



Islands Trust

**SATURNA ISLAND LOCAL TRUST COMMITTEE
BUSINESS MEETING AGENDA
12:30 PM, WEDNESDAY, APRIL 28, 2010
AT THE SATURNA ISLAND COMMUNITY HALL
105 EAST POINT ROAD, SATURNA ISLAND, B.C.**

***Approximate** time is provided for the convenience of the public only and is subject to change without notice.

| | Page # | *Approx. Time* |
|---|---------------|---------------------------|
| 1. CALL TO ORDER | | 12:30 p.m. |
| 2. APPROVAL OF AGENDA | | |
| 2.1 Questions on Agenda Items | | |
| 2.2 Town Hall Session | | |
| 3. COMMUNITY INFORMATION MEETING | | 12:45 p.m. |
| 3.1 Proposed Bylaw No. 101 (Greenhouse Gas Emissions Reduction) | | |
| 4. PUBLIC HEARING -none | | 1:05 p.m. |
| 4.1 Proposed Bylaw No. 101 (Greenhouse Gas Emissions Reduction) | | |
| 5. PREVIOUS MEETINGS | | 1:25 p.m. |
| 5.1 Local Trust Committee Minutes for Adoption | | |
| 5.1.1 Minutes of March 29, 2010 Local Trust Committee Business Meeting (attached) | 1 | |
| 5.2 Public Hearing Records and Community Information Meeting Notes - none | | |
| 5.3 Section 26 Resolutions-without-meeting - none | | |
| 5.4 Advisory Planning Commission - none | | |
| 6. BUSINESS ARISING FROM THE MINUTES | | 1:40 p.m. |
| 6.1 Follow-up Action Report (attached) | | |
| 7. DELEGATIONS -none | | |

| | | |
|-----------|--|-----------|
| 8. | CORRESPONDENCE (attached) | 1:50 p.m. |
| 8.1 | Mary Cooper, letter dated November 22, 2009, re: MIIWSS Septic System Workshop – request for financial support - Staff recommends that the Local Trust Committee (LTC) determine if the report is to be purchased. LTC to direct staff to respond to MIIWSS. | 12 |
| 8.2 | Brian Dixon-Warren dated April 12, 2010 re: East Point Groundwater - to be received by LTC. | 13 |
| 8.3 | Philippe Rouget dated April 6, 2010 re: Vessel Wave Study Performance Trial (report is attached under separate cover) – for information only | 26 |
| 8.4 | Janet Land, Chair- Saturna Water Conservation Committee letter received April 19, 2010 re: Saturna Island Bylaw No. 99 - to be received by LTC | 28 |
| 8.5 | Janet Land email dated February 20, 2010 re: Water Use Figures for the Group of 30 - to be received by LTC | 29 |
| 8.6 | Janet Land email dated February 19, 2010 re: Water Use Statistics - to be received by LTC | 31 |
| 8.7 | Margaret Paterson email dated April 19, 2010 re: Saturna Land Use Bylaw No. 78, 2002, Amendment No. 1, 2009 - to be received by LTC | 33 |
| 8.8 | Kevin Leslie email dated April 19, 2010 re: Draft Bylaw No. 99 - to be received by LTC | 34 |
| 8.9 | East Point Property Owners letter received April 20, 2010 - to be received by LTC | 36 |
| 9. | APPLICATIONS, PERMITS, BYLAWS AND REFERRALS - none | 2:15 p.m. |

10. LOCAL TRUST COMMITTEE PROJECTS

- | | | |
|------|--|----|
| 10.1 | Saturna Island Local Trust Committee Draft Bylaw No. 101 cited as “Saturna Island Official Community Plan Bylaw No. 70, 2000, Amendment No. 1, 2010” - GHG Emissions Reductions – for further consideration (attached) (RK) | 37 |
| 10.2 | Saturna Island Local Trust Committee Proposed Bylaw No. 99, cited as "Saturna Island Land Use Bylaw 78, 2002, Amendment No. 1, 2009" – Water Catchment & Storage – discussion (attached) (GR) | 47 |
| 10.3 | Saturna Island Riparian Area Regulation Stream Identification Report dated March 31, 2010 (report attached under separate cover) (RK) | 50 |

11. REPORTS

3:00 pm

- | | | |
|--------|---|----|
| 11.1 | Work Program Reports – for information | |
| 11.1.1 | Saturna Island Local Trust Committee Work Program - Report dated April, 2010 (attached) | 51 |
| 11.1.2 | Excerpt from the 2008-2011 Trust Council Strategic Plan (attached) | 53 |
| 11.2 | Applications Report – for information | |
| 11.2.1 | Saturna Island Applications Report dated April, 2010 (attached) | 56 |
| 11.3 | Bylaw Enforcement Report - none | |
| 11.4 | Expense/Budget Reports | |
| 11.4.1 | Trustee and Local Expenses (attached) – for information | 58 |
| 11.5 | Policies and Standing Resolutions Report (attached) – for information | 59 |
| 11.6 | Saturna Island LTC Web Page (attached) – for information | 61 |
| 11.7 | Chair’s Report | |
| 11.8 | Trustee Report | |

- 12. NEW BUSINESS** 3:15 pm
- 12.1. **Next Business Meeting scheduled for June 23, 2010, Saturna Island Recreation and Cultural Centre**
- 12.2 **Ponds** – discussion
- 12.3 **Islands Trust Community Housing Tool Kit** **62**
(attached under separate cover)
- 13. TOWN HALL MEETING** 3:45 pm
- 14. ADJOURNMENT** 4:00 pm

**MINUTES OF THE SATURNA ISLAND
LOCAL TRUST COMMITTEE SPECIAL MEETING
HELD ON MONDAY, MARCH 29, 2010 AT 12:30PM
AT THE SATURNA ISLAND COMMUNITY HALL,
SATURNA ISLAND, B.C.**

| | | |
|-----------------|--------------------------|-----------------------|
| PRESENT: | Peter Luckham | Chair |
| | John Money | Local Trustee |
| | Beverley Neff | Local Trustee |
| | Gary Richardson | Island Planner |
| | Robert Kojima | Island Planner |
| | Chantelle Grolway | Minute Taker |

There were approximately (6) members of the public in attendance.

1. CALL TO ORDER

Chair Luckham called the meeting to order at 12:30 p.m. and introduced the committee and staff.

2. APPROVAL OF AGENDA

Chair Luckham added two items to the agenda:

- 8.1 Email from J. Combes dated March 27, 2010 regarding draft bylaw 99.
- 8.2 Email from Geord Holland dated March 25, 2010 regarding draft bylaw 99
- 10.1 Bylaw Referral Form Response Summary from BC Ferries, and
- 10.1 Email containing the Ministry of Agriculture and Lands Sustainable Resource Management Branch's suggestion for Section E.5.6 on Proposed Bylaw 101.

The agenda as amended was approved by consensus.

2.1 Questions on Agenda Items

None

2.2 Town Hall Session

No comments were received from the floor.

3. COMMUNITY INFORMATION MEETING

None

4. PUBLIC HEARING

None

5. PREVIOUS MEETINGS

5.1 Adopted Local Trust Committee

5.1.1 Adopted Minutes of February 3, 2010 Local Trust Committee Business Meeting

The Adopted Minutes of February 3, 2010 Local Trust Committee Business Meeting were received by consensus.

5.2 Public Hearing Records and Community Information Meeting Notes

None

5.3 Section 26 Resolutions- without-meeting

The report was received by consensus.

5.4 Advisory Planning Commission

5.4.1 Draft Minutes of March 3, 2010 Advisory Planning Commission Meeting

The APC Minutes were received by consensus.

6. BUSINESS ARISING FROM THE MINUTES

6.1 Follow-up Action Report

The Report was received by consensus.

7. DELEGATIONS

None

8. CORRESPONDENCE

8.1 Email from J. Combs, dated March 27, 2010 regarding draft Bylaw No. 99.

Letter was received by consensus

8.2 Email from Geord Holland dated March 27, 2010 regarding draft Bylaw 99.

Letter was received by consensus

9. APPLICATIONS, PERMITS AND REFERRALS

9.1 SA-DVP-2010.1 (Fire Protection Society)

Trustee Money citing his conflict of interest because of being the Vice President of the board, removed himself from the room at 12:40 p.m.

Planner Richardson summarized the staff report and outlined to the committee their options.

Resolution: SA-LTC-07-2010

It was Moved and Seconded that the Saturna Island Local Trust Committee approve development variance permit SA-DVP-2010.1 (Saturna Island Fire Protection Society).

CARRIED

Trustee Money returned to the room at 12:50 p.m. after the resolution was carried.

10. LOCAL TRUST COMMITTEE PROJECTS

10.1 Saturna Island Local Trust Committee Draft Bylaw No. 101 cited as “Saturna Island Official Community Plan Bylaw No. 70, 2000, Amendment No. 1, 2010” – GHG Emissions Reductions

Chair Luckham noted the typo read on Recommendation #3 (pg.31) as supposed to being 101, rather than 151.

The Bylaw Referral Response Form from BC Ferries was read, requesting they be included in any future referral process. Also, the suggestion from the Ministry of Agriculture and Lands to remove the word Farmland from E.5.6 was read by Planner Kojima.

Resolution: SA-LTC-08-2010

It was Moved and Seconded that Saturna Island Local Trust Committee Draft Bylaw No. 101, cited as “Saturna Island Official Community Plan Bylaw No. 70, 2000, Amendment No, 1, 2010”, be amended to remove the word “farmland” from E.5.6.

CARRIED

Resolution: SA-LTC-09-2010

It was Moved and Seconded that Saturna Island Local Trust Committee Draft Bylaw No. 101, cited as “Saturna Island Official Community Plan Bylaw No. 70, 2000, Amendment No, 1, 2010”, be given First Reading as amended.

CARRIED

Resolution: SA-LTC-10-2010

It was Moved and Seconded that Saturna Island Local Trust Committee Proposed Bylaw No. 101, cited as “Saturna Island Official Community Plan Bylaw No. 70, 2000, Amendment No, 1, 2010” proceed to Public Hearing on April 28, 2010.

CARRIED

10.2 Saturna Island Local Trust Committee Draft Bylaw No. 99, cited as “Saturna Island Land Use Bylaw 78, 2002, Amendment No.1, 2009” – Water Catchment and Storage

The Local Trust Committee discussed the lack of clarity regarding the APC recommendation that “any water catchment system need not be potable” and further discussed the need for potable water from the tap, not in the tank, pointing out the various uses for water in cisterns, such as grey water usage.

Resolution: SA-LTC-11-2010

It was Moved and Seconded that the Saturna Island Local Trust Committee amend the table in Draft Bylaw No. 99 by inserting cistern sizes in accordance with Trustee Neff's submission.

CARRIED

Resolution: SA-LTC-12-2010

It was Moved and Seconded that the Saturna Island Local Trust Committee add the word "Minimum" before the word "Cistern" in section 2.18 and remove screening requirements.

CARRIED

There was extensive discussion regarding ponds and their relation to the discussed bylaws. Because of the potential conflict of interest concerning Trustee Money, as well as the complexity of ponds being regulated as cisterns, Chair Luckham assured the floor further serious consideration will occur.

Comments were received from the floor.

Trustee Money removed himself from the room and vote at 2:45 p.m. citing potential conflict of interest.

Resolution: SA-LTC-13-2010

It was Moved and Seconded that Saturna Island Local Trust Committee Draft Bylaw No. 99 cited as "Saturna Island Land Use Bylaw 78, 2002, Amendment No.1, 2009", be given First Reading.

CARRIED

Trustee Money re-entered the room at 2:50 p.m.

Resolution: SA-LTC-14-2010

It was Moved and Seconded that Saturna Island Local Trust Committee Proposed Bylaw No. 99 cited as, "Saturna Island Land Use Bylaw 78, 2002, Amendment No.1, 2009" proceed to public hearing

CARRIED

10.3 Saturna Island Local Trust Committee Proposed Bylaw No.100, cited as “Saturna Island Land Use Bylaw 78, 2002, Amendment No.1, 2010” – Accessory Buildings

Resolution: SA-LTC-15-2010

It was Moved and Seconded that Saturna Island Local Trust Committee amend Proposed Bylaw No. 100 cited as “Saturna Island Land Use Bylaw No.78, 2002, Amendment No. 1, 2010”, by deleting the words “50 square metres (538 sq.ft.)” and replacing them with the words “61 square metres (657 sq.ft.)”

CARRIED

Resolution: SA-LTC-16-2010

It was Moved and Seconded that the Saturna Island Local Trust Committee Proposed Bylaw 100 cited as “Saturna Island Land Use Bylaw No.78, 2002, Amendment No.1, 2010” as amended be given First Reading.

CARRIED

Resolution: SA-LTC-17-2010

It was Moved and Seconded that the Saturna Island Local Trust Committee Proposed Bylaw 100 cited as “Saturna Island Land Use Bylaw No.78, 2002, Amendment No.1, 2010”, proceed to public hearing.

CARRIED

11. REPORTS

11.1 Work Program Reports - for information

11.1.1 Saturna Island Local Trust Committee Work Program – Report dated March, 2010

The Work Program Report was received for information by consensus.

11.1.2 Excerpt from the 2008-2011 Trust Council Strategic Plan

The Strategic Plan was received for information by consensus.

11.2 Applications Report – for information

11.2.1 Saturna Island Applications Report dated March, 2010

The Applications Report was received for information by consensus.

11.3 Bylaw Enforcement Program

Chair Luckham spoke to Saturna Island Local Trust Committee's ability to now create Bylaw Enforcement Programs.

11.4 Expense/ Budget Reports

11.4.1 Trustee and Local Expenses – for information

The Trustee and Local Expenses Report was received for information by consensus.

11.5 Policies and Standing Resolutions Report – for information

The Policies and Standing Resolutions Report was received for information by consensus.

11.6 Saturna Island LTC Web Page – for information

Chair Luckham requested that all amendments done today be added to the Web Page.

Trustee Neff requested that the Islands Trust place Public Hearings under Latest News.

The Saturna Island LTC Web Page, with amendment, was received for information by consensus.

11.7 Chair's Report

Chair Luckham reported that the next Trust Council Meeting will be held June 15, 16 and 17, on Saturna Island. He also reported that the last Trust Council meeting held on Hornby Island proved to be successful and productive.

11.8 Trustee Report

Trustee Money had nothing to report

Trustee Neff reported that the next regular Local Trust Committee meeting is on April 28, 2010. She expressed her appreciation of Chair Luckham's presence despite circumstances surrounding the weather. She also reported on her own presence at the last Trust Council meeting on Hornby Island, expressing her appreciation and enjoyment of that meeting.

12. NEW BUSINESS

12.1 Next Business Meeting scheduled for April 28, 2010, Saturna Island Community Hall.

The next Business Meeting is scheduled as stated.

12.2 Trust Fund Board Sensitive Ecosystem Booklet

Chair Luckham presented Trust Fund Board Sensitive Ecosystem Booklet, suggesting it be purchased by the Saturna Island Local Trust Committee at \$10 apiece, with leftover money in budget.

Resolution: SA-LTC-18-2010

It was Moved and Seconded that 20 copies of the Trust Fund Board Sensitive Ecosystem Booklet be purchased for a total of \$200.

CARRIED

12.3 Quarry Trail Update

Planners Richardson and Kojima outlined for the Local Trust Committee the issues regarding Quarry Trail and Harris Rd. and reported the Ministry of Transportation and Infrastructure's

reluctance to take on the stretch of road, citing that it is not up to Highway standards.

Planner Kojima stated that the permit for the use and maintenance the road was no longer valid.

Some discussion ensued on whether or not the road could be closed down or barred from the public, unless action was taken.

It was decided that nothing else could be done until the Local Trust Committee receives a letter from the Ministry of Transportation and Infrastructure (MOTI) stating what their position is.

Planner Richardson stated he would request a response from MOTI in writing before the next meeting.

13. TOWN HALL MEETING

- No comments

14. ADJOURMENT

Resolution: SA-LTC-19-2010

It was Moved and Seconded that the meeting be adjourned at 3:45p.m.

