - Identify and address land uses with high contaminant risk.
 - Advocate better water quality practices in agriculture / forestry.
- Initiate a climate change adaptation program concerning drinking water and aquatic ecosystems.

3.3 Second Five Years

The second five years would continue all programs, but with emphasis on:

- Continue public awareness and demonstration projects.
- Formalize a monitoring and response system to address threats to drinking water and watershed protection issues.
- Develop customized Watershed Management Plans for priority watersheds/aquifers.
- Strengthen incentive programs to encourage more efficient water use by the general public, in the commercial sector, agriculture, etc.
- Analyze the results of the private well monitoring pilot and refine the program.



Water retention structure at River's Edge subdivision (T. Wicks)

4. Funding the DW-WP Action Plan

4.1 Summary of Ten Year Budget

The DW-WP Budget Timeline represents a total recommended investment of \$4.93M in 2007 dollars over 10 years, or \$5.56M with inflation included at 2.5%/annum. The general breakdown of the budget is as follows:

Program costs (w/o staffing)	\$4.46 M	
Staffing costs	\$1.10 M	
Total budget	\$5.56 M	
Grants/other income	- \$985,000	
RDN funds required (over 10 years)	\$4.57 M	(\$3.94 M in 2007 dollars)
Average annual RDN budget	\$457,000	

4.2 Potential Staffing

A program of this size cannot be managed by existing RDN staff, who are allocated to other duties. At the same time, it is more time and cost efficient to have certain aspects of the programs delivered by staff as opposed to outside consultants or contractors.

Recommended staffing for the program is in two phases:

- First Five Years: A Program Manager for Drinking Water Stewardship
- Second Five Years: Program Manager plus Assistant(s)

The budgets allow for 1 full time equivalent (FTE) in the first 5 years, supplemented by a second FTE in the second 5-year period.

4.3 Short term/Transition Funding

A full start of the program is not envisioned until early in calendar 2009. However, early action should begin as soon as possible to address immediate needs and to support fund-raising for the program launch.

Financing this transition period lasting until January 2009 could be provided by:

- “New Deal” funding through the Gas Tax Agreement – continuing to support existing staff and initiate programs.
- Other grants – infrastructure grants, green city grants, etc.
- An allowance of \$100,000 for this short term funding is provided for 2008. This amount is included as a part of the Ten Year Budget in Section 4.1 above.

4.4 Mid to Long-term Funding

To provide long term and stable funding for this important program, it will be necessary to create a new ‘service’ in the Regional District in accordance with the Local Government Act. Two questions need to be addressed:

1. What is the level of funding effort that is required and affordable?

2. Do municipalities wish to participate in all or part of these programs, in addition to Electoral Areas?

A key recommendation of this report is to approach the Municipal governments to invite them to participate in all or part of the program. Doing so provides economy of scale in program delivery, and would reduce the per capita costs.

If, in the end, only the Electoral Areas decide to participate in the service, we suggest an approach that reflects 'A Dollar for Water'.

"A Dollar for Water"

Conceptually, we suggest the Electoral Areas support a funding program that raises approximately \$1/month per electoral area resident, based on:

- 36,045 residents in Electoral Areas = \$432,540/year (generally, \$400K - \$500K/year); and
- 2.5 persons / residence = \$30 / residence /year.

The cost would be less per residence if there were some participation by the municipalities in programs in which they could benefit; e.g., public awareness programs, new development standards, etc.

The proposed local funding method would be a flat rate parcel tax. This would establish a charge of, e.g. \$30 / electoral area parcel / year; the charge would be the same for small or large parcels and regardless of assessed value. The parcel tax approach reflects the concept that all landowners benefit equally from drinking water and watershed protection. This varies from a property tax approach, where properties with a high assessment value pay a higher portion of the total cost.

Utility fees and charges were also considered, but these would not work in areas of the Region that are serviced by private wells.

Getting There

To put the 'Service' and Parcel Tax in place requires a successful referendum under the Local Government Act and Community Charter.

To minimize the costs of the referendum, it is proposed that the new RDN Drinking Water/Watershed Protection "service" go to referendum concurrent with the 2008 municipal election.

4.5 Other Funding Sources

In addition to local taxation, there are over 70 funding programs from senior governments and non-government organizations. Many of these programs might support a program like this one. A key function of existing and new staff will be to make application to funding programs. The proposed budget allows for an average of \$100K per year in such outside funding.

Member municipalities in the RDN might also take a 'granting' approach, with grants directed at project-specific funding.

Therefore, other funding sources might include:

- Senior Government Grants – project basis
- RDN Municipalities Cost Sharing Partnerships - program or project basis
- Water utility partnerships – project basis

The Budget Timeline and related detail budgets in Appendix 2 are provided to staff in Excel format, allowing a regular review and adjustment of the budgets in response to changing outside funding or changing priorities. It is understood that the RDN Board will decide final budget allocations as a part of each year's budget deliberation process.

5. Getting the Action Plan Underway

There is a need to continue work on the Drinking Water / Watershed Protection Program during the RDN Board deliberations and on an interim basis until full funding and program launch, scheduled for early 2009.

5.1 Initial Tasks

Priority actions for 2007-2008 include:

- Continuation and ramping up of Public Awareness programs such as the WaterSmart website. For example, it may be helpful to update, summarize and adapt the internal DW-WP website for public information purposes, as a backgrounder to the upcoming referendum.
- Fund raising and referendum support, in particular regarding the November 2008 referendum question.
- Completion of a prioritization process to identify at-risk watershed areas that warrant early Watershed Management Plans.
- Consideration of incentives to encourage early action; e.g., in efficient water use.

There also will be a need for an initial level of regional funding to support dedicated staff and required consulting services in the interim period.

