District of Sooke
Liquid Waste Management Plan
(Rainwater), Stage 2 & 3

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Executive Summary

The District of Sooke Liquid Waste Management Plan (Rainwater), Stage 2 & 3 has been developed with significant input from the municipal planning and engineering departments, the community and the LWMP Advisory Committee appointed by Council.

Plan development required the consultants to undertake detailed investigations of 72 recommendations identified in the District of Sooke Liquid Waste Management Plan (Stormwater) Stage 1.

The LWMP (Rainwater), Stage 2 & 3 provides the following information for each of the 72 aspects of rainwater management:

- Background (provides the rational for inclusion within the Plan)
- Discussion
- Commitments;
    - lead agency
    - primary contact
    - human, financial and other resources required
    - potential funding sources
    - implementation schedule
- Status

During the LWMP (Rainwater), Stage 2 & 3 process, plan requirements were either completed or developed to provide clear direction to the District of Sooke to ensure that:

- municipal rainwater infrastructure is developed in a manner that will result in healthy watercourses and a healthy near shore marine environment
- watershed based management approaches be implemented to protect Sooke's watersheds
- low impact development techniques are employed to maintain and where possible restore the pre-development hydrologic regime of urbanized and developing watersheds
- biological and chemical contaminants do not enter rainwater flows in the first place (rainwater source control)
- a green infrastructure approach to rainwater management is taken to provide for cleaner air through well treed riparian zones and streetscapes
- education and training activities are undertaken and community involvement is supported
- rainwater, on-site sewage treatment and groundwater recharge are not viewed in isolation
- spills are prevented and response and reporting protocols are in place
- annual monitoring and reporting of rainwater flows is undertaken
- methods to fund rainwater activities are investigated
- regulatory policies, guidelines and options are discussed

- aquatic ecosystems are protected through bylaw development (e.g. Zoning Bylaw for the Riparian Areas Regulation, Subdivision and Development Standards Bylaw for low impact development and the Rainwater Quality Bylaw for contaminant source control.)

The Plan also includes:

- the Terms of Reference for an ongoing Plan Monitoring Committee
- a report on the Public Consultation Process carried out during the development of the Plan
- a Plan Summary of each activity including estimated costs, implementation schedule and status.

Background

The District of Sooke has completed construction of sewage collection and treatment facilities to service the core area of the community. As a condition of the Provincial grant to assist in the construction of the new collection and treatment system, the District of Sooke is required to develop a Liquid Waste Management Plan (LWMP). The province allowed the sanitary and rainwater components of the plan to be developed separately.

In 2006, the District of Sooke commenced work on the LWMP (Rainwater)[1]. The purpose of a LWMP (Rainwater), Stage 1 is to introduce rainwater management issues to the community and provide a realistic set of rainwater management options considered appropriate for detailed investigation and discussion in the District of Sooke LWMP (Rainwater) Stage 2 and 3.

The District of Sooke engaged Downstream Environmental Consulting Ltd. to undertake the Stage 1 LWMP (Stormwater) activities which resulted in the development of three documents:

- *District of Sooke, Liquid Waste Management Plan (Stormwater), Stage 1 Technical Support Document, November 28, 2006*
- *District of Sooke, Liquid Waste Management Plan (Stormwater), Stage 1, November 28, 2006*
- *District of Sooke, Liquid Waste Management Plan (Stormwater), Stage 1 Summary of the Public Involvement Process, September 13, 2007*

The Technical Support Document investigated 22 tasks identified in the Stage 1 Terms of Reference, and the Stage 1 Plan report provides a summary of the findings. The Stage 1 Plan is available on the District of Sooke website and was prepared to meet Province of British Columbia expectations for the process, content and delivery of a LWMP (Stormwater), Stage 1.

The LWMP (Stormwater), Stage 1 received provincial Ministry of Environment approval in a letter dated February 7, 2008. In that letter, the province also approved the District's request to combine the remaining Stage 2 & 3 of the LWMP (Rainwater). The province requested that the final sanitary and rainwater plans be submitted "as one package."

The Terms of Reference (ToR) for Stage 2 & 3 were prepared to meet provincial expectations for the process, content and delivery of a LWMP (Rainwater). Provincial guidelines require that the ToR be prepared in consultation with the Regional Environmental Protection Manager. This has been done and all issues identified in the provinces February 7, 2008 letter have been addressed.

[1] In North America, the term "stormwater" is slowly being replaced with the term "rainwater" to describe a broader range of precipitation events and to identify rainwater as an important resource. The authors have used the term "rainwater" wherever possible in this document, but to avoid confusion the reader should consider the two terms interchangeable.

In May 2008, the District of Sooke hired a multi-disciplinary team lead by Downstream Environmental Consulting Ltd. to complete Stage 2 and 3 of the LWMP (Rainwater).

This document is consistent with provincial objectives and principles of sustainability. The consultant has managed the Plan development using the five guiding principles identified in *Stormwater Planning: A Guidebook for British Columbia* (May 2002). These five principles are located in the Guidebook's Executive Summary. The entire document can be accessed from the Ministry's website at:
http://www.env.gov.bc.ca/epd/epdpa/mpp/stormwater/stormwater.html

The provincially approved LWMP will be a written record of the District's decisions and plans for the management of rainwater.

Plan Summary – Activities, Estimated Costs, Schedule and Status

Background

The District of Sooke has completed a Liquid Waste Management Plan (LWMP) (Rainwater). The Province of British Columbia, Ministry of Environment, in their letter dated February 7, 2008 identified the following requirement for inclusion in the Final Plan:

"The document should identify cost per user for the life of the plan."

Discussions with senior staff from the Provincial Ministry of Environment have determined that it would be more appropriate to base calculations on a costs per household basis. It was also determined that the LWMP (Rainwater) should have an initial 10 year planning horizon.

There are a total of 72 activities addressed in the plan. Many of these activities were completed by the consultants and District of Sooke staff during the 22 months that the plan was under development. However, it must be recognized that the District has in the past and continues to expend significant levels of staff time and financial resources on rainwater management. Some of the existing initiatives include an annual contract with the CRD's monitoring program, the development of four Rainwater Management Plans and ongoing consultation with developers during the development approval process.

Plan implementation will have a cumulative effect on the work loads of existing staff and it is likely that additional staff will be required over time. This should be addressed through the District's ongoing internal assessments of staffing levels.

LWMP (Rainwater) - Activity, Estimated Additional Costs, Schedule and Status

In addition to the completed and ongoing rainwater management activities, the plan identifies 13 new activities that the District of Sooke will have to fund through municipal budgets, external funding sources or a combination of both.

The following Table provides a summary of each activity identified in the plan, an implementation schedule and status. The Table also provides the estimated costs for those 13 new activities that will require additional funding.

LWMP (Rainwater)
Plan Activity, Estimated Additional Costs, Implementation Schedule and Status

Plan Activity	Estimated Additional Costs	Implementation Schedule	Status
Section A – Rainwater Flow – Rate and Quantity			
A 1 – finalize and adopt the updated draft Bylaw 404 to ensure post development rainwater flows mimic predevelopment conditions	one time cost of $5,500	2010	underway
A 2 – finalize and adopt the updated draft Bylaw 404 to address rainwater runoff from roads	included in A 1	2010	underway
A 3 – modify the Zoning Bylaw and OCP to ensure impervious surfaces are minimized	0	2010	ongoing
A 4 – finalize and adopt the updated draft Bylaw 404 to minimize piped rainwater systems	included in A 1	2010	underway
A 5 – finalize and adopt the updated draft Bylaw 404 to encourage surface drainage	included in A 1	2010	underway
A 6 – finalize and adopt the updated draft Bylaw 404 and the updated draft OCP to encourage rainwater management for existing development	included in A 1 & H 1	2010	underway
A 7 – finalize and adopt the updated draft Bylaw 404 to require the use of the Water Balance Model during development proposals	included in A 1	2010	underway
A 8 – finalize and adopt the updated draft Bylaw 404 and the updated draft OCP to encourage rainwater management for existing development	included in A 1 & H 1	2010	underway
Section B – Rainwater Quality			
B 1 - adopt and enforce a Rainwater Quality Protection Bylaw (source control)	$15,000 per year	starting in 2011	pending
B 2 - finalize and adopt the updated draft Bylaw 404 to encourage the infiltration and treatment of road runoff	included in A 1	2010	ongoing
B 3 - modify plumbing permits to address cross connections	$3,500 (once)	2011	pending

Plan Activity	Estimated Additional Costs	Implementation Schedule	Status
B 4 – ensure public information on sewage spills and releases is provided	0	2010	pending
B 5 – provide a sani-dump facility for RVs	0	dependent on a development opportunity	ongoing
B 6 – provide a dockside system to pump out holding tanks on boats	0	dependent on a development opportunity	underway
B 7 – finalize and adopt the updated draft Bylaw 404 to require erosion and sediment control plans	0	2010	underway
B 8a – ensure activities on ALR land are in compliance with provincial requirements	0	2010	pending
B 8b - ensure timber harvesting on crown land is in compliance with provincial requirements	0	2010	pending
B 9 - ensure timber harvesting on private land is in compliance with provincial requirements	0	2010	pending
B 10 – promote appropriate handling and disposal of chemical contaminants	0	2010	ongoing
B 11 – ensure appropriate handling and disposal of street materials	0	2010	complete
B 12 – support educational initiatives to protect rainwater quality	0	underway	ongoing
B 13 – continue with the annual CRD monitoring program	0	underway	ongoing
Section C – Watershed Approach to Rainwater Management			
C 1 – Part 1: complete Rainwater Management Plans for 7 remaining high and moderate rated watersheds	$70,000 per year for 7 years	2011	underway
C 1 – Part 2: collect outstanding rainwater management plan information for the 4 RMPs in progress	$40,000 (once)	2011	ongoing
C 2 – prioritize watersheds for rainwater management	included in C 1	2009	complete
C 3 – discuss planning processes for shared watersheds with neighbouring jurisdictions	0	2010	pending
C 4 – follow development of the Sooke River WMP	0	2010	pending
C 5 – collect missing watershed data	included in C 1 Part 2	2011	ongoing

Plan Activity	Estimated Additional Costs	Implementation Schedule	Status
C 6 – collect baseline ecological and geophysical information	included in C 1 Part 1 & K 8	2010	ongoing
Section D - Groundwater Recharge			
D 1 – use the information in the Associated Engineering soils map to promote groundwater recharge	0	2010	pending
D 2 - finalize and adopt the updated draft Bylaw 404 to ensure development practices mimic the natural hydrology	included in A 1	2010	pending
Section E - Management Options for Properties Serviced by On-site Sewage Treatment Systems			
E 1 - use the information in the Associated Engineering soils map to protect rainwater flows from on-site sewage treatment systems	0	2010	pending
E 2 – ensure compliance with MoE and VIHA requirements to determine lot size for properties with on-site treatment and rainwater management requirements	0	implemented	complete
E 3 – ensure appropriate siting of rainwater management systems to on-site systems and potable wells	0	implemented	complete
Section F – Monitoring Rainwater Discharges, Watercourses and the Marine Receiving Environment			
F 1 – continue with the CRD monitoring program	included in B 13	underway	ongoing
F 2 – expand the CRD monitoring program to determine the effectiveness of various BMPs	included in B 13	underway	ongoing
F 3 – integrate precipitation information into CRD monitoring program	included in B 13	underway	ongoing
F 4 – use monitoring data to promote BMPs	included in B 13	underway	ongoing
F 5 – enhance the CRD monitoring programs educational component	included in J 1	every three years, to coincide with new Councils	ongoing
Section G – Protect and Enhance the Marine Coastline, Waters and Marine Life			
G 1 - adopt and enforce a Rainwater Quality Protection Bylaw (source control)	included in A 1 & B 1	2011	pending
G 2 – minimize impervious surfaces along the marine coastline	included in A 1	2010	underway

Plan Activity	Estimated Additional Costs	Implementation Schedule	Status
G 3 – continue monitoring to assess effectiveness of sewage collection system	included in B 13	underway	ongoing
G 4 – ensure the draft OCP addresses rainwater management and the protection of the marine foreshore	0	2010	complete
G 5 - host initial meeting to determine level of interest in Shellfish Project	$1,000 (once)	2011	pending
G 6 – ensure development is in compliance with the Fisheries Act	included in M 1	2010	ongoing
G 7 - support environmental groups	included in K 8	2011	pending
Section H – Rainwater Management and Low Impact Development			
H 1 - incorporate LID principles in OCP	0	2010	complete
H 2 – finalize and adopt the updated draft Subdivision Bylaw 404, ensuring that LID requirements are addressed	included in A 1	2010	underway
H 3 – compile and provide information on LID techniques on Sooke web site	0	ongoing	ongoing
H 4 – undertake a LID pilot project	0	ongoing	ongoing
Section I – Promote the Prevention, Response and Reporting of Spills to Rainwater Flows and the Marine Environment			
I 1 - provide training to staff on spill prevention, response and reporting	$1,000 every 2 years	2011	ongoing
I 2 - provide training to community members on spill prevention, response and reporting	$1,000 per year	2010	ongoing
I 3 - facilitate the installion of small I D signs at rainwater discharge points	$5,000 (once)	2011	pending
I 4 – post the oil spill reporting # at marinas	0	2010	ongoing
I 5 – host spill prevention, response and reporting workshops for businesses	included in I 1	2011	ongoing
I 6 – provide information to residents on spill prevention, response and reporting	included in I 2	2010	ongoing
I 7 – ensure spill prevention, response and reporting is required during development	included in A 8	2010	ongoing
I 8 – provide a generic spill response and reporting form on Sooke's web site	0	2010	pending

Plan Activity	Estimated Additional Costs	Implementation Schedule	Status
Section J – Rainwater Management, Education and Training Opportunities			
J 1 – provide facilitated tours of innovative rainwater management facilities	0	every three years, to coincide with new Councils	ongoing
Section K – Support Local Community Groups Involved With Rainwater Protection			
K 1 – provide resource information on rainwater management systems on Sooke's web site	0	2009	ongoing
K 2 – support community groups by providing info on funding opportunities	included in L 1	2010	ongoing
K 3 – provide environmental stewardship resources on Sooke's web site	0	2009	ongoing
K 4 – provide mapping resources to the community	0	2009	complete
K 5 – amend the Community Grant Program to include environmental projects	0	2010	pending
K 6 - provide field equipment to stewardship groups	$1,600 once (2010) and $200 per year after that for replacement costs	2010	pending
K 7 - provide environmental stewardship workshops	$2,000 per year	2010	pending
K 8 - facilitate the creation and training of Streamkeeper Teams	$3,000 every 3 years	2011	pending
K 9 - enhance the Volunteer Recognition Program to recognize environmental stewardship	$1,000 per year	2010	pending
Section L – Methods to Fund Rainwater Activities			
L 1 – investigate funding opportunities for rainwater management and ecosystem restoration	0	2010	ongoing
L 2 – partner with others to obtain funding for rainwater management and ecosystem restoration	included in L 1	2010	ongoing
L 3 – include statement requiring DCCs for rainwater management in OCP	0	2010	complete
L 4 – explore other methods of accumulating funds for rainwater management facilities	0	2010	complete

Plan Activity	Estimated Additional Costs	Implementation Schedule	Status
Section M – Regulatory Mechanisms			
M 1 – ensure District of Sooke compliance with all federal and provincial regulations	0	2010	ongoing

Estimated costs per year to implement the unfunded LWMP (Rainwater) activities over a 10 year planning horizon (2009 dollars).
2010 = $ 11,100
2011 = $142,700
2012 = $ 89,200
2013 = $ 90,200
2014 = $ 92,200
2015 = $ 90,200
2016 = $ 89,200
2017 = $ 93,200
2018 = $ 19,200
2019 = $ 20,200
Total = $737,400

Estimated Costs per Household to Implement the LWMP (Rainwater)
Estimated total cost to implement the plan over 10 years is $737,400.
Estimated number of households (2009) to fund plan activities is 4,529*****.

Estimated average cost per household to implement the unfunded activities in the LWMP (Rainwater) over a 10 year period = **$162.82****.

Estimated average annual cost per household to implement the unfunded activities in the LWMP (Rainwater) = **$16.28****.

* The 2009 BC Assessment lists a total of 4,824 property parcels within the municipality. Of this total, 4,529 (residential and commercial) are shown with improvements. It was determined that using 4,529 would provide the most accurate number to calculate the estimated “costs per household”.

** The average costs per household have been calculated under the assumption that the District of Sooke will pay the entire costs of all unfunded plan activities. However, it is highly likely that the District will receive funding assistance from the provincial and federal governments and other sources to assist with plan implementation.

Terms of Reference - Plan Monitoring Committee

The Province of British Columbia, Ministry of Environment, in their letter dated February 7, 2008 identified the following requirement for inclusion in the Final Plan:

"The document should commit to the establishment of an ongoing plan monitoring committee to ensure the commitments of the plan are implemented. The Terms of Reference for the committee and its structure should be identified."

This LWMP commits the District of Sooke to establish an ongoing plan monitoring committee. The Terms of Reference and structure for this committee follow:

Select Committee Name: LIQUID WASTE MANAGEMENT PLAN MONITORING COMMITTEE

Established: Council resolution *Insert date*

Purpose of Committee:
The purpose of the Liquid Waste Management Plan (LWMP or the "Plan") monitoring committee (the Committee) is to monitor the implementation of the approved LWMP (Sanitary and Rainwater) and develop strategies to mitigate issues related to implementation as they arise.

Members: Up to (11) voting members consisting of:

- Two (2) representatives from District of Sooke Development Services, Planning and Engineering;
- Representative from Local First Nations (T'Sou-ke First Nation and/or Beecher Bay);
- Ministry of Environment, Regional Environmental Protection Manager, or designate;
- Ministry of Community and Rural Development;
- Vancouver Island Health Authority;
- Environment Canada;
- District of Sooke sewage collection and wastewater treatment contractor; and
- At least two (2) members of the public at large chosen from:
    - the development community;
    - local environmental groups; and
    - local business and the general community.

Council Representative: Councillor as appointed by Council

Chairperson: The Committee will elect either a sitting member of the public or a member of the District's Development Services staff.

Term: At least one (1) year in accordance with Policy No.1.4., *Committee Structure and Function Policy, 2006*

Staff Support: Engineering

Responsibilities of the Committee:

- Meet two (2) times per year or at the call of the Chairperson.
- Review Development Services reports on the status of the LWMP implementation. These staff reports will provide information on plan activities including scheduling and budgets.
- Assist District staff in identifying potential funding opportunities, developing partnerships and encouraging pilot projects in all aspects of the Plan implementation.
- Review the terms of reference for contracts with agencies involved in implementation and/or operation of aspects of the Plan.
- Assist District staff to ensure that municipal and private projects are in compliance with all aspects of the Plan.
- Develop recommendations to be forwarded to the District Council.
- Review terms of reference for additional work to maintain the
- implementation schedule.
- Review an annual LWMP implementation and status report developed by District staff for subsequent submittal to the Ministry of Environment.

Budget: Engineering

Public Consultation Process

Background

The District of Sooke has prepared a Liquid Waste Management Plan (LWMP), Rainwater, Stage 2 & 3. A Public Consultation Process was designed and undertaken during Plan development using the provincial Ministry of Environment, *Proposed Revised Guidelines for Preparing Liquid Waste Management Plans.*

Provincial Requirements Met

The objective of a LWMP is pollution prevention and involving the public in an open and consultative approach to protecting public health and the environment. The provincial *Environmental Management Act* (EMA) required the District of Sooke to carry out a process for comprehensive public review and consultation for all aspects of Plan development. The EMA also states that the Minister of Environment must be satisfied that there has been adequate public review and consultation during development before approving the Plan. The Public Consultation Process was designed and carried out to foster acceptance and a feeling of ownership among the residents of the community.

The Public Consultation Process addressed the following:

a) public involvement began early in the planning process;
b) information was openly exchanged among the public, local government and the Advisory Committee;
c) public response was given open consideration by the District of Sooke and where appropriate, addressed in the planning process; and
d) proceedings and results of the Public Consultation Process were documented and available for public scrutiny.

The District of Sooke and the consultants were each responsible for various aspects of the Public Consultation Process. It was necessary for the District and the consultants to work closely together to ensure a successful Public Consultation Process.

Create Liquid Waste Management Plan (Rainwater) Committees

Steering Committee – This committee was comprised of the District of Sooke mayor and council. It provided the means by which they were kept abreast of Plan content and progress and also provided an opportunity for input. A member of the Steering Committee also sat on the Advisory Committee. The councillor who sat on both committees provided the liaison between the Steering Committee and the Advisory Committee.

Advisory Committee – The province allowed the District of Sooke to replace the Technical and Local Liquid Waste Advisory Committees (TLWAC and LLWAC, respectively) struck during the Stage 1 planning process with the single Advisory

Committee for Stage 2 & 3. This reduced the number of meetings and increased efficiencies. To ensure consistency, efforts were made to provide members of the Stage 1 TLWAC and LLWAC with the opportunity to continue with the Stage 2 & 3 Advisory Committee. The consultant worked with Sooke staff to form the Advisory Committee and the composition of the committee was consistent with section 4.3.4 of the Guidelines. A list of Advisory Committee members is attached. To enhance continuity, a member of the Advisory Committee also sits on the Steering Committee/District of Sooke Council. Once the committee had been established, the members were provided with copies of the project Terms of Reference and other information for discussion at their first meeting. At their first meeting, the Advisory Committee confirmed District of Sooke staff member Laura Byrne as Chair. Ms. Byrne was also the Project Manager.

Representatives from the neighbouring jurisdictions of Metchosin and the Juan de Fuca electoral area were given the opportunity to sit as committee members and chose to receive information only.

Public Consultation Process – Chronology of Events

- June 4 and 11, 2008 - The District of Sooke ran a “Call for Volunteers” to sit on the Advisory Committee in the *Sooke News Mirror* and on the Sooke website (attached).

- June 26, 2008 – First Advisory Committee held (agenda and minutes attached). This meeting focused on:
    - Advisory Committee Terms of Reference
    - LWMPs – Purpose and Process
    - Stage 1 review
    - Stage 2 & 3 Work Plan, Schedule and Public Consultation Process

- July 9, 2008 – Council and staff members attended a full day event designed to identify the need for new ways to manage rainwater management concepts and to view working examples. The day started with a presentation and introduction to rainwater management held in council chambers. This was followed by a bus tour of nine innovative examples of rainwater management within the core area of the CRD. The entire project team attended along with an environmental planner and educator (event summary attached).

- September 25, 2008 – A second full day event was held for District of Sooke community members and Ministry of Environment staff. A special effort made to encourage developers to attend. The day started with a presentation and introduction to rainwater management held in council chambers. This was followed by a bus tour of nine innovative examples of rainwater management within the core area of the CRD. The entire project team attended along with an environmental planner and educator (event

summary attached). This event was advertised on the Sooke website (attached).

- September 3, 2008 – The Advisory Committee representative from the T'Sou-ke First Nation (Mark Gauti) did not attend the First Advisory Committee meeting and so a special meeting was held on T'Sou-ke First Nations land. Mark Gauti, the consultant and the District of Sooke Project Manager discussed the LWMP (Rainwater), provided an overview of the Advisory Committee Terms of Reference, and the Work Plan and minutes from the first meeting. Chief Russell Chipps from the Beecher Bay First Nation was also invited but did not attend. Throughout the entire LWMP (Rainwater) process the local First Nations Bands were invited to all meetings of the Advisory Committee and provided with copies of all relevant information.

- September 6, 2008 – The First Open House was held during the 95th Annual Sooke Fall Fair. The District advertised the Open House on their website (attached). The entire consultant project team attended along with District staff. Power Point presentations ran throughout the event and handouts were made available. The consultants responsible for the LWMP (Sanitary) were also in attendance. This provided opportunities to explain some aspects of plan development associated with both LWM planning processes.

- January 15, 2009 – Second Advisory Committee held (agenda and minutes attached). This meeting focused on:
    - ongoing efforts to update the requirements for rainwater management under the Subdivision and Development Standards Bylaw 404 and the related Engineering Specifications (additional information below). Draft versions of bylaw components were sent to Committee members for prior review.
    - a regulatory source control approach to contaminants management in rainwater flows. A Draft Model Bylaw complete with associated regulatory Codes of Practice were sent to Committee members for prior review.
    - a watershed level approach to rainwater management. Draft components of the watershed sections of the Plan were sent to Committee members for prior review.

- March 5, 2009 - The project team met with District of Sooke staff and the consultant preparing the Official Community Plan (OCP). Extensive input was provided to ensure that the OCP clearly addressed many aspects of rainwater management including the following:
    - low impact development techniques would be used for rainwater management in all new and redevelopment initiatives

- a source control approach would be taken to contaminants management
- a watershed management approach should be taken during land development

On September 17, 2009, a follow up meeting was held with Sooke staff and the consultant preparing the OCP to ensure these rainwater management components had been incorporated into the final draft.

- March, 2009 – The District of Sooke posted information on their website describing why innovative rainwater management is important. The information also included examples of built projects and links to other rainwater management websites (attached).

- March, 2009 – The District of Sooke posted a map on their website of all watersheds associated with the District.

- March 20, 2009 – The Draft LWMP (Rainwater) Stage 2 & 3 was sent to the Advisory Committee with a request for comments which were incorporated into the document as appropriate. At the same time the Draft Plan was made available to the community on the District of Sooke website.

- May 2009 – the provincially sponsored Waterbucket website posted an article on the District of Sooke's development strategies for the long term management of rainwater and why it is necessary (attached).

- May 6, 2009 – The second Open House was held. The consultants from the LWMP (Rainwater) provided a Power Point display and handouts. Representatives from the LWMP (Sanitary) and the process to update the Official Community Plan were also in attendance. This provided an opportunity for the community to examine the linkages and ask questions about the relationships between these three projects. The Open House was advertised in the *Sooke News Mirror* and on the Sooke website (attached).

- June 19, 2009 - A special meeting was held with the District of Sooke Project Manager, the Municipal Engineer, the entire Consultant Team and those members of the Sooke community who also sit on the LWMP (Rainwater), Advisory Committee. The purpose of the meeting was to offer these community members an opportunity to discuss the draft plan and ask questions in a more informal setting than the Advisory Committee. One of the community members in attendance was also a Sooke Councilor.

The Consultant Team gave an overview of the LWMP process. This was followed by a broad ranging discussion that touched on all major aspects of the LWMP (Rainwater) and its implementation. Questions from the community members were answered and at the end of the meeting the consultant team leader asked if the meeting had raised the community member's level of understanding and comfort about the process and content of the plan. The community members responded that it had.

- June 19, 2009 - A Spill Prevention, Response and Reporting Workshop was held for the public in Sooke Council Chambers. The one hour workshop targeted homeowners and small businesses and was instructed by Sooke's Fire Chief and a member of the LWMP (Rainwater) consulting team. The workshop topics included: ecological effects of spills, types of spills, what to do if you see a spill and what to do if you have a spill on your property. Workshop participants were given informational handouts and were able to examine the contents of a spill kit. Participants attended the workshop including a representative from the T'Sou-ke First Nation.

- June 2008 to December 2009 – Process to re-write the District's Subdivision and Development Standards Bylaw 404 and the Engineering Specifications related to rainwater management.

  During the process to develop the Stage 2 & 3 Final Plan, the Subdivision and Development Standards Bylaw 404 and Schedules related to rainwater management were completely re-written. The consultant started this process by reviewing several other municipal bylaws and using the results as a base upon which to build a comprehensive draft bylaw for rainwater management.

  The consultant then met with Sooke staff and local engineers to gather concepts and concerns to be addressed in the new bylaw. Whenever possible, innovative design technologies and low impact development techniques were developed and/or adopted into the bylaw to support the Districts shift toward an environmentally sustainable future.

  A draft copy of the bylaw was sent out for extensive review and consultation. A number of meetings were held with the Ministry of Transportation to ensure provincial highways standards were met.

  Relevant components of the bylaw were presented to the Advisory Committee for review and comment and nine meetings were held with a group of local consulting engineers involved in land development in the Sooke area. Over a six month period this group provided critical review and made valuable recommendations for improvements to the bylaw and schedules. This part of the process fostered a sense of ownership and provided a level of comfort within the development community.

Bylaw requirements will enhance and protect watercourses by preserving or mimicking the natural hydrology. Opportunities to improve water quality were also identified and integrated into the bylaw. This process required the engineers and others involved to think about rainwater flows in new and challenging ways. The bylaw includes the requirements for rainwater management for all development in the District of Sooke.

The bylaw is now in the final review stage and will be sent to municipal legal counsel for comment. It can then be presented to Sooke Council. After that, the bylaw can advance to the adoption process which includes a public hearing. It is hoped that the bylaw can be adopted by March 2010.

- October, 2009 – The District of Sooke posted a map on their website identifying the type of soils within the District and the suitability of soils for on-site septic systems.

- November 27, 2009 – LWMP (Rainwater) Stage 2 & 3 Final Draft was posted on the District of Sooke website, along with the rainwater management sections of the Engineering Specifications (Schedule H).

- November 30, 2009 – The third and final Open House was held at the Sooke Community Hall. The consultants from the LWMP (Rainwater) provided a Power Point display and handouts. A representative from the LWMP (Sanitary) was also in attendance. This provided an opportunity for the community to examine the linkages and ask questions about the two projects. Copies of the Final Draft LWMP (Rainwater) Stage 2 & 3, complete with plan implementation costs, were made available to the community. Staff estimate that approximately 95 members of the community attended. Advertisements for the Open House were posted on the Sooke website, the Sooke Quarterly Newsletter, the reader board at Sooke Road and Phillips Road and in the *Sooke News Mirror* (attached).

- December 1, 2009 – The Final Draft of the LWMP (Rainwater) Stage 2 & 3 was sent to the Advisory Committee with a request for comments by January 8, 2010. Comments were incorporated into the document as appropriate.

- January 14, 2010 – Third Advisory Committee held (agenda and minutes attached). This meeting focused on:
    - a review of the entire planning process to date
    - a presentation of the entire Stage 2 & 3 Plan where each activity was discussed by the Advisory Committee and comments were received.

- a motion from the Advisory Committee was approved to send the Plan to council with a recommendation to approve the Plan and send it to the provincial Ministry of Environment for consideration and approval.
- the Terms of Reference for the Plan Monitoring Committee were discussed and approved. The committee voted to send the Terms of Reference to council.

- March 29, 2010 – At a Special Council Meeting, the consultants for the District of Sooke LWMP (Sanitary and Rainwater) used power point displays to present the final integrated plan to District of Sooke Council. The Council chambers were full and community members were given the opportunity to comment. A Staff Report (attached) was presented to council which included the following:

  "***RECOMMENDATION: THAT COUNCIL*** *accept the Stage 3 (Sanitary) and Stage 2 & 3 (Rainwater) Liquid Waste Management Plan and authorize staff to forward it to the Minister of Environment for approval."*

  In a vote, Council unanimously endorsed the Recommendation.

  Once the LWMP is received back from Minister of Environment, any comments will be integrated and the document will then be sent to Council for adoption as a bylaw using the following process: 1st and 2nd reading, public hearing, 3rd and 4th reading.

Section A – Rainwater Flow - Rate and Quantity

Background

In undeveloped areas, rainwater is absorbed by vegetation and soil and slowly discharged to ponds, groundwater aquifers and streams. Development diminishes the ability of land to absorb water due to the increase in impervious surfaces such as roofs, driveways and roads. Under heavy development, water retention is reduced significantly, causing most of the water to run off the site on the surface in concentrated flows to catch basins, watercourses and the marine near shore environment. These increased flows can result in significant surface erosion causing damage to downstream soils, constructed facilities and aquatic ecosystems.

The province of B.C. has prepared several documents that provide guidelines for development to maximize the retention of rainwater flows during and after development. The guidelines demonstrate how carefully designed subdivision and site works can store rainwater for infiltration and reduce runoff rates. One of these documents was prepared “to offer a common sense, effective and affordable approach to integrated stormwater (rainwater) management.” This document, *Stormwater Planning: A Guidebook for British Columbia*, can be viewed at: www.env.gov.bc.ca/epd/epdpa/mpp/stormwater/stormwater.html

Stage 1 Recommendation A 1 – *Ensure that wherever possible, runoff water is detained on-site both during and after development, re-development and land alteration to ensure that rainwater leaving the site has flow and quantity characteristics as close to predevelopment conditions as possible. The District should modify its existing subdivision and development standards bylaw or create, adopt and enforce a new bylaw with provisions to minimize the detrimental effects to rainwater flows associated with land disturbance.*

Stage 2 & 3 Discussion

The District of Sooke has prepared a draft bylaw known as the *Subdivision and Development Standards Bylaw No. 404*, and the accompanying Engineering Specifications, Schedule H. The bylaw and schedules have been significantly revised as part of the development of the LWMP (Rainwater) Stage 2 & 3 and includes the requirements for rainwater management for all development in the District of Sooke. Rainwater related design requirements are intended to provide for water detention, treatment, ground absorption, groundwater recharge and slow discharge to downstream receiving environments. Proper management of rainwater will reduce post development impact and improve water quality. The draft rainwater management sections of Schedule H can be viewed at: http://sooke.ca/EN/main/government/devservices/eng/documents/ScheduleH-Bylaw404DRAFTSept1409.pdf

Low impact development (LID) is a term used to describe a set of techniques that are used to reduce environmental impacts when land is being developed or redeveloped. Many of the techniques are aimed at reducing the amount of impermeable surface in the development area which in turn reduces the amount of rainwater discharged from the site. The goal is to have the site absorb and detain the rainwater and to mimic the natural hydrology of the site as closely as possible. Some of these techniques include reducing paved surfaces, using deep soils, retention ponds, bioswales, subsurface detention, green roofs, permeable pavements, groundwater recharge systems and narrower roads.

Implementing LID techniques will enhance community wellbeing by reducing the negative environmental impacts often associated with land alterations and development in the District of Sooke. The requirements for LID techniques have been established in the District of Sooke Official Community Plan and Zoning bylaws. The draft *Subdivision and Development Standards Bylaw No. 404*, and the accompanying Engineering Specifications, Schedule H sets out the requirements for developers, land owners and municipal staff to follow during the development process.

Stage 2 & 3 Commitments
The District of Sooke will update the draft *Subdivision and Development Standards Bylaw 404* and Schedules to address requirements for rainwater management.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: The draft *Subdivision and Development Standards Bylaw 404* and associated Engineering Specifications, Schedule H have been completed in draft during the development of the LWMP (Rainwater), Stage 2 & 3. Additional staff and legal costs, estimated at $5,500, will be required during the bylaw adoption process.
- potential funding sources: municipal budgets
- implementation schedule: 2010

Status: underway

Stage 1 Recommendation A 2 – *Include design parameters for roads within its subdivision and development standards bylaw to reduce both the rate and quantity of rainwater runoff. These design parameters should include the use of swales, infiltration systems, ponds, broad ditches and permeable concrete and asphalt. Standards for narrower paved surfaces with permeable shoulders should also be investigated. The use of curbs and gutters should be minimized or eliminated except where required within the more heavily developed parts of the core area.*

Stage 2 & 3 Discussion
The draft *Subdivision and Development Standards Bylaw No. 404* and Engineering Specifications, Schedule H includes new roadway cross sections to manage rainwater runoff. Bioswales, curb cuts and roadway rainwater management are required for all new streets and upgrades to existing streets. The draft rainwater management sections of Schedule H can be viewed at: http://sooke.ca/EN/main/government/devservices/eng/documents/ScheduleH-Bylaw404DRAFTSept1409.pdf

The new cross sections also address single lane traffic, bicycle lanes, offset walkways and pathways. Inclusion of LID techniques in roadway designs ensures that a more natural approach is taken to provide rainwater treatment and to reduce runoff rates from roadways and municipal rights of way.

Stage 2 and 3 Commitments
The District of Sooke will update the draft *Subdivision and Development Standards Bylaw* and Schedules to address requirements for rainwater management.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: see A 1
- potential funding sources: municipal budgets
- implementation schedule: 2010

Status: underway

Stage 1 Recommendation A 3 – *Encourage the application of urban and rural development concepts to reduce impervious areas. This could include using conservation design principles such as cluster development and preservation of green space.*

Stage 2 & 3 Discussion
Documentation has been provided to the District Planning department for inclusion in the Zoning Bylaw and Official Community Plan related to modified

development concepts. These concepts include cluster housing with bonus density for enlarged green space and improved rainwater management systems. The clause states:

> The OCP: as a policy, the District of Sooke will "require the adoption of low impact development (LID) techniques for all new development and will require that all revitalization projects (both public and private) address the principles of LID including the use of green roofs, surface rainwater management, bioswales, groundwater infiltration, detention and retention. Use of piped systems will only be approved by the Municipal Engineer in special conditions. The municipality will also consider applications for concentrated housing (cluster housing) where sensitive lands such as wetlands, sensitive ecosystems, streams and watercourses can be salvaged and/or remain in their natural states."
>
> The Zoning Bylaw: as a requirement of rezoning, all new development shall address the need for rainwater management and a formal rainwater management plan will be required prior to any rezoning application being forwarded to the municipal council for review. A new zone shall be created that will permit cluster density housing or density bonus where a development provides to the community larger tracks of natural land than would normally be required under the zoning regulations. Such lands shall be for public good, whether used for park or natural space. Some sensitive ecosystems may be protected from public access in order to ensure their preservation.

Stage 2 & 3 Commitments
The District of Sooke Engineering Department will provide input to the Planning Department.

- lead agency: District of Sooke
- primary contact: Municipal Engineer and Director of Planning
- human, financial and other resources required: amendments to the OCP and Zoning Bylaw have been completed during the development of the LWMP (Rainwater), Stage 2 & 3
- potential funding sources: No additional funding required
- implementation schedule: 2010

Status: ongoing

Stage 1 Recommendation A 4 – *Ensure that wherever possible, existing underground rainwater collection and transmission systems will be day lighted during repairs or replacement.*

Stage 2 & 3 Discussion
The new draft *Subdivision and Development Standards Bylaw 404* includes Engineering Standards in Schedule H that require existing piped systems to be day lighted wherever possible. While the bylaw requires new systems to employ surface water management, it is the goal of the municipality to remove existing enclosed piped systems and re-establish open channel creeks wherever possible. There are situations, such as the town core, where it is not practical to remove the piped systems. However, every effort should be made to provide surface water treatment and detention prior to discharge to the piped systems. The draft rainwater management sections of Schedule H can be viewed at: http://sooke.ca/EN/main/government/devservices/eng/documents/ScheduleH-Bylaw404DRAFTSept1409.pdf

Stage 2 & 3 Commitments
The District of Sooke will update the draft *Subdivision and Development Standards Bylaw 404* and Schedules to address requirements for rainwater management.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: See A 1
- potential funding sources: Municipal budgets
- implementation schedule: 2010

Status: underway

Stage 1 Recommendation A 5 – *Allow surface drainage wherever possible and convert ditches to swales by reshaping and re-vegetating.*

Stage 2 & 3 Discussion
The draft *Subdivision and Development Standards Bylaw 404* includes updated Engineering Specifications in Schedule H for road cross-sections that establish the design guidelines for roadside swales, bioswales, and vegetated roadside drainage. The new cross sections include shallow, wide and vegetated swales that provide surface treatment and detention within the road right of way. These are intended to address road water runoff, but if there is sufficient space on the roadway, the roadside swales can hold rainwater from other upland areas. These bioretention facilities will contribute to the overall municipal rainwater management infrastructure. The draft rainwater management sections of Schedule H can be viewed at:

http://sooke.ca/EN/main/government/devservices/eng/documents/ScheduleH-Bylaw404DRAFTSept1409.pdf

Stage 2 & 3 Commitments
The District of Sooke will update the draft *Subdivision and Development Standards Bylaw 404* and Schedules to address requirements for rainwater management.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: See A 1
- potential funding sources: municipal budgets
- implementation schedule: 2010

Status: underway

Stage 1 Recommendation A 6 – *Consider retrofitting developed areas with rainwater management facilities as opportunities arise and replacing lost infiltration capacity in future development and redevelopment.*

Stage 2 & 3 Discussion
This task requires the preparation of a policy statement that will be added to the Official Community Plan and associated bylaws to encourage retrofitting existing developed areas to meet rainwater best management practices. The draft policy statement is:

> Policy: The District of Sooke shall encourage, wherever possible and practical, the revitalization of existing developed areas by retrofitting rainwater management systems so that surface runoff waters will be treated using best management standards established by the provincial government in its guidelines for community development.
>
> Wherever possible, rainwater shall be detained so that natural processes will be allowed to provide improvements to both quality and quantity. If possible, piped systems will be removed and replaced with surface swales and water channels that will both treat and detain the surface waters to reduce the downstream impacts of that water.

Stage 2 & 3 Commitments
The District of Sooke will include an appropriate policy when updating the OCP.

The District of Sooke should update the draft *Subdivision and Development Standards Bylaw 404* and Schedules to address requirements for rainwater management.

- lead agency: District of Sooke
- primary contacts: Municipal Engineer and Director of Planning
- human, financial and other resources required: See A 1
- potential funding sources: Municipal budgets
- implementation schedule: 2010

Status: underway

Stage 1 Recommendation A 7 – *Consider the application of the Water Balance Model and other modeling during the development approval process to demonstrate whether a proposal meets the municipalities rainwater management objectives identified in the OCP. The decision to require modeling will likely be site specific and based on cost-benefit analyses.*

Stage 2 & 3 Discussion
The Water Balance Model provides general guidelines for rainwater management and illustrates the results of including low impact development techniques for detaining and absorbing rainwater on a site. The draft *Subdivision and Development Standard Bylaw* now includes a requirement for developers to employ the Water Balance Model for all developments, regardless of the number of lots. This requirement recognizes that a two or three lot development could involve a land mass larger than a 10 lot development. The Municipal Engineer may also require additional rainwater flow modeling for any size of development. The draft rainwater management sections of Schedule H can be viewed at: http://sooke.ca/EN/main/government/devservices/eng/documents/ScheduleH-Bylaw404DRAFTSept1409.pdf

Stage 2 & 3 Commitments
The District of Sooke will update the draft *Subdivision and Development Standards Bylaw 404* and Schedules to address requirements for rainwater management including the Water Balance Model.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: See A 1
- potential funding sources: Municipal budget
- implementation schedule: 2010

Status: underway

Stage 1 Recommendation A 8 – *Use the process of updating the OCP to ensure development occurs in a manner that will support the OCP. An investigation is required to determine what tools District staff require to adequately protect rainwater flows.*

Stage 2 & 3 Discussion
Through the LWMP (Rainwater) process, the Official Community Plan has been modified to include a section dedicated to low impact development (LID) for all municipal and private sector development and redevelopment.

The Zoning Bylaw will include requirements for the environmental protection of sensitive lands and areas including watercourses, ponds, wetlands and other areas the District wishes to protect through bylaw provisions.

The draft *Subdivision and Development Standards Bylaw 404* has been extensively revised to provide for the protection of natural areas as well as requiring the use of LID techniques. These include the need for rainwater management plans for each lot, as well as the overall development. Rainwater management will be a source management system that addresses rainwater at the individual lot level, on roadways, in streams, ponds and wetlands. Under the draft *Subdivision and Development Standards Bylaw 404*, all development will be required to implement strategies to address erosion and sediment control, spill prevention and management, flood protection, severe storm over flow routes and water quality management.