CARRIED

Recorder

Chair



Follow Up Action Report w/ Target Date

Saturna Island
Oct-28-2009

| No. | Activity | Responsibility | Target Date | Status |
|-----|--|----------------|-------------|----------|
| 1 | SA-DVP-2009.3 (Wilson) variance request rejected. Bylaw Enforcement Officer to followup. | Miles Drew | Nov-26-2009 | On Going |

Feb-03-2010

| No. | Activity | Responsibility | Target Date | Status |
|-----|--|-----------------|-------------|----------|
| 2 | Affordable Housing report from March Trust Council to be put on next LTC meeting agenda. | Gary Richardson | Feb-24-2010 | On Going |

Mar-29-2010

| No. | Activity | Responsibility | Target Date | Status |
|-----|--|----------------|-------------|--------|
| 3 | SA-DVP-2010.1 (Saturna Island Fire Protection Society)Variance Permit Issued as drafted. | Kathy Jones | Apr-15-2010 | Done |

| | | | | |
|---|--|------------------------------|-------------|------|
| 4 | Bylaw 101 (GHG emission reduction) revised by striking the word 'farmlands' from E.5.6, given First Reading, staff directed to schedule public hearing, and forward bylaw to APC for information | Kathy Jones Robert Kojima | Apr-16-2010 | Done |
|---|--|------------------------------|-------------|------|

| | | | | |
|---|--|-----------------|-------------|------|
| 5 | Bylaw 99 to be amended by using wording from Trustee Neffs submission recieved at the meeting. | Gary Richardson | Mar-30-2010 | Done |
|---|--|-----------------|-------------|------|

| | | | | |
|---|---|-----------------|-------------|------|
| 6 | Bylaw 99 to be amended by 1) removing screening provisions; and 2) adding the word minimum. | Gary Richardson | Mar-30-2010 | Done |
|---|---|-----------------|-------------|------|

| | | | | |
|---|--|-------------|--|------|
| 7 | Draft Bylaw 99 given 1st reading as amended. | Kathy Jones | | Done |
|---|--|-------------|--|------|

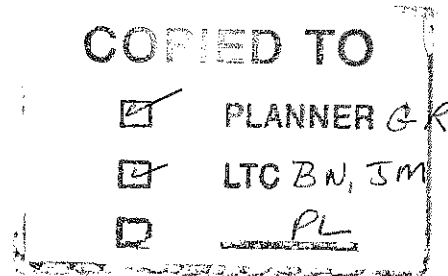
| | | | | |
|---|-------------------------------------|--------------------------------|--|----------|
| 8 | Bylaw 99 - schedule public hearing. | Kathy Jones Gary Richardson | | On Going |
|---|-------------------------------------|--------------------------------|--|----------|

| | | | |
|----|---|--------------------------------|----------|
| 9 | The topic of ponds to be put on next agenda. | Kathy Jones | Done |
| 10 | Proposed bylaw 100 to be amended by replacing 50 square metres with 61 square metres. | Gary Richardson | Done |
| 11 | Proposed bylaw 100 to be read a 1st time as amended. | Kathy Jones | Done |
| 12 | Public Hearing to be scheduled for proposed bylaw 100. | Kathy Jones Gary Richardson | On Going |
| 13 | LTC to purchase 20 Trust Fund Sensitive Ecosystem Books. | Nancy Roggers | Done |
| 14 | Amend website by: putting PH notices on; this already happens correcting spelling of conservation put MOE report on. | Kathy Jones Gary Richardson | Done |
| 15 | Proposed Bylaw 99 to be put on next LTC agenda for discussion. | Kathy Jones | Done |

MAYNE ISLAND INTEGRATED WATER SYSTEMS SOCIETY
S9, C28, 567 Club Cres., Mayne Island, B.C., V0N 2J0

November 22, 2009

Bev Neff, Trustee
John Money, Trustee
c/o Islands Trust
Ste. 200, 1627 Fort Street
Victoria, B.C. V8R 1H8



Dear Bev and John:

Re: MIWSS Septic Systems Workshop – Saturday, May 1, 2010

The Mayne Island Integrated Water Systems Society has plans well underway for our 6th annual Southern Gulf Islands spring workshop which will be about septic systems--the old, the new and maintenance. It will be held on Saturday, May 01, 2010, at the Mayne Island School gym.

We are, once again, requesting financial support from your Island in a substantial amount as you both feel would be suitable. The workshops are always very well attended by Saturna residents. As well, we have many Saturna property owners as members, including a water system and a Society. With these workshops, we assist Small Water Systems Operators with operator certification maintenance by offering CEU qualifying content. We have purchased books for both your library and school, and exchange information with Saturna's water society.


We are approaching you early, so that you may include MIWSS workshops in your upcoming budget planning, but realize that nothing can be forthcoming until next year. As we did last year, we will produce a fairly comprehensive report for your Trust Committee to purchase.

As a matter of interest, the Society now has a membership of 175, 15 water systems and Improvement Districts, 4 fellow water societies, and 8 potable water related businesses.

Our website is extensive because we try to offer links to good information for water users and reliable information on water systems on five islands. It can be accessed through mayneisland.com/water. It is a project we continue to expand.

Thank you for your consideration and if you have any questions, please feel free to call or e-mail me.

Regards,

Mary Cooper, 
Chair and Program Director
250-539-3491 or watersociety@shaw.ca

Kathy Jones

From: Gary Richardson
Sent: April-13-10 1:29 PM
To: Kathy Jones
Subject: FW: Re East Point Groundwater
Attachments: Denny et al. published.pdf
[can you put this and the attachment on the next saturna agenda.](#)

[thanks, Gary](#)

From: Brian Dixon-Warren [mailto:dixonwr@saturnanet.net]
Sent: Monday, April 12, 2010 1:56 PM
To: Gary Richardson
Subject: Re East Point Groundwater

Dear Gary:

I understand that you will be on Saturna tomorrow (Tuesday). Unfortunately, I cannot make an appointment with you for that time.

I am Attaching a research paper that I obtained, & that may throw some light on the concerns of East Point residents. It indicates some of the possible vulnerabilities of the aquifer to contamination from above during the construction of the proposed "pond" on East Point, & I believe it is self-explanatory to those with a hydro-geological background. I am not a hydro-geologist, & these represent my own opinion but I have had some help from a relative who has been employed as a geologist & groundwater specialist in the recent past. I am affected by this issue only by reason of my long interest in water matters, & involvement with the Saturna Water Conservation Committee. My wife & I converted to the use of rainwater only several years ago, because we were aware of the aquifer vulnerabilities.

Please bring the paper to the attention of our local Trustees, & submit it to the public record for the information of the whole Island's Trust.

As it applies to the central portion of East Point (bounded by Tumbo Channel Road, Cliffside, & Fiddlers Lane) the following points seem important: -

- 1) The topsoil over the bedrock is relatively shallow. If blasting was necessary to deepen the pond, this would increase the risk of problems from surface contamination.
- 2) Fractures in the bedrock might cause a significant drainage of the stored water. The process of constructing a lining for the pond, or raising the walls to increase capacity might also cause contamination.
- 3) The stagnant water body would provide a breeding ground for mosquitoes & other insects, & also serve as a watering hole for wildlife, resulting in faecal & other bacterial contamination. The transit time down the fissures may be very short, & thus expose well-owners, especially on the north side of the peninsula to these pathogens. It must be kept in mind that the dip of the bedrock is to the north, & the major fractures also run NE-SW.
- 4) Briefly, the dominant geological unit is the Geoffrey formation on East Point. The upper part is mostly sandstone, but the lower part is mostly conglomerate. However there will be some interbeds of mudstone (& these have been seen). The area has been mapped as moderately-high to highly vulnerable given the low topography.

It seems to me that the prudent & fair thing would be for the best, most expert, & independent hydro-geological opinion to be obtained about the proposal to construct a pond. Critical to this is the

degree to which the underlying bedrock is fractured, or otherwise allows rapid drainage into the aquifer. It seems to me that this assessment requires a high degree of professional expertise.

If any such pond construction goes ahead, & if it results in an adverse effect on the East Point aquifer, I hope that there will be provisions in place to compensate well owners affected.

Brian Dixon-Warren

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SATURNA Island, BC, V0N 2Y0,
Canada
Personal Phone: 250-539-3223,

Email: <dixonwr@saturnanet.net>
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DRASTIC-Fm: a modified vulnerability mapping method for structurally controlled aquifers in the southern Gulf Islands, British Columbia, Canada

S. C. Denny · D. M. Allen · J. M. Journeay

Abstract DRASTIC, the methodology for mapping the intrinsic vulnerability of aquifers, is modified to incorporate the structural characteristics of fractured bedrock aquifers. In these aquifers, groundwater flow is predominantly through fractures, with large-scale fracture zones and faults acting as primary conduits for flow at the regional scale. The methodology is applied to the southern Gulf Islands region of southwestern British Columbia, Canada. Bedrock geology maps, soil maps, structural measurements, mapped lineaments, water-well information and topographic data, assembled within a comprehensive GIS database, form the basis for assigning traditional DRASTIC indices, while adding the structural indices necessary for capturing the importance of regional structural elements in recharge and well capture zone determinations.

Résumé La méthode DRASTIC, destinée à la cartographie de la vulnérabilité intrinsèque des aquifères, a été modifiée afin d'intégrer les caractéristiques structurales d'aquifères de socle fracturés. Dans ces aquifères, les eaux souterraines cheminent essentiellement par les fractures, et les secteurs fracturés et les failles jouent le rôle de drains à l'échelle régionale. Cette méthode a été appliquée à la région sud des Iles Gulf (sud-ouest de la Colombie Britannique, Canada). Les cartes géologiques du socle, les cartes pédologiques, les levés structuraux, les linéaments cartographiés, les informations sur les points d'eau et les données topographiques ont été réunies dans une

base de données exhaustive. Ils forment ainsi la base d'attribution des indices DRASTIC traditionnels, et introduisent les indices structuraux nécessaires pour appréhender l'importance des éléments structuraux régionaux dans la détermination des zones d'alimentation et d'appel des puits.

Resumen Se ha modificado DRASTIC, la metodología para cartografiar la vulnerabilidad intrínseca de acuíferos, incorporando las características estructurales de acuíferos fracturados. En estos acuíferos, el flujo de agua subterránea se produce fundamentalmente por las fracturas, con zonas de fractura a gran escala y fallas que actúan como conductos primarios del flujo a escala regional. La metodología se aplica en el sureste de las Islas Gulf, región del Suroeste de British Columbia, Canadá. Los índices tradicionales en DRASTIC se asignan mediante mapas geológicos, mapas de suelos, medidas estructurales, cartografía de los lineamientos tectónicos, información sobre los puntos de agua y datos topográficos, unidos dentro de una base de datos vinculada a un SIG, mientras que añadiendo índices estructurales se refleja el peso de elementos estructurales regionales en la recarga y en las determinaciones de las zonas de captura de los pozos.

Keywords DRASTIC · Aquifer vulnerability · Fractured rocks · Faults · Gulf Islands · British Columbia · Canada

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Introduction

The dynamic and hidden nature of groundwater often impedes the understanding and management of this vital resource. An initial step toward sustainable groundwater-resource management involves understanding the hydrogeologic nature and mechanics of the resource. Regional-scale assessments, such as vulnerability maps, have proven to provide an effective means of assembling key information assets, identifying environmental trends, and prioritizing the need for detailed site-specific investigations within groundwater environments (Bekesi and McConchie 2002; Aller et al. 1987). However, while the methodologies for undertaking vulnerability assessments are reasonably well-developed for unfractured aquifers, standard approaches for rep-

representing fractured bedrock aquifers are currently limited.

Within this paper, we present a modification to an existing aquifer vulnerability mapping methodology, namely DRASTIC, which identifies the impacts of structurally controlled aquifers on the quality of groundwater resources. We demonstrate the application of this modified methodology through a case study in the southern Gulf Islands in southwestern British Columbia, Canada. It is anticipated that the straightforward nature of this framework will support the uptake and use of model outputs at decision-making levels as well as support the application of this modified methodology in other study areas with similar physical characteristics.

Background

Study area

Like many communities situated in close proximity to urban centres, the southern Gulf Islands, located in the Georgia Strait between Vancouver and Victoria (Fig. 1), are experiencing significant development pressures. Groundwater quality issues in the Gulf Islands have been amplified by improper disposal of agricultural waste, failed septic systems, pesticides, and saltwater intrusion due to both natural conditions and over-pumping. The subdued topography of the Gulf Islands lends itself to the presence of few lakes that can support domestic and agricultural uses; thus, the majority of residents rely on fractured bedrock aquifers as a primary source of freshwater.

The geology and hydrogeology of this region have been researched extensively (e.g., Allen et al. 2003a;

Mackie 2002; Mackie et al. 2001; Journeay and Morrison 1999; England 1990; Dakin et al. 1983; Hodge 1995); however, the complex nature of this information could not be easily translated by decision-makers to support land-use planning objectives in defining regions on the islands where new developments could be located with minimal adverse impacts on the surrounding groundwater environment. A regional-scale evaluation of the potential for groundwater contamination became an important step in synthesizing all available information while supporting this process.

Aquifer vulnerability mapping

Vulnerability mapping, while receiving some criticism internationally and largely on account of uncertainty surrounding the definition of the term “vulnerability”, is nonetheless a common method for representing spatially and semi-quantitatively the relative susceptibility of an aquifer to contamination from surface sources. Assessment of vulnerability is based on the environmental characteristics of a landscape that facilitate or impede contamination, and represents the “likelihood of a contaminant to reach a specified position in the groundwater system after introduction at the surface” (National Research Council 1993 in Bekesi and McConchie 2002).

Although there is a higher degree of scientific soundness in “specific” vulnerability maps for specific pollutants (e.g., Foster 1987; Canter et al. 1987), it has been recognized that generally there is insufficient available data to perform specific vulnerability mapping. Consequently, generic mapping systems have been developed that are simple enough to apply the available data, and yet are capable of making best use of those data in a

Fig. 1 Geology map of southern Gulf Islands (Journeay et al. 2005). The colour coding on the right indicates the geological formations of the Gulf Islands. The numbering refers to the sequence of deposition for each of the formations and corresponds to the stratigraphic column shown in Fig. 2