5.2 Stakeholder Involvement in Initial Tasks

To provide stakeholder input in the transition period, it is recommended that a new implementation committee be struck, as an advisory body to the RDN Board. It is possible that this implementation committee would become the Regional Watershed Technical Committee that is to be established under the Vancouver Island Watershed Steering Committee.

The Implementation/Technical Committee would complete:

- A review and determination of an appropriate program name.
- Oversight of public information materials and public process in support of the 2008 referendum to establish the 'service'.
- Input to program and action refinements, and refinement of budgets.
- Support in discussions with staff and politicians considering involvement of member municipalities in all or parts of the program.
- Liaison with the public and interested organizations.

5.3 Transition Funding

Subject to confirmation by staff and the RDN Board, it is proposed that continued "New Deal" funding be used to support the transition phase.

5.4 Referendum

Full-scale launch of the Drinking Water / Watershed Protection Program would occur after a successful referendum, scheduled for November 2008.

6. Summary of Recommendations

6.1 Recommendations to the RDN Board

- Approve the Action Plan.
- Receive the draft budget and forward it for consideration to the annual budgeting process.
- Approach member municipalities about participating in the program, in whole or in part.
- Prepare for a referendum concurrent with the 2008 local government election to create a regional district 'service' for drinking water / watershed protection.
- Direct staff to prepare a report to the Board on interim funding and interim stakeholder involvement processes to carry the program through the referendum process.

6.2 Recommendations to the Vancouver Island Watershed Steering Committee

- Pursue legislative / regulatory measures to more effectively protect surface and groundwater resources.
- Prepare proposals and advocate for strengthening local governments' ability to influence all types of land and water use activities within watersheds and water supply areas. This would include activities that are currently under the sole purview of the Province, such as forest tenures and licences, water licences, Crown leases, foreshore development, gravel pits, etc.
- Provide funding to map, monitor and model the quantity and quality of at-risk surface and groundwater resources, and provide the results in a form that is accessible for regional, local and neighbourhood-scale land use and growth planning.



Regional District of Nanaimo

Attachment: Drinking Water-Watershed Protection Program Budget Timeline

DWWP Budget Timeline

Base Year 2008

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Inflation Allowance (%) 2.50%

Project or Program

Totals from Detail Budgets
 2008 Pre-Program Budget from Gas Tax Funds
 DWWP Budget Remaining After 2008

Program Start Period

Program End Period

Program Duration (Yrs)