New municipal checklists and forms have been prepared to address all aspects of the development process including rainwater management:

- An engineering checklist has been prepared for developers and consultants. This list specifies all items that must be addressed prior to submitting any plans to the municipality. The list requires that prospective developers meet with staff to determine the needs of the development and to review the municipal servicing requirements including all rainwater needs and requirements. Erosion and sediment control and spill prevention plans are included in the checklists.

- An internal engineering checklist has been developed for use by municipal staff as a guideline for checking important items on all submitted development applications and drawings.

- A review response form has been prepared. This document sets out the resubmission requirements for all development drawings once they have been returned to the consultant for modification or revision. This form also identifies the final items that must accompany the subdivision

drawings so that the designs can be approved and the development can move forward to the construction stage. A review form has been prepared for final review of a subdivision project. This includes the initial site inspection, the submission of as-built drawings, final submission of all required fees and certificates of assurance from the developer and the consulting engineer. The form makes allowance for final reports or assurances from a qualified professional to ensure environmental protection.

- A final acceptance certificate is provided. This represents the municipality's final acceptance after 12 months of maintenance by the developer and includes a deficiency list, release of security, final sign off and final acceptance signatures by the municipality. This maintenance period may be extended as a requirement of the municipal engineer under authority available in the draft of *Bylaw 404*.

- A form is provided that requires the developer to list all the infrastructure assets added in the development. This information is now required by the provincial government and is part of the annual report from the municipality. Therefore, the form provides all the information required for future geographical information system records and submission data for the municipality.

Stage 2 & 3 Commitments
The District of Sooke will update the draft *Subdivision and Development Standards Bylaw 404* and Schedules to address requirements for rainwater management and provide input to updating the OCP.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: See A 1
- potential funding sources: Municipal budgets
- implementation schedule: 2010

Status: underway

Section B – Rainwater Quality

Background

The District of Sooke is widely known for its wealth of freshwater systems, as well as Sooke Harbour, Basin, Inlet and Bay, into which they discharge. These natural systems have come to define the District of Sooke and are an important component of the Sooke economy.

The rainwater collection and conveyance systems in Sooke are comprised of limited piping and consist largely of ditches, watercourses and wetlands. These constructed and natural systems and the marine near shore environment are subject to detrimental impacts from biological and chemical contaminants. Contaminated rainwater flows can result in beach closures, disease in the human population, contaminated sediments and groundwater and fish kills. Senior levels of government can hold municipalities responsible for the contamination of watercourses and the marine environment resulting from contaminated rainwater collection systems.

Stage 1 Recommendation B 1 – *Work with CRD staff toward the adoption of a comprehensive rainwater protection bylaw for the District of Sooke. Consideration should also be given to the need for regulatory codes of practice for the protection of rainwater from business sectors that have the potential to pollute.*

Stage 2 & 3 Discussion

One of the most effective methods of protecting Sooke's infrastructure, watercourses and the near shore marine environment from rainwater carried contamination is to ensure that contaminants do not enter flows in the first place. It is easier, cheaper and more logical to keep chemical/biological substances out of flows than it is to try and find and eliminate their source(s) once they have been discharged. This “source control” approach to contaminant management and environmental protection has gained broad acceptance by providing a truly sustainable approach to the ways in which business and individuals handle and dispose of their wastes. It also minimizes the possibility of Sooke being required to treat contaminated flows at some point in the future due to environmental damage and/or violation of applicable provincial and federal legislation such as the *Environmental Management Act* and the *Fisheries Act*.

The value of a source control approach was recognized during development of the Stage 1 LWMP (Rainwater) and recommended for action in Stages 2 & 3. The Capital Regional District has developed a comprehensive source control program which includes a model source control bylaw titled *Bylaw to Regulate Discharges to the Municipal Stormwater Drainage System*. A bylaw discussion paper that provides background and objectives has also been prepared and the

bylaw was developed to include codes of practice. The codes provide guidance and regulation for certain business sectors that have the potential to discharge contaminated rainwater to the municipal system. All of these documents are available on the CRD's website at:
http://www.crd.bc.ca/watersheds/regulations.htm

A source control approach works with businesses, institutions and others to identify and stop contamination before it enters the rainwater system. A typical program would consist of the development of regulations and best management practices, inspections of businesses and institutions, education of businesses, institutions and residents, monitoring for compliance and reporting and enforcement as required.

A version of this bylaw has been adopted by the City of Victoria and three other municipalities have directed the CRD to proceed with bylaw adoption, implementation and enforcement on their behalf.

The CRD Stormwater Harbours and Watershed Program presented the bylaw and codes to the LWMP Advisory Committee on January 15, 2009. The Committee agreed to proceed with bringing the bylaw forward to the Committee of the Whole.

There are three options available to the District of Sooke:

Option 1- Municipal lead: District of Sooke develops, adopts and enforces its own version of a rainwater source control bylaw using a version of the CRD Model Bylaw or equivalent and incorporating Ministry of Environment water quality objectives.

Estimated Costs
- bylaw development - $20,000 (one time)
- create a database - $7,500 (one time)
- annual enforcement - 10,000 (ongoing)

Option 1 does not include an education program for business.

Option 2 - Inter-jurisdictional approach: District of Sooke develops and adopts its own version of a rainwater source control bylaw using a version of the CRD Model Bylaw or equivalent and the CRD enforces the bylaw.

Estimated Costs
- bylaw development - $20,000 (one time)
- create a database - $7,500 (one time)
- annual enforcement -$15,000 (ongoing)

Option 2 does not include an education program for business.

Option 3 - CRD lead: CRD acquires the authority to adopt and enforce their existing rainwater source control bylaw in the District of Sooke.

Estimated Costs
- acquire legal authority, start business education program - $15,000 (one time)
- annual enforcement and education program - $15,000 (ongoing)

Option 3 includes a business education program, trained staff, data ready data base, consistent regional approach, reporting platform (annual report).

It is recommended that the District of Sooke work with the CRD to determine the preferred option and proceed with bylaw implementation.

Stage 2 & 3 Commitments
The District of Sooke should work with the CRD to determine the need for a rainwater quality protection bylaw.

- lead agency: District of Sooke
- primary contact position: Municipal Engineer
- support agency: Capital Regional District
- human, financial and other resources required: For the purposes of this Plan, the costs associated with Option 3 have been used.
  2011- $15,000
  2012 (ongoing) - $15,000
- potential funding sources: District of Sooke
- implementation schedule: starting in 2011

Status: pending

Stage 1 Recommendation B 2 – *Ensure that the District's subdivision and development bylaw includes provisions for the filtration and biological treatment of runoff from roads and other impervious surfaces. Wherever possible, road water should be kept on the surface and treated in roadside swales, ditches and ponds. Where roads are fully paved with curb and gutter, every effort should be made to intercept and treat the rainwater runoff before it is discharged to a natural waterway.*

Stage 2 & 3 Discussion
The draft *Subdivision and Development Standards Bylaw 404* and related Schedules requires that runoff from roads is treated in rainwater management facilities. New road cross sections require that road water be sent to the facilities on one or both sides of the roadways. On larger roadways, there may be a centre median that will be designed for bioretention and treatment. Subsurface drainage

systems will collect the lower and cleaner flows for transmission to the local waterways. It is the intent of the bylaw to minimize piped systems, however, the bylaw accepts that, in certain conditions, it may be impractical or impossible to transport water without pipes. The Municipal Engineer will be able to provide direction as to whether piped systems will be permitted.

Stage 2 & 3 Commitments
The District of Sooke will update the draft *Subdivision and Development Standards Bylaw 404* and Schedules to address requirements for rainwater management.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: See A 1
- potential funding sources: Municipal budgets
- implementation schedule: 2010

Status: ongoing

Stage 1 Recommendation B 3 – *Develop and implement a cross connection prevention program to minimize the possibility of facilities connecting sewage flows to the rainwater system.*

Stage 2 & 3 Discussion
At present, there is a limited amount of piped infrastructure in the District of Sooke and therefore little chance of a facility connecting a sewage line to the rainwater collection system. However, this will change over time and the possibility of a cross or illicit connection will increase. Connecting sewage flows to the rainwater collection system will result in contaminated rainwater flows, watercourses and near shore marine environments. Contact with sewage can also present a risk to human health. Connecting rainwater flows to the sewage collection system will adversely impact the hydraulic characteristics of the sewage collection system, decrease system capacity and unnecessarily increase the volume of sewage to be treated and therefore the costs.

Many different methods are used to avoid this problem. Some of these methods include requiring the developer or property owner to colour code both the sewer and rainwater pipes and the stakes used to locate the pipes at the property line. Other methods include the use of different pipe caps at the property line or locating one of the pipes further to one direction than the other. These methods are all prone to periodic failure.

Improper or illegal sewer connections are often made when a homeowner or contractor adds a bathroom to the basement of a house. If the toilet is too low for

a gravity connection, then an expensive grinder pump is required. This work and expense is sometimes avoided by the homeowner or contractor choosing to direct the sewage from that toilet somewhere other than the sewage collection system.

District of Sooke staff require the authority to ensure that pipes carrying sewage are not mistakenly or otherwise connected to the rainwater collection system and visa versa. This authority should be provided to the Sooke Plumbing Inspector as part of the permitting required when existing or new facilities or bathroom additions are being connected to the sewage and rainwater collection systems.

Permits should be amended to require that the Plumbing Inspector inspect the pipe(s) prior to backfill and connection and that a dye test be conducted from each toilet in the facility after connection to provide visual confirmation that the connections have been properly made. If dye testing is inconclusive then the developer is responsible to confirm that all connections have been made to the appropriate utility. Once this process has been completed, then the permit can be signed off by the inspector.

Stage 2 & 3 Commitments
The District of Sooke should ensure the District Plumbing Inspector has the required authorities in place and modify plumbing permits.

- lead agency: District of Sooke
- primary contact position: Building Inspector
- human, financial and other resources required: Staff costs and legal costs, estimated at $3,500, to amend the Districts plumbing permit.
- potential funding source(s): Municipal budgets
- implementation schedule: 2011

Status: pending

Stage 1 Recommendation B 4 – *Develop and implement municipal sewage pump station overflow control and response plans.*

Stage 2 & 3 Discussion
Problems will always occur at sewage pump stations and collection systems. This is particularly true in the District of Sooke, where power outages are relatively common. However, the ways in which sewage pump stations and collection systems are constructed and operated will have a significant impact on the likelihood of sewage overflows contaminating the rainwater collection system, watercourses or the marine foreshore. EPCOR Utilities Inc. (EPCOR) are

currently responsible for maintaining the municipally owned sewage collection and treatment facilities under contract with the District of Sooke.

The following two public documents have been provided by EPCOR:

- Sooke Lift Station Overview – Protection of the Environment – July 23, 2008 (**Appendix 1**)
  This document describes various elements incorporated into the design of the lift stations in Sooke to minimize the risk of an overflow. These elements include: pumps, level monitoring, remote monitoring, alarm systems and power outages. The document also describes operations and maintenance protocols and emergency response procedures. It is important to note that each sewage lift station is provided with a diesel powered emergency generator that will operate the facility if the power supply is interrupted.
- Sooke Wastewater Spill Overview – Protection of the Environment– Update: Jan. 06, 09 (**Appendix 2**)
  This document provides “highlights from the response procedures that would be initiated if an operator was responding to a wastewater overflow at a lift station.” These highlights include: assess situation, ensure safety, stop the overflow if possible, initiate notifications as appropriate during response, contain the spill, decontamination/disposal, complete incident report.

This information has been reviewed by the project team engineer and has been found to provide a satisfactory level of protection from sewage pump station overflows.

No public information was provided by EPCOR for the management of sewage spills or releases from the sewage collection system. It is recommended that the District of Sooke require this information in a form suitable for release to the community.

Stage 2 & 3 Commitments
The District of Sooke should require that adequate public information is provided to the District for the management of sewage spills or releases from the sewage collection system.

- lead agency: District of Sooke
- primary contact position: Municipal Engineer
- human, financial and other resources required: Staff time to request the information from EPCOR
- funding source(s): insignificant
- implementation schedule: 2010

Status: pending

Stage 1 Recommendation B 5 – *Provide where appropriate, a facility for the discharge of sewage from holding tanks on recreational vehicles to the sewage collection system (sani-dump).*

Stage 2 & 3 Discussion

The inappropriate disposal of sewage from recreational vehicles can present public health and environmental concerns to District of Sooke creeks and streams and the sensitive Sooke Harbour and Basin.

As in any Canadian community, the District of Sooke is home to a number of recreational vehicles (RVs) with sewage holding tanks. The District is also a popular summer destination point and along a much traveled route for RVs.

There are presently two small sani-dumps in Sooke. One is located at an RV park and motel facility and the other is located at the Sooke Flats Campground owned by the Sooke Community Association. Effluent from RV holding tanks is discharged into underground tanks at these sites. When full, the tanks are pumped out by a licensed septage hauler and trucked to a septage disposal facility in Langford.

The RV park and campground are presently outside of the sewer specified area and although transient RVs are allowed to discharge at these sites, it is neither encouraged nor promoted. There is no signage on the adjacent Highway 14 and it is considered unlikely that non-resident RV owners are aware of the facilities.

There is a concern that if a sani-dump is not readily available for the proper discharge of sewage from RVs, then the possibility of illegal discharges to the environment is greater.

A sani-dump facility should be located within the sewer specified area and considered part of the sewage collection and treatment system. The facility should be close to Highway 14 and ideally located close to existing RV activities within the District of Sooke. Siting, constructing and operating a sani-dump facility are opportunistic processes and therefore municipal staff should negotiate these activities during the development proposal process.

Effluent quality is a concern at sani-dump facilities and therefore an online holding tank should be included in the design to allow the sani-dump operator to inspect the effluent prior to discharge to the collection system. This would minimize the possibility of any inappropriate materials or liquids entering the sewage system that could harm the collection system or cause an upset at the treatment plant. Other factors that must be considered in siting and design include fencing, odour control, turning radiuses for RVs, spill containment, clean

up supplies and access to water. Road signage should be provided for the facility. User fees should be established to help offset the operating costs.

District staff should work with the development community to develop interest in the initiative and eventually an agreement to cover the capital costs of the required infrastructure. District staff should consider amending the operating agreement for the sewage collection and treatment system to include the operations and maintenance of the sani-dump. Support for this initiative should be solicited from the business and RV community.

A facility of this kind would provide a business opportunity, as it would draw vacationers to the area. This activity centre would present businesses like the eco-tourism industry with an opportunity to supply services such as food, lodging, fishing supplies, guiding services and rentals (e.g. canoes, kayaks and bicycles).

The District of Sooke should discuss the operation and maintenance of a sani-dump station for RVs with their sewage collection and wastewater treatment service provider. The Vancouver Island Health Authority must be consulted and kept fully informed of all aspects of the project, from concept to design and operation.

Stage 2 & 3 Commitments
The District of Sooke should look for development opportunities to facilitate the construction of a sani-dump station for recreational vehicles.

- lead agency(s): District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: siting and financing these facilities is an opportunistic process. Municipal staff should negotiate the siting, design, construction and operation of these facilities during the development proposal process.
- potential funding sources: funded through agreement during the development approval process
- implementation schedule: underway – dependent on a development opportunity.

Status: ongoing

Stage 1 Recommendation B 6 – *Provide, where appropriate, a facility for the discharge of sewage from holding tanks on boats to the sewage collection system (dockside vacuum system).*

Stage 2 & 3 Discussion

The inappropriate disposal of sewage from boats can present a public health and an environmental concern to the sensitive Sooke Harbour and Basin.

The nearshore marine areas adjacent to Sooke are home to a large number of pleasure and working vessels. Many of these vessels are equipped with sewage holding tanks. There are presently no facilities along the shores of Sooke to discharge sewage from onboard holding tanks. Many boaters will wait until they are outside of the embayed Harbour and Basin before discharging their sewage, however it is likely that others discharge sewage into the poorly flushed Harbour and Basin.

Transport Canada regulates the discharge of sewage from vessels in Canadian waters. Some water bodies have been designating as “no-discharge zones” for sewage. Federal authorities are hesitant to apply this designation to bodies of water where there are no options available to the boating community. If a dockside vacuum system(s) to pump out marine sewage holding tanks could be located along the coastline of the Harbour or Basin, then the federal government may be more likely to consider designating the sensitive and embayed Harbour and Basin as a no discharge zone. This would eliminate a potentially significant source of non point biological pollution from the area and would benefit the health of the shellfish resource.

Dockside vacuum systems should be located at all larger marinas within the sewer specified area. District staff should work with the development community to develop interest in the initiative and eventually an agreement to cover the capital costs of the required infrastructure.

Effluent quality is a concern with dockside vacuum systems and therefore an online holding tank should be included in the design to allow the operator to inspect the effluent prior to discharge to the collection system. This would minimize the possibility of any inappropriate materials or liquids (e.g. oily bilge water) that could cause harm to the collection system or an upset at the sewage treatment plant from entering the system. Other factors that must be considered in siting and design include: odour control, spill containment, clean up supplies and access to water. Marine oriented signs (visible from the water) should indicate the location of the vacuum pump facilities. User fees and a collection system should be established to help offset the operating costs.

A facility of this kind would provide a business opportunity as it would draw boaters to the area in general and to the marina(s) offering the service. This would present business opportunities to the eco-tourism industry for other

services such as food, lodging, fishing supplies, guiding services and rentals (e.g. canoes, kayaks and bicycles). Support for this initiative should be solicited from the business and the boating communities.

The District of Sooke should investigate and promote the development, operation and maintenance of a dockside vacuum system(s) within their sewer specified area. The Vancouver Island Health Authority must be consulted and kept fully informed of all aspects of the project, from concept to design and operation.

Stage 2 & 3 Commitments
The District of Sooke should look for development opportunities to facilitate the construction of a dockside vacuum facility(s) at larger marinas within the sewer specified area.

- lead agency(s): District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: siting and financing these facilities is an opportunistic process. Municipal staff should negotiate the siting, design, construction and operation of these facilities during the development proposal process.
- potential funding sources: funded through agreement during the development approval process
- implementation schedule: dependent on a development opportunity

Status: underway

Stage 1 Recommendation B 7 – *Require erosion and sediment control plans during land alteration.*

Stage 2 & 3 Discussion
The revised *Subdivision and Development Standards Bylaw 404* addresses this Recommendation. Each development must provide an erosion and sediment control plan as well as a spill prevention plan. For more information, see Recommendation A 8.

Stage 2 & 3 Commitments
The District of Sooke should require Erosion and Sediment Control Plans for all land alteration.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: See A 1
- potential funding sources: Municipal budgets
- implementation schedule: 2010

Status: underway

Stage 1 Recommendation B 8a – *Work with the provincial government to ensure that agricultural activities on land within the Agricultural Land Reserve are in compliance with the various provincial acts that regulate their activities.*

Stage 2 & 3 Discussion

There are 188 properties within the District of Sooke that are completely within the Agricultural Land Reserve (ALR). An additional 86 properties within Sooke are partially within the ALR. In total, the District of Sooke has 554 hectares of land within the ALR. The ALR, BC Assessment Authority and the Ministry of Agriculture and Lands were not able to provide information on how many hectares are actively being used for agricultural purposes.

Agricultural land is used primarily for the production of agricultural commodities and livestock for commercial purposes. These land uses are potential sources of water quality contamination, particularly when located near a stream, rainwater drainage system, or other runoff conveyance. Examples of potential impacts include soil erosion (sediment transfer), contaminated runoff from pesticides (chemicals), fertilizers (nutrients), animal wastes (manure) and meat- and dairy-processing activities (oxygen demand).

Guides and Fact Sheets

The Ministry of Agriculture and Lands has developed a large number of guides and fact sheets that address the many environmental management aspects of the agriculture industry. These documents are distributed to the agricultural community and are available at:
http://www.agf.gov.bc.ca/resmgmt/publist/Environment.htm
http://www.agf.gov.bc.ca/resmgmt/publist/Waste_Mgmt.htm
http://www.agf.gov.bc.ca/resmgmt/publist/Water.htm

Environmental Farm Plans

The Ministry Agriculture and Lands promotes the development of Environmental Farm Plans (EFP) between farmers and their commodity groups. EFPs are designed, in part, to encourage farmers and ranchers to be better stewards of the land, ensure the future of the B.C. agricultural industry through the further implementation of beneficial management practices, be a proactive process to help farmers and ranchers identify environmental opportunities and risks on their own land and reduce conflicts between agriculture and environmental interest. Further information on EFPs is located at
http://www.agf.gov.bc.ca/apf/env.html#efp

Laws and Compliance

The following statements regarding laws and compliance relevant to the agricultural community are taken from the Ministry of Agriculture and Lands website at http://www.al.gov.bc.ca/resmgmt/partners/principles.htm

Compliance with Laws and Regulations
The agriculture industry, as is the case with all other sectors of the economy, has had to comply with various laws and regulations for decades; including those dealing with environmental protection. The *Environmental Management Act*, *Water Act*, *Fisheries Act*, and *Pesticide Control Act* are a few of the laws with which farmers and ranchers must comply. When conducting their businesses, agricultural operators are expected to exercise due diligence to ensure that their businesses conform to the requirements of these laws.

Expediting Compliance
Public agencies have a range of options for promoting compliance including; education and awareness, partnerships, assistance, inspections, monitoring, auditing, warnings, orders and prosecutions.

Most jurisdictions have found education and awareness and assistance approaches, when used in combination with regulatory options, to be effective ways of expediting on farm changes that bring operations into compliance. The Manure Storage Program, funded by Investment Agriculture, has demonstrated the success of the assistance approach.

Addressing Concerns or Complaints
Many activities on agricultural land are exempt from municipal bylaws. However, a process has been developed to deal with concerns and complaints originating on farmland. A person with a concern or complaint about farm practices has a choice of engaging an informal or formal process to address their concern. These two processes are described at the following Ministry of Agriculture and Lands website at http://www.al.gov.bc.ca/resmgmt/sf/farmpp/resolve.htm

If an agricultural activity is thought to be causing a downstream problem, District staff should contact the Regional Agrologist in Victoria (250-356-2521), who will respond and investigate. Ministry staff will keep municipal staff informed of the status and outcome of their investigations. Where agricultural activities are believed to be in contravention of provincial or federal Acts, staff from the Ministry of Agriculture and Lands will contact the appropriate provincial or federal ministry as necessary.

If the concern involves a possible contravention of the *Health Act*, then the Vancouver Island Health Authority's Environmental Health Officer should be contacted at 250-475-1858.

Stage 2 & 3 Commitments
The District of Sooke should ensure that District staff know to contact the Ministry of Agriculture and Lands if agricultural activities are thought to be causing a downstream problem.

- lead agency(s): District of Sooke and the Ministry of Agriculture and Lands
- primary contact: Municipal Engineer
- human, financial and other resources required: staff time to write a memo to District staff
- potential funding sources: existing budgets
- implementation schedule: 2010

Status: pending

Stage 1 Recommendation B 8b – *Work with the provincial government to ensure that forestry activities on Crown (public) land are in compliance with the various provincial acts that regulate their activities.*

Stage 2 & 3 Discussion
The environmental threats associated with timber harvesting and associated activities such as road construction are well understood. These threats include damage to stream banks and beds, loss of habitat, soil erosion and downstream sediment transport to watercourses and the marine receiving environment. Logging can also increase the rate and quantity of rainwater runoff while decreasing the rate of groundwater recharge.

The Provincial Ministry of Forests and Range works to minimize these threats by regulating timber harvesting on Crown land under the *Forest and Range Practices Act* (http://www.bclaws.ca/Recon/document/freeside/--%20f%20--/forest%20and%20range%20practices%20act%20%20sbc%202002%20%20c.%2069/00_02069_01.xml) and the *Forest Planning and Practices Regulation* (Statutes and Regulations) (http://www.bclaws.ca/Recon/document/freeside/--%20f%20--/forest%20and%20range%20practices%20act%20%20sbc%202002%20%20c.%2069/05_regulations/12_14_2004.xml)

From the Ministry of Forests and Range website:

> The Forest and Range Practices Act (FRPA) and its regulations govern the activities of forest and range licensees in British Columbia. The statute sets the requirements for planning, road building, logging, reforestation and grazing.

> FRPA maintains high levels of protection for forest values including watersheds and wildlife habitat, and creates efficiencies for both government and industry through streamlined planning processes.
>
> FRPA encourages innovation by skilled resource professionals and holds industry responsible for outcomes. Combined with rigorous compliance and enforcement, the Act and regulations will contribute to high quality forest management and sustainable environmental values for future generations.

FRPA requires that Forest Stewardship Plans (FSPs) (http://www.for.gov.bc.ca/code/training/frpa/FSP_brochure.pdf) be developed to identify areas within which road building, forest harvesting and silviculture activities are proposed. These plans must be consistent with provincial government objectives which address values such as cultural heritage resources, soils, water, fish, wildlife, biodiversity, timber, forage, recreation, resource features and visual quality.

The process to develop a FSP requires the proponent to publish one or more notices in the local newspaper stating when and where the plan can be reviewed and the address where written comments can be submitted. The review period is normally 60 days from the date of the first notice. A forest licensee must consider any written comments that are relevant to the FSP and were submitted during the review period. The licensee must also describe their efforts to gather input and comments on the plan and how they changed the plan based on the comments received.

A representative of the Ministry of Forests and Range has stated that the ministry will provide the District of Sooke with an opportunity to review and provide input to Forest Stewardship Plans being developed within the municipality or within watersheds that Sooke shares with neighbouring jurisdictions. It should be noted that the ministry is not involved with timber-harvesting activities on First Nations reserve land, as these activities are managed by the respective First Nation and the federal government.

If the District of Sooke becomes aware of a problem associated with timber-harvesting activities on Crown land, it should register a complaint with the Compliance and Enforcement division at the Ministry's Cobble Hill office at 250-743-8933. An investigation will be undertaken to determine if activities are in compliance with FSP and action will be taken if they are not. If timber harvesting related problems are observed in freshwater systems or the marine receiving environment then District staff should contact Fisheries and Oceans Canada at 1-800-465-4336.

Stage 2 & 3 Commitments
The District of Sooke should ensure that District staff know to contact the Ministry of Forests and Range if timber harvesting activities on crown land are thought to be causing a downstream problem.

- lead agency(s): District of Sooke and the Ministry of Forests and Range
- primary contact: Municipal Engineer
- human, financial and other resource requirements: Staff time to write a memo to District staff
- potential funding sources: Existing budgets
- implementation schedule: 2010

Status: pending

Stage 1 Recommendation B 9 – *Work with the provincial government to ensure that logging activities on privately managed forest land are in compliance with the* Private Managed Forest Land Act*.*

Stage 2 & 3 Discussion
The environmental threats associated with timber harvesting and related activities on private-managed forest land are the same as those on Crown land discussed above in Recommendation B 8. These threats include damage to stream banks and beds, loss of habitat, soil erosion and downstream sediment transport to watercourses and the marine receiving environment. Logging can also increase the rate and quantity of rainwater runoff while decreasing the rate of groundwater recharge.

The Private Managed Forest Land Council (http://www.pmflc.ca/council.html#who) is an independent agency established under the *Private Managed Forest Land Act* (http://www.pmflc.ca/legislation.html#legis). The council was established to administer the forest practices component of the Managed Forest Program (http://www.pmflc.ca/program.html) which includes the protection of key public environmental values on Private Forest Lands (PFLs). Stated key environmental values are: fish habitat, water quality, critical wildlife habitat, soil conservation and reforestation. The council's objective is to encourage forest management practices on PFLs, taking into account the social, environmental and economic benefits of those practices.

There are five parcels of land within the District of Sooke that are classified as PFLs. Together these parcels cover an area totalling 442 hectares. In addition, there are a number of PFLs within watersheds that the District shares with the Juan de Fuca Electoral Area and Metchosin. However, the Private Managed Forest Land Council tracks parcels by jurisdiction and is therefore not able to

report on the number or size of these parcels. Large scale mapping of PFLs is available on their website.

The Private Managed Forest Land Council is not structured to notify the District of Sooke when applications are made for PFLs' status within municipal boundaries, but the Council will notify Sooke when properties become classified as PFLs or are removed from the program.

Activities on PFLs are required to be in compliance with a number of provincial and federal acts and regulations. These are available on their website. PFLs are exempt from the provincial Riparian Areas Regulation and any municipal bylaws such as tree protection bylaws that restrict forest management activities under the PFLs legislation.

If timber-harvesting activities on PFLs are observed or reported to be causing environmental damage, then staff or individuals should phone the PFLs office in Victoria at (250) 386-5737. The Private Managed Forest Land Council also has an Inquiry/Complaint Management Process form available on its website.

The Council is not structured to inform District staff of timber harvesting plans. However, Council staff suggests that Sooke could request this information be supplied directly from the property owner.

Stage 2 & 3 Commitments
The District of Sooke should ensure that District staff know to contact the Private Managed Forest Land Council offices if timber harvesting activities on private land are thought to be causing a downstream problem.

The lack of existing consultation and management requirements for timber harvesting on private property is considered problematic for the District of Sooke. The consultants recommend that the District of Sooke partner with other municipalities and address this concern through the Union of British Columbia Municipalities.

- lead agency(s): Private Managed Forest Land Council
- primary contact: PMFLC Executive Director 250-386-5737
- human financial and other resources required: staff time to write a memo to District staff
- potential funding source(s): existing budgets
- implementation schedule: 2010

Status: pending

Stage 1 Recommendation B 10 – *Promote appropriate handling and disposal methods for chemical contaminants from businesses and the community.*

Stage 2 & 3 Discussion
In 2009, the CRD Stormwater, Harbours and Watersheds program (SHWP) promoted the appropriate handling and disposal methods for chemical contaminants from businesses and the community. CRD staff will work with businesses and the community to inform and guide them on the environmentally safe disposal of potentially contaminating material when required. This work is part of a program of consistent messaging across the entire region and provides waste generators with disposal options for all types of waste. On-site visits to businesses, workshops, media ads and web pages will be used to promote safe disposal. Subject to annual budget approval, these rainwater source control initiatives will continue into the future. The CRD provides information on the handling and disposal of chemical contaminants through the CRD Recycling Hotline.

Stage 2 & 3 Commitments
The District of Sooke should promote the appropriate handling and disposal of chemical contaminants.

- lead agency: CRD Stormwater, Harbours and Watersheds Program (SHWP)
- primary contact position: SHWP Supervisor
- human, financial and other resources required: within the existing annual program funding agreement between SHWP and Sooke, no additional funds required
- potential funding source(s): Existing budgets
- implementation schedule: 2010

Status: ongoing

Stage 1 Recommendation B 11 – *Ensure appropriate handling and disposal of street materials from sidewalks, roads and catch basins.*

Stage 2 & 3 Discussion
Street materials are the solids and liquids collected from catch basin cleaning, street and parking lot sweeping and cleaning of stormwater facilities, such as storm drains, ditches and detention ponds. The solids and liquids from street materials frequently contain heavy metals, petroleum hydrocarbons and other substances that can contaminate land and pollute surface and groundwater if handled or disposed improperly. Levels of contaminants associated with street materials will vary depending on the land use from which the materials were collected, the frequency of cleaning and the nature of the infrastructure (for example, catch basin vs. ditch vs. bioretention facility).

Exposure to liability exists for municipalities involved in collecting and disposing of street materials so long as such materials contains levels of contaminants that have the potential to harm the environment, contaminate land or cause damage or nuisance to third parties. This risk cannot be entirely avoided, but it can be managed through proper handling, recycling and disposal of street materials.

Under multi-year agreements, the District of Sooke contracts out the handling and disposal of street material to a private sector company. Presently, the contractor disposes of the solids and liquids outside of the District of Sooke.

The District of Sooke will prepare a new five year contract for road maintenance in 2009 and the new contract is expected to be in effect late in 2009. It is important that this contract be carefully drafted and that the District of Sooke chooses a contractor who will comply with regulatory requirements.

The new contract should be enhanced to address the following street materials issues:

- transfer the ownership of the responsibility for the waste to the contractor
- require the contractor to be aware of and comply with environmental regulations, such as the *Environmental Management Act* (British Columbia) and the *Fisheries Act* (Canada)
- record keeping (activities log)

The new contract should also set out municipal requirements for retrofitting standard ditches into bioretention facilities where appropriate. Engineering specifications for the design of bioretention facilities are being prepared as part of the Stage 2 & 3 LWMP (Rainwater) and should be referenced in the contract. Bioretention facilities will provide additional detention and biological treatment for surface flows.

The new contract should also take a rationalized, needs based approach to scheduling and maintenance activities. Best management practices, including temporal and spatial considerations, should be incorporated into the contract for activities such as roadside ditch or swale maintenance and salt, brine and winter aggregate application. This will help to ensure that the handling, recycling and disposal of street materials are carried out in an efficient, cost-effective and environmentally responsible manner.

The following links have been provided to assist District staff during contract development:

Center for Watershed Protection, Manual 9, Municipal Pollution Prevention/Good Housekeeping Practices
http://www.cwp.org/Resource_Library/Center_Docs/municipal/USRM9.pdf

US Environmental Protection Agency – Storm Drain System Cleaning
http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=102

Stage 2 & 3 Commitments
The District of Sooke will update the road maintenance contract.

- lead agency: District of Sooke in consultation with Contractor
- primary contact: Municipal Engineer
- human, financial and other resources required: determined by contract requirements
- potential funding sources: Existing budgets
- implementation schedule: Starting 2010 with award of new contract

Status: complete

Stage 1 Recommendation B 12 – *Support educational outreach initiatives to businesses and the community for the protection of rainwater quality.*

Stage 2 & 3 Discussion
In 2009, the CRD Stormwater, Harbours and Watersheds Program (SHWP) conducted business and residential education activities to promote the protection of rainwater flows. This work is part of the existing SHWP program in Sooke. SHWP staff will tailor their educational efforts in Sooke, in consultation with District staff, to ensure messaging is effective for environmental protection. Rainwater education will be undertaken using print ads, newsletters, web pages and attendance at public events. Subject to annual budget approval, these rainwater source control initiatives will continue into the future.

Stage 2 & 3 Commitments
The District of Sooke will continue with the Stormwater, Harbours and Watersheds Program.

- lead agency: CRD Stormwater, Harbours and Watersheds Program (SHWP)
- primary contact position: SHWP Supervisor
- human, financial and other resources required: within the existing annual program funding agreement between SHWP and Sooke, no additional funds required
- potential funding source(s): Existing budgets
- implementation schedule: Underway

Status: ongoing

Stage 1 Recommendation B 13 – *Continue with the CRD's annual monitoring of rainwater flows to identify and eliminate threats posed by contaminated rainwater flows to public health and the environment.*

Stage 2 & 3 Discussion

The Capital Regional District Stormwater Harbours and Watersheds Program (SHWP) has prepared annual reports on rainwater quality and related issues for the District of Sooke since its incorporation in 1999. The program works in consultation with municipal staff to limit the impact of contaminated rainwater runoff on the environment and public health and to protect freshwater and marine ecosystems. The annual activities discussed in the reports have evolved to meet the needs of the community.

The most recent report covers the 2007 activities. In 2007, SHWP staff were involved in the following five activities:

- Rainwater Discharge Surveys: Surveys were carried out along the coastline of the District of Sooke to investigate the level of public health concern posed by fecal coliform levels in rainwater flows. The level of environmental concern was assessed by analyzing chemical contaminant levels in sediments associated with select rainwater discharges.
- Upstream Investigations: When high levels of contamination were found, upstream investigations were undertaken to identify and eliminate the source(s) of contamination in rainwater flows.
- Marine Surface Water Monitoring: Marine surface water sampling continued in Sooke Harbour, Basin and Inlet to provide an indication of fecal coliform levels and to monitor for change over time.
- Monitoring Significant Watercourses: Water quality monitoring was undertaken on 14 significant watercourses that flow from the District of Sooke into the marine environment.
- Special Projects: The following special projects have linkages to rainwater quality and were therefore promoted within the District to protect and enhance rainwater quality:
    - The Natural Areas Atlas is a comprehensive web-based informational tool of natural areas for anyone interested or involved in land use planning and/or stewardship.
    - A model Rainwater Protection Bylaw and related codes of practice have been developed. The codes set out the requirements under which various business sectors will be required to operate to prevent the pollution of rainwater.
    - Other special projects include ongoing technical assistance to municipal staff and access to federal and provincial initiatives.

An evaluation of the District of Sooke - Stormwater, Harbours & Watershed Program is attached as **Appendix 3.**

The SHWP provides valuable services to the District of Sooke and the annual contract and reporting protocols should be continued. The SHWP is also active in the Juan de Fuca Electoral Area, which creates cost saving efficiencies that benefit both jurisdictions and allows for a watershed based approach to public health and environmental protection. The District of Sooke should continue to collaborate with the provincial Ministry of Environment and Environment Canada to integrate objectives and make efficient use of available resources.

Stage 2 & 3 Commitments
The District of Sooke will continue with the Stormwater Harbours and Watersheds Program (SHWP).

- lead agencies: District of Sooke in consultation with SHWP.
- support agencies: Vancouver Island Health Authority, neighbouring jurisdictions.
- primary contact position: Supervisor, SHWP
- human, financial and other resources required: the District of Sooke has a $37,400 (2009) annual contract with the SHWP to carry out program activities.
- potential funding sources: District of Sooke
- implementation schedule: underway

Status: ongoing

Section C – Watershed Approach to Rainwater Management

Background

There are 18 significant watercourses (19 watersheds, two for the Sooke River) that flow through the District of Sooke into Sooke Harbour, Basin, Inlet or Bay. Four of these watercourses and their watersheds (Ella Stream, Baker Creek, Throup Stream and Gillespie Creek) are completely within the District. The watersheds associated with Nott Brook, Wright Road Creek, Lannon Creek and Alderbrook Stream are shared with the T'Sou-ke First Nation. The other 10 watercourses and their watersheds cross municipal, electoral or First Nations jurisdictional boundaries.

The LWMP (Rainwater) does not specifically address potable water concerns within the District of Sooke. However, all or most of the plan activities implemented to protect and enhance aquatic ecosystems will also work toward protecting potable water sources.

Stage 1 Recommendation C 1 – *Work toward the development of watershed management plans. Initial discussions should be held with staff from the CRD Stormwater, Harbours and Watersheds program as they have direct experience with watershed level planning.*

Stage 2 & 3 Discussion
Sooke has a combination of watershed types: small urban, small and medium rural and large wild land watersheds. Appropriate planning (e.g. official community plans, bylaws, and development standards) must be in place to prevent degradation in currently healthy watersheds. More intensive planning is required for watersheds with existing problems (flooding, poor water quality, erosion, habitat loss).

A map of Sooke's watersheds, produced by the CRD, can be viewed at:
http://www.sooke.ca/assets/Local~Government/Engineering/CRD_Watershed.pdf

Table 1 summarizes the 18 watersheds and their drainage areas, involved jurisdictions and discharge locations.

Table 1: Watersheds in the District of Sooke

Watershed Name	Drainage Area (ha)	Jurisdiction involved	Discharge Location
Sooke River (Upper)	27,115	Sooke/Juan de Fuca	Sooke River
De Mamiel Creek	3,985	Sooke/Juan de Fuca	Sooke River
Veitch Creek	2,621	Sooke/Metchosin/Juan de Fuca	Sooke Basin
Charters River	1,977	Sooke/Juan de Fuca	Sooke River
Ayum Creek	1,423	Sooke/Metchosin/Juan de Fuca	Sooke Basin
Wildwood Creek	904	Sooke/Metchosin/Juan de Fuca	Sooke Basin
Sooke River (Lower)	777	Sooke/Juan de Fuca	Sooke Harbour
Kemp Stream	601	Sooke/Juan de Fuca	Sooke Bay
Nott Brook	342	Sooke/T'Sou-ke First Nation	Sooke Bay
Lannon Creek	288	Sooke/T'Sou-ke First Nation	Sooke Basin
Baker Creek	146	Sooke	Sooke River
Ella Stream	119	Sooke	Sooke Bay
Alderbrook Stream	105	Sooke/T'Sou-ke First Nation	Sooke Harbour
Throup Stream	98	Sooke	Sooke Harbour
Gillespie Creek	91	Sooke	Sooke Basin
Broom Hill Stream	48	Sooke/Juan de Fuca	Sooke Bay
Grouse Brook	31	Sooke/Juan de Fuca	Sooke Inlet
Wright Road Creek	27	Sooke/T'Sou-ke First Nation	Sooke Harbour
Un-named (Silver Spray)	11	Sooke/Juan de Fuca	Sooke Inlet

Note: The Sooke River system has been divided into two watersheds (upper and lower).

The LWMP (Rainwater) provides guidance to the District of Sooke to implement actions to improve the protection of aquatic ecosystems. This plan and other District plans and policies provide the direction and support for Sooke to pursue applied, watershed specific planning.

Watershed management planning was discussed with District of Sooke and CRD staff and concerns were identified. Of specific concern are the resources (financial, staff and community) required to assess and complete planning processes for each watershed. This is considered a significant barrier to

watershed management planning. It has been determined that Rainwater Management Plans (RMPs) are a more appropriate process for the District of Sooke to develop watershed specific approaches for the protection of aquatic ecosystems.

Rainwater Management Plans provide a framework for the development of on the ground solutions for the management of rainwater at the watershed scale. RMPs integrate planning for drainage infrastructure and ecological assessment and restoration with municipal planning processes (e.g. official community plans, local area plans, recreation and parks plans). This integrated approach provides solutions to drainage and ecological concerns. RMPs are comprised of the following primary components:

- technical assessments including modeling and stream flow monitoring
- watershed assessments to identify ecological and drainage problems
- a planning component to identify rainwater management goals and solutions to meet the goals
- an implementation plan that includes a prioritized list of drainage and ecological enhancement projects, administration, funding, performance monitoring and opportunities to integrate with other planning processes

The CRD's Inter-municipal Working Group on Integrated Watershed Management involves the District of Sooke and others working together to protect and restore watershed health. Limited municipal resources are resulting in the promotion and use of existing planning processes such as official community plans, and local area plans to protect aquatic ecosystems. Zoning bylaws along with updated subdivision and development standards bylaws and rainwater protection bylaws have also been identified as valuable tools. This approach is expected to be effective to protect aquatic ecosystems in watersheds that are currently in good health.

Watersheds that have been degraded by development require detailed investigations and watershed specific solutions to restore the health of these ecosystems. The tasks required to collect baseline information and assess watershed health is provided in C5.

Watershed Prioritization
During the development of the LWMP (Rainwater), Stage 2 & 3, each watershed in the District of Sooke was reviewed and prioritized for the need for Rainwater Management Planning. The review was completed by integrating knowledge from the planning, ecology and engineering disciplines. The 18 watercourses (19 watersheds, two for the Sooke River), were examined and ranked high, moderate or low priority for Rainwater Management Planning.

Appendix 4 contains a review of Sooke's watersheds. Each watershed in the District of Sooke was examined with regard to size, existing development, land use, development pressure and fish status. All watershed names are based on CRD mapping.