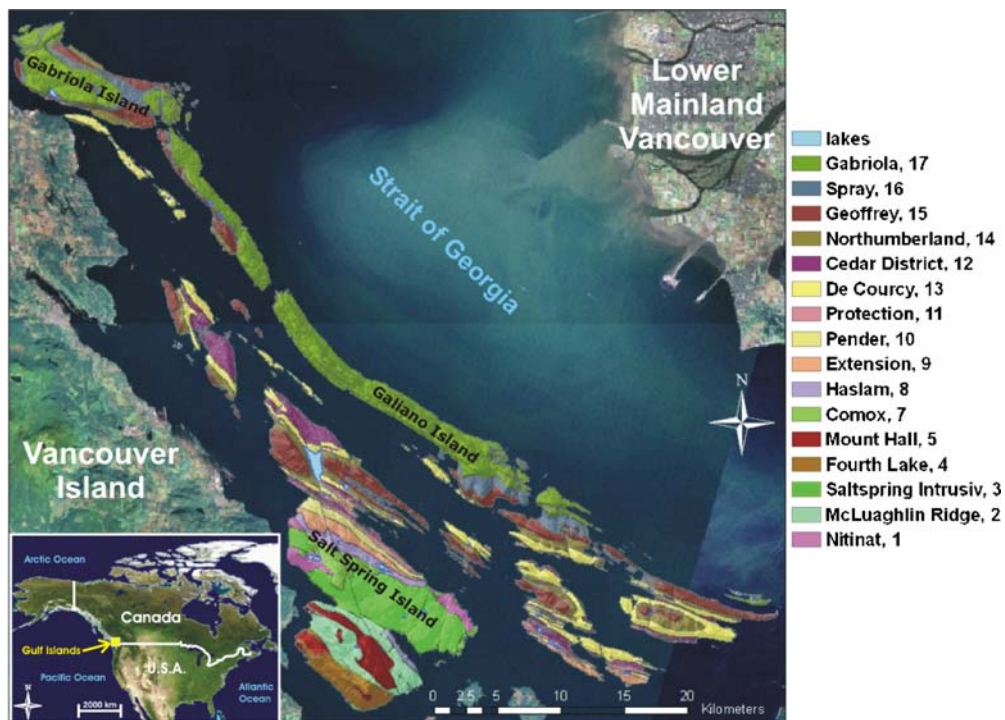
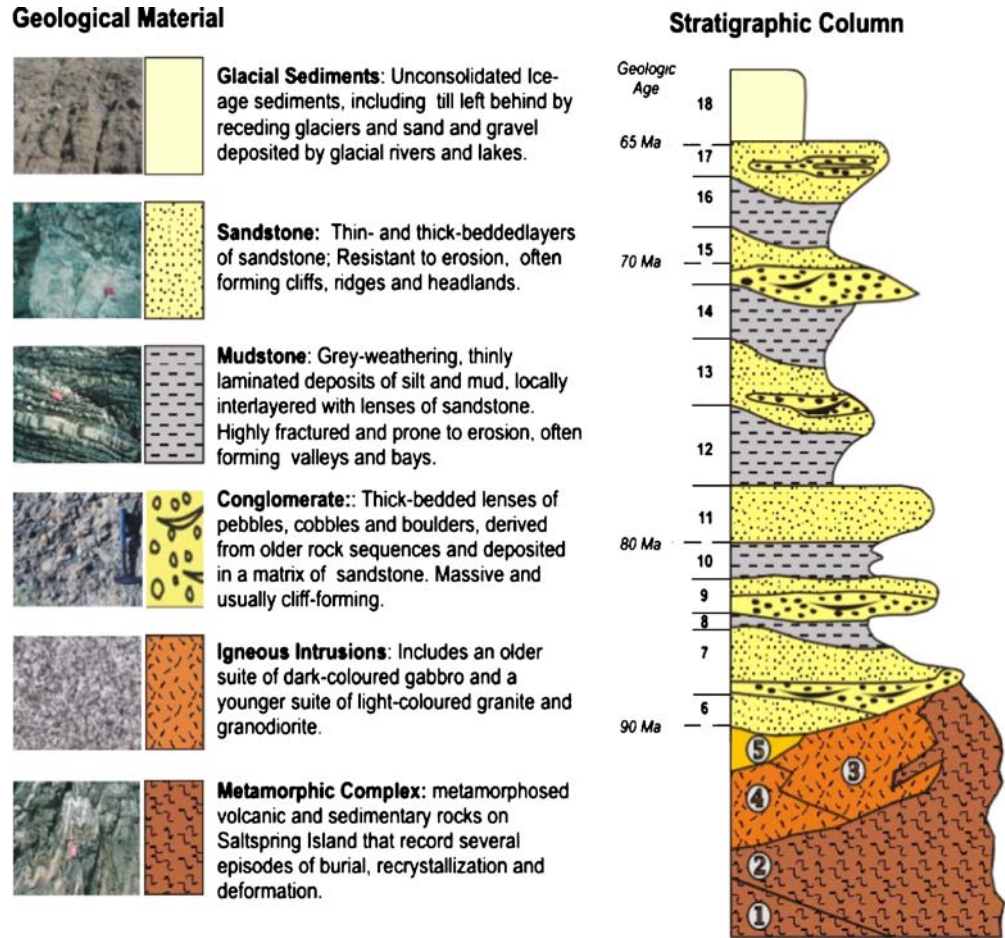


Fig. 2 Nanaimo Group stratigraphy and geological map Legend (modified from Mustard 1994). The corresponding names of the geological formations are found in Fig. 1



technically valid and useful way. Various systems of vulnerability evaluation and ranking have been developed and applied in the past including AVI (van Stempvoort et al. 1992), DRASTIC (Aller et al. 1987), EPIK (Doerflinger et al. 1999) and ISIS (Civita and De Regibus 1995). Such vulnerability methodologies take into account that the natural environment protects itself when a contaminant is introduced. The groundwater system can be classified into three stages based on the origin-pathway-target model: (1) contaminants enter the system and constitute the threat, (2) soil and rock above the water table form a barrier to contaminants percolating down from the surface, and (3) the groundwater resource below the water table that may be damaged if contaminants penetrate the barrier (Piscopo 2001). The purpose of groundwater vulnerability assess-

ments is to characterize the contamination potential within a geologic setting and define areas that are more vulnerable than others. This type of assessment does not consider the properties or characteristics of contaminants (Bekesi and McConchie 2002; Piscopo 2001).

Developed by the US Environmental Protection Agency (EPA), DRASTIC is an aquifer vulnerability methodology that parameterizes the physical characteristics that impact groundwater pollution potential (Aller et al. 1987). The term “DRASTIC” is an acronym for seven model parameters (Table 1).

During the preliminary phases of the model-development process, several alternative aquifer vulnerability frameworks were considered including the aquifer vulnerability index (AVI) methodology (van Stempvoort et al. 1992). The AVI method relies quite heavily on well data to develop the spatial representation of aquifer vulnerability in a study area. Due to the sparse nature of the well data available for the Gulf Islands coupled with the difficulty in applying interpolation measures across discrete island boundaries, the reliance on well data proved to be a barrier to applying the AVI methodology. Furthermore, a comparison study of the DRASTIC and AVI methodologies concluded that the two methodologies yielded similar results in a study area in British Columbia (Wei 1998).

Table 1 DRASTIC-Fm parameter definitions and weights

| Hydrogeologic factor | Weight |
|---|--------|
| <i>D</i> depth to water | 5 |
| <i>R</i> net recharge | 4 |
| <i>A</i> aquifer media | 3 |
| <i>S</i> soil media | 2 |
| <i>T</i> topography | 1 |
| <i>I</i> impact of vadose zone media | 5 |
| <i>C</i> aquifer hydraulic conductivity | 3 |
| <i>Fm</i> fractured media | 3 |

More recent methodologies have been developed to represent aquifer vulnerability in karst landscapes (EPIK and ISIS). Although karst landscapes bear some similarities to fractured bedrock environments, aquifer vulnerability methodologies for karst landscapes are distinct in their application and would not apply to the Gulf Islands. A comparative study completed in 2003 (Gogu et al. 2003) evaluated the applicability of several aquifer vulnerability methodologies in a karst study area including EPIK and DRASTIC. The conclusions from this work state: "Progress is needed to better differentiate fissure matrix from compact rock and from major discontinuities or karst conduits" (Gogu et al. 2003, p 891). Finally, in combination with the above mentioned factors and its successful application in study areas across Canada (Murat et al. 2004; Wei et al. 2004), DRASTIC was determined to be the most suitable methodology for assessing aquifer vulnerability in the Gulf Islands.

Regional geologic setting

Physiography and geology

The Gulf Islands are a group of 40+ islands that range in area from ~1-75 km² and are characterized by a generally NW-SE trend and elongation defined by linear ridges and valleys. Elevations range from 100 to 200 m, reaching a maximum of about 350 m on Saltspring Island. Coastlines are typically rocky, with either long expanses of low relief bedrock sloping shallowly into the ocean or, alternatively, steep cliffs and narrow rocky beaches.

Rocks of two general types underlie the southern Gulf Islands: Paleozoic to Jurassic arc-related igneous and sedimentary rocks, and Upper Cretaceous marine sedimentary rocks (Fig. 1). Arc-related rocks of the Wrangellia Terrane are present locally on Saltspring Island as fault-bounded wedges structurally juxtaposed with sedimentary rocks of the Upper Cretaceous Nanaimo Group, and as "basement" unconformably overlain by the Nanaimo Group. The sedimentary sequence is up to 4 km thick and comprises conformable and laterally intertonguing successions of sandstone and conglomerate formations, separated by mudstone and siltstone formations (Fig. 2). As such, the Nanaimo Group formations do not represent a true "layer cake" stratigraphy, but are composed of laterally thickening and thinning units with both conformable and sharp, erosive contacts. Lithology in the Nanaimo Group varies in grain size both between and within formations. Sandstone-dominated formations (e.g., Gabriola Formation, dominantly massive sandstone) contain little structure, and can attain thicknesses of hundreds of metres, with only minor fine-grained interbeds. Silts and muds dominate mudstone formations (e.g., Spray Formation) with significantly lower bed thickness (mm-cm).

Unconsolidated deposits, of dominantly glacial and/or marine origin do not constitute a volumetrically significant percentage of the exposed geology on any of the islands,

yet are anticipated to have a significant control on recharge. The thickest deposits occur in lowlands between ridges where they may reach 30 m (Hodge 1995). Over a majority of the islands, surficial cover has been eroded down to, or nearly down to, bedrock.

Structure

The present distribution of Nanaimo Group formations is the result of multiple regional deformational events (e.g., Journeay and Morrison 1999). Additionally, the Gulf Islands have undergone glacial isostatic deformation in response to multiple Quaternary glaciations (Clague 1983), which have resulted in upwards of 50 m of vertical isostatic rebound.

Structurally, the Gulf Islands are characterized by gentle folds with bedding that dips in the range of 5–15°, with numerous small- and large-scale discrete fractures and faults. Mackie (2002) summarized the results of a detailed fracture mapping study on the southern Gulf Islands in which fracture data were collected using a linear scan-line technique from 157 stations, incorporating all formations of the Nanaimo Group (with the exception of the basal Comox Formation), and spanning all of the eight southern Gulf Islands. Over 8,000 measurements of fractures were made. Generally, stations were chosen to minimize bias that may have resulted from orientation of coastline exposures, and when possible, different stations were located on mutually perpendicular coastline exposures.

Both chain map and outcrop analyses indicate that the distribution of fractures, defined by spacing between fractures, is not spatially or lithologically homogenous. Fracture density, measured as number of fractures per metre chain length, varies both in relation to structural setting, especially in relation to large faults and in joint zones, and with changes in lithology.

Bedding perpendicular joints

Bedding perpendicular joints, found at all stations, vary in density both within a specific lithology/formation and between lithologies (Mackie 2002). Higher joint densities were observed in the more thinly bedded mudstone-dominated units, notably within the transition zones between formations where mudstone bedding thickness is generally small. This suggests that thinly bedded mudstone-dominant units may have a higher permeability where they are in contact with sandstones. In contrast, the sandstone-dominated formations, with much lower fracture densities, may act more as impermeable blocks with significantly more widely spaced discrete flow zones or pathways. In this respect, intra-formation heterogeneity, in the form of fine-grain interbeds within coarse-grain formations, may create pockets of more highly fractured rock, which, if connected to a recharge zone, may form an "intra-formation" aquifer. Similarly, at the contacts between formations, where there is transitional bedding, there may be enhanced permeability.

Discrete fractures, fracture zones and faults

Many mesoscale fractures were identified on the islands that may represent discrete flow paths or narrow (metre-scale) flow zones. These small structures have variable offset up to approximately 5 m, and only minor changes in fracture density associated with them. The structures are not visible on 1:75,000 scale airphotos or on a DEM (digital elevation model). Flow along these structures is interpreted to be more like a discrete path or conduit, and may be of a relatively short length, perhaps up to a maximum of tens of metres. Additionally, these structures cross-cut all formations and are considered to represent a separate level in a hierarchy of structure-controlled flow. However, it is hypothesized that discrete fractures, which tend to be older than lineament-scale fault and fracture zones described below, may not have as significant an effect on groundwater flow at the island scale, but may be important at the local scale.

Structures visible at the 1:75,000 (regional scale) can be characterized on the ground as fault or fracture zones up to tens of metres in width. These structures are often identified by lineaments that are zones of high weathering or ridges. Variation of fracture density with proximity to faults is common (Caine et al. 1996), and on the Gulf Islands it was found that fracture density tends to

increase by at least a factor of ten in the presence of a regional-scale fault (Mackie 2002). Lithology appears to affect density as zones of high fracture density are dominantly in sandstone, while fracture density does not increase so dramatically in faults that cut mudstone-dominated units.

From a hydrogeologic perspective, fault and fracture zones can likely be represented at the regional scale as zones of high permeability arising from the high density and width of fracturing. These larger fracture zone structures are interpreted to have a significant effect on groundwater flow, particularly at the regional scale.

Hydrogeology and conceptual framework

The Nanaimo Group forms the majority of bedrock of the Gulf Islands, and consequently, the majority of the water-bearing units on the islands. Past investigations into the distribution of water resources (e.g., Allen et al. 2002; Hodge 1995; Dakin et al. 1983) and water-well drilling reports concluded that water is derived primarily from fractures as secondary permeability, reflecting the low primary porosity and permeability of the bedrock. All lithologies are highly cemented, dominantly by calcite, with primary porosity in outcrop averaging about 5%

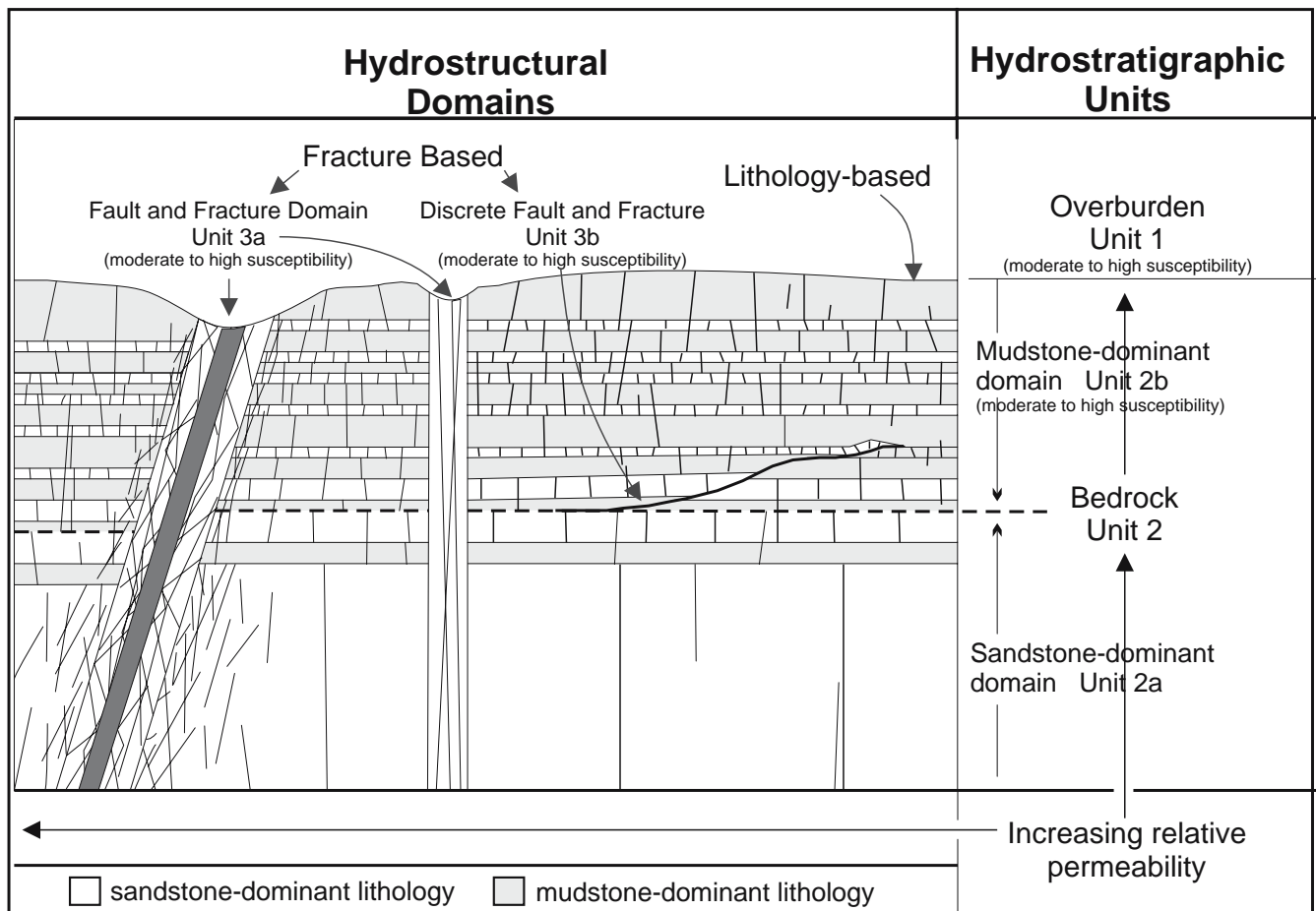


Fig. 3 Conceptual model for hydrostructural domains of the Gulf Islands (Mackie 2002), modified from Journeay et al. 2004

(England 1990). Thus, vulnerability maps would best be represented with a conceptual model that captures permeability variations derived from fracturing at a range of scales.