Project or Program	Totals from Detail Budgets			Program Start Period	Program End Period	Program Duration (Yrs)	Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total Budget w/ Inflation	\$ Allowance for Grants / Other Sources	\$ Total Budget Minus Grants/ Other Sources
	2008 Pre-Program Budget from Gas Tax Funds	DWWP Budget Remaining After 2008					Period	1	2	3	4	5	6	7	8	9	10			
							Annual Program Budget including inflation	Annual Program Budget including inflation	Annual Program Budget including inflation	Annual Program Budget including inflation	Annual Program Budget including inflation	Annual Program Budget including inflation	Annual Program Budget including inflation	Annual Program Budget including inflation	Annual Program Budget including inflation	Annual Program Budget including inflation	Annual Program Budget including inflation			
PROGRAM 1: PUBLIC AWARENESS & INVOLVEMENT																				
1A: WaterSmart Website	\$75,000	\$20,000	\$55,000	1	10	10	5638	5775	5913	6050	6188	6325	6463	6600	6738	6875	62563	\$15,000	\$47,563	
1A: WaterSmart Publications & Awards	\$103,000	\$25,000	\$78,000	1	10	10	7995	8190	8385	8580	8775	8970	9165	9360	9555	9750	88725	\$0	\$88,725	
1B: Coordinated Information & Education Resources	\$115,250	\$10,000	\$105,250	1	3	3	35960	36838	37715	0	0	0	0	0	0	0	110513	\$66,730	\$43,783	
1C: Demonstration Projects	\$270,000	\$10,000	\$260,000	1	10	10	26650	27300	27950	28600	29250	29900	30550	31200	31850	32500	295750	\$150,000	\$145,750	
1D: Support for Volunteers and Non-Profit Organizations	\$300,000	\$10,000	\$290,000	1	10	10	29725	30450	31175	31900	32625	33350	34075	34800	35525	36250	329875	\$92,500	\$237,375	
PROGRAM 2: WATER RESOURCES INVENTORY & MONITORING																				
2A: Compilation and mapping of existing data	\$153,800		\$153,800	1	1	1	157645	0	0	0	0	0	0	0	0	0	157645	\$18,600	\$139,045	
2B: Additional or new data collection	\$475,125		\$475,125	2	4	3	0	166294	170253	174213	0	0	0	0	0	0	510759	\$112,500	\$398,259	
2C Water Quality Monitoring	\$24,000		\$24,000	2	10	9	0	2800	2867	2933	3000	3067	3133	3200	3267	3333	27600	\$6,000	\$21,600	
2D: Response System	\$62,500		\$62,500	6	10	5	0	0	0	0	0	14375	14688	15000	15313	15625	75000	\$0	\$75,000	
PROGRAM 3: LAND PLANNING AND DEVELOPMENT																				
3A: Land Development (Engineering) Standards	\$101,250		\$101,250	1	4	4	25945	26578	27211	27844	0	0	0	0	0	0	107578	\$31,250	\$76,328	
3B: Development Application Review	\$90,000		\$90,000	3	10	8	0	0	12094	12375	12656	12938	13219	13500	13781	14063	104625	\$31,500	\$73,125	
3C: Development Charges	\$22,500		\$22,500	4	4	1	0	0	0	24750	0	0	0	0	0	0	24750	\$2,500	\$22,250	
3D: Planning Tools	\$108,000		\$108,000	1	10	10	11070	11340	11610	11880	12150	12420	12690	12960	13230	13500	122850	\$0	\$122,850	
PROGRAM 4: WATERSHED MANAGEMENT PLANNING																				
4A: Watershed Prioritization	\$27,000	\$25,000	\$2,000	1	1	1	2050	0	0	0	0	0	0	0	0	0	2050	\$0	\$2,050	
4B: Watershed Management Planning - basic watershed protection	\$135,000		\$135,000	2	3	2	0	70875	72563	0	0	0	0	0	0	0	143438	\$37,500	\$105,938	
4B: Watershed Management Planning - custom watershed management	\$900,000		\$900,000	4	10	7	0	0	0	141429	144643	147857	151071	154286	157500	160714	1057500	\$250,000	\$807,500	
PROGRAM 5: WATER USE MANAGEMENT																				
5A Water Conservation Plans	\$99,000		\$99,000	1	3	3	33825	34650	35475	0	0	0	0	0	0	0	103950	\$27,500	\$76,450	
5B: Cooperation among Community Water Supply Systems	\$187,500		\$187,500	1	10	10	19219	19688	20156	20625	21094	21563	22031	22500	22969	23438	213281	\$62,500	\$150,781	
5C: Rainwater and Greywater Use	\$86,250		\$86,250	1	3	3	29469	30188	30906	0	0	0	0	0	0	0	90563	\$18,750	\$71,813	
5D: Incentive Programs	\$249,750		\$249,750	1	10	10	25599	26224	26848	27473	28097	28721	29346	29970	30594	31219	284091	\$0	\$284,091	
5E: Water Use Regulation	\$17,500		\$17,500	1	1	1	17938	0	0	0	0	0	0	0	0	0	17938	\$5,000	\$12,938	
PROGRAM 6: WATER QUALITY MANAGEMENT																				
6A Contaminant Management	\$27,500		\$27,500	3	3	1	0	0	29563	0	0	0	0	0	0	0	29563	\$0	\$29,563	
6B Agriculture and Forestry	\$7,500		\$7,500	2	2	1	0	7875	0	0	0	0	0	0	0	0	7875	\$0	\$7,875	
6C Private Water Well Safety	\$102,500		\$102,500	1	10	10	10506	10763	11019	11275	11531	11788	12044	12300	12556	12813	116594	\$10,000	\$106,594	
6D: On Site Sewage Disposal	\$108,000		\$108,000	5	5	1	0	0	0	0	121500	0	0	0	0	0	121500	\$30,000	\$91,500	
PROGRAM 7: CLIMATE CHANGE																				
7 Climate Change	\$78,000		\$78,000	2	5	4	0	20475	20963	21450	21938	0	0	0	0	0	84825	\$17,500	\$67,325	
STAFFING PROGRAM																				
Staff Position A: Water Program Manager	\$800,000		\$800,000	1	10	10	82000	84000	86000	88000	90000	92000	94000	96000	98000	100000	910000	\$0	\$910,000	
Staff Position B: Water Program Assistant(s)	\$300,000		\$300,000	6	10	5	0	0	0	0	0	69000	70500	72000	73500	75000	360000	\$0	\$360,000	
Subtotals, Base Budgets	\$5,025,925	\$100,000	\$4,925,925																	
Total RDN Staffing Costs	\$1,100,000																			
Total Program Operation (w/o staffing)	\$4,461,398																			
Total Budget Including Inflation	\$5,561,398						\$521,234	\$620,301	\$668,663	\$639,376	\$543,446	\$492,273	\$502,974	\$513,676	\$524,377	\$535,079	\$5,561,398	\$985,330	\$4,576,068	
Total Allowance for Grants / Other Income	\$985,330																			
Total Budget Less Grants	\$4,576,068																			
Total Allowance for Inflation	\$635,473																			
Total Budget Less Inflation	\$4,925,925																			
Total Budget Less Grants & Inflation	\$3,940,595																			

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Appendix 1: Terms of Reference of the DW-WP Stewardship Committee

Purpose

To identify action items and initiatives that support the protection of surface and groundwater drinking water sources for RDN Electoral Area residents and to provide recommendations to the Board regarding key drinking water and watershed protection activities to be considered for the 2007 budget.

The Stewardship Committee will bring together and focus the considerable work already carried out by the RDN with respect to drinking water and watershed protection. It will provide the forum by which broad representation from the region will assist in shaping the direction of DW/WP.

Committee Roles and Responsibilities

The Drinking Water / Watershed Protection Stewardship Committee will be an advisory committee and will provide for a technical sub-committee as required.

The committee will:

- Determine priority actions and initiatives for the protection of surface and groundwater drinking water sources.
- Provide recommendations to the Board regarding key strategies and initiatives relating to drinking water and watershed protection to be included in the 2007 annual budget;
- Liaise with Electoral Area residents;
- Liaise with the Vancouver Island Health Authority Watershed Protection Steering Committee;
- Participate on smaller ad-hoc committees dealing with specific issues or tasks;
- Provide advice and feedback on consultation activities with the general public;
- Provide input and feedback on technical reports and other documents prepared for the committee's information;

Membership Criteria/Selection

The committee will consist of up to 15 members. Members will be selected by the Board through an application process or by agency appointment. Membership representation will be as follows:

Electoral Area resident	Stewardship Group Representative
Electoral Area resident	Stewardship Group Representative
Electoral Area resident	VIHA
Electoral Area resident	Ministry of Environment
Well Drilling Industry Representative	Islands Trust
Private Water Purveyors Representative	RDN (Staff)
Water Improvement Dist. Representative	RDN (Chair)
First Nations Representative	

Membership may be adjusted as needs or issues arise. The application for non-appointed members for committee membership will be promoted through advertisements in local media. Applications must demonstrate the applicant's:

- representation of one of the sectors listed above;
- willingness and ability to commit to volunteering the necessary time to the committee;
- interest in drinking water and watershed protection issues in the RDN;
- willingness and ability to consider issues from all sectors and geographical perspectives within the community;
- experience related to drinking water and watershed protection issues;
- willingness and ability to work towards consensus on issues being addressed by the committee.