The consultants met with District of Sooke staff in June 2008 to analyze the results from a report prepared by SHIP Environmental Consultants Ltd. (1999), the Stage 1 preliminary review and to examine each watershed in greater detail. The analysis investigated the following parameters:

- presence or potential presence of fish
- existing development – based on visual aerial photograph analysis and staff knowledge
- development pressure - based on zoning, proposed OCP changes and staff knowledge
- watershed size
- sewer specified area status

The results of the watershed prioritization for rainwater management planning are summarized in Table 2.

Table 2 – Watershed Prioritization for Rainwater Management Planning

Watershed	Fish (Present or Potential)	Existing Development	Development Pressure	Watershed Size	Inside Sewer Specified Area	Priority for planning
Nott Brook	Y	High	High	Medium	Y	High
Throup Creek	Y	High	High	Small	Y	High*
Wright Road	Y	High	High	Small	Y	High
Ella Stream	Y	Moderate	High	Medium	Y	High*
Gillespie Creek	Y	Low	High	Small	N	High*
De Mamiel Creek	Y	Moderate	High	Large	partial	High
Sooke River Lower	Y	Moderate	Moderate	Large	partial	Moderate
Lannon Creek	Y	Moderate	Moderate	Medium	N	Moderate
Broom Hill Stream	Y	Low	Moderate	Small	N	Moderate
Alderbrook	Y	Moderate	Moderate	Small	N	Moderate
Unnamed (Silver Spray)	Y	Low	Moderate	Small	N	Moderate
Grouse Brook	Y	Low	Moderate	Small	N	Moderate
Veitch Creek	Y	Low	Low	Large	N	Low
Ayum Creek	Y	Low	Low	Large	N	Low
Charters River	Y	Low	Low	Large	N	Low
Sooke River Upper	Y	Low	Low	Large	N	Low
Wildwood Creek	Y	Low	Low	Large	N	Low
Kemp Stream	Y	Low	Low	Medium	N	Low
Baker Creek	Y	Moderate	Low	Medium	N	Low*

* Watersheds completely within the District of Sooke

All of the watersheds were considered to have fish or have the potential to have fish and were therefore ranked equally (high) for environmental sensitivity. As a result, the prioritization was based primarily on existing development and potential for development (development pressure and sewer specified area), as well as watershed size.

The analysis resulted in six watersheds being prioritized as high, six as moderate and seven as low priority for Rainwater Management Planning.

As a result of the watershed prioritization, the District of Sooke has hired a consulting team to complete Rainwater Management Plans for Nott Brook, Wright Road Creek, Throup Creek, Ella Stream and the adjacent foreshore areas. The rainwater management plans for these four watersheds will be completed in 2010. Some additional funding is required to complete the collection of all information suggested in Recommendation C5. The required information includes water quality data and watershed health tracking system analysis.

Gillespie Creek, another high priority watershed, was not included in the present rainwater management planning process. It is anticipated that the development community will cover the costs of a RMP for this watershed as part of a large proposed development.

De Mamiel Creek will likely be the next and last high priority watershed examined in a District of Sooke RMP scheduled for 2011.

Beginning in 2012 the District of Sooke plans to commence RMPs for watersheds rated moderate. There are no plans at present to conduct RMPs for watersheds rated low.

The District of Sooke is committed to protecting and maintaining its high quality watersheds and facilitating the restoration of degraded watersheds. Sooke has a large number of watersheds and limited financial resources. Therefore, strategic use of these resources is critical to protect the health of its aquatic ecosystems.

The District of Sooke can enhance its rainwater management activities by:

- developing Rainwater Management Plans for all high and medium priority watersheds in the District of Sooke
- developing planning documents, policies and rainwater protection bylaws to protect aquatic habitats and prevent degradation of watersheds
- collecting baseline information and assessing watershed health
- continuing to participate in the CRD’s Integrated Watershed Management Planning Working Group

Stage 2 & 3 Commitments
The District of Sooke should use the prioritized information in Table 2 to determine the order in which watersheds should receive Rainwater Management Planning attention.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: $70,000 per year for 7 years starting in 2011, to complete Rainwater Management Plans for all moderate priority watersheds. An additional $40,000 will be required in 2011 to collect the remaining watershed assessment information for the four Rainwater Management Plans currently being conducted.
- potential funding sources: Ministry of Community Development Infrastructure Planning Grants; see Recommendation K 5 for a detailed list of potential funding sources
- implementation schedule: 2011

Status: underway

Stage 1 Recommendation C 2 – *Consider a high level of rainwater management planning for the following watersheds where existing and proposed development is extensive: Veitch Creek, De Mamiel Creek, Baker Creek, Lannon Creek, Alderbrook Stream, Ella Stream, Nott Brook, Wright Road Creek, Throup Creek, Ayum Creek, Kemp Stream, and Broom Hill Stream.*

Stage 2 & 3 Discussion
This Recommendation is addressed under C 1.

Stage 1 Recommendation C 3 – *Hold discussions with representatives from the Juan de Fuca electoral area, Metchosin and the T'Sou-ke Nation to explore planning processes for watersheds of interest to these jurisdictions.*

Stage 2 & 3 Discussion
The District of Sooke shares 14 of its 18 watersheds with other jurisdictions including the Juan de Fuca Electoral Area, the District of Metchosin, T'Sou-ke First Nation and CRD Water Services. Partnering with other jurisdictions for watershed planning is critical to ensure the long term health of Sooke's watercourses and watersheds. Therefore, discussions were held with staff at each jurisdiction to determine the status of watershed planning and potential partnerships.

Planning staff at both the Juan de Fuca Electoral Area and District of Metchosin stated that no watershed planning processes are presently underway in their

jurisdictions. However, both jurisdictions are participating in the CRD's Integrated Watershed Planning – Inter-municipal Working Group and are able to connect with Sooke staff in that context. Staff from Juan de Fuca and Metchosin expressed interest in partnering with Sooke for rainwater management and watershed planning but expressed concern over limited staff and funding resources. Both jurisdictions were receptive to the District of Sooke requesting to be notified of development proposals in shared watersheds.

T'Sou-ke First Nation fisheries staff were consulted and also expressed interest in participating in Sooke's rainwater management and watershed planning processes however limited staffing and funding are issues. No watershed planning processes are underway on T'Sou-ke First Nation lands.

CRD Water Services is in the process of developing a Watershed Management Plan for water supply lands. They have completed a watershed assessment (*Sooke River Watershed Inventory and Risk Assessment* (Golder Associates (06-1414-112), August 2007 for CRD Water Services (File #1049)). The objectives of the report was "to inventory current land use practices, identify potential impacts and risk to water quality and quantity, and fisheries values in a portion of the Sooke River watershed and recommend Best Management Practices for various land uses within the Study Area. The Study Area includes lands within the watershed, but does not include lands which are managed for water supply."

The report includes the Upper Sooke River, DeMamiel Creek and Charters River, which are all shared with the District of Sooke. The watershed assessment examined roads, forestry land use, riparian zones, landslides, non-forestry land uses (including park/recreation, agriculture) and wells.

CRD Water Services is currently having another assessment completed (*Leech River Watershed Assessment of Risks and Implications for Management*), which will focus on identifying hazards and completing a risk assessment related to water quality. Following completion of the assessment, the CRD will be developing a Watershed Management Plan for the water supply lands.

The District of Sooke should send letters to both Juan de Fuca Electoral Area and the District of Metchosin requesting they be notified of any proposed development activities within shared watersheds. Additionally, a letter should be sent to the CRD Water Services Department requesting to be included in stakeholder consultation for the Sooke River Watershed Plan and included for information on meeting minutes and other distributed information.

Stage 2 & 3 Commitments
The District of Sooke should engage with adjacent jurisdictions regarding existing and future watershed management planning processes for shared watersheds.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: Staff time to engage with neighbouring jurisdictions
- potential funding sources: District of Sooke
- implementation schedule: 2010

Status: pending

Stage 1 Recommendation C 4 – *Follow the development of the Sooke River Watershed Management Plan by the CRD Water Department, as this process could assist with future watershed management planning in Sooke.*

Stage 2 & 3 Discussion
This Recommendation is addressed under C 3.

Stage 1 Recommendation C 5 – *Undertake a more detailed assessment of each watershed in the District with input from the community, planners, biologists and engineers to identify at risk watersheds and drainage catchments. These areas can then be prioritized for greater attention to rainwater management.*

Stage 2 & 3 Discussion
The scope and budget for the LWMP (Rainwater) Stage 2 & 3 does not have sufficient resources to complete watershed assessments. The deliverable for this recommendation is to provide an outline of the detailed information required for a watershed inventory and assessment. The information described below will be collected through activities committed to in Recommendation C1 through the completion of Rainwater Management Plans or through activities undertaken with the Ministry of Environment, Capital Regional District or community stewardship groups. Sooke's watersheds should receive this attention on a priority basis. The priority is determined by development pressure and other factors (see Table 2 in Recommendation C 1) and is contingent on funding.

A watershed inventory and assessment has four components:

- ecology
- drainage and watercourse systems
- land use
- hydrogeology

These components form the basis for rainwater management planning and provide a baseline for future monitoring to determine the success of the implementation of rainwater management techniques over time.

Ecology

- Complete a biophysical inventory of ecological resources.
  - Identify dominant aquatic and terrestrial species, abundance and distribution.
  - Assess in stream, riparian and terrestrial habitat features.
  - Identify the resources that require protection.
  - Identify opportunities and constraints to riparian reforestation, creek daylighting and in stream enhancements such as complexing with pools/riffles, side channels, addition of large woody debris.
- Benthic invertebrate sampling is a primary watershed health indicator to assess the biological condition of a watercourse. Review benthic invertebrate data collected by the Ministry of the Environment, CRD and any other available sources. Collect additional data if existing data is insufficient. Two methods of assessing benthic invertebrates are commonly used. The Puget Sound Lowlands version of the Benthic Index of Biological Integrity (B-IBI) protocol has been developed for the region surrounding Puget Sound and is widely used in Metro Vancouver and Washington State (*GVRD Benthic Macro invertebrate B-IBI Guide.* Prepared for the Greater Vancouver Regional District, Burnaby, BC by EVS Environment Consultants, 2003, North Vancouver BC). The BC Ministry of Environment (MOE) and Environment Canada have implemented the Reference Condition Approach (RCA) model rather than B-IBI (MOE 2009). MOE has completed benthic invertebrate sampling for DeMamiel, Ayum and Charters Creeks. MOE expects to have RCA models completed for all regions of BC, including Southern Vancouver Island by March 2010 (Currently the CRD is included in the Fraser/Georgia Basin Model, but this model is being reconfigured and is also expected to be ready by March 2010.) (J. Deniseger [Section Head – Vancouver Island Region, Water Stewardship Division, BC Ministry of Environment] and L. Gaber [Provincial Bio-Monitoring Science Specialist, Water Stewardship Division, BC Ministry of Environment], pers. comm. September 18, 2009). Data collected from the RCA method can be entered into the Canadian Aquatic Bio-monitoring Network (CABIN) to generate results. Different biota collection methods are used for each of the RCA and B-IBI protocols and are not interchangeable for data analysis. At the time of the contracting for the assessments, the District of Sooke should contact the CRD Stormwater, Harbours and Watersheds Program and Ministry of Environment Environmental Quality Section to determine the most appropriate method to use to compliment other data collected in the region.

    - Identify benthic sampling locations at jurisdictional boundaries or near to existing sediment sampling locations, as conditions permit.
    - Obtain, identify and assign scores to samples as per either the B-IBI or RCA method.
    - Define how often this should be repeated to monitor health.
- Determine riparian forest integrity (RFI) and total impervious areas (TIA) under existing and future development conditions. RFI calculations should be consistent with the GVRD's Proposed Watershed Classification System for Stormwater Management in the GVS&DD Area, 1999. Determine opportunities to increase RFI in existing areas where streamside setback is less than 30 metres.
- Complete a Proper Functioning Condition Assessment of watercourses using the method described in *Riparian Area Management: A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas,* Prichard, D. (1998), U.S. Department of the Interior/Bureau of Land Management (TR 1737-15). Provide an assessment of the health of the system and provide recommendations for restoration.
- Use existing water quality data if available (e.g. CRD and MoE water quality and sediment sampling data) or collect water quality data and compare with BC Ministry of Environment Water Quality Objectives when available (http//www.can.gov.bc.ca/wat/wq/wq_objectives.html) as an indicator of watershed health. Until the water quality objectives for Sooke are released use the BC Water Quality Guidelines (http://www.env.gov.bc.ca/wat/wq/BCguidelines/approv_wq_guide/approved.html). The Ministry of Environment provides methods of water quality sampling in their Procedure Guides and Sampling Methods (http://www.env.gov.bc.ca/wat/wq/wq_procedure.html)
- Establish a system to evaluate watershed health over time. Quantify watershed ecological health for existing and future conditions using the Watershed Health Tracking System (WHTS) as per the Template for Integrated Stormwater Management Planning 2005, GVRD. Use it to show the potential impact of unmitigated and mitigated future development and the benefits of mitigation retrofit measures on existing areas. Calibrate with the benthic invertebrate analysis. Quantify the ecological impacts of changing land use, riparian corridors and proposed mitigative measures.
- Using the results of the assessments, prioritize ecological restoration and enhancement works for each watershed, such as in stream complexing, daylighting, and riparian reforestation areas.

The District of Sooke should pursue the following strategies to collect ecological and geophysical information:

- Use the methods described in this Recommendation as components of Rainwater Management Planning contracts (currently being completed for Nott Brook, Ella Stream, Throup Creek and Wright Road Creek); and,

- Following Recommendation K 8, work with existing groups (e.g. T'Sou-ke First Nation, Sooke Salmon Enhancement Society) to establish Streamkeeper and Shorekeeper teams.

Drainage and Watercourses

- Continue to work with the CRD and MoE and other agencies to collect water quality data (water, sediment and benthic invertebrate) to integrate objectives and make efficient use of available resources.
- Compile existing mapping and expand to provide complete mapping, including watershed and sub-basin boundaries, land use, topography, hydrology, soils, surficial geology, storm drain infrastructure, etc. information as necessary (ensure the data is ArcView GIS compatible for future use).
- Inventory significant features of the watershed including culverts, headwalls, storm drains and typical channel cross section survey information as required to prepare a hydrologic/hydraulic model.
- Identify known flooding and erosion problems or issues through discussions with municipal engineering and operations staff, property owners, etc.
- Inventory existing erosion sites and evaluate general conditions of the watercourse based on information provided and site inspection. Pipe inspection videos or other condition testing may be required.

Land Use

- Review zoning and other land use information and determine existing land use patterns within the watershed for use in watershed modeling for rainwater management planning.
- Review the CRD's Regional Growth Strategy, municipal Official Community Plans (OCP), neighbourhood plans, studies and other land use documentation to see how these plans and processes may impact watershed health.

Hydrogeology

- Review soil types and identify opportunities for infiltration. Identify areas where infiltration should be avoided or minimized (i.e. unstable slopes etc.).
- Obtain and review rainfall data for use in watershed modeling
- Quantify creek base flows and develop hydrograph to be used as the basis for watershed modeling.
- Calculate catchment runoff parameters for the existing and future land use patterns within the watershed to be used as scenarios for watershed modeling.
- Determine saturated infiltration rates for modeling purposes and for sizing potential infiltration related facilities. Identify areas for potential infiltration

enhancement, base flow augmentation, source control measures and BMPs.

The District of Sooke should collect the information described in this section to provide an understanding of watershed health and to monitor the effectiveness of rainwater management techniques over time. This information will be collected through activities committed to in Recommendation C1 (e.g. Rainwater Management Plans), in collaboration with the Capital Regional District, the Ministry of Environment, and community stewardship groups (e.g. Streamkeepers).

Stage 2 & 3 Commitments
The District of Sooke should continue collecting watershed level inventory and assessment information using the prioritized list of watersheds identified in C1.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: complete as part of C1
- potential funding sources: See Recommendation K 5 for a detailed list of potential funding sources
- implementation schedule: ongoing as part of C1

Status: ongoing

Stage 1 Recommendation C 6 – *Begin the process of collecting baseline ecological and geophysical information on a watershed by watershed basis.*

Stage 2 & 3 Discussion
The scope and budget for the LWMP (Rainwater) Stage 2 & 3 does not allow for ecological and geophysical data collection as part of the LWMP process. The deliverable for this recommendation is to provide an inventory of existing ecological information and provide a summary of information gaps and recommendations for filling the gaps. Additional recommendations are provided on how to incorporate the information into the rainwater and watershed management planning processes.

Appendix 5 provides a list of the existing ecological and geophysical information for Sooke's watersheds collected by the District of Sooke and additional documents found during Stage 2 & 3.

Information Gaps
Extensive marine water quality information has been collected and some geophysical and ecological data collection has been completed. Watershed based ecological and geophysical information is incomplete. There are five

recommended strategies for collecting baseline information for Sooke's watersheds:

- Continue to partner with the CRD and BC Ministry of the Environment for water quality and benthic invertebrate monitoring
- District should add to their library environmental reports associated with development projects (e.g. Riparian Areas Regulation Assessment reports)
- Implement a process to search for site specific information during development proposals
- Use the inventory and assessment methods being used to develop Rainwater Management Plans for Nott Brook, Ella Stream, Throup Creek and Wright Road Creek
- Following Recommendation K 8, work with existing groups (e.g. T'Sou-ke First Nation, Sooke Salmon Enhancement Society) to establish Streamkeeper and Shorekeeper teams

Rainwater Management and Watershed Management Planning
Incorporation of ecological and geophysical information is critical for rainwater management and watershed planning that will be tailored to Sooke's ecosystems. When tendering contracts for the development of these plans, consulting teams should be provided with these documents and be required to demonstrate an understanding of the contents.

Stage 2 & 3 Commitments
The District of Sooke should create and update an archive of ecological and geophysical information for its watersheds.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: Included in C 1 and K 8
- potential funding sources: N/A
- implementation schedule: 2010

Status: ongoing

Section D – Groundwater Recharge

Background

Groundwater plays an important role in the hydrologic cycle and in sustaining stream flow during periods of low surface runoff. Groundwater reservoirs recharge during the fall and winter when precipitation is greatest, vegetation is dormant and evapo-transpiration is at a minimum. Groundwater reservoirs often provide flow to lakes, streams and rivers. During drier months, groundwater is often the only source of water for smaller streams and is referred to as base flow. During dry periods, base flow is essential for maintaining fish and other aquatic populations as well as water supplies for communities and agriculture. The environmental significance of groundwater mandates that it not be ignored and that it be conserved and protected.

The availability of water in Sooke is largely dependent on the preservation of stable watersheds. Groundwater recharge is enhanced by the absorption and storage of precipitation by soils and vegetation. Lack of such cover through deforestation and development increases soil erosion and reduces the potential for groundwater recharge. Urbanization also reduces ground infiltration due to the creation of impervious areas and the compaction of soils. Roads, parking areas and buildings reduce infiltration and surface runoff becomes the primary pathway for rainwater. Conventional road design includes drains that collect and concentrate surface water. Surface areas are re-graded and depressions are filled, eliminating surface water storage.

Urbanization can have a significant impact on groundwater recharge. To avoid negative impacts on groundwater recharge in Sooke's watersheds, large or significant recharge areas should be protected and the retention of permeable ground should be a priority in land use planning.

Stage 1 Recommendation D 1 – *Identify areas with high ground water recharge capacity and ensure that land use planning requirements will maximize the retention of permeable ground and protect large or significant recharge areas.*

Stage 2 & 3 Discussion

As part of the Liquid Waste Management Plan Stage 2 (Sanitary) Associated Engineering Services prepared a map which indicates those areas of Sooke which have soil conditions suitable for the on-site treatment of sewage. The map can be viewed at:
http://sooke.ca/assets/Local~Government/Engineering/Sooke_Soils_42x60.pdf
Areas suitable for on-site sewage treatment systems are also areas where high levels of infiltration can be expected. Therefore the map provides information on those areas within the District of Sooke that have a higher capacity for groundwater recharge.

The District should use this information to protect these important recharge areas from activities that would reduce their infiltration capacities.

Stage 2 & 3 Commitments
The District of Sooke should use the information provided on the Associated Engineering map to promote recharge and protect areas with high infiltration capacity.

- lead agency: District of Sooke
- primary contacts: Director of Planning and the Municipal Engineer
- human, financial and other resources required: amendments to the OCP and Zoning Bylaw have been completed in draft during the development of the LWMP (Rainwater), Stage 2 & 3
- potential funding sources: N/A
- implementation schedule: 2010

Status: pending

Stage 1 Recommendation D 2 – *Require development practices that will mimic the natural hydrology of the site, including on-site infiltration and detention.*

Stage 2 & 3 Discussion
Low impact development requires developers to employ a combination of several techniques to provide compensation for rainwater falling onto new impermeable surfaces. Some of these innovative methods include green roofs, roof water detention, cisterns at rain downspouts, surface water storage, bioswales, rain gardens, sub surface detention, ground water recharge and evaporation beds. The newly developed Engineering Specifications Schedule H (draft) require the use of these and other techniques to ensure rainwater runoff from development sites is reduced to mimic the natural state. If developers cannot achieve this reduced runoff rate, they will be required to provide off-site detention. The draft rainwater management sections of Schedule H can be viewed at: http://sooke.ca/EN/main/government/devservices/eng/documents/ScheduleH-Bylaw404DRAFTSept1409.pdf

Stage 2 & 3 Commitments
The District of Sooke should ensure that the natural hydrology is maintained or mimicked.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: See A 1
- potential funding sources: Municipal budgets
- implementation schedule: 2010

Status: pending

Section E – Management Options for Properties Serviced by On-site Sewage Treatment Systems

Background

The more heavily developed parts of the District of Sooke have now been serviced by the core area sewage collection system. However, there are large less developed areas of the District that continue to be serviced with on-site sewage treatment systems. The potential for contamination of streams, groundwater and land is high where disposal fields are not well designed or maintained, where soils are marginal or where there is a high groundwater table. Failing on-site systems have been clearly identified by the Capital Regional District and the Vancouver Island Health Authority (VIHA) as a threat to public health and a major source of contamination to rainwater runoff and the near shore ocean environment.

The VIHA Environmental Health Officers work to ensure that the on-site disposal of sewage does not threaten public health. If on-site systems are managed to protect human health, then impacts to rainwater (environmental concerns) will likely be addressed as well.

In 2005, the provincial government enacted the new Sewerage System Regulation under the *Health Act*. VIHA staff no longer review on-site system plans and specifications, conduct site investigations, or carry out final inspections of the installed sewerage system. The new regulation requires that only "authorized persons" are allowed to file information regarding on-site treatment systems with VIHA. VIHA continues to investigate complaints of failing on-site systems and provide health hazard abatement enforcement when necessary.

Stage 1 Recommendation E 1 – *Management for on-site systems: consider for adoption the LWMP, (Sanitary) Stage 2 Conclusions prepared by Associated Engineering in their final report (November 2005).*

Stage 2 & 3 Discussion

Associated Engineering Services prepared a map titled *Suitability of Soils for On-Site Septic Systems*. The map can be viewed at:
http://sooke.ca/assets/Local~Government/Engineering/Sooke_Soils_42x60.pdf
The map identifies the general location of different types of soils within Sooke and rates their effectiveness for on-site sewage disposal systems. This map can provide useful information to identify the general areas, outside of the sewer specified area, where on-site systems may or may not be appropriate. Due to the large scale of the map site specific investigations will be required.

The Stage 2 LWMP (Sanitary) conclusions report on the location, design and approval processes for on-site sewage treatment and disposal systems. The District of Sooke should adopt these conclusions which provide specific guidelines for the approval of on-site treatment plant design, lot size requirements, additional septic disposal field requirements and procedures for approval of subdivisions which are not connected to the municipal sewage system.

Stage 2 & 3 Commitments
The District of Sooke should adopt the Associated Engineering Stage 2 Conclusions for the management of on-site systems and ensure that municipal documents address provincial requirements for on-site systems.

- lead agency: District of Sooke with assistance from the Ministry of Environment and VIHA
- primary contact: Municipal Engineer
- human, financial and other resources required: Staff time to ensure adoption of the Associated Engineering report and municipal concurrence with provincial regulations
- potential funding sources: existing budgets
- implementation schedule: 2010

Status: pending

Stage 1 Recommendation E 2 – *Management for on-site systems: determine a method to evaluate minimum lot sizes for lots requiring larger rainwater management facilities.*

Stage 2 & 3 Discussion
The District of Sooke Engineering Specifications have been updated to include notification that land developed outside the sewer service area is subject to provincial Ministry of Environment regulations. The Municipality does not administer on-site sewage treatment systems. The Ministry of Environment and VIHA have established guidelines for site sizes for on-site sewage disposal. The minimum size for lots not served by community sanitary sewer is one hectare or larger, depending on site conditions. In rocky or impermeable areas, the minimum lot sizes will be determined by the municipal subdivision requirements and will require sufficient area for a secondary disposal field that is equivalent in porosity and size to the main disposal field. This may, in some cases, require the lot size to exceed the minimum of one hectare. On sites where the daily liquid discharge is less than 22,700 litres (5,000 gallons), regulations for on-site disposal fall under the Vancouver Island Health Authority (VIHA). For discharge rates exceeding this amount, the Ministry of Environment, Municipal Sewage Regulation (MSR) is in effect. The following link is to the Ministry of Environment, liquid waste permits: http://www.env.gov.bc.ca/epd/waste_discharge_auth/intro.htm

The VIHA application for on-site sewer systems is found at:
http://www.viha.ca/NR/rdonlyres/66FB1570-F44E-4112-B2CC-FB6BCC2EF185/0/Filingform_editable_crd_2Yr_May2008.pdf

When rainwater detention and treatment is required on the site, these facilities must not negatively impact the sewage disposal field areas. Any detention or infiltration systems must be independent of the sewage disposal system and must ensure that the sewage disposal fields are fully protected from flooding. The consultant involved in the development of any site is required to ensure that the land development and its rainwater management systems do not negatively impact the environment.

Stage 2 & 3 Commitments
The District of Sooke will ensure compliance with VIHA and Ministry of Environment standards and requirements.

- lead agencies: Ministry of Environment and VIHA
- primary contact: VIHA – Environmental Health Officer (250) 475-1858
- human, financial and other resources required: site specific and carried by property developer/owner
- potential funding sources: developer/property owner
- Implementation schedule: implemented

Status: complete

Stage 1 Recommendation E 3 – *Ensure that the proximity of constructed rainwater facilities to on-site sewage treatment systems and potable wells are considered during the approval stage for new development.*

Stage 2 & 3 Discussion
The District of Sooke's newly updated Engineering Specifications require that all rainwater management systems address the location of existing wells and sewage disposal systems. Clearances are established by the Ministry of Environment and VIHA. However, the municipality will review the location of all on-site systems at the time of any rezoning to assist the land owner in determining the best location for the rainwater management system.

Stage 2 & 3 Commitments
The District of Sooke will ensure compliance with VIHA and Ministry of Environment standards and requirements.

- lead agencies: Ministry of Environment, VIHA and District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: site specific and carried by property developer/property owner

- Potential funding sources: site specific and carried by property developer/property owner
- implementation schedule: implemented

Status: complete

Section F – Monitoring Rainwater Discharges, Watercourses and the Marine-receiving Environment

Background
The Background to Section F is addressed in Section B.

Stage 1 Recommendation F 1 – *Continue with the existing CRD rainwater monitoring program.*

Stage 2 & 3 Discussion
This Recommendation is addressed under B 13.

Stage 1 Recommendation F 2 – *Expand the existing CRD rainwater monitoring program to include investigations of the effectiveness of various best management practices.*

Stage 2 & 3 Discussion
This Recommendation is addressed under B 13.

Stage 1 Recommendation F 3 – *Integrate precipitation information into the CRD's monitoring program data analysis.*

Stage 2 & 3 Discussion
This Recommendation is addressed under B 13.

Stage 1 Recommendation F 4 – *Use CRD monitoring data to determine where best management practices may be required.*

Stage 2 & 3 Discussion
This Recommendation is addressed under B 13.

Stage 1 Recommendation F 5 – *Enhance the existing CRD monitoring programs educational component (see Section J).*

Stage 2 & 3 Discussion
This Recommendation is addressed under J 1.

Section G – Protect and Enhance the Marine Coastline, Waters and Marine Life

Background

The District of Sooke does not have authority in Sooke Harbour, Basin, Inlet or Bay. These areas are under the control of the federal government. However, the District borders on these water bodies and they provide recreation and employment opportunities to the citizens of Sooke. Much of the history of Sooke is tied to the Harbour, Basin, Inlet and Bay and they are closely linked to the District's identity. It is very much in the interest of the District of Sooke that these marine areas are protected from sources of pollution.

Stage 1 Recommendation G 1 – *Adopt bylaws to protect rainwater quality and quantity.*

Stage 2 & 3 Discussion

This Recommendation is addressed under Recommendations A 1 (quantity) and B 1 (quality).

Stage 1 Recommendation G 2 – *Minimize impervious surfaces along the entire marine coastline and all inter-tidal areas.*

Stage 2 & 3 Discussion

The consultants and District of Sooke staff recognize the sensitive habitat and nature of marine foreshore areas. However, discussing the imperviousness of marine foreshore areas in isolation within a LWMP (Rainwater) is not considered appropriate. Instead, the plan focuses on reducing imperviousness and dealing with the consequences throughout the entire municipality.

This specific aspect of land management is better addressed by other means. The federal Department of Fisheries and Oceans has a 15 metre development setback guideline from the high water level and municipalities have authorities to establish percentages of impervious surfaces and also to establish development permit areas for foreshore property that could include guidelines addressing imperviousness.

This issue has also been raised with the consultant preparing the Official Community Plan as a possible goal or objective related to the protection of the Harbour, Basin, Inlet and Bay.

This Recommendation is addressed throughout Section A.

Stage 1 Recommendation G 3 – *Continue with the annual CRD monitoring of rainwater flows and the marine environment to assess the effectiveness of the sewage collection system and monitor for change.*

Stage 2 & 3 Discussion
This Recommendation is addressed under B 13.

Stage 1 Recommendation G 4 – *Ensure that the Sooke Official Community Plan addresses rainwater management for the protection and enhancement of Sooke Harbour, Basin, Inlet and Bay.*

Stage 2 & 3 – Discussion
The District of Sooke is in the process of updating their Official Community Plan (OCP). The LWMP (Rainwater) Project Team reviewed all rainwater related sections of the draft OCP and presented comments and suggestions to the Districts Planning consultant. Two meetings were subsequently held with the Planning consultant, District staff and the Project Team. Files from the draft LWMP (Rainwater) relating to Sookes marine receiving environment were provided to the Planning consultant.

A significant level of effort has been invested to ensure the OCP and the LWMP (Rainwater) compliment and support each other. See **Appendix 6** for a complete list of rainwater management components included in the Final Draft of the OCP.

Stage 2 & 3 Commitments
The District of Sooke will ensure that the rainwater management components remain in the updated draft OCP.

- lead agency: District of Sooke
- primary contacts: Director of Planning and the Municipal Engineer
- human, financial and other resources required: Sooke staff and their consultants (all costs for OCP and LWMP (Rainwater) from existing budgets and grants)
- potential funding sources: District of Sooke and external grants
- implementation schedule: 2010

Status: complete

Stage 1 Recommendation G 5 – *Work with the T'Sou-ke First Nation and federal agencies on strategies to open shellfish beds presently closed to the recreational harvesting of shellfish.*

Stage 2 & 3 Discussion

The District of Sooke has completed construction of a sewage collection and treatment system. However, it only services that portion of the District within the sewer specified area. The rest of Sooke, the parts of Metchosin and the Juan de Fuca Electoral Area that drain to the Harbour and Basin and the T'Sou-ke First Nation continue to be serviced by on-site sewage treatment facilities. On-site sewage treatment facilities that are not properly maintained are prone to failure.

Currently, all of Sooke Harbour, Basin and Bay are closed to the recreational harvesting of bivalve shellfish due at least in part to bacterial contamination. Rainwater flows and watercourses are the primary pathway for biological contaminants from the land to the marine environment. Discharges from boats and marinas can also provide contaminants.

A project outline was developed during the LWMP (Rainwater) to work toward relaxing or removing some of the restrictions on bivalve shellfish harvesting (see **Appendix 7**).

Environment Canada prepared an Information Sheet on the Canadian Shellfish Sanitation Program (CSSP) (**Appendix 8**). This document provides an introduction and history to the CSSP. The Information Sheet also discusses:

- indicator organisms and pollution sources
- roles and responsibilities of the three federal departments directly involved with shellfish issues: Fisheries and Oceans Canada, Canadian Food Inspection Agency and Environment Canada
- Environment Canada's marine quality monitoring program including surveys, sampling and water quality criteria
- methods used to classify shellfish growing waters in B.C.
- mandate and membership of The Pacific Region Interdepartmental Shellfish Committee and how decisions on the disposition of shellfish growing areas are handled
- the four classifications of shellfish harvesting areas (Approved, Conditionally Approved, Closed and Prohibited) and methods by which shellfish can be harvested and purified (relay and depuration)

Environment Canada prepared an Annual Review Report (**Appendix 9**)**.** The report covers Growing Area 30: Sooke Harbour and Basin and covers the period from April 1, 2005 to May 2, 2007. The report provides a brief description of federal surveys conducted to confirm whether water quality meets approved federal standards for shellfish harvesting and what action is taken.
The report also discusses Harbour and Basin:

- pollution sources, areas of concern and shellfish related activities by others
- water quality sampling
- maps of the area, sampling stations and data

The Annual Review Report also states: “The T’Sou-ke First Nation (TFN) own five shellfish aquaculture leases in Sooke Basin. They are interested in potentially remediating pollution sources at some of these sites, and opening them to direct harvest (e.g. Anderson Cove, Roche Cove). In February 2006, Environment Canada entered into a water sampling agreement with the TFN, and they collected one set of samples in March 2006. Additional training and sampling was conducted in May 2006.”

This report provides the information for the closure of bivalve shellfish beds to recreational harvesting in Sooke Harbour and Basin based on multiple sources of fecal contamination.

The Provincial Ministry of Environment (MOE), in partnership with several other organizations with interests in the Sooke area, are currently developing water quality objectives (WQO) for the Sooke Basin/Harbour/Inlet and for streams that enter these marine waters. Data has been collected since the late 1980s for both the marine and freshwater sites in the Sooke area (**Appendix 10**).

The CRD Stormwater, Harbours and Watersheds program (SHWP), in cooperation with the District of Sooke, work to limit the impact of contaminated rainwater runoff on the environment and to protect public health. The following is taken from the Executive Summary of a recent Stormwater Quality Annual Report (2007), prepared for the District of Sooke. The entire report is available on the CRD website: http://www.crd.bc.ca/watersheds/monitoring.htm

The 2007 report covers five main areas of activity:

- Stormwater Discharge Surveys – Surveys were carried out along the entire coastline of the District of Sooke to investigate the level of public health and environmental concern associated with rainwater discharges.
- Upstream Investigations – Investigations were undertaken to identify sources of contamination in rainwater flows.
- Marine Surface Water Monitoring – Measurement of fecal coliform bacteria was undertaken in Sooke Inlet, Harbour and Basin.
- Monitoring of Significant Watercourses – Water quality monitoring was undertaken for 14 significant watercourses that flow onto the District of Sooke coastline and into the marine environment.
- Special Projects – SHWP staff were involved in a number of special projects to improve rainwater quality in the region. Brief summaries are included in the report.

The Project Committee should include representation from:

- T'Sou-ke and Beecher Bay First Nations
- Canadian Food Inspection Agency
- Environment Canada
- Fisheries and Oceans Canada
- Provincial Ministry of Environment
- Provincial Ministry of Agriculture and Lands
- Provincial Ministry of Forests and Range
- Capital Regional District
- District of Sooke
- District of Metchosin
- Juan de Fuca Electoral Area
- Aquaculture industry
- Community member(s) that use the Harbour and Basin on a regular basis

Stage 2 & 3 Commitments
The District of Sooke should use the LWMP (Rainwater) as the vehicle to hold initial discussions with representatives from the proposed Project Committee to determine level of interest and a lead agency.

- lead agency: to be determined
- primary contact: Municipal Engineer
- human financial and other resources required: Staff time to organize and host a meeting to determine level of interest- $1,000
- potential funding sources: District of Sooke and other potential committee members
- implementation schedule: 2011

Status: pending

Stage 1 Recommendation G 6 – *Ensure that all land development, alteration or redevelopment is done in compliance with the federal* Fisheries Act*.*

Stage 2 & 3 Discussion
This Recommendation is addressed under M 1.

Stage 1 Recommendation G 7 – *Support community groups by promoting the creation of a Shorekeepers group(s) for Sooke Harbour, Inlet, Basin and Bay.*

Stage 2 & 3 Discussion
This Recommendation is addressed under K 8.

Section H – Rainwater Management and Low Impact Development

Background

Rainwater management is now considered to be one of the most important parts of land development. This reflects our understanding of the impacts of uncontrolled rainwater runoff and the loss of that water to pipes and ditches that transport it away from development sites. To address negative impacts on the environment, low impact development techniques have been developed to provide options for managing rainwater as naturally as possible. These techniques include detention, absorption, bioretention, rain gardens, green roofs, infiltration trenches, ponds, wetlands and groundwater infiltration. Usually, a combination of techniques is used to increase the retention and infiltration of rainwater at the site level to mimic the natural hydrology. Under severe storm conditions, water will leave a site regardless of how much natural absorption is available. Engineered overflow routes must be designed to protect downstream properties and streams.

The District of Sooke Official Community Plan (OCP), Zoning, and Subdivision and Development Standards Bylaws all identify the need to employ low impact development (LID) techniques (Section A). The draft Subdivision and Development Standards Bylaw 404 is very specific and establishes limits for the rate and volume of runoff permitted from a development site. It also encourages innovative designs that will enhance the opportunities for on-site rain water management.

Section B includes discussion of a comprehensive rainwater protection bylaw that is recommended for adoption by the District of Sooke. The bylaw takes a source control approach that ensures contaminants do not enter rainwater flows in the first place.

Stage 1 Recommendation H 1 – *Include low impact development principles for the management of rainwater in the District's OCP.*

Stage 2 & 3 Discussion

The project team has met with District of Sooke staff and the consultant preparing the final draft plan of the Official Community Plan (OCP). Extensive input has been provided to ensure that LID principles are clearly identified as a major goal of the community in all new and redevelopment initiatives. See **Appendix 6** for a complete list of rainwater management components included in the Final Draft of the OCP.

Stage 2 & 3 Commitments
The District of Sooke should ensure that low impact development principles are included in the OCP.

- lead agency: District of Sooke
- Ensure low impact development principles are included in the OCP.
- primary contact: Director of Planning
- human, financial and other resources required: managed during development of the LWMP, (Rainwater) Stage 2 & 3
- potential funding sources: within existing contract funding
- implementation schedule: 2010

Status: complete

Stage 1 Recommendation H 2 – *Include low impact development requirements for the management of rainwater in the District's engineering standards and development specifications bylaw.*

Stage 2 & 3 Discussion
This Recommendation is addressed under A 1.

Stage 1 Recommendation H 3 – *Take advantage of recent developments in the Greater Victoria area and beyond to develop a low impact development brochure that can be provided to developers, house builders and home owners in the municipality*.

Stage 2 & 3 Discussion
A wide range of innovative rainwater management techniques have been used for both new and retrofit projects around the CRD. These examples are useful references not only for Sooke regulatory staff, but for prospective builders and developers of new projects and any land managers (especially institutions and their supporters) who would like to reduce their operation's existing impact on watershed health through on-site rainwater management.

Twenty one of these local, innovative approaches to rainwater management were profiled on fact sheets which have been placed on the District of Sooke website for easy access by all users. The range of approaches used includes: underground storage, roof storage, rainwater harvesting, bioswales, rain gardens, green roofs, permeable surfaces, reduced footprint designs, nature scaping and restoration of habitat. Both public and private sites were featured. The range of land use types represented include commercial, institutional and residential.

Where available, the fact sheets include information about the location of the project, description of the techniques used, one or more photographs, the design storm used to size components, and the name of the design teams involved, with their contact information. The fact sheets can be viewed at: http://sooke.ca/EN/main/government/devservices/eng/rainwater.html

Following a similar format to that provided in this report, Sooke staff can easily accept new individual fact sheets for new projects in the District of Sooke. Interested design professionals could be encouraged to contribute to this website based examples catalogue.

The District of Sooke staff should keep the website fact sheets current and accessible via several links from the planning, engineering and any environmental web pages maintained over time. Also, staff should refer prospective home builders, and development applicants and their professional design consultants to the fact sheets. Sooke staff should encourage design consultants to submit similar fact sheets when they become aware of good examples that should be included with the original 21 provided through this project.

Stage 2 & 3 Commitments
The District of Sooke will provide information on its website to inform developers and property owners about low impact development projects in the region.

- lead agency: District of Sooke
- human, financial and other resources required: staff time to update the website
- potential funding sources: District of Sooke
- primary contact: Municipal Engineer
- implementation schedule: Ongoing

Status: ongoing

Stage 1 Recommendation H 4 – *Undertake a pilot project using low impact development techniques.*

Stage 2 & 3 Discussion
Funds were not available for a pilot project within the LWMP (Rainwater) process. However, there are several developments within Sooke that have incorporated LID techniques for rainwater management. These include green roofs, roadside bioswales, on-site treatment and detention, roadside detention, cross-falled roads with flat or open curbs so road water discharges to bioswales (this eliminates most in-road catch basins), the use of amended, deep, organic soils and narrower road surfaces. The extension of Tominny Road off West Coast

Road and the Mariner's Village at 6585 Sooke Road utilize some of these LID techniques.

Stage 2 & 3 was not resourced to include a pilot project.

Stage 2 & 3 Commitments
The District of Sooke should look for pilot project opportunities. Some opportunities have been identified and brought to the attention of staff.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: to be determined when a pilot project is identified
- potential funding sources: unknown at this time
- implementation schedule: Ongoing

Status: Ongoing

Section I – Promote the Prevention, Response and Reporting of Spills to Land, Freshwater Flows and the Marine Environment

Background

Contaminated rainwater can have significant effects on freshwater and marine environments. The implementation of best management practices (BMPs) for rainwater management throughout the District will help to maintain a constant level of good quality water in aquatic systems. However, spills of contaminants (e.g. oils, fuels, pesticides and sewage) will continue to occur within urban areas and rainwater management facilities can be overwhelmed by these releases. Spill prevention, along with appropriate cleanup and reporting is critical to minimizing potential damage.

Spill prevention is the fundamental BMP to reduce the impact of spilled pollutants. Effective spill prevention is achieved through the education and training of those individuals involved in the storage and/or handling of materials that are potentially harmful if spilled. These include, but are not limited to, materials associated with agriculture, automobiles, construction, dental offices, dry cleaners, hospitals, metal finishing, chemical manufacturing, photo finishing, ship building and repair, waste treatment and recycling. The essence of spill prevention is proper storage, transportation and handling procedures, which will differ based on the characterization of the material. The organizations or businesses that are involved in the use or transport of such materials are responsible for properly training workers. Division B, Part 2, 3 and 5 of the BC Fire Code 2006 and referenced National Fire Protection Association standards provide standards for the proper storage, transportation and handling procedures of these materials. The organizations or businesses that are involved in the use or transport of such materials are responsible for properly training workers by developing a spill response plan under their fire safety plans as per the BC Fire Code 2006 Division B, Section 4.