To this end, Mackie et al. (2001) proposed a conceptual model for representing the hierarchy of fracturing exhibited in regional-scale bedrock aquifers. The model, which was later refined by Mackie (2002), is based on the concept of hydrostructural domains, as opposed to the more traditional hydrostratigraphic units concept commonly used in hydrogeological studies. The term “hydrostructural domain” is essentially equivalent to the term “structural domain”, which is used within the structural geology community to represent bodies of rock with distinct structural characteristics. The prefix “hydro” implies a connection with permeability. Hydrostructural domains are defined on the basis of variation in fracture characteristics such as the orientation, aperture, or density of fractures, all of which contribute to permeability variations at a variety of scales. For example, in a regional aquifer, different domains may represent regions of differing fracture orientation, which might be associated

with anisotropic permeability. Similarly, a discrete domain, superimposed over other domains, may be associated with a fault that has permeability several orders of magnitude greater than the surrounding aquifer material.

On the Gulf Islands, the concept of hydrostructural domains encompasses the lithologic and stratigraphic subdivisions, which observe variations in joint density, which are anticipated to relate to differences in permeability. Thus, three lithology-based domains, corresponding to (1) sandstone-dominant lithologies, (2) mudstone-dominant lithologies, and (3) interbedded sandstone and mudstone lithologies are needed to capture the observed variation in joint density. Where bedrock geology is uniform in a region, perhaps only one lithology-based hydrostructural domain would be required. In either case, the occurrence of lithology-based domains within a study region could be based on mapped geology, and appropriate permeability assigned based on continuum principles (i.e., the equivalent porous media approach) or a stochastic fracture distribution.

A second level of domain, namely a fracture-based domain, would correspond to discrete fractures, fracture

Table 2 Summary of DRASTIC parameter development

| DRASTIC parameters | Parameter derivation description |
|--------------------------------|--|
| <i>D</i> depth to water table | Due to spatial inconsistencies in the water-well database, interpolation methods could not be applied to depth to water values recorded in the water-well database. Taking into account the general principle that depth top-water values will be lower at the periphery of the islands and greater at the middle of the islands, a function was derived by comparing elevations extracted from the DEM and available water depths extracted from the water-well database. Depths for the “D” parameter range from 0 to 106 m (0–350 ft) |
| <i>R</i> net recharge | Rates of net groundwater recharge were calculated using the US Environmental Protection Agency’s HELP (Hydrologic Evaluation of Landfill Performance model; Schroeder et al. 1994). This simple water-balance model simulates infiltration at the base of the vadose zone for specified surface conditions and soil-column geometries. Inputs into this model include climate data collected at the Victoria airport meteorological station (800 mm/year) and the properties of surficial and bedrock geology sequences derived from the water well database. Results from the HELP model are non-spatial; therefore, model outputs were applied to soil polygons to create a spatially referenced recharge map. Recharge rates in the region range from 102–533 mm/year (4–21 inches/year) |
| <i>A</i> aquifer media | The bedrock geology dataset for the Gulf Islands relied on helavilty to derive the aquifer media parameter. Based on the lithologies of the formations in the islands, each formation was assigned a DRASTIC rating. To capture the unique character of the higher permeability interbedded zones on the Gulf Islands, buffer zones were defined around all mapped formation contacts. The buffer zone width was based on field observations and extent of fracturing associated with interbedded zones |
| <i>S</i> soil | To derive the soil (S) parameter for the Gulf Islands, the soil datasets developed by Agriculture Canada (van Vliet et al. 1987, 1991; Kenney et al. 1988, 1990; Green et al. 1989) were used exclusively. Soil descriptions were used to assign DRASTIC ratings to all soil types in the region |
| <i>T</i> topography | Within DRASTIC, the topography parameter is measured in percent slope. Attributes within the soil dataset provided slope descriptions for each polygon within the dataset. It was determined that the percent slope descriptions within the soil dataset would be applied to represent the T parameter due to the detailed scale of the soil dataset and coherence with the S parameter |
| <i>I</i> impact of vadose zone | The DRASTIC methodology measures the impact of vadose zone parameter (I) by the velocity (metres/second) that water moves through the zone. The ranking of this parameter was determined by extracting the lithologies of the material encountered above the water table from the water well database. Queries were conducted to extract seven categories of material layering from the well log database; the queries were limited to well records which had static water levels recorded. Due to the sparse availability of water-well records with static water levels recorded, the water-well logs provided adequate information to understand the lithological sequences encountered above the water table. However, the locations of these wells were too sparse to create an interpolated map of hydraulic conductivities. To accommodate for these spatial issues and the unavailability of a surficial geology map for the region, polygon descriptions derived from the soil dataset were compared to sequences extracted from the water-well database. Associated hydraulic conductivities were applied to the spatial extents of the soil polygons. In the Gulf Islands, impact of vadose zone conductivity values range from 10^{-5} to 10^3 m/s |
| <i>C</i> conductivity | Based on pumping tests performed on wells in the Gulf Islands, hydraulic conductivity ranges and geometric means were determined based on the aquifer material encountered in the well. These values were used as a reference to assign DRASTIC ratings to the bedrock geology dataset. Due to the relatively low permeability of rock in the Gulf Islands, few conductivity ratings were greater than 1 |

zones and faults, with corresponding ranges of permeability depending on the degree of fracturing associated with each mapped feature. These domains are overlain atop the lithology-based domains and represent the hierarchy in fracturing commonly observed as a result of multiple episodes of deformation or deformation mechanics. Such features could be identified using aerial photographs (lineament analysis), field mapping or three-dimensional geologic modelling. Once identified, appropriate hydraulic properties could be assigned to each of the fracture-based hydrostructural domain based on either pumping tests in wells that intersect such features or by discrete fracture analysis.

Figure 3 illustrates the conceptual model developed by Mackie (2002) and classifies the hydrostructural system in the Gulf Islands into five major components: Unit 1, thin unconfined aquifers located primarily in valley bottoms; Unit 2a, sandstone-dominant unit with low fracture density and reduced permeability; Unit 2b, mudstone-dominant units represented by high fracture density and elevated permeability; Unit 3a, cross-cutting fault zones and Unit 3b, discrete fault and fracture systems represented by relatively high permeability (Journeay et al. 2004).

The hydrostructural domain approach appears to be a reasonable one for the Gulf Islands based on over 100 pumping well tests analyzed on the Gulf Islands (Allen et al. 2003a). That study concluded that (1) the hydraulic properties were not significantly different for wells completed in mudstone- or sandstone-dominant formations; and

(2) flow in most wells located near mapped lineaments were highly influenced by linear flow, and that the hydraulic properties calculated for wells situated near such features were consistently higher than those for wells away from lineaments. These observations support the interpretation that large-scale fault and fracture zones exercise a dominant control on the hydrogeology, and probably act as conduits for groundwater flow at the regional scale.

Methodology

Implementation of DRASTIC-Fm

As an index-based model, DRASTIC assigns relative weights to each of its parameters. These weights are allocated based on a parameter’s contribution to the overall susceptibility of an environment. Within each parameter, ratings are assigned to define the significance of one characteristic over another.

Ratings for individual parameters were determined from direct consultation with the DRASTIC EPA manual (Aller et al. 1987) and from the application of DRASTIC to other study areas within similar environments in British Columbia (Wei et al. 2004; Allen et al. 2003b).

In order to properly represent the parameters within the DRASTIC methodology from a spatial context, a comprehensive collection of Geographic Information System (GIS) datasets were compiled. Key input datasets into this model include soil, bedrock geology, a water well database and a DEM. In order to bring consistency to

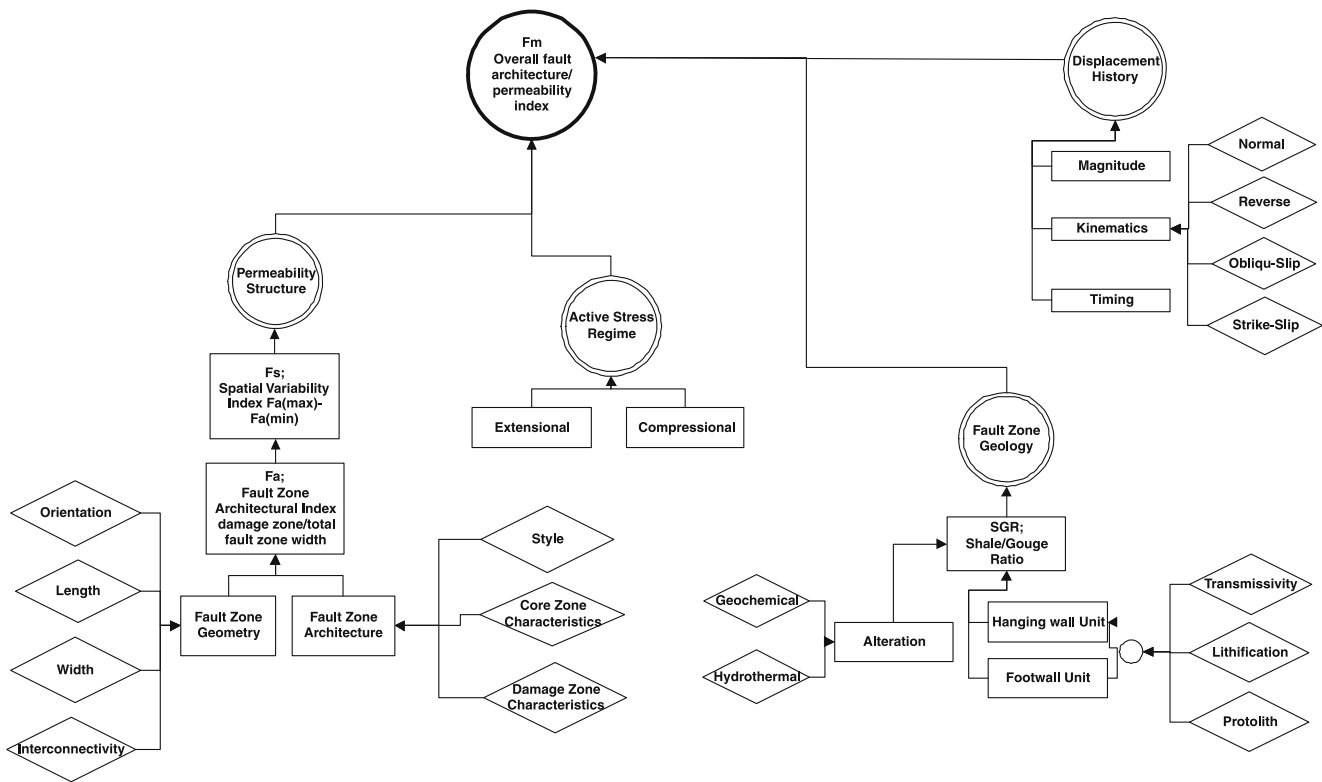


Fig. 4 Conceptual framework for the derivation of the fractured media (Fm) parameter

the varying scales of the input datasets, a constant scale was determined by the DEM (25 metres) and each of the layers were converted to raster datasets. Each cell in the model output dataset is represented by a vulnerability value, which corresponds to the cumulative rating of all parameters. Model outputs were then classed based on their levels of vulnerability.

Table 2 describes the procedures undertaken to develop the traditional seven parameters of the DRASTIC methodology (D, R, A, S, T, I, C). For the purpose of this paper, focus will be put on the development of the Fractured Media (Fm) component and how this parameter was integrated into the existing DRASTIC methodology.

Fm-fractured media

The impact of discrete fractures, fracture zones and faults on the quality of a groundwater resource can be represented generally in the description of the “A” (aquifer media) parameter of the existing DRASTIC methodology. However, the spatial extent and characteristics of fault and fracture systems are not explicitly represented (Aller et al. 1987; Wei 1998). By applying the existing DRASTIC methodology to the Gulf Islands, a significant piece of the hydrogeological story would be missing. To rectify this, DRASTIC was modified to include an additional parameter-fractured media (Fm). Fm takes into account three primary characteristics that dictate the impact of a discrete fracture network: orientation, length and fracture density (Singhal and Gupta 1999). These three characteristics are combined into an eighth DRASTIC parameter and assigned the same weight as aquifer media (see Table 1). This modified methodology has been termed DRASTIC-Fm.

The design of the Fm parameter required the development of a conceptual framework to assess all of the characteristics that needed to be addressed in order to adequately represent the impact of fault and fracture systems in a modified DRASTIC methodology. The details of this framework are described in Fig. 4. Several aspects of the framework were derived from Caine et al. (1996) and formed the basis for representing the spatial variability and fault zone architecture indexes of the permeability structure. For the purpose of the Gulf Islands case study, not all aspects of the framework were able to be represented due to the availability of information sets for the region. Specifically, focus was made on the permeability structure and active stress regime components of the framework. This framework provides an opportunity for alternative case study areas with additional information to expand the scope of the Fm parameter for their test site.

The locations and extents of fault and fracture systems represent the key to properly representing the Fm parameter in any study area. Localized field studies conducted throughout the Gulf Islands (Mackie 2002; Journey and Morrison 1999) significantly supported the derivation of the parameter; however, not all faults and

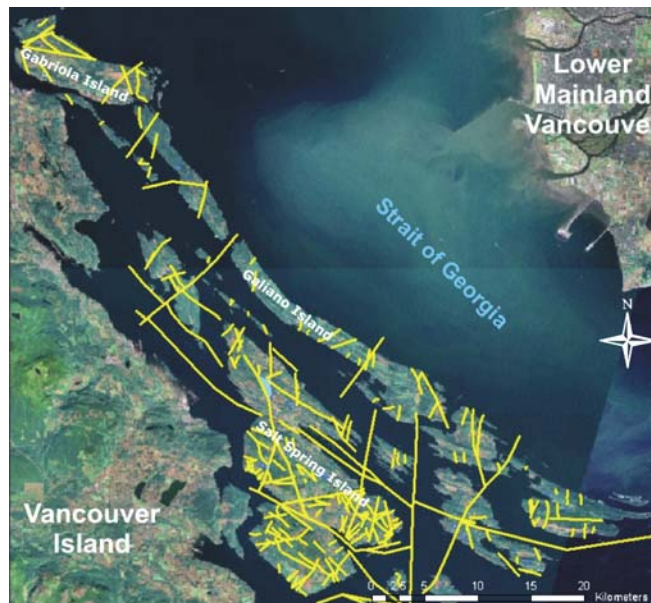


Fig. 5 Lineament and fault network for the southern Gulf Islands

fractures can be derived from “on the ground” investigations. A more regional representation was needed. The use of remote-sensing information has become a commonly used technique in supporting the collection of structural data. Methods of remote-sensing data collection permit the delineation of regional features and trends, provide representation for areas that may be inaccessible by field investigations, and save considerable time and resources when analyzing a large study area (Singhal and Gupta 1999).