Selection of members will attempt to create a committee with a balance of representation:

- geographically;
- demographically; and
- with a variety of interests and perspectives.

Term

Initial members will be appointed by the RDN Board to an 18 month term. Alternate member appointments will be approved by the committee as required. If a member must resign from the committee, their position will be filled through the application process.

In general there may be up to 12 meetings per year of the committee with the provision for workshops or other presentations at the committee's discretion.

Members are expected to attend all committee meetings.

Participation Costs

Out of pocket expenses incurred as result of attending meetings will be reimbursed subject to RDN policy.

Decision Making

Committee recommendations to the RDN Board will be made by consensus whenever possible. If necessary, votes may be taken and minority reports may be submitted to the Board in addition to the majority opinion.

DW/WP committee meetings will be open to the public; however non-committee members will not have speaking or voting privileges. Delegations that wish to address the committee must seek approval from the committee through a written request. Acceptance of a delegate's request to speak to the committee will be at the discretion of the committee.

Chairperson

The chair will be one of the RDN Board members appointed to the committee in order to provide a direct link between the advisory committee and the Board.

Appendix 2: Detailed Budget for the DW-WP Action Plan

1A: WaterSmart Website

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
1) Upgrade and expand the WaterSmart website to:	each	1	\$0	\$0		0	100%	\$0		\$0	0	\$0
a) Incorporate user-friendly, graphical presentations of water data and maps (see Program 2) as they become available.		10	\$1,000	\$10,000	100	10000	0%	\$0		\$0	10	\$1,000
b) Merge water-related information from other parts of the RDN website into the Water Smart location.		1	\$2,500	\$2,500	100	2500	0%	\$0		\$0	0	\$0
c) Create a page for each information topic listed below.			\$0	\$0		0	100%	\$0		\$0	0	\$0
o Efficient water use – in the house and garden		1	\$5,000	\$5,000	25	1250	75%	\$3,750	20	\$1,000	10	\$500
o Efficient water use – commercial, institutional		1	\$5,000	\$5,000	25	1250	75%	\$3,750	20	\$1,000	10	\$500
o Water efficient irrigation systems and xeriscaping		1	\$5,000	\$5,000	10	500	90%	\$4,500	20	\$1,000	5	\$250
o WaterSmart Team activities and WaterSmart Awards		1	\$5,000	\$5,000	10	500	90%	\$4,500	20	\$1,000	5	\$250
o Water sources of the RDN - maps, status		7	\$1,500	\$10,500	50	5250	50%	\$5,250		\$0	10	\$1,050
o Water quality – common sources of contamination, what to do about it		1	\$5,000	\$5,000	25	1250	75%	\$3,750	20	\$1,000	10	\$500
o Low impact development measures – why, what, where, how		1	\$15,000	\$15,000	10	1500	90%	\$13,500	20	\$3,000	5	\$750
o Rainwater collection – methods, uses, treatment		1	\$15,000	\$15,000	10	1500	90%	\$13,500	20	\$3,000	5	\$750
o Water pricing – explain		1	\$5,000	\$5,000	50	2500	50%	\$2,500		\$0	10	\$500
o Water quality needs and testing for private well owners		1	\$2,500	\$2,500		0	100%	\$2,500	20	\$500	5	\$125
o Greywater use		1	\$2,500	\$2,500		0	100%	\$2,500	20	\$500	5	\$125
o Dual plumbing systems – greywater, rainwater		1	\$5,000	\$5,000		0	100%	\$5,000	20	\$1,000	5	\$250
o Effects of climate change on water supply and water quality		1	\$10,000	\$10,000		0	100%	\$10,000	20	\$2,000	5	\$500
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$103,000		\$28,000		\$75,000		\$15,000		\$7,050

1A: WaterSmart Publications & Awards

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
2) Establish an annual WaterSmart Awards program		10	\$5,000	\$50,000	100	50000	0%	\$0		\$0	10	\$5,000
3) Incorporate stories into regular RDN publications, press releases and other publicity media. Encourage other water service suppliers in the Region to use and distribute this information.	each	10	\$5,000	\$50,000	50	25000	50%	\$25,000		\$0	10	\$5,000
4) Support data collection and reporting on status of water resources as part of the annual "State of Sustainability" report, and make available on the WaterSmart website.	each	10	\$2,500	\$25,000	50	12500	50%	\$12,500	0	\$0	10	\$2,500
5) Launch a WaterSmart "mobile unit" to deliver WaterSmart services to neighbourhoods, residents and community events.	year	10	\$5,000	\$50,000	100	50000	0%	\$0		\$0	10	\$5,000
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$175,000		\$137,500	100%	\$37,500		\$0		\$17,500

1B: Coordinated Information & Education Resources

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
6) Collaborate with MOE and VIHA to:			\$0	\$0		0	100%	\$0		\$0	0	\$0
d) establish a coordinating committee or task force to compile, review and coordinate information resources and determine who, where and how a central source of information could be established.	each	1	\$100,000	\$100,000	50	50000	50%	\$50,000	40	\$40,000	10	\$10,000
a) develop school modules and teacher assistance packages coordinated with Intended Learning Outcomes in the BC teaching curriculum.	each	1	\$30,000	\$30,000	10	3000	90%	\$27,000	33	\$9,900	5	\$1,500
b) organize an information program on water quality impacts of common sources of contamination (e.g. agriculture, auto industry, pesticide use, etc.)	each	1	\$26,000	\$26,000	25	6500	75%	\$19,500	33	\$8,580	10	\$2,600
c) develop an information program on water quality needs and testing for private well owners.		1	\$25,000	\$25,000	25	6250	75%	\$18,750	33	\$8,250	10	\$2,500
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$181,000		\$65,750		\$115,250		\$66,730		\$16,600