Spill response is critical to minimizing the effects once a spill has occurred. Proper spill response can only occur when the individuals involved are properly trained, equipped and familiar with the material spilled and the response plan. A spill response plan involves procedures for spill containment, communications, cleanup, sampling, monitoring and reporting. Spill containment and cleanup often involves the use of a spill kit which contains adequate quantities of materials able to absorb and neutralize specific contaminants.

The reaction to spills of contaminants is initiated either at the time of a spill by those on-site or when the spill is reported. Knowledge of when, how and where to report spills is essential for immediate and effective cleanup.

Stage 1 Recommendation I 1 – *Ensure that District staff are trained in spill prevention, response and reporting procedures and that these procedures comply with the provincial Spill Reporting Regulation.*

Stage 2 & 3 Discussion
A Spill Prevention, Response and Reporting Workshop was held for the public on Friday, June 19, 2009 at Sooke Municipal Hall Council Chambers. The one hour workshop focused on homeowners and small businesses and was instructed by Sooke's Fire Chief and a member of the LWMP (Rainwater) consulting team. The workshop topics included: ecological effects of spills, types of spills, what to do if you see a spill and what to do if you have a spill on your property. Workshop participants were given informational handouts including the Spill Response Form included in Recommendation I 8 and were able to examine the contents of a spill kit.

Three participants attended the workshop including a representative from the T'Sou-ke First Nation. The participants provided feedback that the workshop was useful but would likely attract more attendees if held in the evening. Sooke's Fire Chief will coordinate at least one public workshop per year regarding Spill Prevention, Response and Reporting. Additional workshops for staff will be coordinated by Sooke's Fire Chief in 2010.

Stage 2 & 3 Commitments
The District of Sooke Fire Department will provide training to other District of Sooke staff on spill prevention, response and reporting every two years.

- lead agency: District of Sooke
- primary contact: Fire Chief and Municipal Engineer
- human, financial and other resources required: $1,000 every two years
- potential funding sources: CRD, EPCOR
- implementation schedule: 2011

Status: ongoing

Stage 1 Recommendation I 2 – *Provide information at the municipal counter and website regarding the importance of spill prevention, response and reporting for a variety of target audiences (commercial, industrial, institutional and residential).*

Stage 2 & 3 Discussion
Spill prevention is the fundamental Best Management Practice (BMP) to reduce the impact of spilled pollutants. Spill prevention is achieved through the education and training of those individuals involved in the handling of those materials that are potentially harmful if spilled. This includes businesses as well

as homeowners. The essence of spill prevention is proper storage, transportation and handling procedures, which differ for each material.

Spill response is critical to minimizing the effects once a spill has occurred. Proper spill response occurs when the individuals involved are properly trained and familiar with the spill response plan. A spill response plan involves procedures for spill containment, communications, clean up, sampling, monitoring, equipment and training. Spill containment and clean up often involve the use of a spill kit, which contains materials able to absorb and neutralize specific contaminants.

Organizations or businesses that are involved in the use or transport of such materials are responsible for properly training workers, however homeowners and small businesses often lack spill-awareness education.

To address this, the District of Sooke will provide spill information on their website. This material will include the Generic Spill Response and Reporting Procedure and Spill Reporting Form provided in Recommendation I 8, which addresses common hazardous materials that may be found in homes and small businesses (e.g. fuels, oil, paint, solvent and cleaning products). Additionally, the District's website will provide information on the care and maintenance of heating-oil tanks, which are one of the primary sources of spills from residences. This information is contained in a brochure produced by the District of Saanich (http://www.gov.saanich.bc.ca/resident/utilities/pdfs/Otank.pdf).

In addition to having spills information on the website, the District hosted a training workshop for the public regarding spill prevention, response and reporting as part of Recommendation I 1. The District will also have information at the municipal hall, including the Ministry of the Environment *Clean Water* series and the CRD's *Through the Cracks* brochures.

Stage 2 & 3 Commitments
The District of Sooke Fire Department will provide an annual workshop for community members on spill prevention, response and reporting.

- lead agency: District of Sooke
- primary contact: Disctrict of Sooke Fire Chief
- human, financial and other resources required: $1,000 per year
- potential funding sources: N/A
- implementation schedule: 2010

Status: ongoing

Stage 1 Recommendation I 3 – *Install markers at storm drain outlets with the CRD storm drain number, the PEP phone number (1-800-663-3456) and instructions to call if a spill or solid waste is observed.*

Stage 2 & 3 Discussion

The District borders the Sooke Basin, Harbour, Inlet and Bay and these sensitive near shore marine environments are vulnerable to land based pollution. Although municipal government is not responsible for the near shore marine environment, municipal staff regularly receive calls from the public regarding contaminated rainwater in creeks or pipes discharging into the ocean. The federal government can hold local government responsible for contaminated flows entering the marine environment whether or not the municipality was responsible for the contamination.

When a contaminated discharge is observed in the rainwater collection system, a watercourse or entering the marine environment, it is critical that this information be promptly reported. This will increase the possibility that the contaminants can be traced back to source and eliminated. This will provide an enhanced level of environmental protection as well as protection to the municipality through due diligence.

Problems often arise when an individual is trying to accurately report the location of a contaminant entering the near shore marine environment. Municipalities in the core area of the CRD have addressed this problem by posting small metal signs at the point of discharge. These signs carry a unique number that identifies the location of the discharge and instructions to phone the Provincial Emergency Program (PEP) at 1-800-663-3456.

The PEP will then request information (including the discharge number) and immediately forward the information to Environment Canada, the provincial Ministry of Environment and the Vancouver Island Health Authority, if appropriate. PEP will also contact the municipality involved with the expectation that the municipality will respond. The PEP is not a responding agency but a clearing house for information.

A provincial Ministry of Environment response officer reports that having access to the discharge number is very valuable information and will allow for a quicker and more effective response.

All discharges to the marine environment along the entire Sooke coastline have been surveyed by the CRD's Stormwater, Harbours and Watersheds Program (SHWP) and assigned a unique identifying number. If contaminants are observed in the discharge, then PEP should be contacted immediately. This will only happen if the person observing the contamination knows to phone PEP. Therefore, each discharge along the Sooke coastline should be marked with a

small metal sign similar to those used in the core area. The signs should carry the PEP phone number and instructions to call if a contaminant is observed.

In the core area of the CRD, a community group received funding from the federal government to undertake the signage project and the District of Sooke should look for similar opportunities. If a Shorekeepers group is established within the District (Recommendation K 8) that group may be the logical volunteer organization to take the lead with some assistance and direction from the municipality and the SHWP. The probability of receiving federal funding is considered high for a community initiative of this nature. The reductions in contaminants would also provide synergy to the proposed project to work toward opening shellfish beds presently closed to the recreational harvesting of shellfish (Recommendation G 5).

Stage 2 & 3 Commitments
The District of Sooke will facilitate the installation of small signs at rainwater discharge points.

- lead agency: District of Sooke to facilitate the signage project with input from the SHWP
- primary contact: District of Sooke Emergency Operations Coordinator
- human, financial and other resources required: Approximately $5,000 (based on 100 signs) and staff time to assist Shorekeepers group
- potential funding sources: Fisheries and Oceans Canada, Transport Canada, Canadian Food Inspection Agency, Ministry of Environment
- implementation schedule: Starting 2011

Status: pending

Stage 1 Recommendation I 4 – *Post the spill reporting number (1-800-OILS-911) for the west coast at boat launches, marinas and other marine industrial sites. This Recommendation has been expanded to include a discussion on small oil spills in the marine environment.*

Stage 2 & 3 Discussion
Municipal government has no jurisdiction in the marine environment but a healthy Harbour, Basin, Inlet and Bay are in the best interests of the District of Sooke.

Small oil spills are a common occurrence and often take place in the sensitive near shore marine environment. Areas of special concern are marinas, coastal industrial sites and boats. Although small spills are not as catastrophic as large spills, their cumulative impacts can cause significant environmental damage. It is much more likely that small oil spills will go unreported and will not be properly cleaned up. Small spills often take place in coastal areas that provide important

habitat for marine life. Most of these spills can be avoided by using proper preventative measures.

Prevention
The problem is best tackled by preventing small oil spills from occurring. This requires cooperation between the provincial government, conservation groups and private business. The cornerstone of prevention is education and the following two web sites provide information on educational initiatives.

- California Coastal Commission's Oil and Fuel Boater Fact Sheet: http://www.coastal.ca.gov/ccbn/toolkit/fs-oil-fuel.pdf
- Georgia Strait Alliance's Boater Education and Outreach: http://www.georgiastrait.org/?q=node/433

The Georgia Straight Alliance “Clean Marine” initiative is an example of a cooperative approach to spill prevention between the business sector and non governmental organizations. Clean Marine is a marina rating program that encourages marinas to become more environmentally responsible and offers benefits to those who can pass an independent environmental assessment. It includes information for marinas and boaters on both spill prevention and spill response.

- Clean Marine: http://www.georgiastrait.org/?q=node/425

Reporting
Dial (1-800-OILS-911). Callers should be ready with information including their name and telephone number, the time and location of the spill, estimated quantity of oil, details of action taken, description of the surrounding area and other agencies involved.

- Ministry of the Environment's Environmental Emergency Reporting: http://www.env.gov.bc.ca/eemp/overview/eer.htm

Response and Cleanup
The phone number (1-800-OILS-911) will be automatically rerouted to the Provincial Emergency Program’s Coordination Centre. Calls are then routed to the Regional Environmental Emergency Response Officers that correspond to the location of the caller. The severity of the spill will be assessed and a suitable response will be organized.

- The B.C. Provincial Oil Spill Response Plan is described at: http://www.env.gov.bc.ca/eemp/resources/response/pdf/marine_oil_response_plan.pdf

Appendix 11 provides a notice to be posted at marinas and other locations.

Stage 2 & 3 Commitments
The District of Sooke should facilitate the posting of the marine oil spill reporting number at marinas and other locations.

- lead agency: Ministry of Environment
- primary contact: Ministry of Environment, 1-800-OILS-911
- human financial and other resources required: Funded from LWMP (Rainwater)
- potential funding sources: N/A
- implementation schedule: 2010

Status: ongoing

Stage 1 Recommendation I 5 – *Work with the CRD to host training sessions for spill prevention, response and reporting for groups that have a greater possibility of generating spills (e.g. construction, gas stations/garages, marine industries, boaters).*

Stage 2 & 3 Discussion
This Recommendation was addressed under I 1.

Stage 1 Recommendation I 6 – *Provide information to residential landowners regarding potential spills from homes (e.g. paint, heating oil tanks, engine oil).*

Stage 2 & 3 Discussion
This Recommendation is addressed under I 2.

Stage 1 Recommendation I 7 – *Ensure spill prevention, response and reporting information is required under municipal permit applications.*

Stage 2 & 3 Discussion
This Recommendation is addressed under A 8.

Stage 1 Recommendation I 8: D*evelop a reporting procedure that will inform staff from the CRD's Stormwater, Harbours and Watersheds program of a spill. This procedure should include spills from T'Sou-ke Nation lands.*

Stage 2 & 3 Discussion
Discussions were held with the CRD, T'Sou-ke First Nation and Sooke staff regarding a spill response and reporting procedure. No procedure has been established at any of these organizations. The "Generic Spill Response and Reporting Procedure" (**Appendix 12**) was developed following discussions with other municipalities and has been adapted from the City of Victoria and District of Saanich procedures. This document will be available to the public via Sooke's website.

Stage 2 & 3 Commitments
The District of Sooke will provide the generic Spill Response Form and Reporting Procedure on their website.

- lead agency – District of Sooke
- human, financial and other resources required - completed as part of LWMP (Rainwater) Stage 2 & 3
- potential funding sources – N/A
- primary contact – District of Sooke Emergency Operations Coordinator
- implementation schedule – 2010

Status: pending

Section J – Stormwater Management Education and Training Opportunities

Background

New methods of land development and re-development have gained widespread support in the last decade. These methods respect the need to accommodate growth while protecting the natural environment. The management of rainwater plays a major role in these efforts.

Effective rainwater management is determined by the level of understanding held by those responsible for designing, approving, building and maintaining rainwater-management facilities. The key to innovative and appropriate rainwater management in the District of Sooke is education and training.

Education and training initiatives should initially focus on understanding the problems associated with the traditional development and redevelopment of land. After a good understanding of the fundamental issues has been established, the focus can shift to management techniques that solve problems associated with runoff.

Education and training is required at all levels. At the municipal level, staff should be aware of the current practices available for rainwater management. The District of Sooke should ensure that planning and engineering staff have access to progressive tools such as current engineering standards, appropriate regulations, and innovative bylaws. Staff should be aware of the latest techniques available to ensure their ability to adequately evaluate development proposals. This will enable them to provide comments to council, developers and others on innovative approaches and solutions.

Outside the municipality, developers, businesses, institutions and consultants should be aware of the best available techniques to manage rainwater in order to produce the best possible results. The community needs to be aware of how individual actions can affect rainwater management and the effect on downstream ecosystems. Finally, stewardship groups and the public are the eyes of the community and with proper information will help to ensure that rainwater management methods are solving problems rather than creating them.

Stage 1 Recommendation J 1 – *The District of Sooke should work with the CRD's Stormwater, Harbours and Watersheds Program to develop and deliver an education and training program to council, staff, developers businesses, stewardship groups and the public.*

Stage 2 & 3 Discussion
Two presentations and field trips were developed and held as part of the LWMP (Rainwater): one for council and staff and another for the community. The presentations and field trips focused on water quality, water quantity and low impact development in a watershed context.

The events were advertised within the community as a “Presentation and Field Tour of Innovative Rainwater Management Methods.” Each event consisted of a presentation and bus tour of low impact development sites around the CRD. The first bus tour for Sooke council and staff was held on Wednesday, July 9, 2008, while the second bus tour for Sooke council, staff and public was held on Thursday, September 25, 2008. The presentations and field trips were developed, coordinated and instructed by the LWMP (Rainwater) consulting team.

Each day included a one-hour presentation by the project planner and the project biologist followed by a six hour bus tour of nine innovative examples of rainwater management within the core area of the Capital Regional District. The presentation outlined the reasons why rainwater needs to be managed in a way that protects the aquatic and marine environments and introduced the audience to low impact development (LID) concepts and techniques. The project manager and the project engineer joined the field tour to answer questions on the process and technical issues about design, structural issues and sizing.

Goals of the day were as follows:

- understand the need for new approaches to rainwater management.
- understand the challenges and opportunities presented by different types of land uses and sites.
- demonstrate that innovative approaches to rainwater management can help address and support a range of other community values at the same time.
- build support for more and better functioning rainwater management techniques within Sooke by providing on-site viewing, analysis and context.

Appendix 13 provides a list of attendees at the two events.

Appendix 14 provides information and advertising prepared for the events.

Highlights:

- Land-use types featured in the tour included: commercial, park and open space; an integrated K-12 school; an elementary school, a community centre; an urban brown field multi-family development; one green field multi-family and three single-family developments.
- LID techniques featured in the tour included: surface ponding/storage; sub-surface storage and infiltration; creek daylighting; creek restoration/recreation; amended soils and lush native plantings; permeable asphalt; permeable paving blocks; permeable concrete; courtyard rain garden; street edge rain garden; green roof; heavily landscaped detention pond/wetland; narrow roads; and creative space saving (for footprint reduction).

Stage 2 & 3 Commitments

The District of Sooke should provide for facilitated tours of innovative rainwater management sites every three years to coincide with the beginning of new municipal councils.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: None – completed as part of LWMP (Rainwater) Stage 2&3
- potential funding sources: N/A
- implementation schedule: every three years, to coincide with new Councils

Status: ongoing

Section K – Support Local Community Groups Involved With Rainwater Protection

Background

Community groups working in and near Sooke are a valuable resource for the municipality for the proper management and restoration of the watercourses in the District of Sooke. The District does not have the human or financial resources to manage all stewardship activities throughout the municipality. Volunteers can provide valuable assistance to improve the health of natural systems and the quality of life in the District of Sooke. The municipality should support these groups by providing access to information, funding and recognition.

Stage 1 Recommendation K 1 – *The District of Sooke should support community groups by assisting with access to government reports.*

Stage 2 & 3 Discussion

In past decades, the main focus of rainwater management was conveyance to prevent flooding. However, this approach often carries high costs. Increasing levels of impervious areas then require infrastructure replacement. Piped rainwater collection systems also lead to degraded freshwater and marine water quality and habitats. The District of Sooke is developing a Liquid Waste Management Plan (Rainwater) that promotes at source and near source retention and treatment. This results in improved rainwater quality and reduces the cost of infrastructure and upgrades.

The purpose of this section is to provide information to the community about design, implementation and performance of innovative rainwater management systems. The sources cited in **Appendix 15** provide summaries of up to date methods of ensuring public safety while protecting the environment, providing community amenities and respecting costs.

Stage 2 & 3 Commitments

The District of Sooke should provide and periodically update resource information for the design and implementation of rainwater management systems on their website.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: staff time to put information on the website
- potential funding sources: District of Sooke
- implementation schedule: 2009

Status: ongoing

Stage 1 Recommendation K 2 – *The District of Sooke should support community groups by providing information on funding opportunities.*

Stage 2 & 3 Discussion
This Recommendation is addressed under Recommendation L 1.

Stage 1 Recommendation K 3 – *The District of Sooke should support community groups by providing assistance with restoration projects (expertise, approvals, landowner information).*

Stage 2 & 3 Discussion
Appendix 16 provides a list of environmental stewardship resources for community groups in the District of Sooke. For each listed stewardship activity, information is provided that outlines what that activity entails followed by suggested resources (people, organizations/institutions and reference documents/websites) to support that activity.

Stage 2 & 3 Commitments
The District of Sooke should provide and periodically update information on environmental stewardship resources for the community on their website.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: Sooke staff time to maintain links to this information on their website
- potential funding sources: District of Sooke
- implementation schedule: Fall, 2009

Status: ongoing

Stage 1 Recommendation K 4 – *The District of Sooke should support community groups by providing mapping where available.*

Stage 2 & 3 Discussion
Appendix 17 provides a list of resources for mapping and imagery to support community stewardship initiatives and municipally led ecological studies. In projects involving ecosystem restoration and monitoring at both a watershed and site scale, it is often important to understand upstream and downstream connections with other habitats and changes that have occurred over time. Mapping can assist with this understanding.

Stage 2 & 3 Commitments
The District of Sooke should provide and periodically update information on mapping resources for the community on their website.

- lead agency: District of Sooke
- primary contact: Municipal Engineer, Geographical Services
- human, financial and other resources required: staff time to put information on the website
- potential funding sources: District of Sooke
- implementation schedule: 2009

Status: complete

Stage 1 Recommendation K 5 – *The District of Sooke should support community groups by providing an annual opportunity for funding.*

Stage 2 & 3 Discussion
The District of Sooke has an existing community grant program. The program does not currently have a category for environmental projects, but the existing program could be modified to include this category. The same methods could be used for evaluating applications, provided the Community Grant Review Committee has the expertise necessary to evaluate the applications.

The existing program has a budget of $75,000 per year, with no limit on the amount of individual grants. The program provides grants to "assist organizations with projects or special activities that serve the well-being of the community through efforts that build capacity in regard to volunteerism and enhance the well-being of the community." The Community Grant Policy is located on the Sooke website at:
http://www.sooke.ca/assets/Documents~and~Forms/Policies/5.1(4)%20Community%20Grant%20Committee%20Policy%20Mar%2013%2008.pdf

The current program is comprised of the following components:

- eligibility criteria
- application procedures
- assessment process
- assessment criteria
- conditions of funding

.
The District of Sooke should amend the Community Grant Program to include a category for environmental projects. The Community Grant Review Committee should include a member with appropriate technical expertise to assess this category of application.

Stage 2 & 3 Commitments
The District of Sooke should amend the Community Grant Program to include a category for environmental projects.

- lead agency: District of Sooke
- primary contact: Deputy Director of Finance
- human, financial and other resources required: Reallocate a portion of the $75,000 currently allocated, plus staff time to expand program.
- potential funding sources: District of Sooke
- implementation schedule: 2010

Status: pending

Stage 1 Recommendation K 6 – *The District of Sooke should support community groups by providing equipment for restoration activities and clean ups (shovels, rakes, trucks for hauling, etc.).*

Stage 2 & 3 Discussion
A lack of equipment resources is a limiting factor in the ability of community groups to do applied projects, such as restoration activities and clean ups. There are few organizations that supply equipment to community groups on loan for projects. The CRD's Stormwater, Harbours and Watersheds Program has a limited number of shovels, buckets, gloves, etc. to loan - (contact 250-360-3065).

The District of Sooke could enable community groups by purchasing basic equipment that could be loaned out.

A sample list of the type of equipment useful on many environmental projects:

Item	No.	Cost/unit	Cost
short handled shovels	20	$20	$400
trowels	20	$10	$200
wheel barrows	2	$100	$200
garbage bins	5	$13	$65
garbage pickers	5	$35	$175
5 litre buckets	5	$4	$20
clippers	10	$15	$150
loppers	4	$40	$160
axes	2	$20	$40
bow saw	2	$15	$30
pruning saw	5	$20	$100
hedge trimmer	4	$40	$160
TOTAL (prices from Home Depot)			$1,600

The equipment could be stored in the municipal shed at the Ed MacGregor parking lot.

The District of Sooke should consider purchasing and lending equipment for use by volunteer environmental community groups. The District should contact community groups to inform them of the availability of equipment for their use. Access to the equipment should be provided through sign out from the Engineering Department.

Stage 2 & 3 Commitments
The District of Sooke should purchase and loan equipment to stewardship groups for restoration activities.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: $1,600, for initial purchase, plus $200 per year to replace broken items
- potential funding sources: District of Sooke
- implementation schedule: 2010

Status: pending

Stage 1 Recommendation K 7 – *The District of Sooke should support community groups by organizing workshops (e.g. studies from other areas in the CRD).*

Stage 2 & 3 Discussion
It is beyond the resources of the LWMP (Rainwater) project to conduct a broad range of workshops for community groups during the LWMP process. **Appendix 18** provides information on various categories of workshops related to environmental protection. The Appendix also includes a description of each workshops content and potential partners.

Stage 2 & 3 Commitments
The District of Sooke should provide community workshops on environmental stewardship.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: Based on one workshop per year, it is estimated that each workshop would cost approximately $2,000 (space,advertising honourarium and staff time)
- potential funding sources: District of Sooke
- implementation schedule: 2010

Status: pending

Stage 1 Recommendation K 8 – *Support community groups by providing/facilitating Streamkeeper and Shorekeeper training.*

Stage 2 & 3 Discussion

Streamkeepers

The Streamkeepers program was developed by Fisheries and Oceans Canada with the Pacific Streamkeepers Foundation (http://www.pskf.ca/index.html). The objectives of the program are as follows:

- provide volunteers with the training and support required to protect and restore local aquatic habitat
- educate the public about the importance of watershed resources
- encourage communication and cooperation in watershed management

The Streamkeepers Handbook and Modules is the foundation for the program and includes an education component that has been developed from the handbook. There are 14 modules for which training is available:

- introductory stream habitat survey
- advanced stream habitat survey
- water quality survey
- stream invertebrate survey
- storm drain marking
- stream clean up
- streamside planting
- streamside fencing
- observe, record and report
- community awareness
- juvenile fish trapping and identification
- salmonid spawner survey
- creel survey
- stream channel improvement

Community groups or individuals must be trained in the Streamkeepers techniques by a qualified instructor. Qualified trainers are listed here: http://www.pskf.ca/program/trainers/index.html

The training takes approximately two days and the cost is approximately $170 per student. Equipment for performing the assessments is available on loan from the Pacific Streamkeepers Foundation (http://www.pskf.ca/index.html).

Shorekeepers

The Shorekeepers Program (www.keepersweb.org) was developed by Fisheries and Oceans Canada to engage local residents to become stewards of coastal marine ecosystems. It is a monitoring program designed for community groups to

contribute to scientific data collection. It is also an education program aimed at improving the health of coastal ecosystems.

The Shorekeepers' Guide developed by Fisheries and Oceans Canada (DFO) presents an intertidal surveying methodology. The method is presented in a logical step-by-step manner starting from selecting a study area through each type of measurement to entering the field data into the database, and finally, reporting the results.

The program consists of training volunteers to participate in long-term intertidal habitat monitoring. It is a rigorous monitoring method that combines with a database application to allow the data to be analyzed by DFO scientists.

The Shorekeepers' Guide includes a training curriculum for mapping and surveying intertidal habitats. The course teaches participants how to carry out each step of a survey. The training takes three days and can be organized by contacting Fisheries and Oceans Canada Staff from this website: http://www.keepersweb.org/Shorekeepers/Contacts/index.htm

The District of Sooke should work with existing organizations and stewardship groups to create teams of Streamkeepers and Shorekeepers. Organizations that may have interested members or knowledge of active volunteers in the area include the CRD Stormwater, Harbours and Watersheds Program-Integrated Watershed Management Group, T'Sou-ke First Nation and the Sooke Salmon Enhancement Society.

Stage 2 & 3 Commitments
The District of Sooke should facilitate the creation of Streamkeeper and Shorekeeper groups.

- lead agency: District of Sooke to assist in the creation of Streamkeeper and Shorekeeper teams
- primary contact: Municipal Engineer
- human, financial and other resources required: Estimated at $3,000 for staff time, advertising and training for a group of 10 Streamkeepers every three years; Shorekeepers training is provided by DFO at no cost
- potential funding sources: District of Sooke
- implementation schedule: 2011

Status: pending

Stage 1 Recommendation K 9 – *Support community groups by providing political recognition (environmental awards).*

Stage 2 & 3 Discussion
The District of Sooke Volunteer Recognition Program and the CRD's EcoStar programs are suitable for recognizing community contributions to rainwater management and restoration of aquatic habitats.

The District of Sooke Volunteer Recognition Program does not have specific categories, although the criteria for awards are applicable to environmental volunteers. The program provides recognition every two years, the next year being 2010. The program recognizes volunteers that have made significant contributions over a period of 10 or more years. Nominations may be made by non-profit organizations, public institutions, or a group of not less than three individuals unrelated to the nominee. The names submitted are evaluated by a committee appointed to work at arm's length from Council. Application forms are available at the District of Sooke's website at www.sooke.ca.

The CRD's EcoStar Awards Program is an annual event which honours non-profit organizations, community groups, individuals, institutions and businesses who strive to achieve the best in environmental sustainability. There are awards offered in several categories:

- lifetime achievement
- youth achievement (individual)
- youth achievement (group)
- climate action & energy conservation
- environmental education
- environmental innovation
- water stewardship
- land stewardship
- waste reduction

Individuals, groups, organizations and companies can nominate themselves or be nominated by another party. Applications can be submitted by completing the online nomination application or a paper copy, available at the CRD's Fisgard location (625 Fisgard Street, Victoria).

The eligibility criteria include:

- The nominated individual, project, initiative or company must operate/reside within the CRD
- All projects are eligible for an award, regardless of size
- Projects must have been in progress during the previous year

The deadline for nominations and supporting materials is early January/February each year and the awards are given out in April.

More information can be found at http://www.crd.bc.ca/ecostar/index.htm

The District of Sooke should expand its Volunteer Recognition Program to explicitly recognize environmental stewardship and publicize and promote, via its website and other material, the CRD's EcoStar Awards and encourage groups, individuals and businesses active in environmental stewardship to nominate eligible recipients for these awards.

Stage 2 & 3 Commitments
The District of Sooke will expand its Volunteer Recognition Program to include environmental stewardship.

- lead agency: District of Sooke
- primary contact: Manager of Corporate Services/Deputy Clerk
- human, financial and other resources required: $1,000 per year for staff to adapt, promote and deliver an enhanced Volunteer Recognition Program
- potential funding sources: District of Sooke
- implementation schedule: 2010

Status: pending

Section L – Methods to Fund Rainwater Activities

Background
The District of Sooke is taking a proactive step by preparing a Liquid Waste Management Plan (Rainwater). This process will identify the actions that need to be taken to ensure rainwater is properly managed so that freshwater and marine ecosystems are protected and restored. Implementation of the actions identified in this plan will require funding, which will come from all levels of government and external sources.

This section provides a list of possible funding sources to implement the many Recommendations discussed in the LWMP (Rainwater). The projects stemming from the Plan will positively affect water quality and watershed health, including ecosystem restoration.

Stage 1 Recommendation L 1 – *The District of Sooke should explore funding partnerships with provincial and federal government agencies.*

Stage 2 & 3 Discussion
Appendix 19 lists potential funding opportunities for rainwater management and ecosystem restoration. The information is organized according to the eligible agency (municipality, stewardship and community groups, First Nations, businesses and developers, property owners and farmers).

Stage 2 & 3 Commitments
The District of Sooke should investigate opportunities to fund rainwater management and ecosystem restoration projects.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: staff time to develop partnerships and apply for funding, matching funding may be required depending on the program
- potential funding sources: see descriptions above
- implementation schedule: 2010

Status: ongoing

Stage 1 Recommendation L 2 – *The District of Sooke should partner with the CRD, stewardship groups, T'Sou-ke First Nation and businesses to obtain grants for rainwater management facilities and the restoration of aquatic ecosystems.*

Stage 2 & 3 Discussion
This Recommendation is addressed under L 1.

Stage 1 Recommendation L 3 – *Ensure that the District has the proper authorities in place to require developers to carry the costs of rainwater management associated with land development.*

Stage 2 & 3 Discussion

The District's development cost charge bylaw (DCC) is under review at this time by consultants and staff. The following statement has been provided to the District for inclusion in the proposed DCC bylaw:

> "All developments shall provide on-site rainwater management. Each lot shall contribute funds as set out in the Schedules to the DCC bylaw toward the installation, operation and maintenance of municipal rainwater systems. Where a development exceeds ten new lots, specific on-site rainwater management shall be provided and funds as set out in the DCC bylaw shall be paid to ensure long term maintenance of the new on-site systems."

The dollar value set out in the DCC bylaw will be established by the District from time to time and the Schedule to the DCC bylaw will be amended accordingly.

A statement has been prepared and provided to those involved in the preparation of the OCP.

Stage 2 & 3 Commitments

The District of Sooke should prepare a statement on development cost charges for inclusion in the OCP.

- lead agency: District of Sooke
- primary contact: Director of Planning
- human, financial and other resources required: Existing budgets
- potential funding sources: District of Sooke
- Implementation schedule: 2010

Status: complete

Stage 1 Recommendation L 4 – *Explore methods available to the District to accumulate funds for the installation, operation and maintenance of rainwater management facilities. These could include development cost charges or the establishment of a rainwater utility.*

Stage 2 & 3 Discussion

See Recommendation L 3 for a discussion of development cost charges.

The authors have contacted three municipalities that have or are contemplating establishing rainwater management utilities:

- The District of North Vancouver established a rainwater utility by bylaw. However, this bylaw has been difficult to manage and will be rewritten in the next two years or as staff time permits.
- The District of Surrey has a rainwater utility and advises that it is working. However, staff report problems related to the equitable sharing of utility costs between traditional piped development and those that use open channel flows. Therefore, no further effort will be expended on this.
- The District of Saanich is currently reviewing its options for a rainwater utility but is facing the same challenges as Surrey in ensuring equitable cost sharing of the utility charges.

At this time, most municipalities depend upon their development cost charge bylaws as well as annual capital and/or maintenance budgets to operate and maintain their rainwater systems.

Stage 2 & 3 Commitments
The District of Sooke should explore other methods of accumulating funds for rainwater management.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required: Existing budgets
- potential funding sources: District of Sooke, provincial grants may be available to assist with the development of Rainwater Management Utilities
- implementation schedule: 2010

Status: complete

Section M – Regulatory Mechanisms (includes discussion on policies, guidelines and options)

Background

In British Columbia, the Community Charter has vested the responsibility for drainage with municipalities and enabled local governments to address rainwater management. The challenge faced by municipalities is determining how to manage drainage while protecting downstream freshwater and marine ecosystems.

Stage 1 Recommendation M 1– *Ensure that the District is acting in compliance with all provincial and federal regulations relating to rainwater.*

Stage 2 & 3 Discussion

The federal, provincial and regional governments have established regulations, policies, guidelines and options for the management of rainwater and the protection and enhancement of aquatic systems. **Appendix 20** provides a summary of federal and provincial regulations, requirements and guidelines and a review of Sooke's applicable bylaws.

To ensure compliance with federal and provincial regulations related to rainwater management and protection of aquatic ecosystems, the District of Sooke should:

- Approve the updated OCP and other planning documents with rainwater management and aquatic ecosystem protection components, including input provided by the LWMP (Rainwater) Stage 2 &3 consultants.
- Approve the updated draft *Subdivision and Development Standards Bylaw 404*.
- Update the Zoning Bylaw to include all watercourses covered by the Riparian Areas Regulation, including mapping their locations. The bylaw should also require compliance with Section 9 of the provincial *Water Act* for work in and adjacent to watercourses.
- Implement a Rainwater Protection Bylaw, as per Recommendation B 1.

Stage 2 & 3 Commitments

The District of Sooke should adopt/update its bylaws and policies to ensure compliance with federal and provincial regulations.

- lead agency: District of Sooke
- primary contact: Municipal Engineer
- human, financial and other resources required : Addressed throughout this plan
- potential funding sources: District of Sooke
- implementation schedule: 2010

Status: ongoing

Sooke Lift Station Overview – Protection of the Environment

Introduction

An important element of wastewater lift station design and operations is the protection of the environment and the public from exposure to raw wastewater. A multiple barrier approach is used to minimize the risk of a wastewater overflow from a lift station. The key elements are contained in the design, operations, maintenance and emergency response procedures for the lift stations.

Design

Many elements were incorporated into the design of the lift stations in Sooke to minimize the risk of an overflow. These elements include:

- Pumps – each lift station is equipped with two pumps, and the pumps have enough capacity to provide full backup in the case of a pump failure. The pump control system is also designed to prevent overflow situations. Normally one pump runs at a time, and the second pump will start running if the first pump isn't able to handle the flow coming into the lift station.
- Level monitoring – each lift station is equipped with two level monitoring systems to provide full backup for alerting operators of high level conditions. The primary monitoring system is with a level transmitter that controls when the lift station pumps start and stop to keep the wastewater level in the station within a normal operating range. This monitoring system will send out an alarm if the wetwell level reaches the high level alarm point. A second monitoring system with flygt bulbs will send an alarm if a high high level is reached in the wet well, providing full redundancy for alerting the operator of a problem with the lift station.
- Remote monitoring - Each lift station is equipped with a control system that communicates back to the wastewater treatment plant SCADA control system. The WWTP SCADA has remote monitoring operations capabilities that allows operators to monitor the plant from other EPCOR facilities or from other internet connections. This allows operators to monitor the operation of the lift station on an ongoing basis without having to be at the lift station. The communications systems for lift stations and WWTP SCADA are monitoring continuously by the EPCOR IT department, and the onsite operator is notified of any problems with the system.
- Alarm systems – all alarms from the lift station are routed to the WWTP SCADA system. The alarms appear on the control system, and sends out a signal to an alarm monitoring company. The company then sends out an alert to the on-call pager that is carried by an operator at all times. If the alarm is not acknowledged, the company escalates the alarm through a list of contact phone numbers within Sooke and the EPCOR BC Operations until a response is received. This provides multiple levels of redundancy to ensure a response to an emergency situation.
- Power outages – each lift station is provided with a diesel powered emergency power generator to operate the facility in the case of a power outage. The generators automatically start running if the power supply to the lift station is interrupted.

Operations & Maintenance

The lift stations are inspected regularly and the wet well and level sensors are cleaned as identified in the inspections. The lift station generators are run periodically to ensure they are functioning properly. Annual maintenance is conducted on the pumps and generators and other major pieces of equipment.

Emergency Response Procedures

Procedures for responding to various situations that could occur in the collection system, lift stations or the WWTP are contained in the EPCOR Sooke Operations Manual and the EPCOR Sooke Emergency Response Plan. The following are highlights from the response procedures that would be initiated if an operator was responding to a wastewater overflow at a lift station:

- Assess Situation
- Initiate Notifications as appropriate during response
  - Internal and External Notifications to EPCOR staff & safety departments, District of Sooke, and Provincial Emergency Program (PEP, Ministry of Environment, Department of Fisheries & Oceans, Vancouver Island Health Authority, etc) as appropriate depending on specific incident
- Ensure Safety
  - Ensure Personal, Public, and Environmental Safety
  - Secure site; use appropriate Personal Protective Equipment
- Contain the Spill
  - Minimize contamination; contain as close to the source as possible.
  - Block flow from culverts and ditches
- Stop the Overflow if possible
  - Ensure lift station pumps are running
  - Call in vacuum trucks to lower level in wetwell
- Decontamination/Disposal
  - Remove contaminated material and restore site
- Complete Incident Report

Sooke Wastewater Spill Overview – Protection of the Environment

Introduction

An important element of wastewater system design and operations is the protection of the environment and the public from exposure to raw wastewater. A multiple barrier approach is used to minimize the risk of a wastewater overflow.

Emergency Response Procedures

Procedures for responding to various situations that could occur in the collection system, lift stations or the WWTP are contained in the EPCOR Sooke Operations Manual and the EPCOR Sooke Emergency Response Plan. The following are highlights from the response procedures that would be initiated if an operator was responding to a wastewater overflow at a lift station:

- Assess Situation
- Ensure Safety
  - Ensure Personal, Public, and Environmental Safety
  - Secure site; use appropriate Personal Protective Equipment
- Stop the Overflow if possible
  - Ensure lift station pumps are running
  - Call in vacuum trucks to lower wetwell level
  - Call in other support contractors as necessary (electrical, mechanical, excavation, etc.)
- Initiate Notifications as appropriate during response
  - Internal and External Notifications to EPCOR staff & safety departments
  - District of Sooke
  - Provincial Emergency Program (PEP, Ministry of Environment, Department of Fisheries & Oceans, Vancouver Island Health Authority, etc) as appropriate depending on specific incident
  - Local businesses and residents as appropriate
- Contain the Spill
  - Minimize contamination; contain as close to the source as possible.
  - Block flow to culverts and ditches if appropriate
- Decontamination/Disposal
  - Remove contaminated material and restore site
- Complete Incident Report

District of Sooke - Stormwater, Harbours & Watershed Program Evaluation

Bacterial Source Tracking
Bacterial Source Tracking (BST) is a tool used by the Stormwater, Harbours and Watersheds Program (SHWP) to determine whether fecal coliform bacteria found in water samples are from humans or animals. In some cases, BST can identify the specific species of animal. Field staff can more rapidly and accurately narrow down the source(s) of rainwater contamination by using BST. BST has proven to be a powerful tool during upstream investigations to determine contaminant sources.

An example of the application of BST technology is during marine surface water monitoring. In the past, samples with high fecal coliform concentrations might have been suspect in areas with high bird concentrations. Now, BST will often allow field staff to take such “natural contamination” sources into account during data analysis.

Monitoring of Major Watercourses
Watercourses in the District of Sooke have been degraded to various degrees. However, most, if not all, of the watercourses that flow through Sooke still maintain water quality and watercourse characteristics that allow for the survival of fish. It is important that the monitoring of significant watercourses continue in order to help in our understanding of the health of Sooke’s watercourses and those watercourses that Sooke shares with its neighbours. Ongoing monitoring will also track trends and any changes that may be occurring. A watershed based approach to watercourse management is discussed at length in Section C.

Marine Surface Water Monitoring
Marine surface water sampling is carried out in Sooke Harbour, Basin and Inlet twice a year during winter and summer when conditions are considered representative of wet and dry periods. The Harbour and Basin are embayed with low flushing characteristics and therefore contaminant input should be strictly monitored and controlled. The twice annual marine monitoring program is an important component of the SHWP and should continue. The data provides valuable information about the heath of Sooke Harbour and Basin and monitors these water bodies for change.

Modifications to the marine monitoring program may result if the District of Sooke requests that the SHWP become involved in the proposed project to work toward opening Sooke Harbour and Basin to the recreational harvesting of shellfish. (Recommendation G 5).

Use CRD monitoring data to determine where best management practices may be required.
The existing SHWP monitoring program assigns rainwater discharges with a high, moderate or low level of public health concern based on fecal coliform concentrations. The SHWP also assigns a high, moderate or low level of environmental concern to selected discharges based on chemical contaminant levels in sediments associated with rainwater discharges. All discharges that receive a high rating should receive attention to determine and eliminate the source(s) of contamination. This attention should include the use and promotion of best management practices.

Monitor the effectiveness of various best management practices.
When rainwater flows and/or watercourses are found to have elevated levels of biological or chemical contaminants, then SHWP staff and others will use various techniques to identify

and eliminate the contamination at source. These efforts can be time consuming and expensive and they are not always successful.

Best management practices (BMPs) describe structural and nonstructural methods and activities that are effective in reducing rainwater contamination. BMPs are often practical and inexpensive ways of protecting rainwater quality. Examples of BMPs include spill response kits for businesses, erosion and sediment control plans, bioretention facilities and public education programs such as the painting of yellow fish on storm drains.

Expanding the existing CRD rainwater monitoring program to include investigations of the effectiveness of various BMPs would require an unrealistic level of effort and expense. However, during the course of a year, SHWP and District staff will likely see BMPs being applied in Sooke. These observations will often provide an indication of the effectiveness of the BMP. This information could easily be recorded and then shared with the community by inclusion in the annual report. This would also provide an opportunity to acknowledge individual activities that protect human health and the environment. Recognizing the use of innovative or effective BMPs could also support Recommendation K 9 – *Provide political recognition (environmental awards).*

Integrate precipitation information into the monitoring program data analysis.
At present, the SHWP rainwater discharge surveys sample discharges once during the summer dry period and once during the winter wet period. Efforts are made by the SHWP staff to collect samples on days considered representative of these two periods by avoiding extreme weather conditions such as heavy rains that lead to first-flush conditions.

Rainfall, snowmelt and extended dry periods can significantly impact land wash, flow and dilution rates and groundwater and surface water characteristics, including the entrainment of contaminants. These and other precipitation related factors can have large effects on biological and chemical concentrations in stormwater flows.

To date, the SHWP sampling program has worked well in identifying contaminant levels. However, it is likely that some contaminated flows are being inappropriately rated because precipitation prior to sampling has been too little (low or no flow) or too great (dilution). Therefore, SHWP and Sooke staff should discuss precipitation data playing a larger role in determining the risk to human health and the environment posed by rainwater discharges.

The SHWP should also utilize precipitation data to determine fecal coliform contaminant loading estimates for each discharge. This would provide valuable information to assess risk and would be particularly useful if the shellfish project outlined in Recommendation G 5 proceeds. The District of Sooke installed a precipitation gauge in May 2009.

Source Control Approach
The SHWP offers the District of Sooke a comprehensive rainwater source control approach to contaminants management. Source control is a logical and sustainable approach to contaminants management. A source control approach works with businesses, institutions and other stormwater users to identify and stop contamination before it enters the rainwater system. A typical program would consist of the adoption of regulations and best management practices, inspections of businesses and institutions, enforcement as required, education of businesses, institutions and residents and monitoring for compliance and reporting.