The lineament analysis applied to the Gulf Islands incorporated a 25-m resolution DEM and 12.5 m Landsat 7 Thematic Mapper multispectral panchromatic imagery. A hillshade was computed from the DEM to extract features of the landscape through the use of shadowing and sun-angle illumination. By calibrating the hillshade to several different sun angles, different structural characteristics could be identified. Areas of dense vegetation cover can often act as a barrier to the identification of linear features using remotely sensed datasets. Some regions in the Gulf Islands experience quite dense land cover, to

Table 3 30° fault orientation classification and associated DRASTIC-Fm ratings

| Orientation/azimuth | | | |
|---------------------|-----|-----|--------|
| Extension | Min | Max | Rating |
| | 285 | 315 | |
| | 315 | 345 | 10 |
| | 345 | 15 | 7 |
| | 105 | 135 | 7 |
| | 135 | 165 | 10 |
| Contraction | 165 | 195 | 7 |
| | 195 | 225 | 4 |
| | 225 | 255 | 2 |
| | 255 | 285 | 4 |
| | 15 | 45 | 4 |
| | 45 | 75 | 2 |
| | 75 | 105 | 4 |

Table 4 Length classifications and associated DRASTIC-Fm ratings

| Length (m) | Rating |
|---------------|--------|
| 20,000–25,000 | 10 |
| 15,000–20,000 | 8 |
| 10,000–15,000 | 6 |
| 5,000–10,000 | 4 |
| 0–5,000 | 2 |

overcome this, a multispectral image using the infrared band 4 was employed to identify distinct vegetation patterns caused by fault-altered drainage patterns and preferential moisture movement produced by the presence of a fault plane (Campbell 1996). As a means of ground-truthing, the final lineament analysis was compared and combined with structures mapped in the field. The final Gulf Islands structural dataset represents fault and fracture zones as well as discrete structures (Fig. 5).

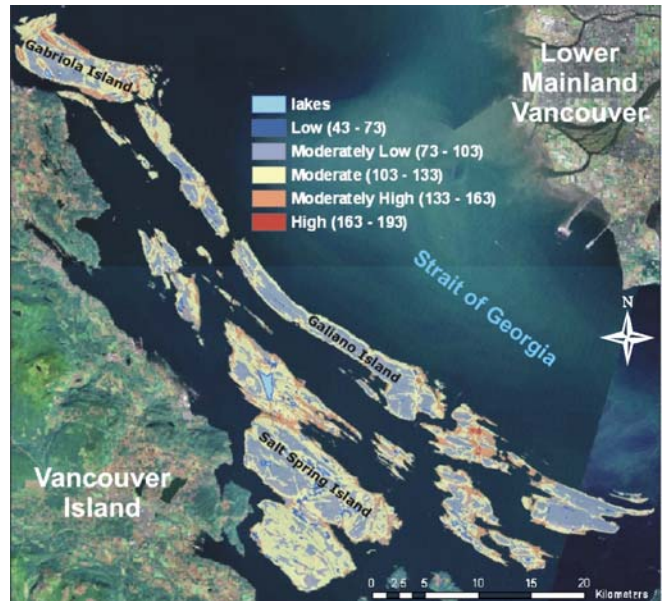
Fracture orientation The orientation of faults and fractures plays a key role in determining whether a fault acts as a hydraulic conduit or barrier to groundwater contamination. Extensive field research was performed by the authors examining the characteristics of fault and fracture systems in this study area. Results of this research were published by Journeay and Morrison (1999) where faults and fractures present in the Gulf Islands were classified into zones of contraction and zones of extension based on their orientation. Within this hypothesis (Journeay and Morrison 1999), NE–SW trending faults were considered to have a high fault aperture and NW–SW trending faults were considered to have a low fault aperture. The results of this work were further collaborated by identifying elevated yields from wells located on major faults in the region. In order to represent this hypothesis spatially, an algorithm was applied to calculate the two-dimensional azimuth of all faults present in the structural dataset for the Gulf Islands. Orientations were divided into 30° increments; DRASTIC ratings reflect the proximity to zones of extension or contraction (Table 3).

Fracture length The length of a fracture determines whether it is a regional or discrete structure. Regional structures often contain several fault intersections, and this can significantly increase the hydraulic conductivity of a fault. Within a GIS, the lengths of all faults were calculated and assigned DRASTIC-Fm ratings (Table 4). Length classifications were determined on the clusters of lengths calculated for the structural dataset.

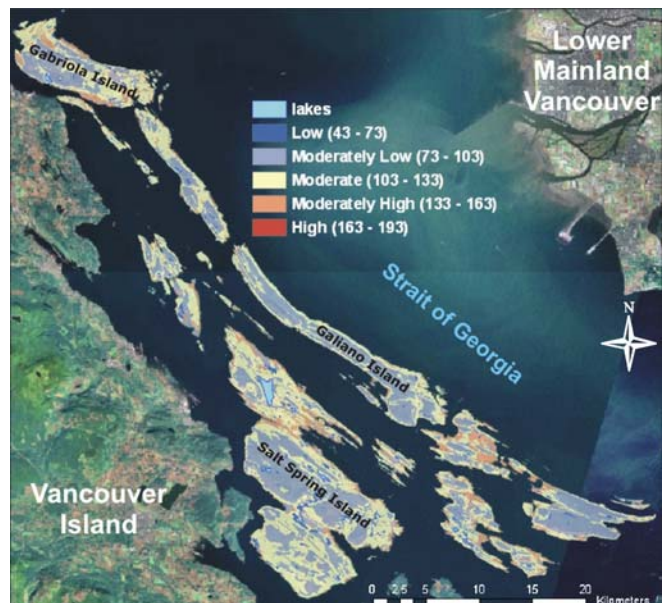
Fracture intensity Based on the conceptual model of Mackie (2002), it was determined that fracture intensities increased with proximity to known faults (Caine et al.

Table 5 Fracture density classifications and associated DRASTIC-Fm ratings

| Fracture density (fractures/m) | Rating |
|--------------------------------|--------|
| 0–2 | 2 |
| 2–4 | 4 |
| 4–6 | 6 |
| 6–8 | 8 |
| >8 | 10 |

**Fig. 6** DRASTIC-Fm model result

1996). Mackie (2002) calculated minimum and maximum fracture density values (fractures/m) for dominant formations in the Gulf islands from scan-line data. To represent the gradation of minimum to maximum fracture density with proximity to faults, buffer distances were assigned to all structures in the dataset. The geological formations within each of those buffers were derived from the Gulf Islands bedrock geology dataset (Journeay et al. 2005). Buffer distances were determined by referencing the resolution of the DEM used in the development of the lineament analysis. Fault and fracture zones visible on the DEM were considered to have greater zones of fracture density because they were visible at a larger scale and, therefore, were assigned buffer distances greater than the

**Fig. 7** DRASTIC model result, fractured media (FM) parameter not included

resolution of the DEM. All other structures represented those mapped in the field and were considered to be local or discrete. These local structures were given buffer distances representing the resolution of the DEM. Once fracture density values had been applied to all structures in the dataset, they were categorized into five classes and ratings were assigned (Table 5). The final Fm parameter was derived by combining the three characteristics discussed above. An average was calculated for the ratings to assign final Fm vulnerability values.

Results

By reviewing previous applications of the DRASTIC methodology in other study areas (Piscopo 2001; Osborn et al. 1998), DRASTIC-Fm model outputs were classified into five categories of vulnerability ranging from high to low. Due to the additional Fm parameter, minimum and maximum output ranges of the DRASTIC-Fm model (26–260) were inflated in comparison to the traditional minimum and maximum DRASTIC outputs (23–230). The final output dataset for the Gulf Islands (Fig. 6) identifies vulnerability rates ranging from 43 (low) to 193 (high).

General trends in the model outputs include regions of high vulnerability around island perimeters where instances of saltwater intrusion are prevalent, and in valley regions where the topography changes, recharge rates are high and structures are present. The model is quite sensitive to changes in the D (depth to aquifer) and the presence of faults and fractures (Fm).

Regions of moderate to low vulnerability (43–107; Fig. 6) exist primarily in poorly drained soil layers with significant clay deposits. These regions occur primarily in the central portions of the islands where the thickness of material above the aquifer is greater than 9 m (30 ft) deep. Bedrock formations that exhibit the lowest vulnerability rates include Pender, Extension, Protection, Buttle Lake and Sicker groups and the Mount Hall and Salt Spring Intrusive Suites (Figs. 1 and 2).

Regions of moderately high to high vulnerability (107–193; Fig. 6) exist primarily at the periphery of the islands and in areas of exposed rock where there is little or no soil material to provide a potential obstruction for a contaminant to move vertically into the vadose zone. Bedrock formations that exhibit the highest vulnerability rates include the Geoffrey, De Courcy and Comox Formations (Figs. 1 and 2).

To identify the spatial changes between the traditional DRASTIC methodology and the modified DRASTIC-Fm approach, a version of the model was run without the Fm parameter (Fig. 7). Comparing Figs. 6 and 7, the overall impact of the presence of fault and fracture systems tends to augment the vulnerability of the regions within proximity to a structure. For example, the presence of faults and fractures within regions of low vulnerability increases the vulnerability range to moderately low. This is particularly evident on the central portion of Salt Spring where the presence of faults and fractures have augmented

the vulnerability from moderately low (73–103) to moderate (103–133) and on Galiano and Gabriola islands where the vulnerability has been augmented from moderate (103–133) to moderately high (133–163).

Conclusions

A modified relative-index vulnerability mapping method is proposed for regional fracture aquifers, DRASTIC-Fm. The method encompasses the use of similar ratings and weights for hydrogeologic parameters used in the original US EPA DRASTIC methodology, but provides for an additional parameter that reflects a higher level of fracturing associated with bedding perpendicular joints, discrete fractures, fracture zones and faults. The features are rated according to their hydraulic influence on an aquifer system and their ability to transport contaminants directly into the subsurface.

Model outputs highlight regions of high vulnerability around island perimeters where the thickness of material above the aquifer is minimal, surrounding faults and fractures and in high recharge areas where topography changes. The fractured media parameter introduces an increased order of vulnerability to zones within proximity to known structures and provides a means of quantifying the potential impact of fracturing on the quality of a groundwater resource.

Although a comprehensive model, this model is a general representation of the hydrogeologic environment of the Gulf Islands. This methodology was chosen deliberately for its ability to be seamlessly adapted to other regions with similar hydrogeologic characteristics. Many of the datasets employed in the model are readily available or can be easily developed in most regions. Furthermore, the model outputs are represented in a manner that can be easily translated to support policy deliberations between hydrogeological professionals and land-use planners to integrate the model outputs into sustainable groundwater resource management strategies.

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8.3

for report see
under separate
cover

Kathy Jones

From: Andrea Pickard
Sent: April-15-10 11:03 AM
To: Kathy Jones
Cc: David Marlor
Subject: FW: NOTICE OF PROJECT REGARDING PROPOSED VESSEL WAVE MODELING STUDY AND PERFORMANCE TRIAL IN PLUMPER SOUND, BC
Attachments: REP 0330_10 NSPIT Vessel Wave Study and Performance Trial.pdf

Hi Kathy,

can you please add the above report to the next North Pender, South Pender and Saturna LTC agendas as correspondence? it is for information only.
 i will also be sending it to the Trustees in advance as an FYI.

thanks,

From: Rouget, Philippe [mailto:Philippe_Rouget@golder.com]
Sent: Tuesday, April 06, 2010 2:00 PM
To: Andrea Pickard
Cc: Munday, David
Subject: NOTICE OF PROJECT REGARDING PROPOSED VESSEL WAVE MODELING STUDY AND PERFORMANCE TRIAL IN PLUMPER SOUND, BC

RE: NOTICE OF PROJECT REGARDING PROPOSED VESSEL WAVE MODELING STUDY AND PERFORMANCE TRIAL IN PLUMPER SOUND, BC

Dear Andrea Pickard,

Please find attached written details of a proposed vessel wave modeling study and performance trial scheduled for May 25, 2010 in Plumper Sound, BC (the Project). A new, low-wake, passenger-only ferry has been designed and constructed as a test vessel for model validation and in-situ response studies to investigate the feasibility of restoring Passenger Only Fast Ferry (POFF) service to Rich Passage, WA (Seattle-Bremerton ferry route). Plumper Sound was selected as a suitable field site for the Project due to its overall proximity to Rich Passage, similarity in oceanographic conditions, lower marine traffic regime, and the natural protection it offers from marine weather (instrumental for wave data collection).

Potential concerns with the Project include the possible interference of Project works with local waterways, navigational safety, and fish and/or fish habitat. As such, the Project will require Transport Canada (TC) approval under Section 5(3) of the Navigable Waters Protection Act (NWPA), Fisheries and Oceans (DFO) approval under a Fisheries Act Request for Review, Canadian Coast Guard (CCG) approval under a "Notice to Shipping", and Canada Border Services Agency (CBSA) approval under a temporary import permit for scientific equipment entering Canada. Federal application packages have been submitted accordingly. Golder anticipates that a project of this nature may attract the attention of local residents and that Islands Trust may be contacted directly regarding the Project. Golder has provided the attached document to facilitate with any questions that may arise.

In addition, I have also forwarded a hard copy of the attached report which should arrive at your Victoria office by Friday.

Please feel free to contact me directly at 250-978-5808 should any additional information be required. Thank you for your continued assistance.

Sincerely Yours,

Phil Rouget

Philippe Rouget (M.Sc.) | Marine Biologist | **Golder Associates Ltd.**

2640 Douglas Street, Victoria, British Columbia, Canada V8T 4M1

T: [+1] (250) 881 7372 | **D:** [+1] (250) 978 5808 | **F:** [+1] (250) 881 7470 | **C:** [+1] 250 888 1100 | **E:** Philippe_Rouget@golder.com | www.golder.com

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Please consider the environment before printing this email.

Re: SATURNA ISLAND TRUST COMMITTEE
BYLAW NO. 99

8 . 4

The Executive of the Saturna Water Conservation Committee (SWCC) has reviewed this draft and has some comments and concerns.

We support the wording that refers only to rainwater storage in cisterns. We urge the Local Trust Committee not to include ponds as an alternative to cisterns. The subject of ponds is complex and research exists that indicates ponds could have a serious negative impact on a sensitive aquifer. At a minimum, there should be thorough research before the inclusion of ponds in a bylaw. Any property owner who wishes to incorporate a pond into an existing or new water system still has the option to apply for a variance, even if ponds are not directly addressed in the bylaw.

The table summarizing storage capacity in this bylaw deals with the minimums for structures of differing sizes (square footage). We believe one of the major flaws of this draft is that it lumps residential and commercial usage into the same category.

It seems reasonable to assume that a commercial "accommodation unit" housing 4 people for a week will utilize more water than a residential property of the same size. Islanders frequently comment that they are more conservative in water consumption than visitors on holiday. Commercial units tend to run at full capacity during the dry summer months while vacation properties are rarely occupied full time. Unfortunately, during the summer there is no appreciable rainfall and cisterns will not refill naturally. Higher capacities are needed to account for this fact.

The associated table should reflect two separate categories, one for residential and one for commercial, to reflect this difference. Since accommodation units are defined as commercial units of no more than 1,000 sq ft, the commercial category needs only one capacity definition. The SWCC has provided Gary Richardson with some figures of residential water use on Saturna obtained from the operators of two local water systems and is trying to obtain data on water use of commercial operations on other islands.

We understand that the Islands Trust is also looking at establishing a development permit area to protect the East Point aquifer recharge area and fully support this idea. We look forward to working with the Local Trust Committee on this initiative and others that help preserve and protect our precious water resources.

Janet Land
Chair Saturna Water Conservation Committee



Kathy Jones

From: Gary Richardson
Sent: April-19-10 1:24 PM
To: Kathy Jones
Subject: FW: Water Use Figures for the Group of 30

Attachments: Hidden Users.cwk; Picture 2.png; ATT00001.txt



Hidden Users.cwk (37 KB)



Picture 2.png (18 KB)



ATT00001.txt (280 B)

Kathy can you put this as correspondence on the saturna agenda, Janet Land has requested this.

-----Original Message-----

From: Janet Land [mailto:jland@gulfislands.com]
Sent: Saturday, February 20, 2010 9:24 PM
To: Gary Richardson
Cc: teresa@weavingbyteresa.com; combes@telus.net; michael@paprika.ca; Beverley Neff
Subject: Water Use Figures for the Group of 30

Thanks to Graeme Bregani for these water use figures (in gallons) for the Group of 30. Residences are metered but the meters read only once a year so we don't have seasonal variations. Graeme has noted the full time people and an estimate of how often the part timers are there based on 2009 figures. In order to get some idea of daily consumption I divided the highest four year number for full time and medium to heavy use part timers by 365 (see below). This is a reasonable estimate for full time people although they aren't always here 365 days. There is no way to tell how many days the part timers are here but it is some fraction of 365 and the figures will be a low estimate of actual daily consumption.