1C: Demonstration Projects

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
7) Encourage developers to provide demonstrations of efficient and alternative water use on their development sites	each	1	\$100,000	\$100,000	10	10000	90%	\$90,000	50	\$50,000	1	\$1,000
8) Showcase existing developments with alternate technologies	each	1	\$100,000	\$100,000	10	10000	90%	\$90,000	50	\$50,000	1	\$1,000
9) Initiate and monitor an RDN demo project in a mainstream housing location in the RDN that incorporates sustainable technologies	each	1	\$100,000	\$100,000	10	10000	90%	\$90,000	50	\$50,000	1	\$1,000
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$300,000		\$30,000		\$270,000		\$150,000		\$3,000

1D: Support for Volunteers and Non-Profit Organizations

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
							100%					
10) Support stewardship group-based 'outreach' programs that provide advice to businesses and landowners on how to avoid contaminating watersheds and water supplies, conserve water and protect watersheds.	annual	10	\$25,000	\$250,000	10	25000	90%	\$225,000	33	\$82,500	1	\$2,500
11) Facilitate communication among nongovernmental organizations to promote better coordination of their watershed protection activities, monitoring programs and public outreach.	annual	10	\$5,000	\$50,000	50	25000	50%	\$25,000	20	\$10,000	5	\$2,500
12) Request that the RDN Board review its policies regarding support to volunteer members for basic expenses (mostly travel and/or printing of electronically sent documents) to participate in RDN committees.	annual	10	\$5,000	\$50,000	0	0	100%	\$50,000		\$0	0	\$0
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$350,000		\$50,000		\$300,000		\$92,500		\$5,000

2A: Compilation and mapping of existing data

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
							100%					
1) Compile and map the following from Fed/Prov data and maps:	yrs	2	\$15,000	\$30,000	0	0	100%	\$30,000		\$0	0	\$0
a) stream (surface water) monitoring systems, weather stations and snowpack monitoring stations.	hrs	2	\$100	\$200		0	100%	\$200		\$0	0	\$0
b) surface water intakes and sewer outfalls.	hrs	8	\$100	\$800		0	100%	\$800		\$0	0	\$0
c) groundwater monitoring wells.	hrs	16	\$100	\$1,600		0	100%	\$1,600		\$0	0	\$0
d) watershed/ basin and sub-basin boundaries, where possible.	hrs	16	\$100	\$1,600		0	100%	\$1,600		\$0	0	\$0
e) known aquifer boundaries and aquifer classification.	hrs	16	\$100	\$1,600		0	100%	\$1,600		\$0	0	\$0
f) known well locations; include well depth and groundwater level in accompanying GIS database (metadata) where reasonably accurate information is available.	hrs	500	\$100	\$50,000		0	100%	\$50,000	10	\$5,000	0	\$0
2) Overlay the above maps on a community/ population and land use base map and interpret geographical relationships between water sources, water demand and aquifer vulnerability.	hrs	120	\$150	\$18,000		0	100%	\$18,000	20	\$3,600	5	\$900
3) Map known and potential aquifer recharge areas; overlay on the above maps to begin to interpret relationships of surface water basins to aquifer recharge areas	hrs	500	\$100	\$50,000		0	100%	\$50,000	20	\$10,000	2	\$1,000
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$153,800		\$0		\$153,800		\$18,600		\$1,900

2B: Additional or new data collection

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Volunteers / Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost+Admin
4) For Surface water sources:												
a) Prepare tables/graphs from existing data to show trends. Identify data gaps and set priorities for adding new stream monitoring sites and/or snowpack monitoring sites, and for upgrading existing sites.	study	1	\$25,000	\$25,000	5	1250	95%	\$23,750		\$0	1	\$250
a) To effectively assess changes in stream flows and the effects of water use may require continuous monitoring using stream data loggers that record water level and temperature. Some streams may require multiple monitoring sites to identify the impact of water demands in stream sections.	each logger	100	\$500	\$50,000	5	2500	95%	\$47,500		\$0	1	\$500
b) Coordinate and support volunteers to operate and maintain stream monitoring sites throughout the year; downloading data loggers, monitoring stream changes on a monthly basis and after major events, etc.	year	10	\$25,000	\$250,000	30	75000	70%	\$175,000	25	\$62,500	3	\$7,500
5) For Groundwater sources:												
a) Identify gaps and priorities in monitoring coverage of aquifers.	study	1	\$25,000	\$25,000	10	2500	90%	\$22,500		\$0	1	\$250
b) From the map of existing wells, identify public or private wells that could be monitored on a volunteer basis to fill data gaps. Install water level loggers in identified wells; hire summer students who can teach well owners how to monitor well levels.	study	1	\$12,500	\$12,500	25	3125	75%	\$9,375		\$0	3	\$375
c) Install dedicated monitoring wells in critical areas where groundwater data are poor and/or conduct geophysical surveys from the surface to obtain hydrogeologic information.	allowance / well	20	\$10,000	\$200,000	10	20000	90%	\$180,000	25	\$50,000	1	\$2,000
6) In critical areas, identify all rural homeowners that are not on a communal water system and do not have a water well on record or a licensed spring or surface water source, and send them a questionnaire asking for information on their water source. Tabulate the responses and follow up with telephone calls, second mail outs and/or selected site visits if needed.	hour	200	\$100	\$20,000	15	3000	85%	\$17,000		\$0	15	\$3,000
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$582,500		\$107,375	100%	\$475,125		\$112,500		\$13,875

2C Water Quality Monitoring

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
7) In collaboration with MOE, identify priority waterways and applicable water quality indicators. In collaboration with VIWRVMP, identify groundwater quality problem areas and key indicators.	(See 2A)		\$0	\$0		0	100%	\$0		\$0	0	\$0
7) Establish a monitoring program in priority waterways and groundwater areas, and develop water quality objectives where needed.	sample	200	120	\$24,000		0	100%	\$24,000	25	\$6,000	5	\$1,200
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$24,000		\$0		\$24,000		\$6,000		\$1,200