Recommendation B 1 provides an in depth discussion of the model *Rainwater Protection Bylaw* and related codes of practice. The bylaw and codes are the regulatory components of a comprehensive source control approach.

Businesses can be regulated but the community must be made aware of how individual actions can cause problems in the environment and that alternatives are available to manage wastes in a responsible manner.

Other SHWP activities related to rainwater source control can be found in Recommendations B 10 and B 12.

Assess the effectiveness of the sewage collection system and monitor for change.
Annual monitoring provides an opportunity to assess the effectiveness of the recently completed sewage collection and treatment system within the sewer specified area of the District of Sooke. The SHWP have begun to analyze field data with the knowledge that almost all facilities within the sewer specified area are now connected to the sewage collection system. Bacterial source tracking has therefore become more important as upstream investigations become more focused. Some sources of fecal coliform have been traced back to sources outside the District of Sooke. Upstream investigations are scheduled to continue, as is the marine monitoring component. These efforts will assist the SHWP in determining the effectiveness of the sewage collection system at removing contaminants from the environment. The SHWP efforts also provide a method of monitoring for problems that may arise with the sewage collection system.

The SHWP provides valuable services to the District of Sooke and the annual contract and reporting protocols should be continued. The SHWP is also active in the Juan de Fuca Electoral Area, which creates cost saving efficiencies that benefit both jurisdictions and allows for a watershed based approach to public health and environmental protection.

Review of Sooke Watersheds

Upper Sooke River

The Upper Sooke River watershed lies above the waterfall located about 8 km upstream from the mouth. It drains approximately 27,000 ha. Privately owned timber companies have the timber rights to a large portion of the drainage area. Within the District of Sooke, land use is primarily forestry related. Resident rainbow and cutthroat trout inhabit the system.

The Sooke River originates at the outlet of Sooke Lake, which drains a hilly region in the northeast portion of the watershed (7,800 ha.). The river flows in a southerly direction for a length of 19.5 km. Sooke Lake (428 ha) is the main reservoir for the Capital Region District water Department. Stream flows in the Sooke River are dependent partially on the Sooke Lake releases. There are generally no releases of water during the summer dry period but considerable release to the river during the winter months when the reservoir is full. The Leech River (drainage area 10,400 ha) provides the majority of flow to the Sooke River for most of the year when the reservoir is not spilling. The Sooke River drains into Sooke Harbour. There are 14 lakes in the Sooke River watershed which help attenuate stream flows and provide fish habitat.

De Mamiel Creek

The De Mamiel Creek watershed is the second largest watershed in the District of Sooke and is used as a source of drinking water. It drains 3,985 ha and joins Sooke River near the mouth from the west. The watershed is mainly forestry land in the Juan de Fuca Electoral Area. Within the District of Sooke, the land uses include residential, agricultural, logging and placer mining. Development is proposed in the Helgesen Creek watershed which is tributary to De Mamiel. Rainwater management needs to be considered for this watershed. Documented fish species include: steelhead, coho and chum salmon, rainbow and cutthroat trout, and small mouth bass.

Veitch Creek

Veitch Creek watershed lies in the eastern part of the District and drains into Sooke Basin, where the habitat sensitivity of the marine environment is rated high. The watershed crosses three jurisdictional areas: the District of Sooke, District of Metchosin and Juan de Fuca electoral area. The upper portion of the watershed is second growth forest with woodlands, rock outcrops and wetlands. Parts of the lower watershed have been developed for rural residential use and the creek is used as a source for drinking water. A small amount of future development is expected. An impassable waterfall is located approximately 200 metres upstream of the mouth of the creek. Below the falls, anadromous cutthroat trout, steelhead, chum and coho salmon are found. Resident cutthroat trout reside above the falls.

Charters River

The Charters River watershed is east of the Sooke River watershed and is one of its major tributaries. The part of the watershed within the Sooke Mountain Provincial Park is protected. Other areas are subject to active logging under a Tree Farm License or are occupied by rural residences. Little development is proposed for the area. Steelhead, coho, chum and chinook salmon, as well as cutthroat and rainbow trout, inhabit the watershed.

Ayum Creek
Ayum Creek watershed lies in the eastern part of the District and drains to Sooke Basin, where the habitat sensitivity of the marine environment is rated high. The watershed is shared by three jurisdictional areas: the District of Sooke, District of Metchosin and Juan de Fuca electoral area. The upper portion of the watershed consists of second-growth forest. Parts of the lower portion of the watershed have been developed for rural residential uses and the creek is source of for drinking water. A small amount of future development is also proposed. Ayum Creek supports anadromous cutthroat trout, steelhead, coho and chum salmon, as well as small mouth bass. Resident cutthroat trout and rainbow trout reside in Glinz Lake.

Wildwood Creek
Wildwood Creek (aka Matheson Lake Creek) drains into Roche Cove at the east end of Sooke Basin. Marine habitats at the location are rated “high” sensitivity. The upper watershed has been developed for single family residential use and the lower watershed is forested and protected within regional parks. Fish values in the watershed are cutthroat trout, small mouth bass, and coho salmon.

Lower Sooke River
The lower Sooke River watershed lies below the waterfall, approximately 8 km upstream from the mouth. The waterfall prevents anadromous fish from migrating further upstream. This section of the river is fished by the T’Sou-ke First Nation and sport fishers. Forested riparian zones and wetlands have been identified near the mouth. A variety of land uses including residential, agricultural, commercial and industrial have impacted the watershed and further development is expected. This section of the river plays an important role in rainwater management for the District of Sooke. Steelhead, coho and chum salmon, rainbow and cutthroat trout and Dolly Varden char are found in the lower part of the watershed.

Kemp Stream
The Kemp Stream watershed is one of the two most western watersheds in the District of Sooke, draining to Sooke Bay. In very dry summer months, such as in the summer of 1998, no water was observed in the stream. This watershed has been developed for rural-residential and industrial uses. The stream flows from Kemp Lake which provides potable water for the Kemp Lake Water District. The watershed lies in the designated Urban Containment Area and residential and industrial development is expected to continue. Fish presence in the watershed includes small mouth bass, rainbow trout and cutthroat trout (stocked).

Nott Brook
Nott Brook is a medium sized watershed and the largest watershed entirely within the District of Sooke. The brook drains into Sooke Bay, where the marine receiving waters are rated high sensitivity. Mapping of this watercourse and Wright Road Creek varies depending on the source. This watershed has been extensively developed and further development is expected. Water quality is a concern and significant rainwater management measures need to be considered for this watershed. The watercourse is currently used by cutthroat trout.

Lannon Creek
The Lannon Creek watershed is located near the foreshore area draining into Sooke Basin just east of Billings Spit, where the habitat sensitivity of the marine environment is rated high. The upper portion of the watershed is protected in the Sea to Sea Green/Blue Belt Lands

Reserve. The lower portion of the watershed has been developed for rural residential and agricultural uses. Additional residential development is expected in the future. The watershed has been subjected to fecal coliform contaminated runoff. Cutthroat trout, steelhead, coho and chum salmon use this watercourse.

Baker Creek
The Baker Creek watershed is small and the creek drains into the Sooke River from the east. This watershed is located completely within the District of Sooke. The watershed has been developed for agriculture, residential and industrial uses and further development is also proposed. Cutthroat trout and (unspecified) salmon use the watercourse.

Ella Stream
This small watershed drains into Sooke Bay. The watershed contains forestry and industrial land use, and is currently undergoing extensive development. Due to expected development, rainwater management planning is crucial to maintain the health of Ella Stream. This watercourse provides habitat for cutthroat trout.

Alderbrook Stream
Alderbrook watershed drains into the Sooke River estuary. The watershed consists of residential and industrial (gravel pit) land uses. Cutthroat trout have been observed in the watercourse.

Throup Stream
Throup Stream is a small watershed within the District of Sooke which drains into the Sooke River estuary, where the marine receiving waters are rated high sensitivity. This watershed has been extensively developed and further development is expected. Water quality is a concern and significant rainwater management measures need to be considered for this watershed. The watercourse is home to coho and chum salmon.

Gillespie Creek
Gillespie Creek watershed is primarily within Forest Land Reserve and Roche Cove Regional Park. It drains into the west end of Sooke Basin, where marine habitats are rated moderate sensitivity. The upper watershed is older second growth forest and rural residential makes up the lower watershed. Intensive future commercial/recreational development is proposed within the watershed. Fish presence is unknown, but potential fish habitat is located downstream of Gillespie Road.

Broom Hill Stream
Broom Hill Stream watershed is one of the two most western watersheds in the District of Sooke, draining to Sooke Bay. In very dry summer months, such as in the summer of 1998, no water was observed in the stream. This watershed has been developed for rural residential and industrial uses. The watershed lies in the designated Urban Containment Area and development is expected to continue. Fish presence is unknown however potential for fish production exists in the lower reaches.

Grouse Brook (Hunden Brook in SHIP Report)
Grouse Brook drains into Sooke Inlet across from Whiffin Spit. The marine receiving waters are rated as moderate sensitivity. The upper watershed is forested and located in East Sooke Park. The lower watershed has been developed for single family residential development and

further development is proposed. No fisheries records were found however initial assessments by SHIP Environmental note that the watercourse could support cutthroat trout and coho salmon.

Wright Road Creek
Wright Road Creek is a small watershed within the District of Sooke which drains into Sooke Harbour, where the marine receiving waters are rated high sensitivity. Mapping of this watercourse and Nott Brook varies depending on the source. This watershed has been extensively developed and further development is expected. Water quality is a concern and significant rainwater management measures need to be considered for this watershed. The watercourse is currently used by stickleback, but has the potential to provide habitat for cutthroat trout and chum salmon, which were found here in the past.

Unnamed -Silver Spray (Grouse Brook in SHIP Report)
This unnamed watercourse at the north end of the Silver Spray development drains into the mouth of the Sooke Inlet. The marine receiving waters are rated as moderate sensitivity. The upper watershed consists of older second growth forest, the lower portion is in agricultural production and the watercourse is ditched. Some development is proposed for this watershed. There are currently no records of fish presence. The watercourse is accessible from the marine environment but is in poor condition in the lower reaches.

Existing Reports Containing Ecological and Geophysical Information

Author	Date	Title	In Sooke's Library
GENERAL WATER QUALITY			
Aquametrix	1989	Water Quality Assessment and Provisional Water Quality Objectives	Y
Aquametrix Research Ltd.	1991	1990 Sooke Harbour and Basin Water Quality Monitoring Program	Y
Aquametrix Research Ltd.	1992	1991-2 Sooke Harbour and Basin Water Quality Monitoring Program	Y
Aquametrix Research Ltd.	1995	1994 Sooke Harbour and Basin Water Quality Monitoring Program	Y
Aquametrix Research Ltd.	1996	1995 Sooke Harbour and Basin Water Quality Monitoring Program	Y
CRD	2007	2005/2006 Stormwater Quality Report District of Sooke	Y
CRD	2002	2001/2002 Stormwater Quality Report Juan De Fuca Electoral Area	Y
CRD	1998	Stormwater Quality Survey Sooke – 1998	Y
CRD	2001	Stormwater Quality Annual Report 2001 District of Sooke-draft	Y
CRD	2004	Stormwater Quality Annual Report 2003 District of Sooke-draft	Y
CRD and Acres International	1989	Sooke Harbour, Basin, and Inlet Management Plan	Y
CRD	2002	Stormwater Quality Annual Report 2001: District of Sooke	Y
CRD	2000	Stormwater Quality Survey 1999 Sooke Bay, Inlet, Harbour, Basin	Y
CRD	2003	Stormwater Quality Annual Report 2002: District of Sooke	Y
CRD	2001	Stormwater quality Annual Report 2000: District of Sooke	Y
Enkon Environmental Ltd.	2002	Veins of Life - Marine Sooke Basin Quality Survey	Y
Roberts, Wayne, Rob MacRae, and Lori Stahlbrand	1992	Sooke Water Quality Study	Y

Author	Date	Title	In Sooke's Library
GEOPHYSICAL			
Associated Engineering		Technical Memo - Stage 2 Liquid Waste Management Plan, Suitability of District Soils for On-Site Wastewater Treatment	Y
District of Sooke	2001	Geo-Environmental Investigation-Sooke Village Sewerage Study Sooke, BC	Y
Professional Environmental Recreation Consultants Ltd.	1990	CRD Sand and Gravel Study	Y
Stantec	2004	Archeological Overview Assessment-Proposed Grant Road Connector	Y
Stantec	2004	Proposed Grant Road Connector District of Sooke Review of Secondary Environmental Information	Y
?	2004	Geotechnical Overview Report, Grant Rd. Connector	Y
Thurber Engineering Ltd	2002	Sooke Sanitary Sewer Project Phase 1 -Geotechnical investigation	Y
WATERSHED-BASED STUDIES			
Golder & Associates Ltd. (for CRD Water Services)	2007	Sooke River Watershed Inventory and Risk Assessment, Available from CRD Water Services	N
Integrated Environmental Consultants	1999	Lower Sooke River Watershed Non-Point Source Assessment: Impact on the Sooke Estuary	N
Lightly and Lightly	1999	An Overview Assessment of the Sooke River Watershed. Vancouver Island BC.	Y
SHIP Environmental	1999	Prioritization of Significant Watersheds Draining to Sooke	Y
The Society for the Protection of Ayum Creek	1999	The Historical Background of Ayum Creek	Y
Waterose Environmental	1999	Sooke River Twelve Month Baseline Water Quality Study for Salmonids	N

Author	Date	Title	In Sooke's Library
MISCELLANEOUS			
BC Ministry of Attorney General	1980	Sooke Harbour & Basin Crown Foreshore	Y
BC Ministry of Water, Land, and Air Protection	2000	Sensitive Ecosystems Inventory 1993-7, Volume 2: Conservation	Y
BC Ministry of Water, Land, and Air Protection	1998	Sensitive Ecosystems Inventory 1993-7, Volume 1	Y
British Columbia	2006	Sunriver Covenants 2C	Y
British Columbia	2005	Silver Spray Covenants, Easements	Y
CRD Environmental Services	1999	Management Plan for Sooke Hills Wilderness & Mount Wells	Y
CRD Environmental Services	2001	Sooke Hills Wilderness and Mount Wells Regional Parks Plan	Y
CRD Municipal Services	2000	Management Plan for Sooke Hills Wilderness & Mount Wells	Y
Downstream Environmental Consulting Ltd.	2005	Inventory and Assessment of Watercourse Mapping, Stormwater Quality and Watershed Information	Y
District of Sooke	2005	District of Sooke Inventory of Community Parks and Walkways	Y
District of Sooke	2002	Foreshore Access Report District of Sooke 2002	Y
District of Sooke	2002	Marine Environmental Impact System for the Proposed New Wastewater Treatment Plant	Y
District of Sooke	2003	Sewer / LWMP	Y
District of Sooke	2005	Sooke Sewer System: Environmental Management Plan	Y
Lidstone, Young, Anderson	1999	August 1999 Parks Inventory Report	Y
Thurber Engineering Ltd	2002	Sooke Core Area Quantification of In-ground Sewage System Failures	Y
Urban Systems	2002	Sooke Waste Water Treatment Plant Project Environmental	Y

Rainwater Management Components Added to Final Draft of the Official Community Plan

The following sections of the District of Sooke Official Community Plan, Final Draft were developed with significant involvement from the LWMP (Rainwater) consultants:

3.2 Guiding Principles

3.2.3 Environmental Stewardship

Sooke will achieve environmental sustainability through the following:

- Working in partnership with T'Sou-ke Nation to enhance environmental stewardship;
- Protecting the natural environment through efficient use of land, energy, water and other resources;
- Protecting and enhancing the marine-receiving environments of the Sooke Harbour and Basin;
- Encouraging individuals and the community to take responsibility for the appropriate handling and disposal of their wastes;
- Protecting and maintaining aquatic ecosystems (lakes, wetlands, rivers, streams, etc.);
- Ensuring wastes associated with the cleaning of streets, parking lots and rainwater conveyance systems are handled and disposed of, in an environmentally responsible manner;
- Participating in project(s) that work toward the protection and enhancement of the Sooke Harbour and Basin such as initiatives to open shellfish beds presently closed to recreational harvesting;
- Working with the Ministry of Forests and Range to minimize the downstream impacts from timber harvesting on Crown land and with the Private Managed Forest Land Council for timber harvesting on private land. Areas of concern should include all of the District of Sooke as well as those portions of watersheds that Sooke shares with the neighbouring jurisdictions;
- Working with the Ministry of Agriculture and Lands to minimize downstream impacts from agriculture and livestock activities;
- Providing increased public access to forest, ocean and rivers wherever possible;
- Encouraging mixed land uses and growth in existing developed areas;
- Building compact neighbourhoods;
- Encouraging "green" technologies;
- Preserving environmentally significant areas, including environmentally sensitive areas, vistas and agricultural lands;
- Protecting wildlife habitats and corridors;
- Preserving, enhancing, rehabilitating and/or restoring existing landscape, including trees; and
- Encouraging existing industry, residents and the municipality to become more environmentally sustainable.

7.5 Development Permit Area (DPA) # 2 – Community Growth Areas and Comprehensive Development Designated Areas

7.5.4.2 Environmental Protection

Developments in this area shall follow the Provincial Riparian Area Regulations as determined by a qualified environmental professional and should include:

1) information regarding potential impacts of the proposed development, mitigation options and design alternatives;
2) evidence that the development will not result in Harmful Alteration, Disruption, or Destruction (HADD) of riparian areas;
3) indicate that the slope stability will not be jeopardized if the area has a slope of 30% or more(i.e. geotechnical study); and
4) identifies measures that will be required to maintain the integrity of the riparian area.

In areas of possible poor drainage as identified by Sooke staff and confirmed through a qualified professional, a drainage plan must be completed and include recommendations for implementation with the proposed development. The drainage plan shall aim to minimize to the fullest extent the impact the development may have on the riparian area, while developing and when built. The drainage plan must include recommendations that address the following factors:

1) water quality;
2) water quantity;
3) erosion control;
4) impact on fish and wildlife habitat;
5) physical riparian functions; and
6) demonstrate how water is managed on-site and the downstream impacts of runoff are mitigated.

A Qualified Environmental Professional (QEP), in conjunction with a landscape architect, is required to provide a landscape plan if the proposed area to be developed was previously cleared of native vegetation, or is cleared during the process of development. Conditions and requirements respecting implementation of the vegetation management may be specified in a development permit. Vegetation species used in replanting, restoration and enhancement shall be selected to suit the soil, light and groundwater conditions of the site. On undeveloped properties, existing trees and significant stands of trees, other native vegetation, and significant geophysical features are to be retained to the fullest extent possible.

Appendix 1 – Physical Context

Rainwater

As part of the grant criteria for the sewer collection system the District of Sooke was required to complete a provincially mandated Liquid Waste Management Plan (LWMP). The 3 stage LWMP process involves evaluation of the way wastewater (rainwater and sanitary sewage) is managed in the community and the development of a long term plan for improved rainwater and sanitary waste management.

The District of Sooke developed the LWMP rainwater and sanitary components separately. It is expected the LWMP will be complete by Spring, 2010. Stage 1 of this plan for both components focused on background data, general servicing and treatment options. Stage 2 and 3 of the LWMP (rainwater), ensures that municipal rainwater infrastructure is developed in a manner that will result in healthy watercourses and healthy near-shore marine environment, that low impact development techniques are employed and biological and chemical contaminants do not enter rainwater flows. Stages 2 and 3 (sanitary) investigated how future development will be serviced, and the beneficial reuse opportunities of solids and sludge's. The final stages of the LWMP are to amend existing bylaws and draft new bylaws to implement these plans. The Subdivision and Development Standards bylaw is being amended to ensure the goals of the LWMP are being reflected.

The philosophy is to design with nature using rain gardens, green roofs, permeable pavements, swales and created wetlands, and to use the traditional pipe systems only when the "green" way is impractical.

There are eighteen water courses (nineteen watersheds – two for Sooke River-upper and lower) within the District of Sooke. Storm drainage consists mainly of open ditches, culverts and natural drainage courses. Some newer subdivisions, strata subdivisions and the town centre commercial core consist mainly of underground storm drains; however, most also have rainwater detention systems incorporated in the designs. The town centre drainage is an enclosed system.

The older underground storm drain systems consist mostly of concrete pipe, corrugated metal pipe and even a section of wood-stave piping. The actual condition and location of these systems is sometimes unknown, with no available record drawings. Some systems are known to be undersized. Many of these older systems run through private property and are unsecured. The drainage systems along Highway 14 through the town centre core consist of undersized pipes in deteriorating condition.

Recently installed storm drain systems consist of curbs, gutters and catch basins and pipes to open water discharge. These systems are designed to be environmentally responsible and include retention ponds and oil/grit separators where warranted. Developers are required to ensure post-development rainwater flows are no greater than predevelopment flows. Storm drainage systems within new developments are contained within road allowances or registered statutory rights of way.

The District is currently upgrading its Engineering Specifications. These new specifications require that all new developments adopt Low Impact Development (LID) standards, which include rainwater management throughout the developments as well as addressing downstream impacts. The bylaw requires streams, ditches, ponds and wetlands be preserved and that each individual lot adequately detain or contain rainwater generated on the lot. Rainwater leaving any site will be required to be carefully designed to incorporate managed runoff patterns, which optimize ground absorption, evapotranspiration, detention and water balancing techniques.

The District of Sooke, in partnership with the Capital Regional District (CRD), monitors rainwater discharge and quality in all piped or open channel marine discharges, and samples marine surface water, to determine if any catchment contains contaminants.

Subsequently the CRD works with District staff to locate the source of contamination and resolve the matter. This monitoring program will continue as the community expands.

It is the District of Sooke's goal to maintain and enhance the natural environment, including the surface water runoff channels. All new development will assist in protecting the existing streams and enhancing sections of the downstream systems that may have been impacted by previous activities.

The District of Sooke is widely known for its wealth of freshwater systems and Sooke Harbour, Basin, Inlet and Bay into which they discharge. These natural systems have come to define the District of Sooke and are an important component of the Sooke economy.

The rainwater collection and conveyance systems in Sooke are comprised of limited piping and consist largely of ditches, watercourses and wetlands. These constructed and natural systems and the marine near shore environment are subject to detrimental impacts from biological and chemical contaminants. Contaminated rainwater flows can result in beach closures, disease in the human population, shellfish closures, contaminated sediments and groundwater and fish kills.

One of the most effective methods of protecting Sooke's infrastructure, watercourses and the near shore marine environment from rainwater-carried contamination is to ensure that contaminants do not enter flows in the first place. It is clearly better to institute a source control method approach to contaminants management and environmental protection. A source control approach works with businesses, institutions and other rainwater collection system users to identify and stop contamination before it enters the rainwater system. A typical program would consist of the development of regulations and best management practices, inspections of businesses and institutions, enforcement as required, education of businesses, institutions and residents, and monitoring for compliance and reporting.

Open Shellfish Beds for Recreational Harvesting

Currently, all of Sooke Harbour and Basin are closed to the recreational harvesting of shellfish due at least in part to bacterial contamination. Rainwater flows and watercourses are the primary pathway for biological contaminants from the land to the marine environment. Discharges from boats and marinas can also provide contaminants.

Shellfish are an important and traditional source of food for First Nations and they have expressed interest in working toward opening shellfish beds to recreational harvesting. The health of shellfish beds and harvesting opportunities are also important issues for the rest of the community.

The marine receiving environments of Sooke Harbour and Basin are embayed and sensitive areas with very low flushing rates. If contaminant levels in the marine receiving environment can be lowered, then consideration could be given to relaxing or removing some of the present restrictions on shellfish harvesting. This would clearly show that contaminants were being managed more appropriately than at present. Federal water quality criteria for shellfish are stringent and if those criteria can be met, then the District of Sooke and all those involved with Sooke Harbour and Basin should have a high level of confidence that their contaminant management efforts have been successful. Healthy, uncontaminated shellfish beds can be an excellent indicator of how the District of Sooke, neighbouring jurisdictions and the community are managing contaminants at source.

Efforts to open shellfish beds will also require marine based initiatives such as providing land based sewage pump out facilities for boats, implementing restrictions on sewage discharge to the marine environment and promoting best management practices for boaters and marinas.

There are many people and organizations interested and involved in the health of shellfish in Sooke Harbour and Basin. Shellfish are a shared resource and the responsibility for keeping shellfish beds clean must also be shared. Strategies to open shellfish beds should be part of an integrated long term project involving those people and organizations. The project should be managed by a project committee comprised of members from all of the groups listed below, as well as people who live and work in the area.

A watershed based approach must be taken to ensure that all jurisdictions, land managers and property owners are involved. This will help to ensure that all point and non point sources of contamination are addressed.

Because of the large and diverse nature of the Harbour and Basin, the project should take a phased approach. Smaller areas should be targeted early on so that once a specific initiative has been tested, the committee can determine whether to apply it to a broader area. A number of different initiatives have been employed in other coastal areas but some initiatives will require a made in Sooke approach. Establishing realistic and achievable goals will help to develop a strong project and will also help to attract funding. Some areas will remain closed regardless of water quality due to their proximity to things like wharfs, marinas and known contaminated sites.

A project of this nature will require a large, ongoing public education and involvement component. Political support at all levels will also be needed from the beginning of the project.

Establishing the project committee and subsequent development of the project's goals and objectives will require a significant level of effort and a project manager. Committee membership and structure, protocols and terms of reference must all be established. It is important that roles and responsibilities are clearly understood from the beginning. A project of this nature is complex and some project initiatives will have to be sustained for many years. Progress will likely be slow. Significant input will also be required from people that live and work in the area to create a sustainable project.

Environment Canada's Marine Water Quality Monitoring Program *Information Sheet*

CANADIAN SHELLFISH SANITATION PROGRAM

Introduction
Filter-feeding bivalve molluscs are subject to bacterial contamination which can make them unfit for human consumption. The Canadian Shellfish Sanitation Program (CSSP) monitors the shellfish growing waters on the east and west coasts of Canada to ensure that bivalves are safe to eat. The CSSP is jointly administered by the Department of Fisheries and Oceans (DFO), the Canadian Food Inspection Agency (CFIA) and Environment Canada (EC).

History of the CSSP
The CSSP was developed in 1925 under the Canadian Fish Inspection Act as a measure directed at an outbreak of typhoid fever in the U.S. in 1924 which involved 1500 cases of illness and 150 deaths as a result of consuming oysters contaminated by sewage. The program is based on the Canada/U.S. Shellfish Agreement signed in 1948 to control and improve the sanitary practices followed by molluscan bivalve shellfish industries within the two countries. Compliance with protocols and practices outlined in a Manual of Operations under the bilateral Agreement is a prerequisite to cross-border shipment and marketing of shellfish products.

Diseases from Eating Contaminated Shellfish
There is extensive evidence of the spread of disease in humans following the consumption of contaminated shellfish. Although a wide range of diseases have been described, the more common include typhoid, Salmonellosis, gastroenteritis, infectious hepatitis, *Vibrio parahaemolyticus* infection and paralytic shellfish poisoning (PSP). Although cooking will generally destroy the pathogenic organisms, shellfish are often eaten raw or undercooked, exposing the consumer to potential disease. Testing growing waters or shellfish tissue for specific pathogens is very expensive and difficult since these organisms can easily go undetected due to their low numbers and problems culturing the organisms. As a result, regulatory agencies test for indicator organisms rather than actual pathogens.

Indicator Organisms
The indicator organisms currently used by Canadian agencies to determine the sanitary quality of water and molluscan shellfish belong to the coliform group of bacteria. This group is considered a good indicator of sewage pollution as it contains bacteria found primarily in the intestinal tract of warm-blooded animals. Fecal coliforms and the principal member of this group, *Escherichia coli* (*E. coli*), are directly associated with the feces of humans and other warm-blooded animals such as domestic and farm animals, land-based wildlife, marine mammals and birds. Although *E. coli* will not normally cause disease in humans they do meet the requirements of a good indicator organism. Their presence in samples is easy to determine and they are consistently present in large numbers in sewage (6 million/100 mL). Fecal coliforms are not normally present in sea-water but are able to survive as well as the pathogens and they are unable to multiply in sea-water.

Pollution Sources
Pollution of shellfish growing areas can occur from a variety of sources and under many different conditions. Generally, pollution sources are divided into two broad categories: point and non-point. A point source of pollution enters the receiving water at distinct, measurable locations. Examples include discharges from sewage treatment plants, pulp mills, food processing plants, sewage lift station overflows, etc. Non-point source pollution refers to contamination from sources related to the activities of humans and to natural processes in watersheds which are diffuse or dispersed. Such sources do not enter at discrete, identifiable locations and are difficult to measure or define. Examples include urban runoff, agricultural runoff, animal fecal pollution, sewage discharges from boats, etc. Evaluation of these sources is done during shoreline sanitary surveys. Samples of shellstock, sediment, and freshwater inputs are also analyzed and taken into consideration when evaluating the level of fecal coliform contamination in a given area.

Federal Roles and Responsibilities
Under the CSSP, DFO is responsible for closing harvesting areas which are contaminated, posting and patrolling closed areas, enforcement activities and the management of marginally contaminated areas which are only approved for harvesting under certain conditions. CFIA is responsible for ensuring and inspecting for the proper handling, storage and processing of shellfish product and monitoring for naturally occurring marine biotoxins (such as paralytic shellfish poisoning or PSP). CFIA is also the designated lead Canadian contact with the U.S. Food and Drug Administration concerning the bilateral Agreement. EC is responsible for monitoring the water quality of growing areas and for classifying these areas as “Approved” or “Closed” to shellfish harvesting, based on the results of the water quality surveys. This mandate is accomplished under EC's Marine Water Quality Monitoring Program.

EC’S MARINE WATER QUALITY MONITORING PROGRAM

Introduction
The shellfish growing area monitoring program is the first line of defence in the sanitary control of shellfish. The program is designed to identify and evaluate all sources of pollution to shellfish growing and harvesting waters. Since these waters are the pathway by which pathogenic micro-organisms and other contaminants are introduced into shellfish, the classification of growing areas with respect to the pollutant levels (actual and potential) is critical for determining the suitability of shellfish harvesting for human consumption. The Environment Canada (Pacific and Yukon Region) Marine Water Quality Monitoring Program conducts sanitary surveys to identify actual or potential pollution sources which may impact B.C. shellfish growing areas, and tests shellfish growing waters for the presence of fecal coliforms (FC). The survey results are used to assess the adequacy of shellfish closure boundaries, to evaluate water quality at new aquaculture and wild harvest sites and to quantify pollution levels at point and non-point sources.

Sanitary Surveys
Shellfish growing water quality on the west coast of Canada is assessed by EC using a network of ~ 3900 marine and ~ 2000 freshwater sampling stations from which ~ 5000 samples are collected annually for fecal coliform analyses. Salinity measurements are also taken from the marine samples for comparison with precipitation data obtained from the Atmospheric Monitoring Division of the Meteorological Service of Canada.

Surveys involve collecting samples of marine water, freshwater, sediment, and shellstock for analysis for fecal coliform contamination, as well as hydrographic and dye release studies, shoreline investigations of point and non-point pollution sources, outfall modeling and sewage treatment plant evaluations. The growing areas are then classified as to their suitability for the harvesting of shellfish according to accepted water quality criteria and general sanitary conditions in the growing area.

Marine Water Sampling
Each area of the coast is sampled according to a schedule which takes into account harvesting intensity and number of nearby pollution sources. Sample stations are located off recreational and commercial clam beaches, as well as aquaculture lease sites. A minimum of 15 samples from each sample station within a shellfish growing area is usually required in order to classify an area. The 15 samples must be collected over a minimum one-year period. This assists EC in identifying pollution sources which may not be present year-round (e.g., heavy seasonal rainfall, increased summer boating or cabin use, migratory birds and/or mammals). Water samples and shellstock samples must also meet the standards set in the CSSP manual for an area to remain open to harvesting.

Water Quality Criteria

International shellfish water quality criteria, which have been determined by statisticians, state that classification decisions should be based on the most recent 15 sample results from a sampling station, and should result in the closure of an area if it exceeds one (or both) of the following two limits:

1. If the median (mid-point or 50 percentile) of the most recent 15 samples is greater than 14 FC/100 ml MPN (Most Probable Number analysis method)

2. If more than 10% of the most recent 15 samples exceed 43 FC/100 ml.

To put this in perspective, the standard for drinking water is 0 FC/100ml MPN, and the standard for swimming waters is 200 FC/100ml MPN.

APC and SRS and CMPs

There are currently three sampling methods which are used in B.C. for classifying shellfish growing waters.

Adverse Pollution Condition (APC) Sampling

This is the most common method used, which involves conducting an initial comprehensive survey of an area. The comprehensive survey includes the collection of 15 marine water samples from each station, spread out over a minimum one-year period, and a detailed assessment of potential and actual pollution sources. Sampling is specifically targetted for worst-case or "adverse" pollution conditions, which may include periods of heavy rainfall and landwash, high summer-time occupancy of cabins and boats, and/or increased seasonal populations of migratory birds or mammals. The marine water quality data is analyzed according to the "Water Quality Criteria" listed above. Sampling frequency is then maintained during Re-evaluation and Review surveys at a minimum of 2 samples per station per year for "remote" areas and 5 samples per station per year for areas considered at high risk of fecal pollution.

Systematic Random Sampling (SRS)

This sampling regime is currently used in only 3 shellfish harvesting areas in B.C.: Barkley Sound, Clayoquot Sound, and Jervis Inlet. It is specifically suited for classifying and re-evaluating growing areas which have no point sources of pollution and which are chiefly impacted by random and intermittent environmental events. The SRS approach takes into account and compensates for variability introduced by combining data collected under normal conditions with data collected during infrequent seasonal contamination events.

To establish an SRS regime, 15 samples must be collected on random dates from all stations within the first year. These 15 results are combined with the most recent 15 sample results from previous APC sampling, for a total of 30 data points. A statistical analysis is conducted on the 30 data points from each station. In order for an area to remain Approved for direct shellfish harvesting, the 90th %ile of these 30 data points must be less than 43 FC/100ml MPN. Once established, the SRS approach then requires a minimum of 6 samples per station per year, randomly scheduled in advance.

Conditional Management Plans (CMPs)

There is currently only one CMP in place in B.C.: in Baynes Sound off the east coast of Vancouver Island. A second CMP is being developed in Kyuquot Sound off the west coast of Vancouver Island. A CMP requires an identifiable "trigger" which can be used to determine when the area can be Conditionally Approved for direct harvest, and when it must be Closed. In the case of Baynes Sound, the area remains Conditionally Approved until precipitation levels exceed a set amount. The area then becomes Closed until rainfall levels decrease. One set of verification samples must be collected from each station prior to re-opening a Closed area, and a minimum of 5 sets of routine samples must be collected during the Approved period. In the case of Kyuquot Sound, a seasonal CMP period of December 1 to April 30 has been identified as being the time period when the specific portions of the Sound could be Conditionally Approved for direct harvest, provided all verification samples and routine samples meet the approved shellfish growing water quality standard.

PACIFIC REGION INTERDEPARTMENTAL SHELLFISH COMMITTEE

Based on water quality results and information on potential pollution sources obtained from shoreline sanitary surveys, EC makes recommendations to the Pacific Region Interdepartmental Shellfish Committee (PRISC) regarding area classification. This committee consists of representatives from EC, DFO, CFIA, the Provincial Ministry of Agriculture & Lands, the Integrated Land Management Bureau, and the Ministry of Health, as well as invited representatives of First Nations and the aquaculture industry who are non-voting members. The committee meets twice a year and makes decisions on invoking, expanding, reducing, and removing shellfish sanitary closures. When necessary, closure action is taken by issuing Closure Orders under the Management of Contaminated Fisheries Regulations of the federal Fisheries Act.

CLASSIFICATION OF SHELLFISH HARVESTING AREAS

Approved Areas

Approved areas are not contaminated with fecal material, poisonous or deleterious substances or marine biotoxins to the extent that consumption of the shellfish might be hazardous, and the marine water samples meet the water quality criteria identified above. These areas are open for shellfish harvesting year-round based on EC's Sanitary Surveys, however, they may be closed for other reasons, such as the presence of marine biotoxins (e.g., PSP) or because the harvesting quota has been reached.

Conditionally Approved Areas

Conditionally Approved areas are closed for part of the year based on seasonal effects related to rainfall, or summer boating, or the seasonal presence of human or wildlife populations. For an area to have a "conditionally approved" designation, the conditions causing the contamination must be easily identified, predictable and/or controllable, and a management plan for the area must be developed.

Closed Areas

Closed areas are contaminated with fecal material, poisonous or deleterious substances to the extent that consumption of the shellfish might be hazardous, and/or the marine water samples do not meet the water quality criteria or the marine biotoxin criteria. Shellfish growing areas can also be closed on the basis of known or potential pollution sources which may or may not be reflected in the bacteriological water quality results. No shellfish are permitted to be removed from these areas without a licence from DFO (see Relay and Depuration below). Multiple pollution sources account for the largest area closures, followed by sewage outfalls, agriculture/hinterland drainage, boat sewage discharges, and urban run-off including septic seepage and pulp mill pollution.

Prohibited Areas

Areas can also be prohibited to shellfish harvesting for any purpose when they are highly contaminated and it may not be possible to adequately cleanse them. Standard prohibited areas are also in place within a 125 meter minimum of any marinas or large docks and wharves, and within a 300 meter minimum of any major point source discharges such as sewage outfalls.

Relay and Depuration

Areas which are Closed can still be harvested provided the shellfish are purified either by relay or by depuration. Relaying involves moving the contaminated shellfish to an approved beach area and leaving them for at least 2 weeks to allow them to naturally cleanse themselves. Depuration involves moving the contaminated shellfish to tanks in a land-based depuration plant where they are cleansed over a period of 48 hours using treated seawater. Both these procedures require a special permit issued by DFO/CFIA.

CONTACT INFORMATION

For more information on the Marine Water Quality Monitoring Program in the Pacific and Yukon Region, please contact:

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Marine Water Quality Monitoring
Monitoring de la qualité des eaux marines

ENVIRONMENT CANADA

SCIENCE & TECHNOLOGY BRANCH

MARINE WATER QUALITY MONITORING

ANNUAL REVIEW REPORT

GROWING AREA 30: SOOKE HARBOUR AND BASIN (SK)

Sector 01: Sooke River Estuary
Sector SK02 : Sooke Basin
Sector SK03 : Hutchinson Cove
Sector SK04 : Roche Cove
Sector SK05 : Anderson Cove
Sector SK06 : Whiffin Spit, Sooke Harbour, Sooke Inlet

REVIEW PERIOD : April 1, 2005 – May 2, 2007

FILE NO: 4796-RP-30

MARINE WATER QUALITY MONITORING PROGRAM

ANNUAL REVIEW REPORT

Bivalve molluscan shellfish growing areas require frequent sanitary surveys to ensure that water quality meets approved federal standards for direct harvesting. Environment Canada regularly assesses both water quality and pollution sources in shellfish growing areas, and publishes triennial File Reports which evaluate specific survey data collected over a three year period. If a shellfish growing area does not meet the conditions for direct harvesting then closure action is required. If immediate action is required, Contaminated Area Reports, recommending closure action at specific sites, are prepared as soon as possible upon completion of a survey and evaluation of the data, and are presented to the Pacific Regional Interdepartmental Shellfish Committee (PRISC). Annual reviews summarize new data/information collected within an entire growing area or sector during the survey year. Annual reviews also provide an indication as to whether the current classification needs to be re-evaluated prior to the 3 year schedule. The information found within Contaminated Area Reports and Annual Review Reports will be incorporated into the triennial File Report at a later date.

Canadian bivalve molluscan shellfish growing areas are classified as Approved, Conditionally Approved, Closed, or Prohibited. Each classification is based on the bacteriological quality of the growing waters and the known and potential sources of pollution. Surveys are conducted during adverse pollution conditions, where possible. The frequency of re-evaluation and review surveys for each growing area is determined using a National Risk Assessment approach.

Shellfish growing areas may be designated as Approved when the following conditions set forth in the Canadian Shellfish Sanitation Program (CSSP) Manual of Operations are met:

> The area is not contaminated with fecal material, poisonous or deleterious substances or marine biotoxins to the extent that consumption of the shellfish might be hazardous; and
>
> The median or geometric mean fecal coliform Most Probable Number (MPN) of the water does not exceed 14/100ml, and not more than 10% of the samples exceed a fecal coliform MPN of 43/100ml.

The concentration of fecal coliforms within the overlying shellfish growing waters is estimated using the Multiple Tube Fermentation (MTF) five-tube decimal dilution test. The results of such an analysis are expressed in terms of the Most Probable Number (MPN). This represents an estimate based on probability formulae. The standard is based on a minimum of 15 samples.

Shellfish growing areas can also be closed on the basis of known or potential pollution sources which may or may not be reflected in the bacteriological water quality results. These sources are evaluated during shoreline investigations.

Further information on the Marine Water Quality Monitoring Program can be obtained from:

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Science & Technology Branch
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Annual Report

1. **Years:** April 1, 2005 - May 2, 2007

2. **Area / Sector Identification:** Sooke Harbour and Basin

   SK01 – Sooke River Estuary
   SK02 – Sooke Basin
   SK03 – Hutchinson Cove
   SK04 – Roche Cove
   SK05 – Anderson Cove
   SK06 – Whiffin Spit, Sooke Harbour, Sooke Inlet

3. **Date of last re-evaluation:** March 2005

4. **Current area classification(s):** Closed. See attached Classification Map

At the beginning of the 2005/06 sampling year, the following closure was in effect:

Closure Description	Source of Fecal Contamination
Annual (January 1 to December 31)	
20.1 – Sooke Harbour & Basin	Multiple sources

Seasonal (May 31 to September 30) – None

5. Pollution Sources

Sooke Harbour and Basin (EC Sectors SK01 - 06; DFO Areas 20-6 and 20-7) are approximately 25 km west of Victoria at the southern tip of Vancouver Island. There are about 11,000 people in the area, with the main population located in the town of Sooke. The townsite is primarily commercial and residential; the outlying rural areas have scattered houses and some agricultural uses. Increased development is becoming evident in both the Sooke townsite and in some of the rural areas, where housing density is becoming more concentrated.

In December 2006, construction was completed on a 27 km sewage collection system and a 3000 m^3/day secondary wastewater treatment plant. The outfall for the plant discharges to Sooke Bay, and impacts upon wild geoduck beds in the Juan de Fuca Strait growing area (EC Sector JA01; DFO Areas 20-4 and 20-5). It is expected that by September 2007 all the homes in the Sooke townsite on the west side of Sooke Harbour will be connected to the sewerage system. All the homes outside the sewer specified area will remain on individual waste treatment systems, primarily septic tanks / tile fields.

The Capital Regional District (CRD) Stormwater, Harbour and Watersheds Program (SHWP) evaluates stormwater discharges for public health concerns. In their 2005 / 2006 program for the District of Sooke, they also conducted upstream investigations, marine surface water sampling, and monitoring of major watercourses. In their annual report, it was stated that they anticipated that fecal coliform levels in stormwater flows draining from the sewer specified area would be significantly reduced in 2007.

Areas of concern which were mentioned in the report included:

Cooper Cove – high fecal coliform counts were noted in a discharge at the head of the cove. An attempt will be made to identify the source using Bacterial Source Tracking (DNA fingerprinting). There is a shellfish aquaculture lease and a wild clam harvest beach at the head of the cove. EC has one new marine sample station located on the lease at the head of the cove. Station SK075 has only been sampled 3 times; counts were <2, 5, and 49 FC/100ml MPN.