Daily water use by full time residents:

72.6
 59.4
 40.7
 56.5
 59.2

Daily water use by part time residents:

62.1
 133.6
 43.67
 81.2
 56.9
 80.5

Kathy Jones

From: Gary Richardson
Sent: April-19-10 1:26 PM
To: Kathy Jones
Subject: FW: Re: Water Use Statistics Hawks Subdivision

can you add this as correspondence also, Janet Land also made this request.

-----Original Message-----

From: Janet Land [mailto:jland@gulfislands.com]
Sent: Friday, February 19, 2010 10:29 AM
To: Gary Richardson
Cc: Teresa Higgins; combes@telus.net; michael@paprika.ca; Beverley Neff
Subject: Fwd: Re: Water Use Statistics Hawks Subdivision

I hope to get more statistics from the other water systems on the island and will forward them to you.

>Date: Mon, 15 Feb 2010 10:56:47 -0800
 >From: Cy Tordiffe <cytordiffe@shaw.ca>
 >Subject: Re: Water Use Statistics
 >To: Janet Land <jland@gulfislands.com>
 >X-Mailer: Sun Java(tm) System Messenger Express 6.2-7.05 (built Sep 5
 >2006)
 >X-Accept-Language: en
 >Priority: normal
 >
 >Janet
 >
 >It was nice to meet you also.
 >
 >I have detailed records in a spreadsheet which I will send to you tonight.
 >
 >However, based on memory;
 >
 >1. we do not meter individual connections. we have a water meter to
 >measure water pumped into our holding tanks and an hour meter to
 >measure pump run time. we use a log in the pump house to record
 >readings and computer gallons used per day and gallons pumped per minute.
 >
 >2. we have 3 full time households and 14 part timers. in the winter,
 >there are 4 part timers that come on a fairly regular basis (e.g. twice
 >per month). In the summer most places are occupied.
 >
 >3. On average the winter water usage per household is around 100 gal / day.
 >
 >4. On average the peak summer water usage per household is around 150

>gal / day.

>

>We have two wells (only one is in service at one time). The normal
>well produces between 5.3 and 5.8 gal / minute.

>

>We don't run short so we don't have too many usage restrictions.

>

>I will send more details when I get home.

>

>thanks

>Cy

>

>----- Original Message -----

>From: Janet Land <jland@gulfislands.com>

>Date: Monday, February 15, 2010 10:12 am

>Subject: Water Use Statistics

>To: CyTordiffe@shaw.ca

>

>> Hi Cy,

>>

>> It was nice to meet and talk with you at the meeting a couple of
>> weeks ago. I'm very interested in the statistics you have for water
>> use in the Hawks Subdivision. Don't know what form they're in but
>> what I'm hoping to get is a use per household in both the winter and
>> summer. I'm hoping to compare this with water use at the Group of
>> 30,

>> Old Point Farm and maybe Saturna Beach. Any help you
>> can offer is

>> much appreciated.

>>

>> Janet

>> Saturna Water Conservation Committee

>>

>>

Kathy Jones

From: Gary Richardson
Sent: April-19-10 2:03 PM
To: Kathy Jones
Subject: FW: Saturna Land use bylaw no.78 2002 Amendment no.1 2009
[please put as correspondence on the next agenda.](#)

From: Mike & Tammy [mailto:mtlawren@shaw.ca]
Sent: Monday, April 19, 2010 1:37 PM
To: Gary Richardson
Subject: Re: Saturna Land use bylaw no.78 2002 Amendment no.1 2009

Dear Mr. Richardson
With reference to the above mentioned Bylaw:

I am concerned about the impact of further development on the East point peninsular and its` impact on the water supply.

I feel that a clear distinction between Residential and Commercial Accommodation units is essential. It is my experience that people who do not live on the Island have very little appreciation of the scarcity of water. I would expect this to be even more pronounced in those people who rent Commercial Accommodation units. People on holiday from places where water is supplied by a municipality do not understand that every drop is precious or appreciate how much water is wasted by running a tap for even a few seconds. They are on holiday & paying for accommodation and would expect an unlimited supply of water. It does not matter how many notices are put up there is still a huge wastage of water. It takes practice to become a conserver of water. There is also the attendant larger volume of water usage for laundry where beds are changed more frequently than in a private house.

As someone who has owned property with only rain water catchment as a source of water I feel that the amount of storage per unit listed is inadequate both for Residential & Commercial Accommodation.

I understand that there is a proposal to allow ponds as a form of storage. This causes me some concern. I wonder how the ponds would be created on a rocky Island. Would this involve blasting and attendant damage to an already fragile aquifer. also there seems to me there would be a loss of water through evaporation.

Yours Sincerely
Margaret Paterson

Kathy Jones

From: Gary Richardson
Sent: April-20-10 9:06 AM
To: Kathy Jones
Subject: FW: Draft Bylaw 99 - Submission for the Public Record

From: Kevin B. Leslie [mailto:kevinbleslie@telus.net]
Sent: Monday, April 19, 2010 4:22 PM
To: Gary Richardson
Subject: Draft Bylaw 99 - Submission for the Public Record

Gary Richardson
 Trust Planner for Saturna

Dear Gary,

We are residents on Cliffside, Saturna Island, and are generally in support of some form of regulation of groundwater usage on East Point.

For the reasons given below, however, we are **strongly opposed** to the new bylaw as drafted.

1. HOW TO MEASURE WATER NEEDS OF A HOUSEHOLD

The amount of rainwater that can be collected from a dwelling is, naturally, affected by the size (square footage) of that dwelling. The amount of water consumed by that dwelling, however, is not proportional to the size of the dwelling but to the number of people in that dwelling (a large house may have very few residents, while a small house may have many). This is a similar concept to the regulation of the minimum size of a septic field for a dwelling: the consideration is NOT the size of the dwelling, but the number of bedrooms in that dwelling (which generally will reflect the number of people living in the dwelling).

The number of bathrooms and toilets are, again, not relevant unless one were illogically to suppose that an individual would be more likely to use a facility more frequently if there were more than one toilet facility from which to choose.

Regulation of water use should thus be guided by the number of bedrooms in the dwelling, not by the size of the dwelling.

2. WHICH PROPERTIES TO REGULATE

Many dwellings on Cliffside operate entirely (or substantially) on rainwater collection already. Since such dwellings are no threat to groundwater sustainability (they do not use groundwater), it does not make sense to regulate their rainwater collection and storage. If applications are made to increase the size of those dwellings (with or without the addition of more bedrooms), it is not logical to require that dwelling to change its rainwater storage system UNLESS there is an intention to add a groundwater well to the water usage system.

Since such a dwelling does not use groundwater, a dwelling that obtains all (or substantially all) of its water from rainwater collection (or water delivery) should be exempt from the provisions of bylaws that regulate groundwater usage.

3. REGULATION OF WELLS

Under the bylaw as drafted, there is no way to regulate the number of wells or usage of water from those wells other than when an application is made to increase the size of an existing dwelling or to build a new dwelling. For example, under the draft bylaw every resident on East Point could simply drill a new well or series of wells, grossly depleting the groundwater reserves.

In addition to the regulation of water usage in the context of new construction and renovations, the bylaw should also provide limits on existing dwellings by providing that a new groundwater well cannot be drilled and connected to a dwelling without the prior installation of an adequate water collection system.

Do contact me should you wish to discuss any of the above.

I would ask, however, that you **do not circulate my email or telephone contact information** to any other individuals. Thank you.

Regards,

KBL

Kevin B. Leslie MB BS PhD
RPO 19107 Fourth Avenue
Vancouver, BC
CANADA V6K 4R8

TEL 1-604-736 9675
FAX 1-604-909 4718

Concerns of the proposed Bylaw to amend Saturna Island Land Use Bylaw No. 78,2002

THE PROBLEM: The limited supply of water on East Point, Saturna Island.

THE SOLUTIONS: We are supportive of a plan to encourage water conservation and capture:

THE CURRENT PROCESS: We believe the process to develop, draft and review the Bylaw is flawed and needs to be changed. Islands Trust meetings regarding water conservation at East Point are held in the middle of the day, in the middle of the week. Most landowners at East Point are unable to attend these important meetings because they live elsewhere or work. The proposed Bylaw has implications for the very people who are unable to participate in the development and drafting discussions.

CONCERNS WITH THE CONTENT OF THE PROPOSED BYLAW:

- The proposed bylaw is only designed for new buildings rather than addressing the encouragement of water conservation for all homes at East Point.
- Can the proposed bylaw include a mandate for the addition of cisterns on existing wells?
- Could a mandate be included that all well owners be required to install an automatic shut-off valve for their well?
- In reference to a “family home” – How many people are considered a family and how was this determined?
- Will the new Bylaw differentiate between private homes and commercial dwellings? Rental properties generally accommodate larger numbers of people, requiring a higher capacity of water during the summer, when it is the driest. Further, weekend cottages may accommodate many more people, with higher water usage, than one couple in a large house.
- We support a higher water storage requirement when the structure is commercial.
- How have the water storage and cistern capacities been estimated? In the existing homes on East Point with rainwater capture, storage of 6,000 to 10,000 gallons is adequate during the summer. The calculation of water storage by square footage alone is not necessarily an accurate reflection of actual water usage. The number of bedrooms, bathrooms and the types of water fixtures are important factors to be considered. Tanks can be added if needed.
- There is an aesthetic concern about the visual impact of large number of tanks on East Point.
- Regarding the water storage requirements for additions to existing houses – Will existing cisterns on wells be included as part of the final water storage requirement? Is there a reason why the amount of water catchment required is based on the final total square footage instead of the square footage of the addition? If the addition does not include water usage, such as a kitchen or bathroom, is added water storage necessary?
- If all the water in cisterns is required to be potable as per the CRD building codes, there will be increases in energy use and cost for filtration. Most water collected as rain capture is not used for drinking. Has the use of gray water for flushing been considered in the bylaw?
- We support a bylaw that encourages the reduction of water use by all East Point residents. Some methods could include separate water capture for garden watering, washing boats and cars; xeroscaping and not watering lawns. Instead of storing massive amounts of filtered water we encourage storing adequate amounts of water and water conservation.

East Point Property Owners:

Nettie Adams, Mairead Boland, Sheila Fox, Joan Hoskinson, David Paton, Jean-François Renaud, Loren Smith, Mark Timmings, Sharon Wagner, Jude White



STAFF REPORT

April 15, 2010

File No.: SA-OCP-2009.1

To: Saturna Island Local Trust Committee
For Meeting of April 28, 2010

From: Robert Kojima
Island Planner
Local Planning Services

CC: Gary Richardson, Island Planner
David Marlor, RPM

Re: Proposed Bylaw 101: Post - Public Hearing procedures

BACKGROUND

The Saturna Island Local Trust Committee is considering a bylaw to amend the OCP to include greenhouse gas (GHG) emission reduction targets, policies and actions (Bylaw 101). A public hearing for the three proposed bylaws is scheduled for April 28th. A public hearing is a quasi-judicial process within and following which specific procedures must be followed.

Following the hearing, an LTC may choose to give further readings to a bylaw, defeat a bylaw, or alter a bylaw within certain parameters. The procedural steps following the close of the hearing are as follows:

1. Consideration of Second Reading (this may include amendments to alter a bylaw).
2. Consideration of Third Reading.
3. Forwarding of the bylaw to Executive Committee for approval.
4. Forwarding of the bylaw to the Minister's office for approval (OCP amendment bylaws only).
5. Reconsideration and adoption.

Following the close of the hearing, the LTC may not hear further submissions without holding a new hearing. The principle is that if new information is considered by the LTC, all other interested parties also need to have the opportunity to consider any new relevant material and to make further representations to the LTC. The courts have recently clarified that this does not open the door to endless public hearings: a local government body can legitimately decide that after a hearing it wishes to hear further from staff on issues raised at the hearing.

A bylaw may be altered after the hearing, based on information received or heard by the LTC at any point prior to the close of the hearing, provided that the amendments do not alter use or increase density, or decrease density without a landowner's consent.

Finally, section 879 of the *Local Government Act* requires that in considering an OCP, or an amendment to an OCP, that the local government "must provide one or more opportunities it considers appropriate for consultation with persons, organizations and authorities it considers will be affected." This consultation must be in addition to the public hearing and specifically should include affected agencies, First Nations and other levels of government. As a practice, this consultation is built into the referral process for all LTC bylaws; in addition, an LTC will typically hold community information meetings or other means of community consultation prior to the formal hearing. In order to confirm that the LTC has addressed this legislative requirement, it is recommended that the LTC adopt a resolution to the effect that it has undertaken consultation that it considers appropriate.

RECOMMENDATIONS

1. THAT the Saturna Island Local Trust Committee give second reading to proposed Bylaw 101.
2. THAT the Saturna Island Local Trust Committee give third reading to proposed Bylaw 101.
3. THAT the Saturna Island Local Trust Committee forward proposed Bylaw 101 to the Secretary of the Islands Trust for Executive Committee approval.
4. THAT the Saturna Island Local Trust Committee forward proposed Bylaw 101 to the Minister of Community and Rural Development for approval.
5. THAT the Saturna Island Local Trust Committee resolves that it has undertaken consultation that it considers appropriate with persons, organizations and authorities it considers will be affected by proposed Bylaw No. 101.

Prepared and Submitted by:



Robert Kojima

April 15, 2010

Date

Concurred in by:

David Marlor, MCIP
Regional Planning Manager

April 19, 2010
Date

BYLAW NO. 101

A BYLAW TO AMEND THE OFFICIAL COMMUNITY PLAN

WHEREAS the Saturna Island Local Trust Committee is the Local Trust Committee having jurisdiction on and in respect of the Saturna Island Local Trust Area, pursuant to the Islands Trust Act;

AND WHEREAS Section 29 of the *Islands Trust Act* gives the Saturna Island Local Trust Committee the same power and authority of a Regional District under Part 26, except sections 932 to 937 and 939, of the *Local Government Act*;

AND WHEREAS the Saturna Island Local Trust Committee wishes to amend the Saturna Island Official Community Plan Bylaw No. 70, 2000;

AND WHEREAS the Saturna Island Local Trust Committee has held a Public Hearing;

NOW THEREFORE the Saturna Island Local Trust Committee enacts in open meeting assembled as follows:

1. CITATION

This Bylaw may be cited for all purposes as "Saturna Island Official Community Plan Bylaw No. 70, 2000, Amendment No. 1, 2010."

2. SCHEDULES

Schedule A (Policy Document) of Saturna Island Official Community Plan No. 70, 2000 is amended as indicated on Schedule 1, attached to and forming part of this amending bylaw.

3. SEVERABILITY

If any provision of this Bylaw is for any reason held to be invalid by a decision of any Court of competent jurisdiction, the invalid provision must be severed from the Bylaw and the decision that such provision is invalid must not affect the validity of the remaining provisions of the Bylaw.

READ A FIRST TIME this 29th day of March , 2010.

PUBLIC HEARING HELD this day of , 2010.

READ A SECOND TIME this day of , 2010.

READ A THIRD TIME this day of , 2010.

APPROVED BY THE EXECUTIVE COMMITTEE OF THE ISLANDS TRUST this
day of , 2010.

APPROVED BY THE MINISTER OF COMMUNITY AND RURAL DEVELOPMENT this
day of , 2010.

ADOPTED this day of , 2010.