2D: Response System

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
8) Through the Vancouver Island Watershed Steering Committee and the Regional Watershed Technical Committee, identify:	year	5	\$25,000	\$125,000	50	62500	50%	\$62,500	20	\$25,000	5	\$6,250
a) the critical or problem areas in the Region from a water management perspective;							100%					
b) key water-related indicators (e.g., stream base flows or temperatures, groundwater levels, water quality in indicator wells, etc.) and their "threshold" levels in these problem areas;							100%					
c) which agency can and should take action when these thresholds are exceeded, and the nature of the action to be taken.			\$0	\$0		0	100%	\$0		\$0	0	\$0
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$125,000		\$62,500		\$62,500		\$25,000		\$6,250

3A: Land Development (Engineering) Standards

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30% (Class D estimate)

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
1) Prepare and adopt 'low impact' development standards for:	each	1	\$125,000	\$125,000	25	31250	75%	\$93,750	25	\$31,250	2.5	\$3,125
- Rain gardens			\$0	\$0		0	100%	\$0		\$0	0	\$0
- Pervious paving for driveways and parking			\$0	\$0		0	100%	\$0		\$0	0	\$0
- Infiltration swales			\$0	\$0		0	100%	\$0		\$0	0	\$0
- Absorbent soils and landscapes			\$0	\$0		0	100%	\$0		\$0	0	\$0
- Rainwater leader exfiltration trenches or soakaways			\$0	\$0		0	100%	\$0		\$0	0	\$0
- Reduced (from typical urban standards) road widths for local streets			\$0	\$0		0	100%	\$0		\$0	0	\$0
- Green roof			\$0	\$0		0	100%	\$0		\$0	0	\$0
2) After a reasonable period of time of voluntary implementation, move to make the use of these alternate engineering standards mandatory.	each	1	\$10,000	\$10,000	25	2500	75%	\$7,500		\$0	2.5	\$250
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$135,000		\$33,750		\$101,250		\$31,250		\$3,375

3B: Development Application Review

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30% (Class D estimate)

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
3) Within RDN authority, review and revise the application requirements for rezoning, subdivision, development permits and building permits for large developments to:	each	10	\$25,000	\$250,000	80	200000	20%	\$50,000	10	\$25,000	8	\$20,000
a) Require an aquifer impact assessment for all proposed wells or well clusters			\$0	\$0		0	100%	\$0		\$0	0	\$0
b) Require all development applications over a specified size to provide an analysis of impacts on surface and groundwater sources, such as impacts on infiltration flows, effects of proposed wells on downstream surface flows, etc.			\$0	\$0		0	100%	\$0		\$0	0	\$0
4) Provide the authority in the appropriate bylaws to refuse building or development if the impacts are unacceptable.	each	1	\$15,000	\$15,000		0	100%	\$15,000	10	\$1,500	5	\$750
5) Within RDN authority, review and strengthen regulatory requirements regarding proof of adequate drinking water supplies in applications to rezone or subdivide.			\$0	\$0		0	100%	\$0		\$0	0	\$0
6) Provide info / training to RDN staff and approving officers in water management, rainwater management (LID methods) and efficient water use.	annual	10	\$5,000	\$50,000	50	25000	50%	\$25,000	10	\$5,000	5	\$2,500
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$315,000		\$225,000	100%	\$90,000		\$31,500		\$23,250

3C: Development Charges

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
7) Examine options for establishing fees or charges for new developments for water management.	study	1	\$25,000	\$25,000	10	2500	90%	\$22,500	10	\$2,500	1	\$250
8) Explore incentives for developers who apply LID and/or water conserving methods in their developments.			\$0	\$0		0	100%	\$0		\$0	0	\$0
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$25,000		\$2,500		\$22,500		\$2,500		\$250

3D: Planning Tools

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
9) Review existing zoning for rural subdivisions, and refine the requirements in these zones in respect drinking water protection (e.g. special land use requirements for parcels in aquifer recharge areas).	hours	400	\$100	\$40,000	50	20000	50%	\$20,000		\$0	5	\$2,000
9) Examine the drinking water implications of any proposed changes to Urban Containment Boundaries in reviews of the Growth Management Strategy.	each review	2	\$25,000	\$50,000	50	25000	50%	\$25,000		\$0	5	\$2,500
10) Undertake aquifer impact assessments when considering changes in Urban Containment Boundaries or significant density changes in RDN Electoral Area OCPs, or in municipalities in the RDN that would affect aquifers in Electoral Areas.	each review	2	\$35,000	\$70,000	10	7000	90%	\$63,000		\$0	1	\$700
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$160,000		\$52,000		\$108,000		\$0		\$5,200

4A: Watershed Prioritization

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
1) Identify and prioritize watersheds (and/or aquifers) that are candidates for Integrated Watershed Management Plans that address drinking water and food production needs, habitat needs, management of stormwater and flood protection and existing and potential drinking water resources.	each	1	\$30,000	\$30,000	10	3000	90%	\$27,000	0	\$0	1	\$300
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$30,000		\$3,000		\$27,000		\$0		\$300

4B: Watershed Management Planning - basic watershed protection requirements

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30% (Class D estimate)

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
2a) For Basic watershed protection requirements, identify and document basic BMPs (best management practices) that should apply to all development across the Region, and that do not require a customized watershed management plan prior to implementation. Create public awareness and regulatory bylaws to implement the BMPs.	study	1	\$150,000	\$150,000	10	15000	90%	\$135,000	25	\$37,500	1	\$1,500
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$150,000		\$15,000		\$135,000		\$37,500		\$1,500

4B: Watershed Management Planning - custom watershed management plans

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30% (Class D estimate)