Harrison Point – a discharge near Harrison Point on the southwest side of Sooke Harbour had an extremely high fecal coliform count. The source was identified as a faulty septic system, and has been remediated. EC marine station SK006 to the north off an aquaculture site meets the standard for controlled purification (depuration).

Sooke River – The SHWP sampling noted some elevated fecal coliform counts in the marine waters off the mouth of the Sooke River. A BST sample from this station tested positive for human bacteria, meaning the contamination is likely due to failing onsite sewage disposal systems. It was anticipated that the contamination would be reduced or eliminated with the sewering of the adjacent land area. EC has two marine sample stations in the Sooke River estuary, off an aquaculture lease site. Both stations (SK011 and SK045) meet the depuration standard.

The CRD has developed a web-based atlas of all natural areas (i.e. significant watercourses) which can be viewed at www.naturalareasatlas.ca.

The following new / updated information was obtained during EC's 2005 / 2006 and 2006 / 2007 survey years:

Sooke Harbour – The new sewage treatment plant, a Sequence Batch Reactor with ultraviolet disinfection, is now operational, and homes are being connected to sewer on a phased-in schedule which should be completed by September 2007. There will likely be a significant reduction in the volume of septic seepage and urban runoff entering the harbour due to this new STP, but it is not likely to result in a reduction in shellfish Closure 20.1. since the harbour is heavily urbanized, with numerous marinas, commercial development, residential areas, and new condominium developments.

Sooke Bay – This bay is actually in the Juan de Fuca growing area. The new STP outfall pipe extends into Sooke Bay and impacts subtidal geoduck beds in the area. There is a minimum 300 meter prohibition zone around the outfall pipe. The Underwater Harvesters Association, under an agreement with EC, conducted sampling along the shoreline northwest of Sooke Inlet. Based upon this data and a pollution source assessment, the Pacific Region Interdepartmental Shellfish Committee classified the area as Approved for subtidal harvesting in June 2005. Subsequently, the UHA have determined that the geoduck beds in the area cannot sustain a commercial harvest, and so the classification has been allowed to lapse. There are no other shellfish resources identified in the area which could be impacted by the STP outfall.

Sooke Inlet – On the east side of the inlet, Silverspray Development is proceeding with the building of 37 waterfront homes, 90 homes further inland, a marina, a restaurant, and a golf course. The shoreline fronting the development site, from Simpson Point to Company Point, is already within Closure 20.1

T'Sou-ke First Nation – The T'Sou-ke First Nation (TFN) own five shellfish aquaculture leases in Sooke Basin. They are interested in potentially remediating pollution sources at some of these sites, and opening them to direct harvest (eg. Anderson Cove, Roche Cove). In February 2006, EC entered into a water sampling agreement with the TFN, and they collected one set of samples in March 2006. Additional training and sampling was conducted in May 2006.

6. Water Quality Sampling

Since all of Sooke Basin and Harbour are within Closure 20.1, any shellfish harvested from this area must be depurated or relayed. This area was therefore considered "low risk", and has been sampled a minimum of two times per year. Since the completion of the last re-evaluation survey in March 2005, surveys have been conducted in November 2005, January, March, May and September 2006, and May 2007. The U.S. Food & Drug Administration now requires that all areas used for depuration and relay be considered "high risk", since because they are Closed, they have been confirmed to be contaminated. A more frequent sampling schedule of 5 times per year is therefore being phased in for the Sooke area. The next survey is scheduled for September 2007.

Sample stations within shellfish closures must meet the standard for controlled purification (depuration). In order to classify a Closed area as acceptable for depuration harvesting, the median or geometric mean fecal coliform Most Probable Number (MPN) of the water must not exceed 88/100ml, and not more than 10% of the samples may exceed a fecal coliform MPN of 260/100ml. The concentration of fecal coliforms within the overlying shellfish growing waters is estimated using the Multiple Tube Fermentation (MTF) five-tube decimal dilution test. The results of such an analysis are expressed in terms of the Most Probable Number (MPN). This represents an estimate based on probability formulae. The standard is based on a minimum of 15 samples.

Daily marine water quality results for the most recent 15 samples from each station are listed in the appendix. All stations meet the standard for controlled purification (depuration). More than half the stations also meet the direct harvest standard, but the entire area remains Closed due to urbanization and potential failing septic systems during periods of heavy rainfall.

Sample stations SK015, 071, 072, and 073 were dropped from the list of active stations in May 2006. There do not appear to be any resources in the vicinity of these stations.

Stations SK026 and SK074 have been sampled infrequently due to the difficulty in accessing Roche Cove at low tide. Station SK074 was first sampled in May 2007; the fecal coliform count was <2 FC/100ml MPN.

In May 2006, station SK075 was added at the head of Cooper Cove in order to better assess water quality off the aquaculture lease site. This station has now been sampled 3 times; counts were <2, 5, and 49 FC/100ml MPN.

Station SK053 is located off the south side of Whiffin Spit, in an Approved area. There are 10 data points for this station, but 4 of the data points are greater than 10 years old, and should not be used as a basis for classification. One of these old data points exceeds the direct harvest (Approved) standard at 49 FC/100ml MPN. Additional sampling is recommended at this station in order to collect more recent data.

Rainfall was very variable during the survey periods, with previous 24-hour rainfall ranging from 0 – 41 mm, and previous 5-day rainfall ranging from 0 – 99 mm. Visual observations of the data would indicate that on the survey dates with the most rainfall (3 November 2005, and 17 January 2006) the majority of the fecal coliform counts were elevated. However, on 29 October 2003, fecal coliform counts at most stations were also elevated, whereas rainfall for the entire 5 days prior to sampling was nil.

7. Results and Recommendations

Data and pollution source information collected during the annual review periods in 2005 / 2006 and 2006 / 2007 confirmed the most recent classification made during 2004 / 2005.

The new sewer connection for the Sooke townsite will likely result in an improvement in overall water quality in Sooke Harbour, and also possibly in Sooke Basin and Sooke Inlet, however, concerns remain about other potential pollution sources to the enclosed waters of the harbour and basin. Further investigations should be conducted on potential positive impacts on water quality due to the new sewage treatment plant.

The T'Sou-ke First Nation have indicated a willingness to continue working towards the goal of reducing Closure 20.1 in order to approve portions of Sooke Basin for direct harvest. High priority areas are Roche Cove, Anderson Cove, and Hutchinson Cove. Environment Canada is supportive of this goal. Prior to a re-assessment of the classification, pollution source identification and remediation must be addressed.

Additional effort must be made during surveys to collect marine water samples from stations SK026 and SK074 in Roche Harbour - by foot if the survey boat is unable to enter the cove.

At this time, no change is recommended to Closure 20.1.

The next re-evaluation of Sectors SK01-06 is scheduled for March 2008. However, additional sampling runs will be conducted when possible. The first of these extra runs is scheduled for September 2007.

Prepared by Jady Tyers (August 2007)

APPENDICES:

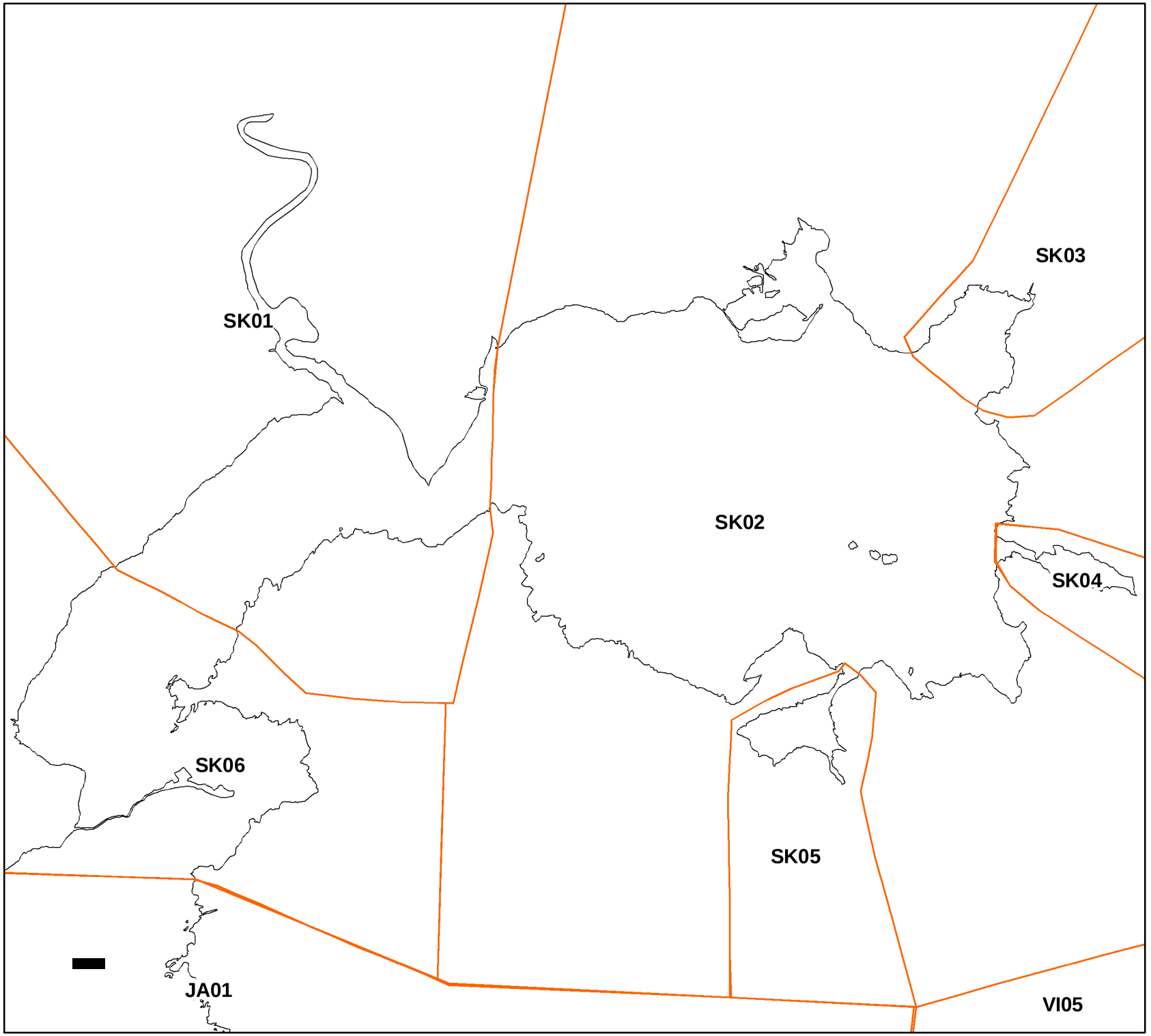
EC Sector Map – Sectors SK01 - SK06; DFO Areas 20-6 and 20-7

Marine Station Location Map

Closure 20.1 Map

Marine Station Summary Report (Combined Data; n≤15)

Marine Daily Report : Water (Combined Data; n≤15)



Marine Water Quality Monitoring

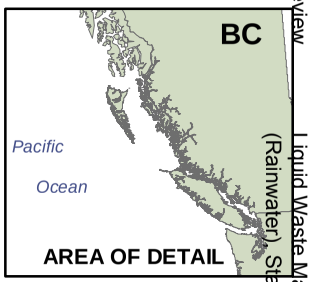
Monitoring de la qualité des eaux marines

SOOKE HARBOUR AND BASIN

Sector Map SK01 - SK06

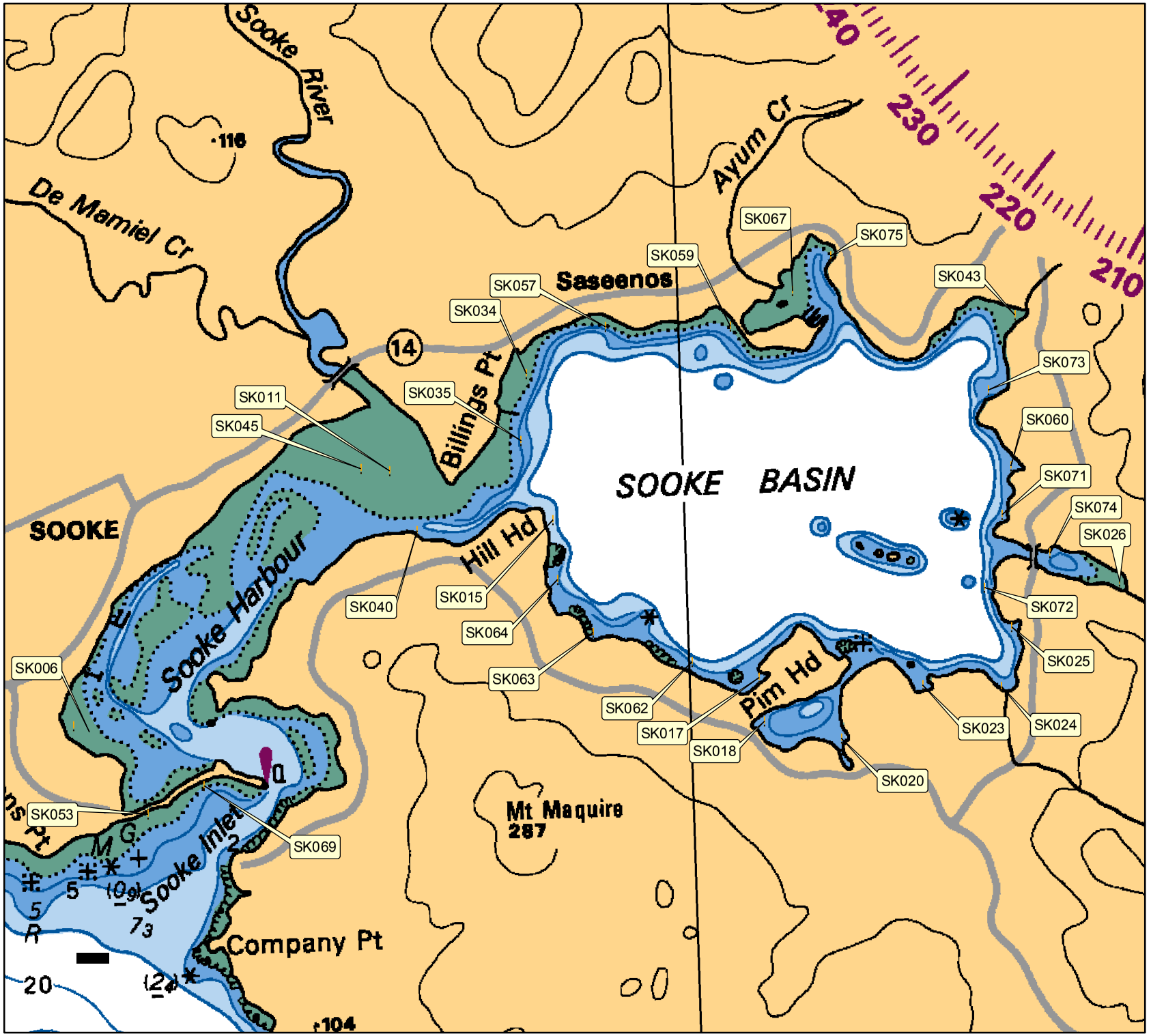
Legend

Sectors



Projection: BC Albers Standard
Data Sources:
Basemap - Canadian Hydrographic Service Chart

0 0.25 0.5
Kilometers



Shellfish water quality protection program

Programme de salubrité des eaux coquillières

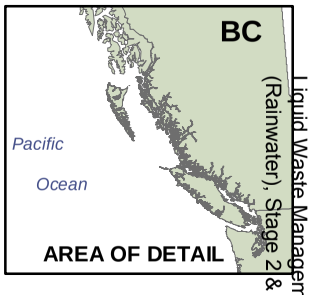
SOOKE HARBOUR AND BASIN

Sectors SK01 - 06

2005 / 2006 and 2006 / 2007 Sample Stations

Legend

! Active Station

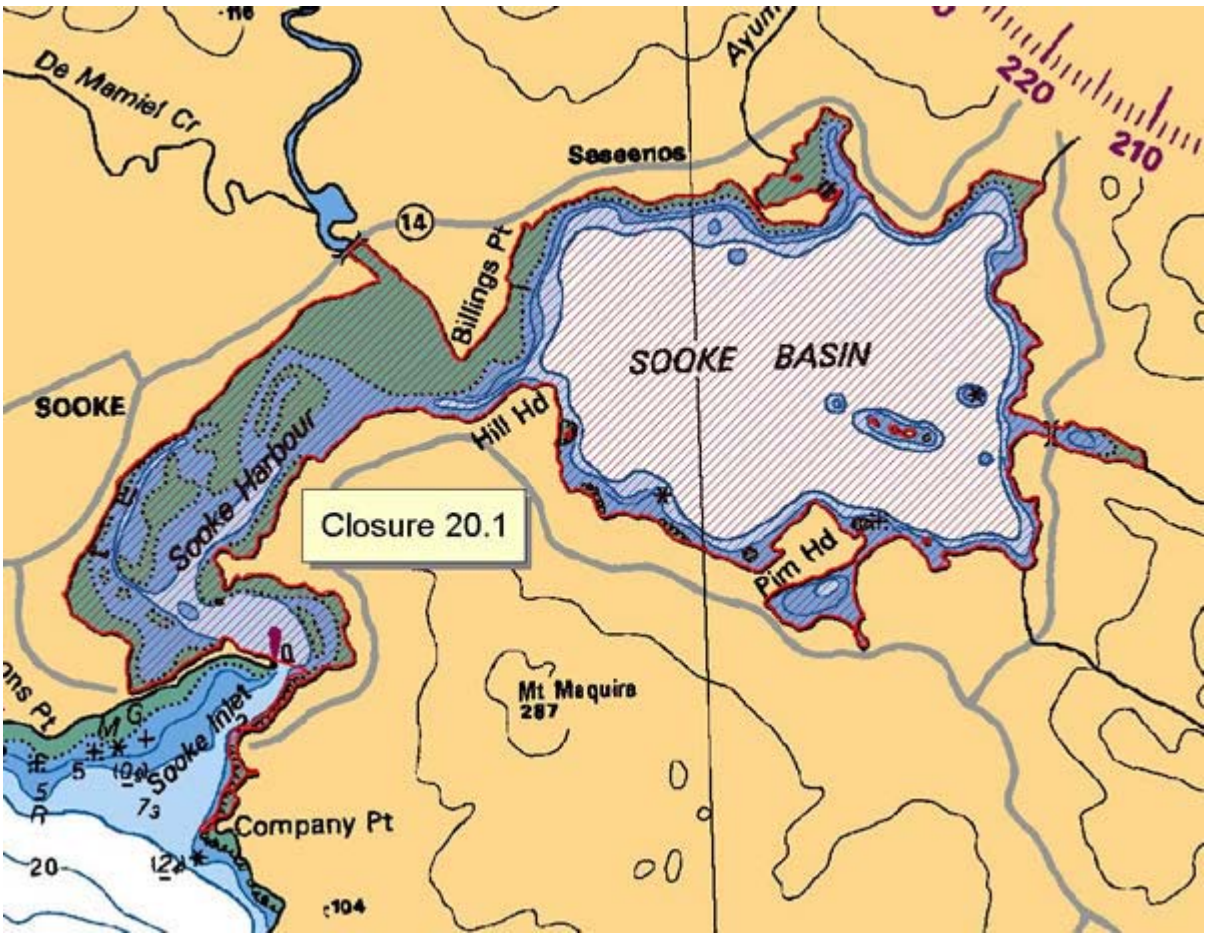


Projection: BC Albers Standard
Data Sources:
Basemap - Canadian Hydrographic Service Chart

0 0.5 1
Kilometers

Area 20 - Sanitary Closures

Closure 20.1



Click Here for larger picture (246kb)

The waters and intertidal foreshore of Sooke Harbour and Sooke Basin, lying inside a line drawn from the eastern tip of Whiffin Spit due east to a point on the opposite shore, thence along the shoreline to Company Point.

Return to Area 20 Closures

Marine Station Summary Report

Sector: SK*
Survey: All
Sample Type: Water
Tide State(s): High-Slack, Ebb, Low-Slack, Flood
Station(s): Include Stations from following list: SK006,SK011,SK015,SK017,SK018,SK020,SK023,SK024,SK025,SK026,SK034,SK035,SK040,SK043,SK045,SK053,SK057,SK059,SK060,SK062,SK063,SK064,SK067,SK069,SK071,SK072,SK073,SK074,SK075
Fecal Coliform: The Report includes only values >=0
Time Period: All
Agency: All

REPORTING CRITERIA

***NOTE: Depth Samples are excluded**
***NOTE:Most recent 15 samples selected.**

Precipitation Criteria for:

Prev 24hr: All
Prev 48hr: All
Prev 72hr: All
Prev 5d: All

		SAMPLE			FC/100ml MPN					
Sector	Station	n	No. >43	% >43	Min	Max	Median	Log Std Dev	Geo. Mean	Est. 90th
SK01										
	SK011	15	1	7%	<2	350	8	0.584	9.2	51.7
	SK034	15	1	7%	<2	79	4	0.524	5.0	23.3
	SK035	15	2	13%	<2	46	4	0.535	5.7	27.6
	SK040	15	3	20%	<2	49	2	0.612	6.2	37.7
	SK045	15	0	0%	<2	23	8	0.289	6.4	15.0
SK02										
	SK015	15	2	13%	<2	170	5	0.624	7.1	44.7
	SK017	15	0	0%	<2	33	2	0.384	3.8	11.7
	SK023	15	2	13%	<2	110	2	0.606	5.9	35.4
	SK024	15	0	0%	<2	13	2	0.294	2.8	6.7
	SK025	15	1	7%	<2	49	2	0.423	3.5	12.0
	SK057	15	0	0%	<2	33	<2	0.366	2.8	8.3
	SK059	15	0	0%	<2	23	5	0.390	4.5	14.1
	SK060	15	0	0%	<2	23	2	0.339	3.1	8.5
	SK062	15	0	0%	<2	17	2	0.350	3.8	10.6
	SK063	15	2	13%	<2	130	2	0.582	5.2	28.7
	SK064	15	1	7%	<2	110	2	0.597	4.6	26.7
	SK067	15	2	13%	<2	79	21	0.544	11.6	57.4
	SK071	15	0	0%	<2	14	2	0.319	3.6	9.1
	SK072	15	0	0%	<2	11	2	0.295	3.1	7.3

Marine Station Summary Report

		SAMPLE			FC/100ml MPN					
Sector	Station	n	No. >43	% >43	Min	Max	Median	Log Std Dev	Geo. Mean	Est. 90th
SK02										
	SK075	3	1	33%	<2	49	5	0.725	7.8	65.6
SK03										
	SK043	15	0	0%	<2	17	<2	0.376	3.4	10.4
	SK073	15	1	7%	<2	70	2	0.510	4.9	22.0
SK04										
	SK026	15	2	13%	<2	140	5	0.606	6.5	39.0
	SK074	1	0	0%	<2	<2	<2	0.000	1.9	1.9
SK05										
	SK018	15	2	13%	<2	79	2	0.548	4.9	24.8
	SK020	15	2	13%	<2	49	2	0.552	5.4	27.5
SK06										
	SK006	15	3	20%	<2	130	8	0.606	8.1	48.5
	SK053	10	1	10%	<2	49	8	0.528	6.8	32.4
	SK069	6	0	0%	<2	2	<2	0.009	1.9	2.0

Marine Daily Report

REPORTING CRITERIA

Sector: SK*
Survey: All
Sample Type: Water
Tide State(s): High-Slack, Ebb, Low-Slack, Flood
Station(s): Include Stations from following list: SK006,SK011,SK015,SK017,SK018,SK020,SK023,SK024,SK025,SK026,SK034,SK035,SK040,SK043,SK045,SK053,SK057,SK059,SK060,SK062,SK063,SK064,SK067,SK069,SK071,SK072,SK073,SK074,SK075
Fecal Coliform: The Report includes only values >= 0 and values > 43 are circled.
Time Period: All
Agency: All

*****NOTE: Depth Samples are excluded***
*****NOTE:Most recent 15 samples selected.***

Precipitation Criteria for:
Prev 24hr: All
Prev 48hr: All
Prev 72hr: All
Prev 5d: All

Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK01											
SK011											
	1884	01-May-07	0810	Low Slack	0	5	21				
	1884	06-Sep-06	1150	Flood	0	8	32	-	-	-	-
	1884	31-May-06	1045	Ebb	0	7	31	-	-	-	5.4
	1884	30-May-06	1040	Ebb	0	8	31	-	-	2.2	12.6
	1665	17-Jan-06	1025	Flood	0	5	2	41.0	45.6	48.4	99.0
	1665	03-Nov-05	1050	Flood	0	17	26	12.0	28.0	33.6	73.6
	1665	07-Mar-05	0835	Flood	0	<2	32	1.2	1.2	1.8	1.8
	1665	15-Dec-04	0945	Flood	0	13	2	0.4	30.4	33.8	60.4
	1665	18-Feb-04	0645	Flood	0	350	14	16.4	26.2	30.4	41.0
	1665	29-Oct-03	0650	High Slack	0	27	28	-	-	-	-
	1665	11-Feb-03	0715	High Slack	0	2	31	-	1.2	1.2	1.2
	1665	04-Dec-02	1015	Flood	0	4	32	0.4	0.6	0.6	0.6
	1390	27-Nov-99	1010	Flood	0	13	16	1.0	6.1	23.5	34.5
	1390	26-Nov-99	1030	Flood	0	33	22	5.1	22.5	26.5	34.9
	1390	25-Nov-99	1050	Flood	0	2	28	17.4	21.4	28.4	43.0
SK034											
	1884	01-May-07	0715	Ebb	0	2	26				
	1884	06-Sep-06	1330	Flood	0	<2	33	-	-	-	-
	1884	31-May-06	1235	Low Slack	0	<2	32	-	-	-	5.4
	1884	30-May-06	1250	Low Slack	0	<2	31	-	-	2.2	12.6
	1665	21-Mar-06	1055	Ebb	0	<2	25	-	-	1.8	8.0

Marine Daily Report

Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK01											
SK034											
	1665	03-Nov-05	0745	Low Slack	0	21	18	12.0	28.0	33.6	73.6
	1665	07-Mar-05	0915	High Slack	0	<2	30	1.2	1.2	1.8	1.8
	1665	15-Dec-04	1025	Flood	0	5	15	0.4	30.4	33.8	60.4
	1665	18-Feb-04	0655	Flood	0	<2	27	16.4	26.2	30.4	41.0
	1665	29-Oct-03	0700	High Slack	0	79	22	-	-	-	-
	1665	11-Feb-03	0730	High Slack	0	5	26	-	1.2	1.2	1.2
	1665	04-Dec-02	0820	Flood	0	4	30	0.4	0.6	0.6	0.6
	1665	22-Mar-02	1325	Ebb	0	33	16	0.2	2.4	18.0	28.4
	1390	27-Nov-99	0825	Low Slack	0	5	23	1.0	6.1	23.5	34.5
	1390	26-Nov-99	0830	Low Slack	0	11	20	5.1	22.5	26.5	34.9
SK035											
	1884	01-May-07	0720	Ebb	0	<2	27				
	1884	06-Sep-06	1335	Flood	0	<2	33	-	-	-	-
	1884	31-May-06	1240	Low Slack	0	<2	32	-	-	-	5.4
	1884	30-May-06	1255	Low Slack	0	<2	32	-	-	2.2	12.6
	1665	03-Nov-05	1055	Flood	0	46	16	12.0	28.0	33.6	73.6
	1665	07-Mar-05	0910	High Slack	0	<2	29	1.2	1.2	1.8	1.8
	1665	15-Dec-04	1025	Flood	0	4	8	0.4	30.4	33.8	60.4
	1665	18-Feb-04	0650	Flood	0	17	25	16.4	26.2	30.4	41.0
	1665	29-Oct-03	0655	High Slack	0	2	24	-	-	-	-
	1665	11-Feb-03	0725	High Slack	0	46	24	-	1.2	1.2	1.2
	1665	04-Dec-02	0810	Flood	0	11	30	0.4	0.6	0.6	0.6
	1665	22-Mar-02	1320	Ebb	0	2	20	0.2	2.4	18.0	28.4
	1390	27-Nov-99	0815	Low Slack	0	13	24	1.0	6.1	23.5	34.5
	1390	26-Nov-99	0825	Low Slack	0	5	22	5.1	22.5	26.5	34.9
	1390	25-Nov-99	0810	Low Slack	0	22	20	17.4	21.4	28.4	43.0
SK040											
	1884	01-May-07	0725	Ebb	0	<2	28				
	1884	06-Sep-06	1145	Flood	0	2	32	-	-	-	-
	1884	31-May-06	1045	Ebb	0	<2	32	-	-	-	5.4
	1884	30-May-06	1050	Ebb	0	<2	32	-	-	2.2	12.6
	1665	03-Nov-05	1015	Flood	0	49	10	12.0	28.0	33.6	73.6
	1665	07-Mar-05	0830	Flood	0	<2	32	1.2	1.2	1.8	1.8
	1665	15-Dec-04	0940	Flood	0	5	2	0.4	30.4	33.8	60.4
	1665	18-Feb-04	0840	Flood	0	17	27	16.4	26.2	30.4	41.0
	1665	29-Oct-03	0845	High Slack	0	33	4	-	-	-	-
	1665	11-Feb-03	0720	High Slack	0	2	26	-	1.2	1.2	1.2

Marine Daily Report

Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK01											
SK040											
	1665	04-Dec-02	1010	Flood	0	<2	31	0.4	0.6	0.6	0.6
	1665	22-Mar-02	1315	Ebb	0	2	24	0.2	2.4	18.0	28.4
	1390	27-Nov-99	1005	Flood	0	13	10	1.0	6.1	23.5	34.5
	1390	26-Nov-99	1025	Flood	0	46	12	5.1	22.5	26.5	34.9
	1390	25-Nov-99	1045	Flood	0	49	6	17.4	21.4	28.4	43.0
SK045											
	1884	01-May-07	0805	Low Slack	0	5	24				
	1884	06-Sep-06	1145	Flood	0	5	33	-	-	-	-
	1884	31-May-06	1045	Ebb	0	8	29	-	-	-	5.4
	1884	30-May-06	1030	Ebb	0	<2	32	-	-	2.2	12.6
	1665	03-Nov-05	1045	Flood	0	8	25	12.0	28.0	33.6	73.6
	1665	07-Mar-05	0835	Flood	0	4	31	1.2	1.2	1.8	1.8
	1665	15-Dec-04	0950	Flood	0	23	18	0.4	30.4	33.8	60.4
	1665	18-Feb-04	0845	Flood	0	2	29	16.4	26.2	30.4	41.0
	1665	29-Oct-03	0850	High Slack	0	13	24	-	-	-	-
	1665	11-Feb-03	0705	High Slack	0	8	24	-	1.2	1.2	1.2
	1665	04-Dec-02	1020	Flood	0	5	32	0.4	0.6	0.6	0.6
	1665	22-Mar-02	1310	Ebb	0	13	13	0.2	2.4	18.0	28.4
	1390	27-Nov-99	1015	Flood	0	8	24	1.0	6.1	23.5	34.5
	1390	26-Nov-99	1055	Flood	0	5	26	5.1	22.5	26.5	34.9
	1390	25-Nov-99	1055	Flood	0	8	30	17.4	21.4	28.4	43.0

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Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK02											
SK015											
	1885	30-May-06	1055	Ebb	0	2	32	-	-	2.2	12.6
	1666	17-Jan-06	1015	Flood	0	23	18	41.0	45.6	48.4	99.0
	1666	03-Nov-05	1005	Flood	0	49	23	12.0	28.0	33.6	73.6
	1666	07-Mar-05	0825	Flood	0	<2	30	1.2	1.2	1.8	1.8
	1666	15-Dec-04	0935	Flood	0	13	20	0.4	30.4	33.8	60.4
	1666	18-Feb-04	0835	Flood	0	2	26	16.4	26.2	30.4	41.0
	1666	29-Oct-03	0840	High Slack	0	170	20	-	-	-	-
	1666	11-Feb-03	0915	Ebb	0	5	25	-	1.2	1.2	1.2
	1666	04-Dec-02	1005	Flood	0	2	31	0.4	0.6	0.6	0.6
	1666	22-Mar-02	1455	Ebb	0	<2	20	0.2	2.4	18.0	28.4
	1391	27-Nov-99	1000	Flood	0	13	24	1.0	6.1	23.5	34.5
	1391	26-Nov-99	1020	Flood	0	5	23	5.1	22.5	26.5	34.9
	1391	25-Nov-99	1040	Flood	0	33	18	17.4	21.4	28.4	43.0
	1391	24-Nov-99	1105	Flood	0	4	20	4.0	11.0	12.4	39.6
	1391	23-Nov-99	1645	Ebb	0	<2	22	7.0	8.4	21.6	35.6
SK017											
	1885	01-May-07	0830	Low Slack	0	<2	26				
	1885	06-Sep-06	1215	Flood	0	<2	32	-	-	-	-
	1885	31-May-06	1115	Ebb	0	<2	32	-	-	-	5.4
	1885	30-May-06	1115	Ebb	0	4	31	-	-	2.2	12.6
	1666	17-Jan-06	1000	Flood	0	8	19	41.0	45.6	48.4	99.0
	1666	03-Nov-05	0950	Flood	0	33	25	12.0	28.0	33.6	73.6
	1666	07-Mar-05	0815	Flood	0	<2	29	1.2	1.2	1.8	1.8
	1666	15-Dec-04	0920	Low Slack	0	2	20	0.4	30.4	33.8	60.4
	1666	18-Feb-04	0825	Flood	0	5	24	16.4	26.2	30.4	41.0
	1666	29-Oct-03	0825	High Slack	0	7	24	-	-	-	-
	1666	11-Feb-03	0855	High Slack	0	2	25	-	1.2	1.2	1.2
	1666	04-Dec-02	0955	Flood	0	<2	30	0.4	0.6	0.6	0.6
	1666	22-Mar-02	1440	Ebb	0	<2	20	0.2	2.4	18.0	28.4
	1391	27-Nov-99	0945	Low Slack	0	5	24	1.0	6.1	23.5	34.5
	1391	26-Nov-99	1005	Flood	0	13	24	5.1	22.5	26.5	34.9
SK023											
	1885	01-May-07	0855	Low Slack	0	<2	25				
	1885	06-Sep-06	1240	Flood	0	<2	33	-	-	-	-
	1885	31-May-06	1120	Ebb	0	<2	32	-	-	-	5.4
	1885	30-May-06	1140	Low Slack	0	33	32	-	-	2.2	12.6
	1666	17-Jan-06	0930	Flood	0	2	19	41.0	45.6	48.4	99.0

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Sector	Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK02												
	SK023											
		1666	03-Nov-05	0925	Flood	0	110	22	12.0	28.0	33.6	73.6
		1666	07-Mar-05	0750	Flood	0	8	29	1.2	1.2	1.8	1.8
		1666	15-Dec-04	0900	Low Slack	0	2	20	0.4	30.4	33.8	60.4
		1666	18-Feb-04	0805	Flood	0	<2	26	16.4	26.2	30.4	41.0
		1666	29-Oct-03	0810	High Slack	0	49	23	-	-	-	-
		1666	11-Feb-03	0835	High Slack	0	2	26	-	1.2	1.2	1.2
		1666	04-Dec-02	0935	Flood	0	13	30	0.4	0.6	0.6	0.6
		1666	22-Mar-02	1425	Ebb	0	8	20	0.2	2.4	18.0	28.4
		1391	27-Nov-99	0935	Low Slack	0	2	24	1.0	6.1	23.5	34.5
		1391	26-Nov-99	0950	Flood	0	13	22	5.1	22.5	26.5	34.9
	SK024											
		1885	01-May-07	0900	Low Slack	0	2	25				
		1885	06-Sep-06	1250	Flood	0	<2	32	-	-	-	-
		1885	31-May-06	1135	Ebb	0	<2	32	-	-	-	5.4
		1885	30-May-06	1145	Low Slack	0	2	31	-	-	2.2	12.6
		1666	21-Mar-06	1200	Ebb	0	<2	26	-	-	1.8	8.0
		1666	17-Jan-06	0930	Flood	0	5	16	41.0	45.6	48.4	99.0
		1666	03-Nov-05	0920	Flood	0	8	27	12.0	28.0	33.6	73.6
		1666	07-Mar-05	0750	Flood	0	<2	27	1.2	1.2	1.8	1.8
		1666	15-Dec-04	0900	Low Slack	0	13	13	0.4	30.4	33.8	60.4
		1666	18-Feb-04	0800	Flood	0	<2	23	16.4	26.2	30.4	41.0
		1666	29-Oct-03	0805	High Slack	0	8	24	-	-	-	-
		1666	11-Feb-03	0830	High Slack	0	2	26	-	1.2	1.2	1.2
		1666	04-Dec-02	0930	Flood	0	2	30	0.4	0.6	0.6	0.6
		1666	22-Mar-02	1420	Ebb	0	<2	20	0.2	2.4	18.0	28.4
		1391	27-Nov-99	0925	Low Slack	0	<2	24	1.0	6.1	23.5	34.5
	SK025											
		1885	01-May-07	0900	Low Slack	0	2	25				
		1885	06-Sep-06	1255	Flood	0	5	33	-	-	-	-
		1885	31-May-06	1140	Ebb	0	2	32	-	-	-	5.4
		1885	30-May-06	1150	Low Slack	0	2	32	-	-	2.2	12.6
		1666	21-Mar-06	1205	Ebb	0	<2	26	-	-	1.8	8.0
		1666	17-Jan-06	0925	Flood	0	11	16	41.0	45.6	48.4	99.0
		1666	03-Nov-05	0915	Flood	0	11	25	12.0	28.0	33.6	73.6
		1666	07-Mar-05	0745	Flood	0	<2	25	1.2	1.2	1.8	1.8
		1666	15-Dec-04	0855	Low Slack	0	49	15	0.4	30.4	33.8	60.4
		1666	18-Feb-04	0800	Flood	0	<2	25	16.4	26.2	30.4	41.0

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Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK02											
SK025											
	1666	29-Oct-03	0800	High Slack	0	5	26	-	-	-	-
	1666	11-Feb-03	0825	High Slack	0	<2	26	-	1.2	1.2	1.2
	1666	04-Dec-02	0925	Flood	0	2	30	0.4	0.6	0.6	0.6
	1666	22-Mar-02	1415	Ebb	0	<2	20	0.2	2.4	18.0	28.4
	1391	27-Nov-99	0920	Low Slack	0	2	24	1.0	6.1	23.5	34.5
SK057											
	1885	01-May-07	0710	Ebb	0	2	27				
	1885	06-Sep-06	1325	Flood	0	<2	32	-	-	-	-
	1885	31-May-06	1225	Low Slack	0	<2	32	-	-	-	5.4
	1885	30-May-06	1245	Low Slack	0	<2	31	-	-	2.2	12.6
	1666	21-Mar-06	1100	Ebb	0	<2	26	-	-	1.8	8.0
	1666	03-Nov-05	0755	Low Slack	0	<2	23	12.0	28.0	33.6	73.6
	1666	07-Mar-05	0915	High Slack	0	2	29	1.2	1.2	1.8	1.8
	1666	15-Dec-04	1030	Flood	0	8	18	0.4	30.4	33.8	60.4
	1666	18-Feb-04	0700	Flood	0	<2	26	16.4	26.2	30.4	41.0
	1666	29-Oct-03	0705	High Slack	0	33	22	-	-	-	-
	1666	11-Feb-03	0740	High Slack	0	<2	26	-	1.2	1.2	1.2
	1666	04-Dec-02	0825	Flood	0	<2	30	0.4	0.6	0.6	0.6
	1666	22-Mar-02	1330	Ebb	0	2	18	0.2	2.4	18.0	28.4
	1391	27-Nov-99	0830	Low Slack	0	2	24	1.0	6.1	23.5	34.5
	1391	26-Nov-99	0835	Low Slack	0	8	24	5.1	22.5	26.5	34.9
SK059											
	1885	01-May-07	0930	Low Slack	0	2	27				
	1885	06-Sep-06	1320	Flood	0	<2	32	-	-	-	-
	1885	31-May-06	1215	Low Slack	0	8	32	-	-	-	5.4
	1885	30-May-06	1240	Low Slack	0	<2	31	-	-	2.2	12.6
	1666	21-Mar-06	1105	Ebb	0	5	26	-	-	1.8	8.0
	1666	03-Nov-05	0805	Low Slack	0	11	26	12.0	28.0	33.6	73.6
	1666	07-Mar-05	0710	Flood	0	8	28	1.2	1.2	1.8	1.8
	1666	15-Dec-04	0810	Low Slack	0	23	20	0.4	30.4	33.8	60.4
	1666	18-Feb-04	0705	Flood	0	<2	26	16.4	26.2	30.4	41.0
	1666	29-Oct-03	0710	High Slack	0	8	22	-	-	-	-
	1666	11-Feb-03	0740	High Slack	0	<2	26	-	1.2	1.2	1.2
	1666	04-Dec-02	0835	Flood	0	<2	30	0.4	0.6	0.6	0.6
	1666	22-Mar-02	1335	Ebb	0	2	20	0.2	2.4	18.0	28.4
	1391	27-Nov-99	0835	Low Slack	0	5	24	1.0	6.1	23.5	34.5
	1391	26-Nov-99	0840	Low Slack	0	17	25	5.1	22.5	26.5	34.9

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Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK02											
SK060											
	1885	01-May-07	0905	Low Slack	0	<2	26				
	1885	06-Sep-06	1300	Flood	0	5	33	-	-	-	-
	1885	31-May-06	1145	Ebb	0	2	32	-	-	-	5.4
	1885	30-May-06	1205	Low Slack	0	2	31	-	-	2.2	12.6
	1666	21-Mar-06	1125	Ebb	0	<2	26	-	-	1.8	8.0
	1666	03-Nov-05	0835	Flood	0	8	26	12.0	28.0	33.6	73.6
	1666	07-Mar-05	0730	Flood	0	<2	27	1.2	1.2	1.8	1.8
	1666	15-Dec-04	0830	Low Slack	0	2	17	0.4	30.4	33.8	60.4
	1666	18-Feb-04	0735	Flood	0	<2	26	16.4	26.2	30.4	41.0
	1666	29-Oct-03	0735	High Slack	0	23	22	-	-	-	-
	1666	11-Feb-03	0805	High Slack	0	<2	26	-	1.2	1.2	1.2
	1666	04-Dec-02	0905	Flood	0	<2	30	0.4	0.6	0.6	0.6
	1666	22-Mar-02	1400	Ebb	0	<2	20	0.2	2.4	18.0	28.4
	1391	27-Nov-99	0900	Low Slack	0	5	24	1.0	6.1	23.5	34.5
	1391	26-Nov-99	0910	Flood	0	8	23	5.1	22.5	26.5	34.9
SK062											
	1885	01-May-07	0825	Low Slack	0	<2	27				
	1885	06-Sep-06	1210	Flood	0	<2	32	-	-	-	-
	1885	31-May-06	1110	Ebb	0	<2	32	-	-	-	5.4
	1885	30-May-06	1110	Ebb	0	<2	31	-	-	2.2	12.6
	1666	03-Nov-05	0955	Flood	0	13	24	12.0	28.0	33.6	73.6
	1666	07-Mar-05	0820	Flood	0	5	30	1.2	1.2	1.8	1.8
	1666	15-Dec-04	0930	Flood	0	<2	22	0.4	30.4	33.8	60.4
	1666	18-Feb-04	0830	Flood	0	5	25	16.4	26.2	30.4	41.0
	1666	29-Oct-03	0830	High Slack	0	8	22	-	-	-	-
	1666	11-Feb-03	0900	High Slack	0	2	26	-	1.2	1.2	1.2
	1666	04-Dec-02	1000	Flood	0	<2	30	0.4	0.6	0.6	0.6
	1666	22-Mar-02	1445	Ebb	0	17	20	0.2	2.4	18.0	28.4
	1391	27-Nov-99	0950	Low Slack	0	2	24	1.0	6.1	23.5	34.5
	1391	26-Nov-99	1010	Flood	0	8	24	5.1	22.5	26.5	34.9
	1391	25-Nov-99	1030	Flood	0	7	22	17.4	21.4	28.4	43.0
SK063											
	1885	01-May-07	0820	Low Slack	0	2	27				
	1885	06-Sep-06	1205	Flood	0	<2	33	-	-	-	-
	1885	31-May-06	1105	Ebb	0	<2	32	-	-	-	5.4
	1885	30-May-06	1105	Ebb	0	<2	32	-	-	2.2	12.6
	1666	03-Nov-05	1000	Flood	0	49	21	12.0	28.0	33.6	73.6