SECRETARY

CHAIRPERSON

**SATURNA ISLAND LOCAL TRUST COMMITTEE
BYLAW NO. 101**

SCHEDULE 1

Schedule A of the Saturna Island Local Trust Committee Bylaw No. 70, cited as, "Saturna Island Official Community Plan Bylaw No. 70, 2000" is amended as follows:

1. Section C.1 (General Policies) is amended by inserting the following as a new General Policy C.1.7 as follows and re-designating the following policies accordingly:

"C.1.7 The Saturna Island Local Trust Committee should ensure that land use planning and development support reductions in greenhouse gas emissions and efforts to adapt to climate change impacts."
2. Subsection C.2.2 (Natural Environment Policies) is amended by inserting the following as a new policy (g):

"g) considering greenhouse gas emissions and climate change impacts."
3. Section C.2 (Natural Environment Policies) is amended by inserting the following as a new advocacy policy C.2.10:

"C.2.10 Regional, provincial and federal agencies are encouraged to undertake and support local initiatives to reduce greenhouse gas emissions."
4. Section C.3 (Development Policies) is amended by inserting the following as a new policy C.3.10:

"C.3.10 To move towards a land use pattern that results in a more compact, complete and connected community, with new residential development occurring in locations accessible to services."
5. Subsection D.1.1 (Rural) is amended by inserting the following as a new policy (i):

"i) The Local Trust Committee may consider allowing for mixed uses in locations in close proximity to services."
6. Policy D.1.A.2(b) (Commercial Recreation and Accommodation) is amended by inserting the phrase "greenhouse gas emissions," following the word "groundwater," and preceding the word "local."
7. Subsection D.1.A (Commercial Recreation and Accommodation) is amended by inserting the following as a new policy D.1.A.11:

"D.1.A.11 Employee accommodation may be required in new development where a significant number of additional units are permitted or proposed."
8. Policy D.1.1.2 (Commercial and Industrial) is amended by inserting the phrase "including greenhouse gas emissions and climate change impacts," following the word "soils," and preceding the third instance of the word "and."
9. Policy D.1.1.8 (Commercial and Industrial) is amended by inserting the phrase "and proximity to residential uses is considered" following the word "provided."
10. Section D.2 (Farmland) is amended by inserting the phrase "to enhance local food security;" following the phrase "to support agriculture;" and preceding the phrase "to preserve arable Farmland."

11. Policy D.2.1 (Farmland) is amended by inserting the following as a new second sentence:
“Zoning regulations should be crafted so as not to preclude local food production, processing and distribution.”
12. Section D.4 (Forest) is amended by inserting the following as a new advocacy policy D.4.29:
“D.4.29 Landowners, including Parks Canada, are encouraged maintain forest cover as a means of capturing and storing carbon.”
13. Policy E.1.12 (Open Space Advocacy Policies) is amended by inserting the phrase “and as a means to reduce emissions.” at the end of the sentence.
14. Policy E.1.14 (Open Space Advocacy Policies) is amended by deleting the phrase “recreational lands” and replacing it with the phrase “public trails as a means of providing alternate transportation”.
15. Amending Part E by adding the following as a new Section E.5:

“E.5 CLIMATE CHANGE MITIGATION AND ADAPTATION

Background

Climate change results from the increasing concentration of heat-trapping greenhouse gases in the atmosphere as the result of human activities— primarily the burning of fossil fuels and large-scale deforestation. The rise in atmospheric greenhouse gas concentrations has in turn triggered an increase in the average temperatures of near-surface air and ocean water, with temperatures projected to rise over the next century. Although seemingly slight, these temperature changes could have potentially dramatic and negative impacts on ecological systems around the globe.

The *Local Government Act* now requires that all local governments include in their Official Community Plans targets to reduce greenhouse gas (GHG) emissions and policies and actions to achieve these targets.

The following targets, objectives, policies and actions are the first step to ensuring that the reduction of GHG emissions specifically and the impact of climate change in general become part of the planning process for Saturna Island. This section of the Plan contains objectives and policies relating to the reduction of GHG emissions and the broader topic of climate change adaptation and mitigation.

E.5.1 Target

This plan supports a target of reducing greenhouse gas emissions by 33% by 2020 from 2007 levels. Emission reductions within the local trust area should be achieved through individual and community initiatives, the actions of other levels of government, technological changes, and changes to land use policies and regulations.

E.5.2 The Local Trust Committee should consider climate change as a factor in land use decision-making.

E.5.3 The Local Trust Committee should support land uses that result in a more compact, complete and connected community.

E.5.4 The Local Trust Committee should support efforts and policies to help the community adapt to climate change impacts.

E.5.5 The Local Trust Committee should work with others to support actions to limit emissions.

- E.5.6** The Local Trust Committee should recognize the role that natural areas, particularly forests, wetlands, and other sensitive ecosystems, watersheds, forests, parks and open spaces play in storing carbon.
- E.5.7** The Local Trust Committee should work with the Trust Fund Board (and others) to set targets for ecosystem protection and restoration.
- E.5.8** The Local Trust Committee should consider potential climate change impacts and GHG emissions in reviewing any application for additional density or any increase in intensity of use.
- E.5.9** The Local Trust Committee may consider amending policies, zoning and development permit area provisions to allow for mixed uses, including second-storey residential dwelling units, in commercial designations in order to provide for a mix of housing types and to encourage residences closer to services and amenities in appropriate locations and with appropriate regulation.
- E.5.10** The Local Trust Committee should consider amending zoning regulations to permit or facilitate small-scale renewable energy production, such as solar collectors, wind turbines and geothermal heating
- E.5.11** The Local Trust Committee should consider amending the parking requirements for commercial uses, to require alternatives to parking spaces, including but not limited to: bicycle racks, electric vehicle plug-ins, or cash-in-lieu for use for trails and paths
- E.5.12** The LTC should review and potentially amend the provisions for existing development permit areas to ensure that objectives and guidelines support energy conservation and alternative transportation options.
- E.5.13** The LTC may consider creation and implementation of development permit areas to effectively manage lot layout in new subdivisions, manage tree removal and require restoration, and to implement energy conservation in significant new commercial development.
- E.5.14** The Local Trust Committee may consider amending zoning to permit secondary dwelling units in appropriate locations.
- E.5.15** The Local Trust Committee may consider amending zoning to permit attached dwellings where current zoning permits more than one dwelling on a parcel.
- E.5.16** The Local Trust Committee may consider amending zoning to limit floor area or lot coverage of single family dwellings.
- E.5.17** The Local Trust Committee should consider developing or adopting a sustainability checklist for use by applicants for new construction.
- E.5.18** The Local Trust Committee should support development of a Community Energy Strategy and regional community energy plans.
- E.5.19** Regional, provincial and federal agencies are encouraged to undertake and support initiatives to reduce greenhouse gas emissions.
- E.5.20** Developers of public and community buildings are encouraged to incorporate energy conservation design features in all projects.
- E.5.21** The Local Trust Committee should support efforts to create shared energy production in neighbourhoods.

E.5.22 The Local Trust Committee should support incentives to incorporate alternative energy features and energy efficient building design in all buildings.

16. Policy F.1.2 (Public Transportation Advocacy Policies) is amended by deleting the phrase “public transportation” and replacing it with the phrase “alternative forms of transportation”.
17. Section F.2 (Roads, Trails and Bicycle Paths) is amended by inserting the phrase “minimize the contribution of greenhouse gas emissions,” between the words “impact,” and “provide”.
18. Policy F.2.4 (Roads and Trails Advocacy Policies) is amended by inserting the phrase “to assist in meeting local and provincial targets for greenhouse gas emission reduction” following the second instance of the phrase “*Land Title Act,*” and preceding the phrase “and are to accommodate”.
19. Section F.2 (Roads, Trails and Bicycle Paths) is amended by inserting the following as a new policy F.2.8:

“F.2.8 The Ministry of Transportation and Infrastructure, and others, are encouraged to support alternative transportation initiatives, including, but not limited to, car stops, neighbourhood zero emission vehicles, car shares, a bicycle path network and walking trails linking population to services.”
20. Policy F.3.2 (Water Transportation Advocacy Policies) is amended by inserting the phrase “and B.C. Ferry Services Inc. is encouraged to consider basing a ferry at Saturna” at the end of the sentence.
21. Policy F.3.3 (Water Transportation Advocacy Policies) is amended by inserting the phrase “to assist in meeting local and provincial targets for greenhouse gas emission reduction” at the end of the sentence.
22. Policy F.3.4 (Water Transportation Advocacy Policies) is amended by inserting the phrase “, and B.C. Ferry Services Inc., the Ministry of Transportation and Infrastructure, and B.C Transit are encouraged to create and maintain facilities and services supporting ferry travel by means other than private automobiles” at the end of the sentence.
23. Policy F.5.2 (Water Supply) is amended by deleting the second instance of the word “consider” and replace it with the word “support and insert the word “conservation” following the word “including” and preceding the phrase “the collection.”
24. Policy F.6.3 (Utilities Advocacy Policies) is amended by inserting the following as a new second sentence: “The Local Trust Committee may consider amending zoning regulations to permit or facilitate small-scale renewable energy production, such as solar collectors, wind turbines and geothermal heating.”
25. Subsection F.6 (Utilities) is amended by inserting the following as a new policy F.6.6:

“F.6.6 Providers of internet and other electronic communications services should be encouraged to expand and improve the delivery of services to, and the development of infrastructure for, the local community.”
26. Subsection F.7 (Waste Disposal) is amended by inserting the following as a new policy F.7.4:

“F.7.4 The Local Trust Committee should support efforts to reduce waste, including expansion of recycling, composting and chipping services, in order to move towards a goal of zero waste.”
27. Amending Part H (Temporary Commercial and Industrial Use Permits) by inserting a new policy H.1.11 as follows:

“H.1.11 In reviewing applications and establishing permit conditions, the Local Trust Committee should consider the climate change impacts of the proposed use.

28. Appendix A (Community Amenity Density Reserve) is amended by inserting a new requirement (k) as follows:

“k) The Local Trust Committee should ensure that any additional density minimizes greenhouse gas emissions, considers requirements for energy efficient building standards, and should be in locations near existing services and transportation infrastructure.”

29. Appendix B is amended by inserting a new requirement (y) as follows:

“y) potential climate change impacts and GHG emissions;”

**SATURNA ISLAND TRUST COMMITTEE
BYLAW NO. 99**

A BYLAW TO AMEND SATURNA ISLAND LAND USE BYLAW NO. 78, 2002

The Saturna Island Local Trust Committee, being the Trust Committee having jurisdiction in respect of the Saturna Island Trust Committee Area under the Islands Trust Act, enacts as follows:

A. The Saturna Island Land Use Bylaw, No. 78 is amended as follows:

1. By inserting the following immediately after subsection 2.17.10:

“2.18 Water Storage

A building permit shall not be issued for any residential building, visitor accommodation unit, or addition to a residential building or visitor accommodation unit in the water management area depicted on Schedule C unless the building is equipped with a water catchment system and cistern(s) for the storage of rainwater. Minimum cistern capacity is required as follows:

| Proposed Construction | Cistern Capacity Required |
|--|--------------------------------|
| Any new construction or addition to a residence or visitor accommodation unit that exceeds 11.6 square metres (125 square feet) and will create a residence or visitor accommodation unit having a floor area up to 55.7 square metres (600 square feet) | 15141 litres (3330 gallons) |
| Any new construction or addition to a residence or visitor accommodation unit that will create a residence or visitor accommodation unit having a floor area up to 92.9 square metres (1000 square feet) | 30282 litres (6660 gallons) |
| Any new construction or addition to a residence or visitor accommodation unit that will create a residence or visitor accommodation unit having a floor area up to 139.4 square metres (1500 square feet) | 45414 litres (9990 gallons) |

| | |
|---|---------------------------------|
| Any new construction or addition to a residence or visitor accommodation unit that will create a residence or visitor accommodation unit having a floor area up to 185.8 square metres (2000 square feet) | 60555 litres (13320 gallons) |
| Any new construction or addition to a residence or visitor accommodation unit that will create a residence or visitor accommodation unit having a floor area of more 185.8 square metres (2000 square feet) | 63885 litres |

3. By adding a new Schedule C as shown on Schedule A which is attached to and forms part of this bylaw.

B. This Bylaw may be cited as "Saturna Island Land Use Bylaw 78, 2002, Amendment No. 1, 2009".

READ A FIRST TIME this 29th day of March ,2010.

PUBLIC HEARING HELD this day of ,20

READ A SECOND TIME this day of , 20

READ A THIRD TIME this day of , 20

APPROVED BY THE EXECUTIVE COMMITTEE OF THE ISLAND TRUST this day of , 20

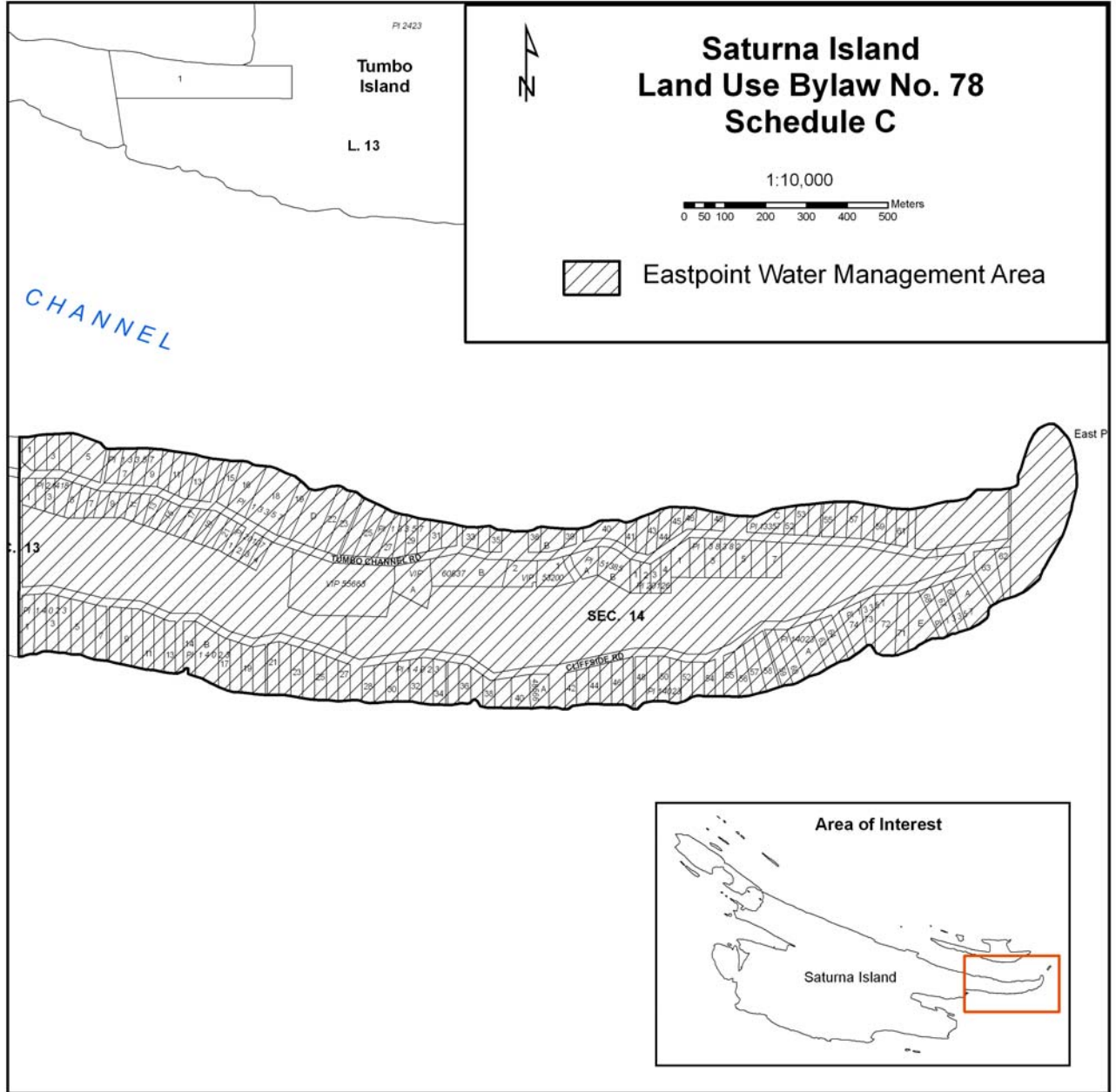
ADOPTED this day of , 20

Chair

Secretary

SATURNA ISLAND TRUST COMMITTEE
BYLAW NO. 99

Schedule A



**Saturna Island Riparian Area Regulation Stream Identification
Report dated March 31, 2010**

(attached under separate cover)