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
2b) Undertake custom watershed management plans for identified priority 'at-risk' areas. Create public awareness and regulatory materials to implement the recommendations.	each IWMP	5	\$200,000	\$1,000,000	10	100000	90%	\$900,000	25	\$250,000	1	\$10,000
3) Ensure that water for local food production is a consideration in watershed management planning.							100%					
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$1,000,000		\$100,000		\$900,000		\$250,000		\$10,000

5A Water Conservation Plans

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
1) Develop a Water Conservation Plan for the RDN water local service areas based on the EPA Water Conservation Plan Guidelines or similar water conservation plan models. The Plan would provide a common set of goals and strategies, but would also address characteristics that are unique to individual service areas as required.	study	1	\$75,000	\$75,000	10	7500	90%	\$67,500	25	\$18,750	1	\$750
2) Based on the experience in generating a Plan for the water local service areas, generate a template for Water Conservation Plans that could be used in other parts of the Region, and work with water purveyors to apply the template to their water supply systems (see action 5B).	annual	7	\$5,000	\$35,000	10	3500	90%	\$31,500	25	\$8,750	1	\$350
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$110,000		\$11,000		\$99,000		\$27,500		\$1,100

5B: Cooperation among Community Water Supply Systems

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
3) Work with operators of water supply systems to achieve long-term sustainability of all water systems in the Region. The recommended approach is to establish a Water Purveyor Working Group, sponsored by the RDN. The intent of this Group would be to provide a forum for discussion and the exchange of ideas to assist water purveyors in the Region.	annual	10	\$25,000	\$250,000	25	62500	75%	\$187,500	25	\$62,500	2.5	\$6,250
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$250,000		\$62,500		\$187,500		\$62,500		\$6,250

5C: Rainwater and Greywater Use

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
4) Investigate water supply and distribution systems in other jurisdictions (e.g., Europe) that separate drinking water from non-potable water at the utility level, for examples that might be considered in building new systems or system extensions in the Region. (funded in 2007)	unded in 2007		\$50,000	\$0	10	0		\$0	25	\$0	1	\$0
5) Work with the RDN bylaws and with building inspectors to identify barriers to the application of dual plumbing and graywater or rainwater reuse where appropriate, and work towards removing those barriers by providing applicable standards.	year	3	\$5,000	\$15,000	50	7500	90%	\$7,500		\$0	5	\$750
6) After a reasonable learning and assessment period, move to require use of rainwater and/or greywater reuse in key water shortage areas.	each	1	\$15,000	\$15,000	25	3750	50%	\$11,250		\$0	2.5	\$375
7) In collaboration with MOE, MOH and Malaspina University-College, develop training for local contractors and builders on dual plumbing installation.	per session	10	\$7,500	\$75,000	10	7500	75%	\$67,500	25	\$18,750	1	\$750
8) Lobby the senior governments to include dual plumbing in their Building Codes, and to offer related training.	year	3	\$2,500	\$7,500	100	7500	90%	\$0		\$0	10	\$750
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$112,500		\$26,250		\$86,250		\$18,750		\$2,625

5D: Incentive Programs

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30% (Class D estimate)

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
9) Research and prioritize water conservation incentive programs based on their effectiveness ('bang for buck') in reducing water demand.	study	1	\$30,000	\$30,000	10	3000	90%	\$27,000		\$0	1	\$300
10) In areas of existing or potential water shortage, provide "challenge grants" for:			\$0	\$0		0	100%	\$0		\$0	0	\$0
a) Xeriscape planting schemes (institutional, commercial, residential).	per install	50	\$1,100	\$55,000	10	5500	90%	\$49,500		\$0	1	\$550
b) Conversion to waterless urinals (institutional, commercial).	per install	50	\$550	\$27,500	10	2750	90%	\$24,750		\$0	1	\$275
c) Conversion to low flush toilets and low flow showerheads (institutional, commercial, residential).	per install	200	\$550	\$110,000	10	11000	90%	\$99,000		\$0	1	\$1,100
d) Installation of water-conserving irrigation systems (institutional, commercial, residential).	per install	50	\$1,100	\$55,000	10	5500	90%	\$49,500		\$0	1	\$550
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$277,500		\$27,750		\$249,750		\$0		\$2,775

5E: Water Use Regulation

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
11) Request the Province to analyze existing water licences on waterways in the Region that are subject to critically low flows, and to: a) require metering and reporting of withdrawals; and b) consider reducing or terminating high-volume licences unless proof of need can be validated.	each	1	\$5,000	\$5,000	50	2500	50%	\$2,500		\$0	5	\$250
11) Urge the Province to complete their groundwater protection review and bring forward the necessary legislative changes for regulating the extraction and use of groundwater from all types of wells.	each	1	\$5,000	\$5,000	50	2500	50%	\$2,500		\$0	5	\$250
12) In the absence of applicable Provincial regulation, develop methods for regulating commercial use of private wells through zoning or business licensing.	each	1	\$20,000	\$20,000	25	5000	75%	\$15,000	25	\$5,000	2.5	\$500
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$25,000		\$10,000		\$17,500		\$5,000		\$750

6A Contaminant Management

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
1) In collaboration with the Vancouver Island Water Resource Vulnerability Mapping Project, create a list of land uses that occur in the Region that have a high probability of introducing contaminants to groundwater or surface water sources, and map their location. Identify information resources on how these land uses can avoid contamination and distribute to identified landowners.	(See 2A), plus info distribution]	1	\$25,000	\$25,000	20	5000	80%	\$20,000	0	\$0	2	\$500
2) Over time, and in collaboration with MOE's contaminant management division, develop methods for requiring high-risk land users to manage contaminants in a prescribed manner.	program	1	\$15,000	\$15,000	50	7500	50%	\$7,500	0	\$0	5	\$750
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$40,000		\$12,500		\$27,500		\$0		\$1,250