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Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK02											
SK063											
	1666	07-Mar-05	0820	Flood	0	<2	29	1.2	1.2	1.8	1.8
	1666	15-Dec-04	0930	Flood	0	5	20	0.4	30.4	33.8	60.4
	1666	18-Feb-04	0830	Flood	0	13	26	16.4	26.2	30.4	41.0
	1666	29-Oct-03	0835	High Slack	0	130	22	-	-	-	-
	1666	11-Feb-03	0905	Ebb	0	<2	26	-	1.2	1.2	1.2
	1666	04-Dec-02	1000	Flood	0	2	30	0.4	0.6	0.6	0.6
	1666	22-Mar-02	1450	Ebb	0	2	2	0.2	2.4	18.0	28.4
	1391	27-Nov-99	0955	Flood	0	5	25	1.0	6.1	23.5	34.5
	1391	26-Nov-99	1015	Flood	0	9	24	5.1	22.5	26.5	34.9
	1391	25-Nov-99	1035	Flood	0	13	18	17.4	21.4	28.4	43.0
SK064											
	1885	01-May-07	0820	Low Slack	0	<2	27				
	1885	06-Sep-06	1155	Flood	0	<2	32	-	-	-	-
	1885	31-May-06	1055	Ebb	0	2	32	-	-	-	5.4
	941	25-Jan-94	1110	High Slack	0	7	26	4.0	5.5	7.5	9.0
	941	24-Jan-94	1020	High Slack	0	33	26	1.5	3.5	5.0	5.0
	941	13-Dec-93	1135	Flood	0	14	23	4.0	8.0	10.0	37.5
	941	12-Dec-93	1140	High Slack	0	31	16	4.0	6.0	30.5	39.5
	805	27-Feb-93	1045	Ebb	0	<2	30	-	-	-	-
	805	12-Dec-92	1140	Flood	0	2	28	1.5	3.3	6.6	20.8
	805	24-Oct-92	1200	High Slack	0	2	31	0.9	5.2	10.5	14.4
	805	26-Aug-92	1405	High Slack	0	2	33	-	-	-	2.0
	805	26-Jun-92	1705	Flood	0	<2	30	-	-	-	-
	805	16-May-92	0940	Low Slack	0	<2	30	-	-	-	-
	689	20-Mar-92	1135	Flood	0	110	30	-	-	-	11.6
	689	19-Mar-92	1235	Flood	0	<2	25	-	-	-	11.6
SK067											
	1885	01-May-07	0915	Low Slack	0	23	23				
	1885	06-Sep-06	1315	Flood	0	<2	32	-	-	-	-
	1885	31-May-06	1200	Ebb	0	79	31	-	-	-	5.4
	1885	30-May-06	1230	Low Slack	0	7	31	-	-	2.2	12.6
	1666	21-Mar-06	1110	Ebb	0	2	22	-	-	1.8	8.0
	1666	03-Nov-05	0815	Low Slack	0	21	8	12.0	28.0	33.6	73.6
	1666	07-Mar-05	0715	Flood	0	<2	27	1.2	1.2	1.8	1.8
	1666	15-Dec-04	0815	Low Slack	0	13	2	0.4	30.4	33.8	60.4
	1666	18-Feb-04	0715	Flood	0	11	24	16.4	26.2	30.4	41.0
	1666	29-Oct-03	0715	High Slack	0	21	20	-	-	-	-

Marine Daily Report

Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK02											
SK067											
	1666	11-Feb-03	0745	High Slack	0	<2	25	-	1.2	1.2	1.2
	1666	04-Dec-02	0840	Flood	0	26	28	0.4	0.6	0.6	0.6
	1666	22-Mar-02	1320	Ebb	0	49	4	0.2	2.4	18.0	28.4
	1391	27-Nov-99	0840	Low Slack	0	27	10	1.0	6.1	23.5	34.5
	1391	26-Nov-99	0850	Low Slack	0	23	16	5.1	22.5	26.5	34.9
SK071											
	1885	30-May-06	1200	Low Slack	0	<2	31	-	-	2.2	12.6
	1666	03-Nov-05	0845	Flood	0	5	25	12.0	28.0	33.6	73.6
	1666	07-Mar-05	0735	Flood	0	5	29	1.2	1.2	1.8	1.8
	1666	15-Dec-04	0835	Low Slack	0	6	20	0.4	30.4	33.8	60.4
	1666	18-Feb-04	0740	Flood	0	2	25	16.4	26.2	30.4	41.0
	1666	29-Oct-03	0740	High Slack	0	14	22	-	-	-	-
	1666	11-Feb-03	0810	High Slack	0	<2	26	-	1.2	1.2	1.2
	1666	04-Dec-02	0910	Flood	0	2	30	0.4	0.6	0.6	0.6
	1666	22-Mar-02	1400	Ebb	0	<2	20	0.2	2.4	18.0	28.4
	1391	27-Nov-99	0905	Low Slack	0	2	25	1.0	6.1	23.5	34.5
	1391	26-Nov-99	0915	Flood	0	5	22	5.1	22.5	26.5	34.9
	1391	25-Nov-99	0915	Flood	0	7	22	17.4	21.4	28.4	43.0
	1391	24-Nov-99	1100	Flood	0	13	22	4.0	11.0	12.4	39.6
	1391	23-Nov-99	1515	Ebb	0	<2	22	7.0	8.4	21.6	35.6
	1162	14-Dec-96	1010	Low Slack		2	24	1.8	5.6	8.4	13.0
SK072											
	1885	30-May-06	1155	Low Slack	0	<2	32	-	-	2.2	12.6
	1666	21-Mar-06	1155	Ebb	0	<2	25	-	-	1.8	8.0
	1666	03-Nov-05	0910	Flood	0	5	24	12.0	28.0	33.6	73.6
	1666	07-Mar-05	0745	Flood	0	<2	29	1.2	1.2	1.8	1.8
	1666	15-Dec-04	0850	Low Slack	0	2	18	0.4	30.4	33.8	60.4
	1666	18-Feb-04	0755	Flood	0	<2	26	16.4	26.2	30.4	41.0
	1666	29-Oct-03	0755	High Slack	0	2	25	-	-	-	-
	1666	11-Feb-03	0820	High Slack	0	2	27	-	1.2	1.2	1.2
	1666	04-Dec-02	0920	Flood	0	2	30	0.4	0.6	0.6	0.6
	1666	22-Mar-02	1415	Ebb	0	<2	20	0.2	2.4	18.0	28.4
	1391	27-Nov-99	0915	Low Slack	0	11	24	1.0	6.1	23.5	34.5
	1391	26-Nov-99	0935	Flood	0	8	22	5.1	22.5	26.5	34.9
	1391	25-Nov-99	0940	Flood	0	8	25	17.4	21.4	28.4	43.0
	1391	24-Nov-99	1015	Flood	0	7	22	4.0	11.0	12.4	39.6
	1391	23-Nov-99	1535	Ebb	0	2	22	7.0	8.4	21.6	35.6

Marine Daily Report

Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK02											
SK075											
	1885	01-May-07	0925	Low Slack	0	5	22				
	1885	06-Sep-06	1305	Flood	0	<2	32	-	-	-	-
	1885	31-May-06	1210	Ebb	0	49	32	-	-	-	5.4
SK03											
SK043											
	1886	01-May-07	0910	Low Slack	0	<2	26				
	1886	06-Sep-06	1300	Flood	0	<2	33	-	-	-	-
	1886	31-May-06	1155	Ebb	0	<2	32	-	-	-	5.4
	1886	30-May-06	1220	Low Slack	0	<2	32	-	-	2.2	12.6
	1667	21-Mar-06	1115	Ebb	0	<2	25	-	-	1.8	8.0
	1667	03-Nov-05	0825	Low Slack	0	17	18	12.0	28.0	33.6	73.6
	1667	07-Mar-05	0720	Flood	0	<2	25	1.2	1.2	1.8	1.8
	1667	15-Dec-04	0825	Low Slack	0	13	6	0.4	30.4	33.8	60.4
	1667	18-Feb-04	0725	Flood	0	2	25	16.4	26.2	30.4	41.0
	1667	29-Oct-03	0725	High Slack	0	8	22	-	-	-	-
	1667	11-Feb-03	0755	High Slack	0	11	20	-	1.2	1.2	1.2
	1667	04-Dec-02	0850	Flood	0	<2	29	0.4	0.6	0.6	0.6
	1667	22-Mar-02	1350	Ebb	0	<2	21	0.2	2.4	18.0	28.4
	1392	27-Nov-99	0850	Low Slack	0	8	16	1.0	6.1	23.5	34.5
	1392	26-Nov-99	0900	Low Slack	0	2	22	5.1	22.5	26.5	34.9
SK073											
	1886	30-May-06	1215	Low Slack	0	<2	31	-	-	2.2	12.6
	1667	21-Mar-06	1120	Ebb	0	<2	26	-	-	1.8	8.0
	1667	03-Nov-05	0830	Flood	0	7	22	12.0	28.0	33.6	73.6
	1667	07-Mar-05	0725	Flood	0	<2	28	1.2	1.2	1.8	1.8
	1667	15-Dec-04	0825	Low Slack	0	8	15	0.4	30.4	33.8	60.4
	1667	18-Feb-04	0730	Flood	0	2	25	16.4	26.2	30.4	41.0
	1667	29-Oct-03	0730	High Slack	0	33	22	-	-	-	-
	1667	11-Feb-03	0800	High Slack	0	2	26	-	1.2	1.2	1.2
	1667	04-Dec-02	0855	Flood	0	2	30	0.4	0.6	0.6	0.6
	1667	22-Mar-02	1355	Ebb	0	<2	20	0.2	2.4	18.0	28.4
	1392	27-Nov-99	0855	Low Slack	0	8	24	1.0	6.1	23.5	34.5
	1392	26-Nov-99	0905	Flood	0	8	20	5.1	22.5	26.5	34.9
	1392	25-Nov-99	0905	Flood	0	13	24	17.4	21.4	28.4	43.0
	1392	24-Nov-99	0950	Flood	0	70	24	4.0	11.0	12.4	39.6
	1392	23-Nov-99	1500	Ebb	0	2	19	7.0	8.4	21.6	35.6

Marine Daily Report

Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK04											
SK026											
	1887	02-May-07	0745	Ebb	0	140	4				
	1668	17-Jan-06	0910	Low Slack	0	2	3	41.0	45.6	48.4	99.0
	1668	03-Nov-05	0900	Flood	0	17	22	12.0	28.0	33.6	73.6
	1668	07-Mar-05	0740	Flood	0	<2	20	1.2	1.2	1.8	1.8
	1668	15-Dec-04	0840	Low Slack	0	8	6	0.4	30.4	33.8	60.4
	1668	18-Feb-04	0750	Flood	0	5	22	16.4	26.2	30.4	41.0
	1668	29-Oct-03	0750	High Slack	0	79	18	-	-	-	-
	1668	11-Feb-03	0845	High Slack	0	4	25	-	1.2	1.2	1.2
	1668	04-Dec-02	0915	Flood	0	<2	30	0.4	0.6	0.6	0.6
	1668	22-Mar-02	1410	Ebb	0	<2	18	0.2	2.4	18.0	28.4
	1393	27-Nov-99	0910	Low Slack	0	<2	20	1.0	6.1	23.5	34.5
	1393	26-Nov-99	0925	Flood	0	13	12	5.1	22.5	26.5	34.9
	1393	25-Nov-99	0935	Flood	0	17	12	17.4	21.4	28.4	43.0
	1393	24-Nov-99	1005	Flood	0	5	17	4.0	11.0	12.4	39.6
	1393	23-Nov-99	1525	Ebb	0	2	16	7.0	8.4	21.6	35.6
SK074											
	1887	02-May-07	0805	Ebb	0	<2	25				

Marine Daily Report

Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK05											
SK018											
	1888	01-May-07	0840	Low Slack	0	2	26				
	1888	06-Sep-06	1230	Flood	0	2	32	-	-	-	-
	1888	31-May-06	0915	Ebb	0	46	31	-	-	-	5.4
	1888	30-May-06	1125	Ebb	0	2	30	-	-	2.2	12.6
	1669	17-Jan-06	0950	Flood	0	5	17	41.0	45.6	48.4	99.0
	1669	03-Nov-05	0940	Flood	0	79	18	12.0	28.0	33.6	73.6
	1669	07-Mar-05	0810	Flood	0	2	29	1.2	1.2	1.8	1.8
	1669	15-Dec-04	0910	Low Slack	0	8	18	0.4	30.4	33.8	60.4
	1669	18-Feb-04	0815	Flood	0	<2	25	16.4	26.2	30.4	41.0
	1669	29-Oct-03	0820	High Slack	0	23	22	-	-	-	-
	1669	11-Feb-03	0845	High Slack	0	<2	21	-	1.2	1.2	1.2
	1669	04-Dec-02	0945	Flood	0	<2	30	0.4	0.6	0.6	0.6
	1669	22-Mar-02	1435	Ebb	0	<2	4	0.2	2.4	18.0	28.4
	1394	27-Nov-99	0940	Low Slack	0	6	12	1.0	6.1	23.5	34.5
	1394	26-Nov-99	1000	Flood	0	6	22	5.1	22.5	26.5	34.9
SK020											
	1888	01-May-07	0840	Low Slack	0	<2	27				
	1888	06-Sep-06	1230	Flood	0	<2	33	-	-	-	-
	1888	31-May-06	0925	Ebb	0	23	32	-	-	-	5.4
	1888	30-May-06	1130	Ebb	0	2	31	-	-	2.2	12.6
	1669	17-Jan-06	0945	Flood	0	49	10	41.0	45.6	48.4	99.0
	1669	03-Nov-05	0935	Flood	0	8	24	12.0	28.0	33.6	73.6
	1669	07-Mar-05	0800	Flood	0	<2	26	1.2	1.2	1.8	1.8
	1669	15-Dec-04	0910	Low Slack	0	7	12	0.4	30.4	33.8	60.4
	1669	18-Feb-04	0815	Flood	0	<2	26	16.4	26.2	30.4	41.0
	1669	29-Oct-03	0815	High Slack	0	49	22	-	-	-	-
	1669	11-Feb-03	0845	High Slack	0	2	27	-	1.2	1.2	1.2
	1669	04-Dec-02	0940	Flood	0	2	30	0.4	0.6	0.6	0.6
	1669	22-Mar-02	1430	Ebb	0	<2	18	0.2	2.4	18.0	28.4
	1394	27-Nov-99	0935	Low Slack	0	7	24	1.0	6.1	23.5	34.5
	1394	26-Nov-99	0955	Flood	0	23	12	5.1	22.5	26.5	34.9

Marine Daily Report

Sector / Station	Survey	Date	Time	Tide State	Depth (m)	FC/100ml MPN	Salinity (ppt)	Precipitation Amounts (mm) PREV 24hr	PREV 48hr	PREV 72hr	PREV 5d
SK06											
SK006											
	1889	01-May-07	0755	Ebb	0	<2	26				
	1889	06-Sep-06	1130	Flood	0	2	32	-	-	-	-
	1889	31-May-06	1015	Ebb	0	5	33	-	-	-	5.4
	1889	30-May-06	1020	Ebb	0	2	32	-	-	2.2	12.6
	1795	17-Jan-06	1045	Flood	0	49	14	41.0	45.6	48.4	99.0
	1795	03-Nov-05	1035	Flood	0	79	24	12.0	28.0	33.6	73.6
	1795	07-Mar-05	0840	Flood	0	2	32	1.2	1.2	1.8	1.8
	1795	15-Dec-04	0955	Flood	0	8	14	0.4	30.4	33.8	60.4
	945	25-Jan-94	1020	High Slack	0	5	30	4.0	5.5	7.5	9.0
	945	24-Jan-94	1115	Ebb	0	8	32	1.5	3.5	5.0	5.0
	945	13-Dec-93	1220	High Slack	0	13	24	4.0	8.0	10.0	37.5
	945	12-Dec-93	1235	High Slack	0	130	15	4.0	6.0	30.5	39.5
	808	27-Feb-93	1000	Ebb	0	2	30	-	-	-	-
	808	12-Dec-92	1105	Flood	0	8	26	1.5	3.3	6.6	20.8
	808	24-Oct-92	1230	High Slack	0	17	32	0.9	5.2	10.5	14.4
SK053											
	1889	01-May-07	0740	Ebb	0	<2	31				
	1889	06-Sep-06	1110	Flood	0	<2	33	-	-	-	-
	1889	31-May-06	1005	Ebb	0	<2	33	-	-	-	5.4
	1889	30-May-06	1000	Ebb	0	<2	33	-	-	2.2	12.6
	1795	07-Mar-05	0855	High Slack	0	8	31	1.2	1.2	1.8	1.8
	1795	15-Dec-04	1010	Flood	0	8	31	0.4	30.4	33.8	60.4
	945	25-Jan-94	1035	High Slack	0	14	31	4.0	5.5	7.5	9.0
	945	24-Jan-94	1105	Ebb	0	49	28	1.5	3.5	5.0	5.0
	945	13-Dec-93	1210	High Slack	0	23	33	4.0	8.0	10.0	37.5
	824	17-Nov-86	1510	Ebb		17	27				
SK069											
	1889	01-May-07	0745	Ebb	0	<2	31				
	1889	06-Sep-06	1120	Flood	0	<2	32	-	-	-	-
	1889	31-May-06	1000	Ebb	0	<2	32	-	-	-	5.4
	1889	30-May-06	1005	Ebb	0	2	32	-	-	2.2	12.6
	1795	07-Mar-05	0855	High Slack	0	<2	32	1.2	1.2	1.8	1.8
	1795	15-Dec-04	1005	Flood	0	<2	32	0.4	30.4	33.8	60.4

Provincial Ministry of Environment

Water Quality Objectives for Sooke Harbour, Basin, Inlet and for Streams Entering These Marine Waters: February, 2009

The Ministry of Environment (MOE), in partnership with several other organizations with interests in the Sooke area, are currently developing water quality objectives (WQO) for the Sooke Basin/Harbour/Inlet and for streams that enter these marine waters.

WQO are prepared for specific bodies of fresh, estuarine and coastal marine surface waters of British Columbia (BC) as part of the MOE's mandate to manage water quality. WQO are the safe limits for the physical, chemical or biological characteristics of water, biota (plant and animal life) or sediment that protect all designated water uses in a given waterbody or watershed. They are prepared only for those waterbodies and water quality characteristics that may be affected by human activity now or in the future. The MOE has the authority to set WQO under Section 5(e) of the Environmental Management Act. In addition, Section 150 of the Forest and Range Practices Act (FRPA) contains provisions for the MoE to establish objectives to protect water quality in designated community watersheds. Objectives are established in BC for waterbodies on a site-specific basis taking into consideration provincial water quality guidelines, local water quality, water uses, water movement, waste discharges and socio-economic factors. Each objective for a location may be based on the protection of a different water use, depending on the uses that are most sensitive to the physical, chemical or biological characteristics affecting that waterbody. Historically, WQO have not been legally enforceable. However, since 2004, objectives for water quality, quantity and timing of flow established under the Government Actions Regulation (B.C. Reg. 582/2004) may be enforced by the Conservation Officer Service. Objectives are most commonly used to guide the evaluation of the state of water quality in a watershed, the issuance of permits, licenses and legal orders, and the management of fisheries and the province’s land base. WQO are also a standard for assessing the ministry’s performance in protecting water uses.

Data have been collected since the late 1980’s for both the marine and freshwater sites in the Sooke area. Given the amount of historical data available, the usual three years of data used to develop objectives are not needed for Sooke. One year of both marine and freshwater data will be considered with historical data to develop current WQO for the Sooke Inlet, Basin and Harbour, including WQO for streams that enter the marine waters. Marine data were collected in 2008 and freshwater data were collected in 2009. The goal is to integrate WQOs into the LWMP.

KEEP IT CLEAN DON'T LEAVE A SHEEN!

Call

1-800-OILS-911

PLEASE REPORT OIL SPILLS

Generic Spill Response Plan and Reporting Procedure

Emergency Numbers

Provincial Emergency Program (PEP)
1-800-663-3456

District of Sooke Emergency Services
Day phone: 250-642-1634
After hours: 250-478-9555

For Spills into Sanitary Sewer System
EPCOR: (250) 642-0151

Fire Department
Emergency – 911
Non-Emergency – 250-642-5422

Police
Emergency – 911
Non-Emergency – 250-642-5241

Property Owner _____

Business Owner _____

Operations Manager _____

Suggested Minimum Spill Response Equipment

25 kg - Loose Absorbent
1 - Absorbent Booms
20 - Absorbent Pads
1 - Shovel
1 - Broom

Spill Response Plan

COMMON HAZARDOUS MATERIALS

- Fuel
- Oil
- Paint
- Solvent
- Cleaning products
- Pesticides
- Sewage

Small Spills – (less than 10 litres)

1. Make sure area is safe for entry and the spill does not pose an immediate threat to health or safety of responder.

If safe to proceed:

2. Stop source of spill (plug hole, upright the container, shut off valve).

3. Check for hazards (flammable material, noxious fumes, cause of spill). If flammable liquid is spilled, turn off engines and nearby electrical equipment. If serious hazards are present leave the area and call 911. When in doubt, consult the applicable Material Safety Data Sheets for hazards.

4. Stop spill from entering drain (use absorbent or other material as necessary, close valve to drain, cover or plug drain).

5. If spilled material has entered a storm sewer, then check oil/water interceptor or catch basins then notify the municipality. Day Ph: 250-642-1634 Evening/weekend Ph. 250-478-9555.

6. If spilled material has entered the sanitary sewer then contact EPCOR: (250) 642-0151

7. Clean up spilled material/absorbent (do not flush area with water).

8. Dispose of cleaned material/absorbent into secure container for disposal as hazardous waste.

9. Make sure cleaned area is not slippery (if slippery, put down no-slip material or mark area with a “slippery when wet” sign).

10. Notify Supervisor.

11. Complete a Spill Reporting Form.

12. Contain spill clean up materials, keep dry and contact a Hazardous Waste Disposal company or CRD Hartland Landfill to determine the proper disposal method.

Medium Spills (10-<100 litres)

1. Make sure area is safe for entry and the spill does not pose an immediate threat to health or safety of responder, call 911.

If safe to proceed:

2. Stop source of spill (Plug hole, upright the container, shut off valve).

3. Check for hazards (flammable material, noxious fumes, cause of spill) - If flammable liquid, turn off engines and nearby electrical equipment. If serious hazards are present leave area and call 911. When in doubt, consult the Material Safety Data Sheet for hazards.

4. Call co-workers and supervisor for assistance and to make them aware of the spill and potential dangers.

5. Stop spill from entering drain (use absorbent or other material as necessary, close valve to drain, cover or plug drain).

6. Stop spill from spreading (use absorbent or other material).

7. If spilled material has entered a storm sewer, then check oil/water interceptor or catch basins then notify the municipality. Day Ph: 250-642-1634 Evening/weekend 250-478-9555.

8. If spilled material has entered the sanitary sewer then contact EPCOR: (250) 642-0151

9. Clean up spilled material/absorbent (do not flush area with water) - If outside clean-up service is required, Day Ph: 250-642-1634 Evening/weekend Ph. 250-588-2335

10. Dispose of cleaned material/absorbent into secure container for disposal as hazardous waste.

11. Make sure cleaned area is not slippery (if slippery, put down no-slip material or mark area with a “slippery when wet” sign).

12. Complete Spill Reporting Form and notify the CRD, and the District of Sooke.

13. Contain spill clean up materials, keep dry and contact a Hazardous Waste Disposal company or CRD Hartland Landfill to determine the proper disposal method.

Large Spills (greater than 100 litres)

1. Make sure area is safe for entry and the spill does not pose an immediate threat to health or safety of responder, call 911.

If safe to proceed:

2. Stop source of spill (Plug hole, upright the container, shut off valve).

3. Check for hazards (flammable material, noxious fumes, cause of spill) - If flammable liquid, turn off engines and nearby electrical equipment. If serious hazards are present leave area and call 911. LARGE SPILLS ARE LIKELY TO PRESENT A HAZARD.

4. Call co-workers and supervisor for assistance and to make them aware of the spill and potential dangers.

5. If possible, stop spill from entering drain (use absorbent or other material as necessary, close valve to drain, cover or plug drain).

6. Stop spill from spreading (use absorbent or other material).

7. Call the Provincial Emergency Program (PEP) at 1-800-663-3456

8. If spilled material has entered a storm sewer, then check oil/water interceptor or catch basins then notify the municipality. Day Ph: 250-642-1634 Evening/weekend Ph. 250-478-9555

9. If spilled material has entered the sanitary sewer then contact EPCOR: (250) 642-0151

10. Clean up spilled material/absorbent (do not flush area with water) - If outside clean-up service is required, Day Ph: 250-642-1634 Evening/weekend Ph. 250-588-2335

11. Dispose of cleaned material/absorbent into secure container for disposal as hazardous waste.

12. Make sure cleaned area is not slippery (if slippery, put down no-slip material or mark area with a “slippery when wet” sign).

13. Complete a Spill Reporting Form and notify PEP, CRD, and the District of Sooke.

14. Contain spill clean up materials, keep dry and contact a Hazardous Waste Disposal company or CRD Hartland Landfill to determine the proper disposal method.

Spill Reporting Form

Date: _____ Time Notified:_____
Spill Reported By: _____
Location of Spill: _____
Extends from: _____
Extends to: _____
Receiving Environment:
❑ Ground ❑ Roadway ❑ Park
❑ Storm Drain ❑ Creek/Watercourse/Ditch
❑ Sanitary Sewer
❑ Other: _____
Was spill sampled? Y/N
Cause of the Spill:_____
Time of the spill: _____
Start: _____ Stop: _____
Duration: _____ (hr) _____(min)
Responsible Parties: _____
Action Taken:
_____
_____
_____
_____
_____

Attended by: _____
Cost (Approx.): $ _____

Contacts	Date/Time	Person Contacted	On Scene
CRD			
District of Sooke			
Provincial Emergency Program			
Other			

Sign-Off Authority (Signature) _____ Date: _____

Fax a copy of the <u>complete</u> Spill Reporting Form to:
BC Ministry of the Environment: 250-751-3103 (Attn: Spill Response Officers)
District of Sooke: (250) 642-0541 (Attn: Municipal Engineer)
Capital Regional District: (250) 360-3093 (Attn: Supervisor of Stormwater, Harbours and Watershed program.

Presentation and Field Tour of Innovative Rainwater Management Methods List of Attendees

July 9, 2008 attendees:
District of Sooke Mayor, Janet Evans; Councilors Ron Dumont and Brenda Parkinson; Darcey Kohuch, Director of Engineering; Marlaina Elliott, Director of Planning; Katherine Lesyshen, Associate Planner; Laura Byrne, Engineering Technologist; Al Fontes, Engineering Technologist; Tony Bastone, Building/Plumbing Official; Sue Lin Tarnowski, Deputy Director of Finance (presentation only); Dave McClimon, Rainwater Advisory Committee member; William Norton, Rainwater Advisory Committee member; Tami Wetmore, Epcor (presentation only).

September 25, 2008 attendees:
Laura Byrne, District of Sooke Engineering Department; Nikki Lewers, District of Sooke, Deputy Approving Officer; Gerald Christie, Director of Planning, District of Sooke; Tara Johnson, District of Sooke, Planner (presentation only); Cindy Walsh, Senior Environmental Protection Officer, Ministry of the Environment; Bryce Watson, Environmental Protection Officer, Ministry of the Environment; Mark Gauti, Environmental Technician, T'Sou-ke Nation; Randy Welters, Chamber of Commerce; Laurie Wallace, West Coast Design; Randy Clarkston, West Coast Design; Adrian Small, Small & Rossell Landscape Architects; Renaat Marchand, local artist; Bev Befus, resident.

Rainwater and You:
Why Does Rainwater Matter To Sooke?

Are you a resident of Sooke?
Do you care about rivers, fish and greenspace?
Would you like to see examples of how innovative building design, landscaping & engineering can help protect streams and marine environments from the impacts of development?

If so, please attend the

PRESENTATION & BUS TOUR
OF INNOVATIVE RAINWATER MANAGEMENT
IN THE CORE AREA OF THE CRD

Thursday, September 25thth, 2008

Meet - 9:20 a.m., Sooke Council Chambers
Returning by 4:30 p.m.

Lunch Will Be Provided

RSVP by Tues. September 16th to Laura Byrne, Sooke Engineering Dept.
Phone 250-642-1639 or email lbyrne@sooke.ca
indicating any food restrictions, or to ask for detailed information.

This information sharing event is provided as part of the District of Sooke Liquid Waste Management Plan (Rainwater) Project.

Resources for the Design, Implementation and Performance of Rainwater Management Systems

Planning and General Information

BC Ministry of Environment, 2002: *Stormwater Planning: a Guidebook for British Columbia*:
http://www.env.gov.bc.ca/epd/epdpa/mpp/stormwater/stormwater.html
This guidebook provided one of the first comprehensive sources of information about the need for and an approach to managing rainwater in urban areas in the Pacific Northwest based on a principle of mimicking the natural water balance. It continues to provide practical information for managers and engineers with a framework and case studies of effective on-the-ground strategies and policies to facilitate widespread implementation of integrated rainwater management.

BC Ministry of Environment, 2006: *Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia*
http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare2006/develop_with_care_intro.html
As stated in the report abstract, “This document is intended to assist people who are involved in planning, implementing, reviewing and/or approving land developments in British Columbia’s urban and rural areas. Its primary purpose is to provide province wide guidelines for the maintenance of environmental values during the development of urban and rural lands. It also provides information on ways that environmental protection and stewardship can benefit the community, the property owner and the developer, as well as the natural environment.”

BC Inter-Governmental Partnership and the Green Infrastructure Partnership, 2007: *Beyond the Guidebook: Context for Rainwater Management and Green Infrastructure in British Columbia*
http://www.waterbucket.ca/rm/sites/wbcrm/documents/media/37.pdf
This resource outlines an approach to development and urban watershed management. It builds on the principles of the BC Ministry of Environment's 2002 *Stormwater Planning Guidebook* and outlines an approach for water management based on the water balance model and continuous hydrological modeling to reduce runoff volume and improve water quality.

US EPA, National Pollutant Discharge Elimination System (NPDES), 2008: *Green Infrastructure Municipal Handbook*
http://cfpub.epa.gov/npdes/greeninfrastructure/munichandbook.cfm
As stated on the site, “The Municipal Handbook is a series of documents to help local officials implement green infrastructure in their communities. Handbook topics cover issues such as financing, operation and maintenance, incentives, designs, codes & ordinances, and a variety of other subjects. The handbook documents are intended to serve as "how to" manuals on these topics, written primarily from the standpoint of municipal implementation. The handbook is being produced in sections, with each new element being released as it is completed.”

US EPA, Polluted Runoff (Nonpoint Source Pollution): Low Impact Development (LID)
http://www.epa.gov/nps/lid/
This site provides many links to reports and factsheets about low impact development, including case study examples, costs/benefits and a literature review about monitoring and effectiveness.

Center for Watershed Protection http://www.cwp.org/
This website provides a large source of information about watershed protection policies, planning and BMP technologies and strategies to reduce the impact of urban areas on aquatic ecosystems. Since its establishment in the 1990s, CWP has produced hundreds of articles and publications on these topics and is regarded as an authority on low impact development and watershed planning and practice.

Hydrological Modeling
Waterbucket website http://www.waterbucket.ca/
This site, a partnership of the Water Sustainability Committee of the BC Water and Waste Association and the Stewardship Centre for BC, provides information relevant to B.C. and Vancouver Island regarding integrated water management, green infrastructure and development/planning to protect watershed ecology. The site covers emerging issues and recent research, including the water balance model.

Water Balance Model Canada, Powered by QUALHYMO http://www.waterbalance.ca/
This tool allows modeling a site (from the lot scale to the watershed scale) to determine the existing and future water balance, for example, the proportion of precipitation that is intercepted, infiltrated to groundwater and runs off as surface water. Users can put in different scenarios, such as rainwater detention ponds, to test how these structures will change runoff characteristics of the site.

US EPA Stormwater Management Model
http://www.epa.gov/ednnrmrl/models/swmm/index.htm
As stated on the site, “The EPA Storm Water Management Model (SWMM) is a dynamic rainfall-runoff simulation model used for single event or long-term (continuous) simulation of runoff quantity and quality from primarily urban areas . . . SWMM tracks the quantity and quality of runoff generated within each sub catchment and the flow rate, flow depth, and quality of water in each pipe and channel during a simulation period comprised of multiple time steps . . . SWMM was first developed in 1971, and has since undergone several major upgrades since then. It continues to be widely used throughout the world for planning, analysis and design related to stormwater runoff, combined sewers, sanitary sewers, and other drainage systems in urban areas, with many applications in non-urban areas as well.”

Washington Department of Ecology, 2006: Western Washington Continuous Simulation Hydrology Model http://www.ecy.wa.gov/programs/wq/stormwater/wwhmtraining/index.html
This model is a continuous simulation model, based on precipitation records for 19 western Washington counties, that allows modeling of various development scenarios to develop strategies that mimic the pre-development hydrological regime of a site. Although designed for Washington, nearby areas in B.C., such as southern Vancouver Island and Greater Vancouver, could be modeled with the system by using county data with similar precipitation/weather patterns.

Rainwater Systems Performance Research

Canada Housing and Mortgage Corporation: Alternative Stormwater Management Practices for Residential Projects
http://www.cmhc-schl.gc.ca/en/inpr/su/waho/waho_006.cfm
This site gives general information about options for residential scale rainwater management and relative comparisons of pollutant removals, economic costs/benefits and implementation issues. Types of strategies reviewed include green roofs, constructed wetlands, sand filters, vegetative practices, urban forestry, infiltration trenches, downspout disconnection and oil and grit separators.

Seattle Public Utilities: Natural Drainage Systems
http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/GreenStormwaterInfrastructure/NaturalDrainageProjects/
Seattle has implemented several low impact development pilot projects that began with the Street Edge Alternatives project in 2001. These consist of bio-retention facilities (rain gardens) in roadside swales, combined with traffic calming and other strategies to retain and filter road runoff and reduce the volume conveyed in stormwater pipes and discharged to the natural environment. The systems have been proven highly effective. The site provides general information, technical reports and engineering diagrams of the systems.

Washington State Department of Transportation Stormwater Research Reports
http://www.wsdot.wa.gov/Environment/WaterQuality/Research/Reports.htm
Provides links to a large number of technical reports regarding performance of rainwater systems (filter strips, infiltration ponds, etc.) for reducing volume and improving water quality.

University of New Hampshire: Innovative Stormwater Management Inventory
http://www.erg.unh.edu/stormwater/index.asp
A searchable database of a large number of low impact development rainwater projects with project summaries and performance notes.

US EPA: Literature Review and Fact Sheets about Low Impact Development
http://www.epa.gov/owow/nps/lid/lidlit.html
The literature review was produced in 2000 and summarizes current knowledge and design challenges of low impact development strategies to reduce runoff and improve water quality discharged to the natural environment. Types of LID reviewed include bio-retention, grass swales and permeable pavement.

Environmental Stewardship Resources

Stream, Wetland, Lake and Shoreline Restoration and Monitoring
Restoration is carried out for a variety of objectives and is often initiated by a desire to improve wildlife and fish habitat or to mitigate a particular problem. Monitoring and collecting baseline data is an important first step to improving ecosystem health. For the project to be successful the program should be based on sound scientific theory and practice and data collection should follow quality control and assurance protocols. Community groups should contact the District of Sooke or other municipal/regional authority prior to beginning any project, to make sure permissions for the work are granted through the proper authorities; such as the provincial Ministry of Environment or Fisheries and Oceans Canada.

Local professionals and consultants: These individuals may be able to provide a limited amount of advice and guidance, depending on their availability and interest in the project. The District of Sooke or the Capital Regional District Stormwater, Harbours and Watersheds Program should be able to provide a list of consultants who have expertise in the given area. Although professionals and consultants may not be able to oversee an entire project unless they are paid, they may be able to provide some guiding principles and practices to initiate the project and recommendations for other resources.

Local institutions and organizations: Organizations that may be able to provide information and assistance in aquatic and riparian ecological restoration and monitoring include:

- The provincial Ministry of Environment and/or Fisheries and Oceans Canada may be able to provide recommendations and possibly assistance in a project, for example with fish salvaging.
- The Pacific Streamkeepers Federation (http://www.pskf.ca/) provides training and resources for community stewardship groups, for stream monitoring and planting initiatives.
- The BC Lake Stewardship Society (http://www.bclss.org/) helps community groups set up monitoring and restoration programs
- Sister organizations in nearby municipalities may be able to provide advice based on their experience. The CRD Stormwater, Harbours and Watersheds program has good knowledge about general restoration and monitoring work carried out in the region. The Conservation Connections website (www.conservationconnection.bc.ca) also lists community groups working on various types of environmental projects.
- Professional Associations, such as the College of Applied Biology (http://www.cab-bc.org/) maintain listservs; by contacting the association, members can be asked for information, equipment to loan/donate or technical assistance to a stewardship group.

Written references and online guidebooks:

- BC Ministry of Environment: Ecological Restoration Guidelines for British Columbia http://www.env.gov.bc.ca/fia/documents/TERP_eco_rest_guidelines/intro/index.html Provides a framework for carrying out a restoration project, and guidelines for implementation and monitoring.
- Society for Ecological Restoration of BC's website http://www.ser.org/serbc/default.asp Provides general information and publications about ecological restoration.
- Stewardship Canada publication series http://www.stewardshipcentre.bc.ca/cdirs/publications/

A series of manuals covering stream- and wetland keepers, shoreline restoration, native plant landscaping, agricultural practices, residential property stewardship, forming a stewardship group, etc.

- Department of Fisheries and Oceans, Stewardship and Community Involvement: Tools for Stewardship http://www-heb.pac.dfo-mpo.gc.ca/community/tools/toolsh_e.htm A long list of resources for stewardship activities in a number of areas beyond stream/wetland restoration. Some links are no longer active but many are.
- US Forest Service, 2002: *A Soil Bioengineering Guide for Streambank and Lakeshore Stabilization, FS-683* http://www.fs.fed.us/publications/soil-bio-guide/
- Plotnikoff, R. and C. Wiseman. 2001: *Benthic Macro invertebrate Biological Monitoring Protocols for Rivers and Streams: 2001 Revision* http://www.ecy.wa.gov/biblio/0103028.html
  A guidebook explaining theory and practice of macro invertebrate sampling as an indicator of water quality and watershed conditions.
- Shorekeepers' Guide for Monitoring Intertidal Habitats in Canada's Pacific Waters http://www.keepersweb.org/Shorekeepers/
  This technique is based on habitat mapping and identification/enumeration of intertidal organisms. The guide outlines the process and provides resources for establishing a program.
- Washington Department of Fish and Wildlife, Salmon and Steelhead Habitat Inventory and Assessment Program: Inventory and Monitoring of Salmon Habitat in the Pacific Northwest, Directory and Synthesis of Protocols for Management/Research and Volunteers in Washington, Oregon, Idaho, Montana and British Columbia http://wdfw.wa.gov/hab/sshiap/dataptcl.htm
  From the executive summary: “This document reflects an effort to establish a consistent format for the collection of salmonid habitat data across the Pacific Northwest. More specifically, our objectives were to: 1) provide a synthesis of the salmon habitat protocols applicable to the Pacific Northwest, 2) recommend a subset of these protocols for use by volunteers and management/research personnel across the region, 3) link these protocols with specific types of habitat projects, 4) establish a Quality Assurance/Quality Control framework for the data derived from the use of these protocols, and 5) to the degree possible, identify the format and destination where the data is routinely sent.”
- US EPA, 2006: Volunteer Estuary Monitoring, a Methods Manual. EPA-842-B-06-003 http://www.epa.gov/owow/estuaries/monitor/
  From the website: “The Volunteer Estuary Monitoring Manual contains information and methodologies specific to monitoring estuarine water quality. The manual includes information that is useful to new and established volunteer estuary monitoring programs.”
- Federal Interagency Stream Restoration Working Group (10/1998, Revised 2001): Stream Corridor Restoration: Principles, Processes, and Practices http://www.nrcs.usda.gov/technical/stream_restoration/newgra.html
  A comprehensive resource outlining stream processes and characteristics, guidelines for developing a restoration plan, and applying restoration principles.

Terrestrial Ecosystem Restoration, Native Plants and Invasive Species Control

Terrestrial ecosystems in the region are a diverse mosaic of various forest types, rocky knolls and woodlands. These ecosystems can be disturbed by land use and vegetation removal,

and invasive species. Stewardship activities may include replanting a degraded area, removing invasive plants or simply backyard gardening with native species. Local professionals and consultants: (see notes for same category above).

Local Institutions and Organizations: Organizations who may be able to contribute with student projects, expertise and oversight include:

- University of Victoria, Restoration of Natural Systems Program
  http://www.uvcs.uvic.ca/restore/
  Provides academic and applied courses in ecological restoration, offering a diploma and semi-distance learning. Students of the diploma program must do a major project and are often looking for good practical ideas.
- Camosun College, Environmental Technology Program
  http://camosun.ca/learn/programs/envr/index.html
- Royal Roads University, Environmental Science Program
  http://www.royalroads.ca/programs/faculties-schools-centres/faculty-social-applied-sciences/environment-sustainability/envscnc-bsc/
- Garry Oak Ecosystems Recovery Team http://www.goert.ca/
- Victoria Natural History Society http://www.vicnhs.bc.ca/

Written and online resources for information, data collection and monitoring about terrestrial ecosystems:

- Pojar, J. and A. MacKinnon (eds.), 1994: *Plants of Coastal British Columbia including Washington, Oregon and Alaska.* Lone Pine Publishing, Vancouver
  The “bible” for BC native plant identification, used by beginners and botanists alike.
- Native Plant Society of B.C. http://www.npsbc.org/
  Resources and information about native plants, and the online home of the Native Plant Study Group, a great source of information for general or specific native plant questions.
- Invasive Plant Council of B.C. http://www.invasiveplantcouncilbc.ca/
  Provides general information about the effects of invasive plants, information about established and emerging invasive species, and workshops and events.
- BC Ministry of Forests and Range, Biogeoclimatic Ecosystem Classification and Ecology Research Program (BEC)
  http://www.for.gov.bc.ca/hre/becweb/
  BEC is the provincial standard for classifying and describing ecosystems. This site provides background information about the system and describes the methods used.
- BC Ministry of Forests. *Field Manual for Describing Terrestrial Ecosystems. Land Management Handbook No. 25*.
  http://www.env.gov.bc.ca/ecology/dteif/index.html (download pdf or html version)
  http://ilmbwww.gov.bc.ca/risc/pubs/teecolo/fmdte/deif.htm (html version of manual)
- BC Ministry of Environment, BC Species and Ecosystems Explorer.
  http://www.env.gov.bc.ca/atrisk/toolintro.html
  A searchable database of conservation information regarding endangered species and ecosystems.
- Capital Regional District, Stormwater, Harbours and Watersheds Program Ecosystems web page. http://www.crd.bc.ca/watersheds/ecosystems/
  Provides general descriptions and information about various terrestrial, freshwater and marine ecosystems of the region.

- E-Flora BC http://www.eflora.bc.ca/
  A database of practically all native (and many invasive) plants in BC, searchable by common name or scientific name, many with photographs and drawings.
- Naturescape BC http://www.naturescapebc.ca/naturescape/resources.htm
  Provides resources and an inexpensive package of information about landscaping with native plants.
- Garry Oak Ecosystems Recovery Team. http://www.goert.ca/
  Information and resources about Garry oak ecosystems, one of the most endangered terrestrial ecosystems in the region.

Greening Individual Properties

Greening individual properties can be an effective way to improve watershed health. This may include installing rain barrels to reduce roof runoff to storm drains, building a rain garden, reducing fertilizer and pesticide use or landscaping for biodiversity (e.g. attracting native birds and butterflies). Many of the publications listed under terrestrial ecosystem restoration can provide information about native plants. Be advised that local building codes and regulations may apply.

- Washington State University, Pierce County Low Impact Development, Rain Garden Handbook for Western Washington Homeowners
  http://www.pierce.wsu.edu/Water_Quality/LID/
- CRD: rain barrels information and suppliers
  http://www.crd.bc.ca/water/conservation/outdoorwateruse/recycling/rainbarrels.htm
- CRD: greening your residence
  http://www.crd.bc.ca/watersheds/protection/howtohelp/index.htm
- CRD: homeowners' guide to outdoor water use
  http://www.crd.bc.ca/water/conservation/outdoorwateruse/outdoorsavingtips.htm
- The Garden Water Saver (make your own rain barrel)
  http://www.gardenwatersaver.com/1.html
- CMHC rain garden guide
  http://www.cmhc-schl.gc.ca/en/co/maho/la/la_005.cfm
- Victoria Compost Education Centre http://www.compost.bc.ca/
- BC Environmental Farm Planning
  http://www.agf.gov.bc.ca/resmgmt/EnviroFarmPlanning/index.htm
- Green Communities Canada http://greencommunitiescanada.org/
- CRD guidelines for developing/managing shoreline properties
  http://www.crd.bc.ca/watersheds/protection/howtohelp/limitimpacts.htm

Other Resources

Other resources for restoration and building social-ecological networks:

- Water Connections, Centre for Sustainable Watersheds http://www.waterconnect.ca/
  This site provides information and resources related to watershed stewardship across Canada.
- Centre for Sustainable Watersheds http://www.watersheds.ca/whatwedo/about_us.html
  As stated on the website, “Centre for Sustainable Watersheds (CSW) is a non-governmental, non-profit, charitable organization dedicated to facilitating community involvement in water resource protection in Canada.”
- Land Trust Alliance of BC http://www.landtrustalliance.bc.ca/

Provides resources and tools for establishing land trusts and land covenants.

- Stewardship Centre for BC
  http://www.stewardshipcentre.bc.ca/stewardshipcanada/home/scnBCIndex.asp
  This organization provides a number of resources for stewardship projects and practices, including publications, case studies and guidebooks/toolkits.
- Smart Growth BC http://www.smartgrowth.bc.ca/
  Provides education and resources to encourage planning to limit the ecological f0ootprint of cities.

- Pettinger, A and B. Costanzo. (2002). Native Plants in the Coastal Garden: A Guide for Gardeners in British Columbia and the Pacific Northwest. Whitecap Books.
- Brayshaw, T. (1996). *Trees and Shrubs of British Columbia*. UBC Press, Vancouver.
- Link, R. (1999). *Landscaping for Wildlife in the Pacific Northwest. Washington Department of Fish and Wildlife.* University of Washington Press, Seattle.
- Harper, R. (1994). *The Natural Garden Book: A holistic approach to gardening*. A Fireside Book. Simon and Schuster Inc.
- Gerling, H., M. Willoughby, A. Schoepf, K. Tannas and C. Tannas. (1996). *A Guide to Using Native Plants on Disturbed Lands*. Alberta Agriculture, Food and Rural Development and Alberta Environmental Protection, Edmonton, Alberta.
- Kozloff, E.N. 1993. *Seashore Life of the Northern Pacific Coast, an Illustrated Guide to Northern California, Oregon, Washington and British Columbia*. University of Washington Press, Seattle.
- McKenzie, W.H. and J.R. Moran. 2004. *Wetlands of British Columbia, a Guide to Interpretation*. British Columbia, Ministry of Forests, Forest Science Program. Handbook no. 52.
- Falk, D.A., Palmer, M.A. and J.B. Zedler. *Foundations of Restoration Ecology*. Island Press
- Apostol, D. and M. Sinclair. *Restoring the Pacific Northwest, the Art and Science of Ecological Restoration in Cascadia*. Island Press.
- Snyder, C. and C. Duerksen. 2005. *Nature-Friendly Communities*. Island Press.
- Schaefer, V., Rudd, H. and J. Vala. 2004. *Urban Biodiversity, Exploring Natural Habitat and its Value in Cities*. Captus Press
- Register, R. 2006. *Ecocities, Rebuilding Cities in Balance with Nature*. New Society Publishers
- Dobson, C. and G.G. Beck. *Watersheds, a Practical Handbook for Healthy Water*. Firefly Books
- Chiras, D. and D. Wann. 2003. *Superbia! 31 Ways to Create Sustainable Neighborhoods*. New Society Publishers

Mapping Resources

The Capital Regional District's Natural Areas Atlas: http://www.crd.bc.ca/maps/natural/
One of the best sources of publicly accessible mapping information. It includes orthophotos, topography (contours), watercourses and water bodies, roads and other infrastructure and sensitive ecosystems in layers that can be toggled on and off. There are also tools for drawing polygons and labelling maps, and for printing maps as pdf documents.

District of Sooke Web Map:
http://gis.sooke.ca
This is a web-based GIS application intended to provide access to addressing and basic property information within the District of Sooke municipality. It includes orthophotos, topography, watercourses and water bodies, green spaces, roads and other infrastructure.

GeoBC: http://www.geobc.gov.bc.ca/
A major repository of mapping resources across many sectors in the province, including archeological information, base maps and air photos, demographics, ecosystems, Google Earth resources, land ownership/title, land use planning, mining and parks.

The Community Mapping Network: http://www.cmnbc.ca/
A wide variety of mapping resources. As stated on the website: “The CMN helps communities in British Columbia and Canada map sensitive habitats and species distribution. Information is integrated from many sources to assist land use planning and is freely available in over fifty user friendly atlases. The atlases have links to local and remote databases, WMS sources and geo-referenced video. The CMN supports Sensitive Habitat Inventory and Mapping (SHIM) projects and provides customized data entry, digitizing and other tools.”

Fisheries Inventory Data Queries: http://a100.gov.bc.ca/pub/fidq/main.do
A service provided by the BC Ministry of Environment that provides a searchable database of watershed codes, fisheries information and lake summary data.

Union of BC Indian Chiefs: http://www.ubcic.bc.ca/
This website provides resources and information to support the aboriginal people of B.C., including guidelines for cultural land use studies. It also includes the first publicly accessible reproduction of the McKenna-McBride Royal Commission which defined the current form and extent of Indian reserves in the province.

GeoConnections: http://www.geoconnections.org/en/index.html
As stated on the website: “GeoConnections helps decision-makers use online location-based (or "geospatial") information, such as maps and satellite images, to tackle some of Canada's most pressing challenges. The program focuses on working with partners in public health, public safety and security, the environment and sustainable development, Aboriginal matters, and geomatics technology development.”

Provincial air photo warehouse:
http://ilmbwww.gov.bc.ca/bmgs/airphoto/index.htm#warehouse
Hard copies of historical and recent air photos can be ordered online or in person through this provincial service.

National Airphoto Library: http://airphotos.nrcan.gc.ca/
This library has some different sets of air photos from the provincial warehouse, including some older air photos. Areas of interest can be outlined in their map-based system, and air photos applicable to that area are listed and can then be ordered.

BC Land Title and Survey, Surveyor General: http://www.ltsa.ca/surveyor-general
The land titles office is located at 3400 Davidson Avenue in Victoria, and, in addition to land title and survey information for existing lots, also houses historical survey records and maps, including some of the first hand-drawn maps of the region.

Green Map: http://www.greenmap.org/
A world-wide organization that supports community-led mapping for a variety of social and environmental purposes, and provides a common mapping language (icons) so maps can be shared internationally.

Common Ground Community Mapping Project:
http://www.lifecyclesproject.ca/initiatives/common_ground/approaches.php
A local green mapping initiative, which has completed community maps for Greater Victoria and the University of Victoria, among other areas.

Organizations and Institutions that may be able to provide mapping guidance and/or training in GIS and GPS include:

- The Capital Regional District, GIS Department: http://www.crd.bc.ca/
- The University of Victoria, Geography Department: http://www.geog.uvic.ca/
- Camosun College, Geography Department:
  http://camosun.ca/learn/programs/geography/index.html
- Malaspina College, Geography Department
  http://www.mala.ca/geography/

Community Workshops – Content and Potential Partners

Protection of Aquatic Resources	
Green Boating	Potential Partners: • Georgia Strait Alliance: http://www.georgiastrait.org/?q=node/51
	Content: Risks to marine ecosystems, regulations, sewage and grey water management, hull maintenance and spills
Living By Water	Potential Partners: • The Living by Water Project: http://www.livingbywater.ca/
	Content: For freshwater and marine residences: healthy shorelines, native plants and shoreline landscaping, shoreline erosion and bioengineering, septic systems, preventing water pollution, and trails and docks
Spills	Potential Partners: • Capital Regional District - Stormwater, Harbours, Watersheds Program: www.crd.bc.ca
	Content: Identification of potential pollutants, ecosystem risks, prevention, spill preparation and response, and reporting of spills
Community Mapping	Potential Partners: • Life Cycles: www.lifecyclesproject.ca • Common Ground: www.commongroundproject.ca
	Content: Mapping natural and community resources, planning for preservation and improvement of resources
Toxic Smart Solutions	Potential Partners: • Georgia Strait Alliance : http://www.georgiastrait.org/?q=node/371
	Content: Identification of common household toxic chemicals, ecosystem risks, alternatives, proper disposal

Fish/Habitat

Ecological Data for Freshwater and Marine Aquatic Habitat	Potential Partners: • Streamkeepers: www.pskf.ca • Shorekeepers:http://www.keepersweb.org/Shorekeepers/index.htm • Wetland Stewardship Partnership, BC Ministry of Environment: http://www.gov.bc.ca/env/
	Content: Habitat surveys, water quality monitoring, invertebrate surveys, storm drain marking, stream clean up techniques, riparian plantings, fish trapping, stream channel restoration
Bioengineering	Potential Partners: • Appropriate environmental consultants
	Content: Bioengineering techniques, appropriate uses, field application of willow wattles
Proper Functioning Condition Assessments for Communities	Potential Partners: • Appropriate environmental consultants
	Content: Overview of the PFC Assessment method, applications for community groups, field assessments
Environmental Farm Plans	Potential Partners: • Ministry of Agriculture and Lands: http://www.agf.gov.bc.ca/resmgmt/EnviroFarmPlanning/index.htm
	Content: Developing Environmental Farm Plans, funding for implementation
Invasive Species Management	Potential Partners: • Invasive Plant Council of BC: www.invasiveplantcouncilbc.ca
	Content: Identification of invasive species (field trip), management techniques

Rainwater Management

Building a Rainwater Management Facility	Potential Partners: • Compost Education Centre: www.compost.bc.ca • Appropriate Environmental Consultants
	Content: rain garden and bioswale design and construction, application of green roofs, local examples
Native Plant Gardening	Potential Partners: • Compost Education Centre • Swan Lake Christmas Hill Nature Sanctuary • Glendale Gardens • Appropriate Environmental Consultants / Landscape Designers
	Content: Designing a native plant garden, plant selection, sources, maintenance, local examples
Rainwater Harvesting	Potential Partners: • Compost Education Centre • Environmental Consultants • Appropriate Environmental Consultants
	Content: Collection devices, how to use rainwater (e.g. irrigation, toilets, laundry), regulatory requirements

Resources
Information on resources (individuals, organization and materials) for workshops may be found at some of these websites:
www.stewardshipcentre.bc.ca
www.waterbucket.ca
www.livingwatersmart.ca
www.crd.bc.ca/watersheds/protection/howtohelp/index.htm
www.conservationconnection.bc.ca/

Funding Opportunities for Rainwater Management and Ecosystem Restoration

Municipality
The 2007 federal Building Canada Plan has committed $33 billion to invigorate the economy by supporting projects at the federal, provincial and community level. “A clean environment” is one of the central tenets of the program and eligible projects include wastewater infrastructure, public transit, green energy and solid-waste management. Other projects may fall under the “strong and prosperous communities” category, including drinking water safety and conservation, disaster mitigation, brown field redevelopment, local roads, sport and culture.

By nature, integrated watershed initiatives could fall under several of these categories. In particular, the wastewater category includes the objective to “encourage investments in wastewater infrastructure designed to: reduce the negative impacts of municipal wastewater effluent or storm-water effluent on human health and the environment; . . . improve the management and efficiency of municipal wastewater infrastructure or storm-water infrastructure; and improve the quality of treated municipal wastewater effluent and storm-water discharged into the environment.” Sooke could also seek funding for green streets initiatives (e.g. rain gardens, permeable road surfaces and traffic calming) under the “roads” category.
http://www.buildingcanada-chantierscanada.gc.ca/plandocs/bg-di/bg-di-info5-eng.html

The federal Gas Tax Fund (GTF) is part of the Building Canada Plan and “supports environmentally sustainable municipal infrastructure projects that contribute to cleaner air, cleaner water and reduced greenhouse gas emissions.” Eligible categories for funding include public transit, drinking water, wastewater infrastructure, green energy, solid waste management and local roads and bridges. The GTF also provides funding to increase the capacity of communities to undertake long-term planning. Funding for planning capacity is complemented by a requirement for communities to develop Integrated Community Sustainability Plans, which are long-term plans aimed at improving sustainability outcomes in Canada’s communities. Municipalities can pool, bank and borrow against this funding. The Government of Canada and the Province of British Columbia signed the Canada-British Columbia Framework Agreement on November 6, 2007, allocating $2.724 billion to infrastructure improvements in the province. $1.485 billion in gas-tax funds are allocated to Canadian municipalities between 2007 and 2014. Municipalities will receive $23.59 million through the Municipal Rural Infrastructure Fund Top Up.
http://www.buildingcanada-chantierscanada.gc.ca/funprog-progfin/base/gtf-fte/gtf-fte-eng.html
http://www.buildingcanada-chantierscanada.gc.ca/plandocs/booklet-livret/booklet-livret-eng.html.

Green Municipal Funding (GMF) is provided by the Federation of Canadian Municipalities in the form of grants and loans. A number of sustainable rainwater management plans and projects have received funding under the “water” category. As stated on the website: “FCM offers low-interest GMF loans or low-interest loans combined with grants to implement leading examples of sustainable development projects. GMF can offer financing for up to 80 per cent of the eligible costs of some capital projects. GMF interest rates for municipal governments are Government of Canada bond rate for the equivalent term minus 1.5 per cent.”
http://www.sustainablecommunities.fcm.ca/GMF/GMF-Funding-Projects.asp

The Infrastructure Planning Grant Program is offered through the Ministry of Community Development. According to their website: “The Infrastructure Planning Grant Program offers grants to support local government in projects related to the development of sustainable community infrastructure. Grants up to $10,000 are available to help improve or develop long-term comprehensive plans that include, but are not limited to: capital asset management plans, community energy plans, integrated stormwater management plans, water master plans and liquid waste management plans. Grants can be used for a range of activities related to assessing the technical, environmental and/or economic feasibility of municipal infrastructure projects.” Although funding from this source has already been applied to Sooke's LWMP, applications could still be submitted for specific planning projects.
http://www.cd.gov.bc.ca/lgd/infra/infrastructure_grants/infrastructure_planning_grant.htm

Other grant programs through the Ministry of Community Development are also offered, including:

- The Building Canada Fund - Communities Component (applicable to drinking water, wastewater, local roads, short line railways, short sea shipping and tourism)
- The Canada/BC Infrastructure Program
- The Canada/BC Municipal Rural Infrastructure Fund (water, sewer, public transit, environmental energy improvement; culture, tourism, recreation, local road and connectivity projects.
- Local Motion (bike paths, walkways, greenways, seniors- and disability-friendly communities; playgrounds and children's parks activities); provides a 50% cost sharing program with up to $1 million contributed by the provincial government. Watershed-related components of such initiatives could include pervious paving on walkways, and rain gardens integrated with greenways and parks.
- Towns for Tomorrow, for municipalities with a population less than 15,000 (categories include water wastewater, public transit, environmental energy improvement, local roads, recreation/culture, tourism, protective/ emergency services, community development)

The Western Economic Partnership Agreement, between Canada and the Province of British Columbia, was signed on January 19, 2009 and dedicated a total of $50 million to B.C. organizations and communities, including First Nations, to promote “the development and diversification of the western economy.” http://www.wd-deo.gc.ca/eng/297.asp
Inquiries on this agreement can be made to find out if rainwater management projects would qualify. Direct inquiries to:
Ministry of Small Business, Technology and Economic Development Economic Initiatives Branch PO Box 9327 Stn Prov Govt 7th Floor, 1810 Blanshard Street Victoria, British Columbia V8W 9N3
Telephone: (250) 952-0675
Fax: (250) 952-0688
or
Western Economic Diversification Canada
700 - 333 Seymour Street
Vancouver, British Columbia V6B 5G9
Telephone: (604) 666-6256
Fax: (604) 666-2353
E-mail: info.bc@wd-deo.gc.ca

The Provincial Trees for Tomorrow program focuses on tree-planting initiatives by local governments, First Nations, institutional landowners and school districts. Funding amounts are up to $50,000, not exceeding 50% of the total costs of the project. Urban forestry is a major focus of this initiative and tree planting could be incorporated as part of municipal rainwater management systems (e.g. road-side rain gardens). The first application deadline was March 31, 2009.
http://www.treesfortomorrow.gov.bc.ca

The BC Healthy Communities provides seed grants for community capacity building. According to their website: “BCHC Seed Grants are small, one-time-only funding opportunities that support communities to undertake activities and processes that will develop effective community building practices. The maximum amount per grant is $2,500. Seed Grants support local and regional groups to pay attention to the many ways in which capacity can be strengthened by using the Integral Capacity Building Framework. This Framework offers a holistic map of community that helps us to explore our edges – those areas of thinking and practice that are ready to be challenged and stretched a little. With the framework as a guide, we’re encouraged to take an approach to capacity building that includes the whole community, seeing the big picture and the interconnections among seemingly separate problems and potentials.”
http://www.bchealthycommunities.ca/Content/News/Index.asp#WhatisSG

The Walter and Duncan Gordon Foundation grant for fresh water resources is provided under three program areas: sustainable watershed governance, groundwater conservation and trans-boundary water security. Municipalities and charitable groups are eligible to apply and amounts granted range from $5000 to over $300,000. The most applicable area for Sooke's LWMP would likely be watershed governance (e.g. developing policies for demand management and water quality protection) and possibly groundwater protection (if groundwater is a drinking water source in the municipality).
http://www.gordonfn.org/FreshWater.cfm?cp=55

The Smart Development Partnership is a program administered by the Ministry of Community Development. Proponents from local government or the private sector apply to the Ministry and a partnership is established between those two parties and additional partners such as the Urban Development Institute, Canadian Homebuilders Association, other ministries and financial institutions. The Ministry typically provides 50% of the project costs, to a maximum of $50,000. Current priorities of the program are:

- Streamlining/harmonizing the development approvals system,
- Encouraging the development of affordable market housing,
- Planning for development that integrates social interests, and
- Encouraging the development of compact communities.

http://www.cd.gov.bc.ca/lgd/intergov_relations/smart_development/index.htm

The TD Friends of the Environment Foundation Community Funding Program provides funding to not for profit organizations (including municipalities), to support programs that fall within the following focus areas:

- Protects and preserves the Canadian Environment
- Assists young Canadians in understanding and participating in Environmental activities

- Supports urban renewal such as environmental projects to rejuvenate smaller or at risk neighbourhoods and "main streets"
- Enhances cooperation among Environmental organizations

Specific types of projects listed on the TD website include wildlife rehabilitation, education programs for children, environmental clean ups, urban renewal, conservation and recycling initiatives and tree planting campaigns.
http://www.td.com/fef/overview.jsp

The Victoria Foundation provides grants in a number of focal areas including the environment, to non-profit agencies (including municipalities), in priority areas including improving air and water quality; enhancing ecosystem awareness and protection; addressing urban sprawl and sustainable communities. Eligible agencies are located within “Victoria County” (which is defined as the CRD and areas north to Mill Bay and southern Gulf Islands). Applicants must contact the agency to submit an expression of interest.
http://www.victoriafoundation.bc.ca

Other Funding and Policy Strategies to Implement Integrated Rainwater Management and Improve Water Quality in General:

- Development Cost Charges can be required from developers to implement distributed rainwater management, green infrastructure and preservation of green space. (WCEL, 2008)
- Rainwater harvesting and water reclamation can help to reduce demand for potable drinking water for non-potable uses (thus preserving ecological integrity of nearby watersheds, e.g. allowing additional flows to support salmon spawning in Sooke River). Various incentives, metering schemes and policies are available. See the resources below:
  - West Coast Environmental Law, *Green Infrastructure Guide*. 2008. http://wcel.org/resources/publication/green-infrastructure-guide-issues-implementation-strategies-and-success-storie
  - POLIS Project, Water Sustainability: http://poliswaterproject.org/
- A rainwater management (rainwater) utility can be established that collects fees to fund green infrastructure rainwater management projects; this is a common strategy in the USA, and is a way of ensuring that those contributing more runoff from impervious surfaces pay more into the funds. Incentives such as fee reductions and credits can then be applied to encourage on-site infiltration and retention. (US EPA, 2008)
  - US EPA, 2008. Managing Wet Weather with Green Infrastructure, Municipal Handbook Funding Options. http://www.epa.gov/npdes/pubs/gi_munichandbook_funding.pdf

Stewardship and Community Groups
Environment Canada provides the National Green Source Funding Guide in print format or searchable database, listing funding opportunities for a wide range of community groups, farmers, First Nations and other agencies. The website also provides fundraising resources.
http://www.ec.gc.ca/ecoaction/default.asp?lang=En&n=910BBE65-1

Included in the database are the following opportunities:

- EcoAction Community Funding Program, “an Environment Canada funding program that provides financial support to community groups for projects that have measurable, positive impacts on the environment. Funding support can be requested for projects that have an action focus to improve the environment and/or to increase environmental awareness and capacity in the community.” Funding is for non profit, non-government groups for up to $100,000.
- Habitat Stewardship Program, offered through a partnership of Environment Canada, Fisheries and Oceans Canada and Parks Canada. According to their website: “The program focuses on results in three main areas: protecting important habitat to protect species at risk and support their recovery; mitigating threats to species at risk caused by human activities; and supporting the implementation of other priority activities in recovery strategies or action plans, where these are in place or under development.” http://www.cws-scf.ec.gc.ca/hsp-pih/
- Evergreen Canada Wal-Mart Green Grants. According to their website: “Green Grants, a Canadian community greening program sponsored by Wal-Mart Canada and led by Evergreen, provides funds of up to $10,000 to local groups working on urban naturalization projects that use native plants to restore and steward woodlands, meadows, wetlands and ravines. This grant program also supports community gardening projects that involve native plants and food gardening.” http://www.evergreen.ca/en/funding/grants/walmart.sn
- The Honda Foundation provides grants to charitable groups in Canada under the categories of education, environment and engineering. See also http://www.hondacanadafoundation.ca/grant.htm
- The Invasive Alien Species Partnership Program provides funding to non-government and not for profit organizations for preventing, detecting and managing invasive species. http://www.recovery.gc.ca/IASPP-PPEEE/index.cfm?lang=e
- The Mountain Equipment Co-op Environment Fund, which sponsors projects such as land acquisition, capacity building, research, advocacy and education, and urban sustainability, with funding up to $10,000 (up to $100,000 for land acquisition). http://www.mec.ca
- The Canadian Wildlife Federation sponsors grants including the Blue Schools Program that provides small grants for classroom and field teaching activities that improve ocean health awareness. http://www.cwf-fcf.org/en/action/funding-awards/grants/
- The Shell Environmental Fund provides grants up to $5,000 for community groups or individuals. See also http://www.shell.ca/sef
- BC Hydro provides donations and sponsorships under funding areas including: environment and sustainability; youth and education; people and leadership; community initiatives. http://www.bchydro.com/community/community_investment/donations_sponsorships.html
- The Real Estate Foundation of British Columbia provides endowment grants and project funding that supports “sustainable real estate and land use practices.” http://www.realestatefoundation.com/
- The Walter and Duncan Gordon Foundation grant for fresh water resources is provided under three program areas: sustainable watershed governance, groundwater conservation and trans-boundary water security. Municipalities and charitable groups are eligible to apply; amounts granted range from $5,000 to over $300,000. The most

applicable area for Sooke's LWMP would likely be watershed governance (e.g. developing policies for demand management and water quality protection), and possibly groundwater protection (if groundwater is a drinking water source in the municipality). http://www.gordonfn.org/FreshWater.cfm?cp=55

The TD Friends of the Environment Foundation Community Funding Program provides funding to not-for-profit organizations (including municipalities), to support programs that fall within the following focus areas:

- Protects and preserves the Canadian Environment
- Assists young Canadians in understanding and participating in Environmental activities
- Supports urban renewal such as environmental projects to rejuvenate smaller or at risk neighbourhoods and "main streets"
- Enhances cooperation among Environmental organizations

Specific types of projects listed on the TD website include wildlife rehabilitation, education programs for children, environmental clean-ups, urban renewal, conservation and recycling initiatives and tree planting campaigns.
http://www.td.com/fef/overview.jsp

First Nations

Note: First Nations may be eligible for many of the grants listed under Municipality and Community Groups; the following are opportunities that are focused specifically on First Nations.

Indian and Northern Affairs Canada provides funding up to $100,000 per project, for sustainable infrastructure projects under the Integrating energy efficiency/renewable energy (EE/RE) technologies program, such as ground source heat pumps, solar energy and water heating, etc. Projects relevant to watershed health may include on-site wastewater treatment and bioenergy projects.
http://www.ainc-inac.gc.ca/enr/clc/pra/eefc-eng.asp

The Lands Environmental Action Fund (LEAF), sponsored by Indian and Northern Affairs Canada, provides funding for aboriginal environmental stewardship projects. This opportunity is listed in the Environment Canada National Green Source Funding Guide (see link under Stewardship Groups). The contact is listed as: Jerry Wolchuk, Environmental Protection Officer, Indian and Northern Affairs Canada Atlantic Regional Office P.O. Box 160, 40 Havelock Street, Amherst, Nova Scotia, B4H 3Z3; Phone: (902) 661-6325; Email: wolchukj@inac.gc.ca

The Provincial Trees for Tomorrow program focuses on tree-planting initiatives by local governments, First Nations, institutional landowners and school districts. Funding amounts are up to $50,000 (not exceeding 50% of the total costs of the project). Urban forestry is a major focus of this initiative, and tree planting could be incorporated as part of municipal and community rainwater management systems (e.g. road-side rain-gardens). The first application deadline was March 31, 2009.
http://www.treesfortomorrow.gov.bc.ca/

Businesses and Developers
Sustainable Development Technology Canada (SDTC) is an “arm's length” governmental foundation that provides grants for sustainable technology industries. Providing a proponent could demonstrate meeting the SDTC principles and criteria, possible watershed-related projects could include on-site wastewater treatment technologies, local power generation through wood waste biofuel, brown field remediation and integrated waste-to-resource projects. The following rainwater relevant statement is taken from the SDTC website at http://www.sdtc.ca

> “Sustainable Development Technology Canada (SDTC) is a not-for-profit foundation that finances and supports the development and demonstration of clean technologies which provide solutions to issues of climate change, clean air, water quality and soil, and which deliver economic, environmental and health benefits to Canadians. SDTC operates two funds aimed at the development and demonstration of innovative technological solutions. The $550 million SD Tech Fund™ supports projects that address climate change, air quality, clean water, and clean soil.”

The Smart Development Partnership is a program administered by the Ministry of Community Development. Proponents from local government or the private sector apply to the Ministry and a partnership is established between those two parties and additional partners such as the Urban Development Institute, Canadian Homebuilders Association, other ministries and financial institutions. The Ministry typically provides 50% of the project costs, to a maximum of $50,000. The program supports initiatives for Low Impact Development, including reducing development footprints and innovative rainwater management. According to their website, current priorities of the program are:

- Streamlining/harmonizing the development approvals system,
- Encouraging the development of affordable market housing,
- Planning for development that integrates social interests, and
- Encouraging the development of compact communities.

http://www.cd.gov.bc.ca/lgd/intergov_relations/smart_development/index.htm

Property Owners and Farmers
The Investment Agriculture Foundation of British Columbia provides funding for a range of environmental farm initiatives.
http://www.iafbc.ca/funding_available/environmental_issues.htm

Summary of Jurisdictional Regulations, Requirements and Guidelines

Federal Regulatory Requirements
The *Fisheries Act* (Sections 35 and 36) is the federal act that is most applicable to rainwater management (http://laws.justice.gc.ca/eng/F-14/page-1.html). It provides protection for fish habitat and prohibits the harmful alteration, disruption and destruction (HADD) or the introduction of deleterious substances (e.g. sediment, pollutants) to fish-bearing waters or into any water that flow into fish-bearing waters. Rainwater collection systems and development activities must comply with the *Fisheries Act*.

Fisheries and Oceans Canada (DFO) has developed a series of operational statements to streamline the Habitat Management Program's regulatory review of low-risk activities. The operational statements outline measures and conditions for avoiding the harmful alteration, disruption and destruction (HADD) to fish habitat, ensuring compliance with the *Fisheries Act*. If the measures and conditions outlined in the Operational Statements are incorporated into the plans for projects, proponents are not required to submit their proposal for review by DFO (http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/operational_statements_e.htm). Operational statements have been created for aquatic-vegetation removal, beaver-dam removal, bridge maintenance, clear-span bridges, culvert maintenance, directional drilling, dock construction, ice bridges, isolated pond construction, overhead line construction, routine maintenance dredging and underwater cables.

Federal Guidelines
The federal government has also developed the Canadian Environmental Quality Guidelines, which provide target conditions for water bodies, including bottom sediments (http://www.ec.gc.ca/ceqg-rcqe/English/ceqg/default.cfm). They provide, according to their website, "nationally endorsed, science-based benchmarks for assessing the risk of priority substances to aquatic and terrestrial organisms; targets towards which environmental control measures / pollution prevention efforts can be directed; and performance indicators to help evaluate, track and/or improve upon the effectiveness of existing or proposed management measures." The sediment and water quality guidelines for the protection of aquatic life are particularly applicable to rainwater management.

Provincial Regulatory Requirements
The provincial government has vested responsibility for rainwater to local governments. Other than the *Local Government Act* requiring that downstream flooding is not generated, the province does not have legislation that requires a specific level of rainwater management for quantity or quality. However, two provincial acts do apply to rainwater management. They govern where rainwater management can take place and require approvals to permit the construction of some types of rainwater management, as well as restoration activities in or adjacent to aquatic ecosystems. Rainwater management facilities and development activities must comply with these acts:

- *Water Act*, Section 9: this section regulates "changes in and about a stream" and requires notification or application for approval for "work in and about a stream." http://www.env.gov.bc.ca/wsd/water_rights/licence_application/section9/index.html

- *Fish Protection Act*, Section 12, *Riparian Areas Regulation (RAR):* The provincial government enacted the Fish Protection Act, Riparian Areas Regulation (RAR) in 2005, to protect the integrity of streams and fish habitat in areas of the province subject to development pressure. Municipal governments were required to implement their approach to the RAR by March 31, 2006.

  The RAR applies to development i.e. residential, commercial and industrial activities as described in the RAR:

  > (a) removal, alteration, disruption or destruction of vegetation;
  > (b) disturbance of soils;
  > (c) construction or erection of buildings or structures;
  > (d) creation of non-structural impervious or semi-impervious surfaces;
  > (e) flood protection works;
  > (f) construction of roads, trails, docks, wharves and bridges;
  > (g) provision and maintenance of sewer and water services;
  > (h) development of drainage systems;
  > (i) development of utility corridors;
  > (j) subdivision as defined in section 872 of the Local Government Act.

  The RAR does no apply to agricultural, forestry or institutional activities. The RAR does not apply to the tidal sections of watercourses however Fisheries and Oceans Canada recommends a 15 metre setback from the marine high water mark.

  The RAR applies to streams that provide fish habitat, or that are connected by surface flow to fish habitat. The definition of a stream under the RAR is:

  > “”includes any of the following that provides fish habitat: (a) a watercourse whether it usually contains water or not; (b) a pond, lake, river, creek, brook; (c) a ditch, spring or wetland that is connected by surface flow to something referred to in paragraph (a) or (b);” side channels, intermittent streams, seasonally wetted contiguous areas are included by the definition of a stream which includes active floodplains and wetlands connected to streams.”

  Where a landowner wishes to carry out development on their land within the 30 metre Riparian Assessment Area (RAA) of a watercourse, they are required to have a RAR assessment carried out by a Qualified Environmental Professional (QEP) to determine the size of the required “setback” or Streamside Protection and Enhancement Area (SPEA).
  http://www.env.gov.bc.ca/habitat/fish_protection_act/riparian/riparian_areas.html

- *Environmental Management Act, Municipal Sewage Regulation:* developed by the Ministry of the Environment to provide clear and effective requirements for local governments and private sewage dischargers in order to protect public health and the environment. Compliance with the regulation provides authorization (with minimum standards and requirements) for the treatment, reuse and discharge of domestic sewage, wastewater or municipal liquid waste.
  The Municipal Sewage Regulation applies to all discharges of domestic sewage except those regulated under the Sewerage System Regulation (under the *Health Act*) and

those discharges from individual single-family or duplex dwellings. The Sewerage System Regulation generally applies to smaller domestic sewer systems.
http://www.env.gov.bc.ca/epd/codes/msr/mun_sew_reg.htm

Provincial Guidelines
The province has developed several documents of guidelines and policies that provide advice and assistance to local governments regarding rainwater management. These documents include:

- *Stormwater Planning: A Guidebook for British Columbia:* provides an overview and step-by-step planning process to guide municipalities through developing adequate levels of rainwater management including Liquid Waste Management Plans and Integrated Stormwater (Rainwater) Management Plans.
  http://www.env.gov.bc.ca/epd/epdpa/mpp/stormwater/stormwater.html

- *Environmental Best Management Practices for Urban and Rural Development:* provides a broad overview of BMPs for development practices including regulatory requirements and links to additional documents.
  http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare2006/develop_with_care_intro.html

- *Developing with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia:* guides landowners, developers and municipalities through the land development process and the regulatory requirements and guidelines that are applicable.
  http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare2006/develop_with_care_intro.html

- *Water Quality Objectives for District of Sooke Watersheds (in progress)*
  The provincial Ministry of Environment has undertaken water quality sampling in order to set water quality objectives. These objectives will help to protect the Districts watersheds. Following completion the objectives will be available at:
  http//www.env.gov.bc.ca/wat/wq/wq_objectives.html
  Until the water quality objectives for Sooke are finalized and released, refer to the BC Water Quality Guidelines (2010) at:
  http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html

- *Land Development Guidelines for the Protection of Aquatic Habitat* (129 pages), 1992, Province of British Columbia and Department of Fisheries and Oceans: provides guidelines and BMP examples to ensure that the quantity and quality of fish habitat are preserved and maintained at the productive level that existed prior to land development activities.
  http://www-heb.pac.dfo-mpo.gc.ca/publications/pdf/165353.pdf

- *Tackling Non-Point Source Water Pollution in British Columbia: An Action Plan,* 1999, Ministry of Environment, Lands and Parks (now Ministry of Water, Land and Air Protection): provides and overview of pollution sources and potential solutions.
  http://www.env.gov.bc.ca/wat/wq/bmps/npsaction.html

- *Urban Runoff Quality Control Guidelines for British Columbia* (138 pages), 1992, Ministry of Environment, Lands and Parks (now Ministry of Environment): provides a review of urban runoff quality and management including characteristics and sources of contamination, treatment technologies, operations and maintenance, ecological impacts and future directions, as well as a step-by-step method to assist municipalities in developing a rainwater management plan. http://www.env.gov.bc.ca/wat/wq/nps/NPS_Pollution/Stormwater_Runoff/urban_runoff_guidelines.pdf

Regional Resources
In addition to the federal and provincial legislation and guidelines, the Capital Regional District (CRD) Stormwater, Harbours and Watersheds Program (SHWP) has developed a Model Bylaw to Regulate Discharges to the Municipal Stormwater Drainage System and associated Codes of Practice. This bylaw "provides member municipalities with the regulatory powers to prohibit certain types of wastes from being discharged into storm sewers and watercourses to protect the environment, public health, storm sewer infrastructure, and the marine receiving environment." http://www.crd.bc.ca/watersheds/regulations.htm

Members of the Stormwater, Harbours and Watersheds Program keep up to date on the status of Federal and Provincial acts and regulations associated with the protection of rainwater. The District of Sooke has staff involved with this group. The SHWP could help the District of Sooke ensure it is in compliance with senior government regulatory requirements.

District of Sooke
The District of Sooke is in the process of updating several of its planning documents and bylaws and adopting new documents and bylaws. The requirements in these new documents and bylaws will change the ways in which rainwater is managed during land development and alteration. This will result in greater protection of aquatic ecosystems (watercourses and riparian areas) and the near-shore marine environment. The documents that have the greatest potential to improve rainwater management and aquatic habitat protection in Sooke are discussed below.

- Official Community Plan

The draft revised Official Community Plan (OCP) has many specific references to rainwater management and the protection of aquatic ecosystems and riparian areas. The consultants met with District Staff and the District's consultant to review the draft OCP with regard to rainwater management and the protection of aquatic ecosystems and riparian areas. The LWMP (Rainwater) consultants and the OCP consultants agreed that an additional section should be added specifically related to rainwater management and that several references should be added throughout the document.

As a result of that meeting, the draft Official Community Plan (OCP) has been significantly modified to contain specific references to rainwater management and the protection of aquatic ecosystems and riparian areas, which aids in creating bylaws with improved compliance with federal and provincial regulations.

- Subdivision and Development Standards Bylaw No. 404

The revised draft Subdivision and Development Standards Bylaw 404 provides due diligence for the municipality for its rainwater management systems to meet the federal *Fisheries Act*. It also requires many of the BMPs which are outlined in provincial guidelines. The revised bylaw will require changes to development practices and rainwater management that will result in a substantial improvement to the quality and quantity of water delivered to aquatic ecosystems. In particular, Schedules F and H provide the requirements for managing rainwater on-site and on the surface, as well as providing the engineering specifications for doing so.

Additionally, this bylaw requires that subdivisions in the Specified Sewer Area (SSA) sewer connect to Sooke's sewage collection and treatment system. If outside the SSA, subdivisions must meet Vancouver Island Health Authority requirements or the Provincial Environmental Management Act, Municipal Sewage Regulation.

The draft rainwater management sections of Schedule H can be viewed at: http://sooke.ca/EN/main/government/devservices/eng/documents/ScheduleH-Bylaw404DRAFTSept1409.pdf

- Zoning Bylaw No. 270

The zoning bylaw is used by the District of Sooke to comply with the provincial *Fish Protection Act*, Riparian Areas Regulation (RAR) (see Appendix 20, "*Provincial Regulatory Requirements"* for details about the RAR). The bylaw requires that when submitting an application for development activities (e.g. building permit, subdivision application) property owners must identify watercourses and have a Qualified Environmental Professional (QEP) complete an assessment report for any property adjacent to watercourses, as defined by the RAR. The zoning bylaw complies with the RAR however mapping of watercourses in the District is incomplete. Therefore the bylaw does not include identification of all applicable watercourses. Incomplete mapping creates a risk that a development application may be received which does not identify a watercourse.

Existing mapping provides information on main channels and major tributaries to watercourses but there is currently no detailed mapping that will allow staff to check for proposed development activities adjacent to all the RAR applicable watercourses. Rainwater Management Plan development contracts that are underway for Ella Stream, Wright Road Creek, Throup Creek and Nott Brook will include the process of collecting detailed mapping information.

In addition to addressing the RAR, the zoning bylaw provides direction compliance with the federal *Fisheries Act* by requiring that no structures or buildings be located within 15 metres of the marine high water mark.

- Rainwater Protection Bylaw (Recommendation B 1)

As discussed in Recommendation B 1, the District of Sooke is working with the CRD to implement a Rainwater Protection Bylaw. This bylaw will require landowners and businesses to ensure that pollutants are properly managed and that contaminants are not released into the municipal rainwater collection system, freshwater systems or the marine receiving environment. The bylaw should take a source control approach to contaminants management by working with business and the community. The bylaw is scheduled for adoption in 2010.

- Riparian Areas Protection Bylaw

The 2009 draft revision of the District of Sooke's Official Community Plan proposes that the District remove compliance with the *Fish Protection Act* Riparian Areas Regulation (RAR) from the Zoning Bylaw and create a new Riparian Areas Protection Bylaw to improve municipal compliance with the RAR. The revised or new bylaw should also contain requirements for work in and adjacent to watercourses to comply with Section 9 of the provincial *Water Act*.

- Other District of Sooke documents which have components related to rainwater management and protection of aquatic ecosystems are: Parks and Trails Master Plan, Downtown Revitalization Plan, Sustainability Strategy and the Transportation Master Plan. The LWMP (Rainwater) Stage 2 & 3 consultants have provided technical support and information to consultants working on these documents (e.g. Parks and Trails Master Plan) where appropriate.