6B Agriculture and Forestry

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
3) Through the Vancouver Island Watershed Steering Committee and a future Regional Watershed Technical Committee, meet with regional staff from the Ministry of Forests and Ministry of Agriculture and Lands to determine ways of effectively influencing farming and forestry operations to protect drinking water sources from contamination and steward watersheds in the Region. This may involve tailoring information and incentive programs that these Ministries already have in place on a province-wide basis to the particular circumstances in the RDN, and collaborating on education and incentive programs for local farmers and forest managers.	contact	3	\$5,000	\$15,000	50	7500	50%	\$7,500		\$0	5	\$750
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$15,000		\$7,500		\$7,500		\$0		\$750

6C Private Water Well Safety

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
4) Support the Province's proposal to establish Ground Water Management Zones (GWMZs) in areas with groundwater problems. As part of that initiative, encourage the Province to establish requirements for water quality testing of private wells in GWMZs in the short term, and province-wide in the long term. Any program that requires water quality testing should include incentives and possibly subsidies for more advanced testing where this may be necessary.	each	1	\$5,000	\$5,000	50	2500	50%	\$2,500		\$0	5	\$250
5) Initiate a pilot well monitoring project that would test water from a limited number of private wells. The pilot could be based on annual sampling of basic water quality parameters (e.g., total dissolved solids, electrical conductivity, pH, alkalinity, hardness, chloride, fluoride, nitrate, sulphate, arsenic, boron, iron, etc.) for 100-200 wells over a 5-6 year period. Sampling costs are estimated roughly at \$100/well/year; setting up the project and follow-up analysis could potentially be cost-shared with MOE and/or VIHA.	year	10	\$10,000	\$100,000		0	100%	\$100,000	10	\$10,000	0	\$0
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$105,000		\$2,500		\$102,500		\$10,000		\$250

6D: On Site Sewage Disposal

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
6) In collaboration with VIHA, the Vancouver Island Watershed Steering Committee and local stewardship groups, identify areas of concern regarding failing on-site systems, and develop an information program on BMPs for operating and maintaining them to be delivered to residents; e.g., information bulletings, local information sessions ("septic socials"). Include:	program, cost shared, per year	8	\$15,000	\$120,000	10	12000	90%	\$108,000	25	\$30,000	1	\$1,200
a) Surveys of local residents in known or suspected problem areas.			\$0	\$0		0	100%	\$0		\$0	0	\$0
b) A coordinated complaint/referral process wherein the identity of complainants may remain anonymous if desired.			\$0	\$0		0	100%	\$0		\$0	0	\$0
c) Improved follow-up to installation of new systems to assure quality control.			\$0	\$0		0	100%	\$0		\$0	0	\$0
d) An incentive program for annual monitoring and maintenance of on-site systems; or alternatively, adopt regulations for mandatory maintenance and reporting.			\$0	\$0		0	100%	\$0		\$0	0	\$0
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$120,000		\$12,000		\$108,000		\$30,000		\$1,200

7 Climate Change

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30%

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost (% of Calculated Budget)	\$\$ Annual Added New Staff Cost
1) Monitor evolving science on the relationship of climate change to water quantity and quality.	each	1	\$20,000	\$20,000	25	5000	75%	\$15,000		\$0	2.5	\$500
2) Develop a strategy that identifies the potential impacts of climate change on aquifers and watersheds and/or water service areas in the Region and measures for reducing the RDN's contribution to greenhouse gases, but also to adapting to anticipated changes. The study should involve local residents in identifying risks and developing adaptation tools.	study	1	\$70,000	\$70,000	10	7000	90%	\$63,000	25	\$17,500	1	\$700
3) Incorporate consideration of local and regional hydro-climatic balance in improved data collection and evaluation of changes to groundwater, surface water, and available evapotranspiration moisture levels (Program 2); public awareness and education for government officials, planners, engineers, developers, forestry and agricultural professionals (Program 1); and best management practices to maintain the balance between land use and hydro-climatic changes (Programs 3-6).			\$0	\$0		0	100%	\$0		\$0	0	\$0
Other (specify)	each			\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$90,000		\$12,000		\$78,000		\$17,500		\$1,200

PROJECT BUDGET MASTER

Project Name Alternative #

General Note: Unit Costs indicated are suitable for general budgeting only, and are accurate only to +/- 30% (Class D estimate)

Cost Estimate	Unit	Quantity	Budget / Unit	Calculated Budget	% Labour By Ex or New Staff (max 100%)	\$ Value of Staff Work	Net % New Regional Budget (w/o staff)	\$\$ Regional New Budget w/o staff	% Grants / Other Sources (max 100%)	\$ Value of Grants / Other Sources	Added Annual New Staff Cost	\$\$ Annual Added New Staff Cost
											(% of Calculated Budget)	
insert tasks here	each	1	\$0	\$0		0	100%	\$0		\$0	0	\$0
			\$0	\$0		0	100%	\$0		\$0	0	\$0
			\$0	\$0		0	100%	\$0		\$0	0	\$0
			\$0	\$0		0	100%	\$0		\$0	0	\$0
			\$0	\$0		0	100%	\$0		\$0	0	\$0
			\$0	\$0		0	100%	\$0		\$0	0	\$0
			\$0	\$0		0	100%	\$0		\$0	0	\$0
			\$0	\$0		0	100%	\$0		\$0	0	\$0
			\$0	\$0		0	100%	\$0		\$0	0	\$0
			\$0	\$0		0	100%	\$0		\$0	0	\$0
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			\$0	\$0		0	100%	\$0		\$0	0	\$0
			\$0	\$0		0	100%	\$0		\$0	0	\$0
			\$0	\$0		0	100%	\$0		\$0	0	\$0
Other (specify)	each		\$0	\$0		0	100%	\$0		\$0	0	\$0
Other (specify)	each		\$0	\$0		0	100%	\$0		\$0	0	\$0
Other (specify)	each		\$0	\$0		0	100%	\$0		\$0	0	\$0
Subtotals for Project				\$0		\$0		\$0		\$0	0	\$0