Top Priorities

Saturna Island

| No. | Description | Activity | Received/Initiated | Responsibility | Target Date | Status |
|-----|--|--|--------------------|-----------------|-------------|----------|
| 1 | East Point Water Conservation | To consider LUB amendment to require cisterns for new construction and additions in East Point, and to consider OCP amendment for new advocacy policies supporting water conservation. Review the feasibility of making center of Eastpoint a Development Permit area. | Oct-28-2009 | Gary Richardson | May-24-2010 | On Going |
| 2 | Accessory Building Review | To consider LUB amendment to permit construction of non-residential buildings before construction of dwelling. | Sep-02-2009 | Gary Richardson | May-24-2010 | On Going |
| 3 | Greenhouse Gas Emissions Reduction Target and policies | To amendment OCP to adopt GHG emission reduction target, and include policies and actions to achieve the target. | Oct-28-2009 | Robert Kojima | May-31-2010 | On Going |



Islands Trust

Projects

Saturna Island

| No. | Description | Activity | Received/Initiated | Status |
|-----|--|---|--------------------|----------|
| 1 | National Park Reserve Designations and Zoning | Amend zoning and OCP designations on National Park Reserve Lands. | Apr-29-2009 | On Going |
| 2 | Development Approval Information Bylaw | 1) Review recently developed DAI bylaws and adapt for Saturna DPA. 2) Readings, Trust Council, EC | Feb-25-2009 | On Going |
| 3 | Implementation of provincial Riparian Area Regulations | 1) Review DPA mapping and provisions 2) Recommend amendments to bring DPA into compliance with RAR | Feb-25-2009 | On Going |
| 4 | Sensitive Ecosystem Mapping and DPA review | 1. Complete Sensitive Ecosystem Mapping 2. Consider options for implementing sensitive ecosystem protection, including DPA | Feb-25-2009 | On Going |
| 5 | Build-out potential review | Undertake analysis of current build-out potential, review Community Amenity Density Reserve | Feb-25-2009 | On Going |
| 6 | Protection of Archaeological Resources | | Feb-25-2009 | On Going |
| 7 | Geological Hazard Mapping | | Feb-25-2009 | On Going |
| 8 | Raptor Nest Mapping | | Feb-25-2009 | On Going |
| 9 | Affordable Housing | To consider options for amending bylaws to support and encourage the creation of affordable housing | Sep-02-2009 | On Going |

Excerpt from the Islands Trust 2008-2011 Strategic Plan

This excerpt contains only those strategic plan items specific to local trust committees.

Goal 1: Ecosystem Preservation and Protection...

| OBJECTIVE | STRATEGIES | ACTIVITIES AND PHASES | WHO WOULD WORK ON IT? | IS FUNDING REQUIRED OR IN PLACE? | HOW WOULD WE MEASURE SUCCESS? | STATUS <i>Italics indicate changes since last TC meeting</i> |
|---|---|--|-----------------------|--|--|---|
| To identify and protect riparian areas | Implement Riparian Area Regulations throughout the Trust Area | Develop bylaws re RAR requirements, subject to RAR mapping completion | LTCs/BIM* | Funding in place (09/10 budget) | By whether all islands are RAR compliant | Two islands are RAR compliant |
| To improve the identification and protection of biodiversity, environmentally sensitive areas and significant natural sites, features and landforms | Protect sensitive and significant land through land use planning decisions | 2008-2011 term Optimize opportunities to protect land | LTCs/BIM* | No new funding required | By the hectares of land that have been protected | TBD |
| To reduce greenhouse gas emissions | Amend OCPs to include emission reduction targets, policies and actions (TPAs) | Jan to May 2010 Establish targets, policies, and actions in OCPs by legislated deadline (May 31/09) | LTCs/BIM* | Funding in place (09/10 budget) Additional funding may be available through application | By whether all OCPs have been amended to include GHG emission reduction targets, policies and actions by May 31/10 | Policies and action included in two OCPs (SSI, DE) |
| | Foster energy-efficient communities through land use planning decisions | FY 2010/11 Consider the inclusion of the information provided by the LPC into appropriate bylaws and processes | LTCs/BIM* | Subject to funding (10/11 budget) | By whether GHG emission reduction is achieved in LTC land use decisions | TBD |

11.1.2

* Depends upon decisions of the Bowen Island Municipal Council

** Depends upon decisions of the Trust Fund Board

Goal 2: Stewardship of Island Resources...

| OBJECTIVE | STRATEGIES | ACTIVITIES AND PHASES | WHO WOULD WORK ON IT? | IS FUNDING REQUIRED OR IN PLACE? | HOW WOULD WE MEASURE SUCCESS? | STATUS |
|--|---|--|-----------------------|--|---|---|
| To increase the sustainability and quality of freshwater resources | Include new policies and regulations as OCPs and LUBs are amended | FY 2009/10 OCP/LUB reviews underway on selected islands FY 2010/11 & 2011/12 OCP/LUB reviews underway on selected islands | LTCs LTCs | Funding in place (09/10 budget) Subject to funding (10/11 budget) | By the number of LTCs/IM with new policies and regulations for protection of freshwater resources | Reviews beginning in 09/10 Reviews planned to begin in 10/11 |
| To advance the stewardship of coastal areas and marine shore lands | Develop and implement new land use planning tools for shoreline and marine protection | FY 2009/10 Thetis Island LTC – consider the use of integrated shoreline & watershed protection into OCP review process | LTC | Funding in place (09/10 budget) | By whether OCP has been amended to include new forms of protection | OCP review underway |

Goal 3: Sustain Island Character and Healthy Communities...

| OBJECTIVE | STRATEGIES | ACTIVITIES AND PHASES | WHO WOULD WORK ON IT? | IS FUNDING REQUIRED OR IN PLACE? | HOW WOULD WE MEASURE SUCCESS? | STATUS |
|---|---|--|-----------------------|--|--|----------------------------|
| To support socio-economic diversity of island communities | Support/restore socio-economic diversity through land use planning strategies about affordable/accessibile/appropriate housing Support local food security | FY 2010/11 Consider implementing land use planning decisions to advance affordable housing Support completion of a second area farm plan (Denman) | LTCs LTC | Subject to funding (10/11 budget) No new funding required | By the number of LTCs have implemented land use planning decisions regarding affordable housing. By whether a second area farm plan is complete | Not started Started |
| To minimize the impact of climate change | Integrate climate change adaptation into land use | FY 2012/2013 Continue implementation of adaptation planning framework | LTCs/BIM* | Subject to funding | TBD | Not started |

* Depends upon decisions of the Bowen Island Municipal Council

** Depends upon decisions of the Trust Fund Board

| OBJECTIVE | STRATEGIES | ACTIVITIES AND PHASES | WHO WOULD WORK ON IT? | IS FUNDING REQUIRED OR IN PLACE? | HOW WOULD WE MEASURE SUCCESS? | STATUS |
|--|---|---|-----------------------|----------------------------------|-------------------------------|-------------|
| upon islands and communities | planning and regulatory decisions | | | | | |
| To cultivate community engagement and participation in land use planning | Develop new tools and strategies to encourage community engagement in land use planning processes | FY 2010/2011 Consider new tools and strategies to encourage community engagement in land use planning processes | LTCs | TBD | TBD | Not started |

Goal 4: Organizational Effectiveness...

| OBJECTIVE | STRATEGIES | ACTIVITIES AND PHASES | WHO WOULD WORK ON IT?* | IS FUNDING REQUIRED OR IN PLACE? | HOW WOULD WE MEASURE SUCCESS? | STATUS |
|--|---|---|------------------------|--|--|--|
| To provide services on an increasingly effective basis | Develop cost effective bylaw enforcement tools Develop model LTC meeting procedure bylaw regarding bylaw electronic meetings | FY 2009/10 & 2010/2011 Consider bylaw amendments to allow Bylaw Dispute Adjudication System FY 2009/2010 LTCs to consider adoption | LTCs LTCs | No new funding required No new funding required | By the number of islands where a Bylaw Dispute Adjudication System is in place By the number of LTCs that have adopted amendments | Initial discussions started Not started |

Abbreviations:

ADMIN – Administrative Services
 BIM – Bowen Island Municipality
 DEM – Digital Ecosystem Mapping
 EC – Executive Committee
 FN – First Nations
 FY – Fiscal Year
 GHG – Green House Gases
 IM – Island Municipality
 IT – Islands Trust
 LPC – Local Planning Committee
 LPS – Local Planning Services

LTA – Local Trust Area
 LTC – Local Trust Committee
 LUB – Land Use Bylaw
 MCRD – Ministry of Community & Rural Development
 MGMT – Management Team
 NA – Not Applicable
 NAPTEP – Natural Area Protection Tax Exemption Program
 OCP – Official Community Plan
 PMFL – Private Managed Forest Land
 RAR – Riparian Area Regulations
 RCP – Regional Conservation Plan
 RD – Regional District

RFD – Request for Decision document
 RM – Records Management
 SEM – Sensitive Ecosystem Mapping
 SSI – Salt Spring Island
 TAS – Trust Area Services
 TBD – To Be Determined
 TC – Trust Council
 TFB – Trust Fund Board
 TPA – Targets, Policies and Actions (re GHG emission reduction)
 TPC – Trust Programs Committee
 UBC – University of British Columbia
 UBCM – Union of BC Municipalities

For more information, contact

Sheila Malcolmson, Chair,

Linda Adams, Chief Administrative Officer, Visit our website at

Islands Trust Council upon decisions of the Bowen Island Municipal Council

email: support@islandstrust.bc.ca or the Toll Free www.islandstrust.bc.ca

telephone: 250.247.8078

3 www.islandstrust.bc.ca



Applications w/ Status - Saturna Island Status: Open

Print Date: Apr-20-2010

Applications

Development Variance Permit

| File Number | Applicant Name | Date Received | Purpose |
|---------------|--|---------------|--|
| SA-DVP-2009.4 | Tracy/John Logan/Hogg Planner: Kaitlin Kazmierowski | Sep-22-2009 | variance required for garage, deck and additions |

Planning Status

Status Date: Jan-25-2010

On November 9, 2009, applicant stated that an archaeologist was coming to do a site visit that month and that the islands Trust would be informed of findings. No word from applicant since.

Status Date: Oct-08-2009

Archaeological site identified (RAAD) on property. Applicant has been notified and has spoken to the planner.

Status Date: Sep-22-2009

Application received; Trustees copied

Subdivision

| File Number | Applicant Name | Date Received | Purpose |
|---------------|--|---------------|---|
| SA-SUB-2010.1 | Nancy Angermeyer Planner: Gary Richardson | Jan-28-2010 | 204 NARVAEZ BAY RD To create 2 new lots |

Planning Status

Status Date: Apr-20-2010

Staff reviewing application.

Status Date: Mar-22-2010

Received Title from applicant; sent copy of app. to trustees and forwarded file to planner.

Status Date: Mar-10-2010

Phoned applicant requesting title search - applicant is sending it.

Kathy Jones

From: Nancy Roggers
Sent: March-25-10 8:59 AM
To: David Marlor; Gary Richardson; Kathy Jones; Sharon Lloyd-deRosario
Cc: Craig Elder
Subject: Saturna expense report - Mar/10
Attachments: saturna ltc expense.pdf; saturna ocp expense.pdf

| | | Budget | Spent | Balance |
|---------------------------------|--------------------------------|-----------------|-----------------|----------------|
| Posted to March 22, 2010 | | | | |
| 660 Saturna | 65000 Trustee Expense | 1,100.00 | 368.45 | 731.55 |
| 660 Saturna | 65200 LTC Meetings | 3,000.00 | 1,616.33 | 1,383.67 |
| | 65210 APC Meetings | - | 85.93 | (85.93) |
| | 65220 Communications | - | | - |
| | 65230 Special Projects | - | 150.00 | (150.00) |
| | 65240 Miscellaneous | - | 164.60 | (164.60) |
| | TOTAL LTC Local Expense | 3,000.00 | 2,016.86 | 983.14 |
| 660 Saturna | 72300 OCP/LUB Expense | 2,000.00 | 174.37 | 1,825.63 |

Thanks!

Nancy Roggers
 Finance Officer

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 Victoria, B.C. V8R 1H8
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 Fax: (250) 405-5155
www.islandstrust.bc.ca

Preserving *island* communities, culture and environment

Please consider the environment before printing this email.

Saturna Island Local Trust Committee

POLICIES AND STANDING RESOLUTIONS

| No | Meeting Date | Resolution No. | Issue | Policy |
|----|--------------|----------------|--|--|
| | May 16/07 | SA-LTC-16-07 | Travel Trailer or Camper | <p>It was Moved and Seconded that staff be directed to not take enforcement action against property owners when a travel trailer or camper is located on a lot when:</p> <ul style="list-style-type: none"> The travel trailer or camper is being used for recreational purposes by the owners of the lot and; The travel trailer or camper is being used intermittently and for short periods not exceeding two months. <p>Not withstanding this direction, staff is to take action to prevent the recreational use of travel trailers or campers on inappropriately zoned land if:</p> <ul style="list-style-type: none"> The travel trailer or camper is being used as a second residence or; The trailer or camper is situated within the setbacks for a structure or; There are serious safety issues, unsightliness, noise, or health problems related to the use or; A complaint based on the above three items is received from a person who owns neighboring property. <p>Nothing in this direction should be interpreted by a property owner as giving permission to violate the Land Use Bylaw and the Saturna Island Trust Committee may change this policy at any time and may give direction to enforce the Bylaw at any time.</p> |
| 1. | August 20/08 | SA-LTC-43-08 | Bylaw Enforcement: Short Term Vacation Rentals | <p>It was Moved and Seconded THAT given finite resources available for enforcement activities and in order to ensure the most effective results for enforcement activities, STVRs not permitted by Section 2.16.10 of the Saturna Island Land Use Bylaw No. 78 that have one or more of the following characteristics will be subject to enforcement:</p> <ol style="list-style-type: none"> 1. They are advertised on the internet, newspapers or other media; 2. They are not managed by the property owner; <p>More than one STVR per constructed residence on the lot is simultaneously made available for STVR;</p> |

| | | | | |
|----|----------------|--------------|--------------------------|---|
| | | | | <p>4. While the property is rented persons are also staying in tents, trailers, or RV's;</p> <p>5. There are issues related to health and safety;</p> <p>6. There is a written complaint by owners or residents about bona fide nuisance issues such as noise or parking congestion related to the STVR;</p> <p>7. The owner of the property uses more than one property on Saturna Island as an unpermitted STVR.</p> <p>And THAT nothing in this enforcement policy should be interpreted as giving permission to violate the Land Use Bylaw and the Saturna Island Local Trust Committee may change this policy at any time and may give direction to expand enforcement activities at any time.</p> |
| 2. | February 25/09 | SA-LTC-09-09 | Adopt LTC Minutes by RWM | <p>It was Moved and Seconded that the Saturna Island Local Trust Committee draft minutes be adopted by Resolution without meeting within 14 days of the meeting and posted to the website.</p> |

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Islands Trust

Preserving **island** communities, culture and environment.

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Population:

Approximately 359

Size:

3422 hectares (8,455 acres)

Location:

27 kilometres south-east of the Swartz Bay ferry terminal on Vancouver Island.

[Land Use Planning](#)

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[Related Resources](#)

[Trust Area Mapping](#)

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Saturna Island Local Trust Committee

Latest News

In this section you will find current news items that are relevant to your Local Trust Area and your community. [Subscribe](#) to the Saturna Island Latest News updates and receive the latest information on official community plan reviews, staff reports, notifications and other documents published in the latest news section.

April 2010

- [Saturna Island Public Hearing Notice - April 28, 2010](#)

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Projects, Bylaw Reviews and Reports

In this section you will find current Local Trust Committee projects specifically related to the island area.

General

- [Policies and Standing Resolutions Chart](#)
- [Southern Gulf Islands Accommodation Inventory & Accommodation Policy Assessment Report - 2005](#)

Climate Change Action

- [Staff Report - October 2009](#)
- [Staff Report - November 2009](#)
- [Community Engagement Tools](#)
- [Table of Potential Official Community Plan Amendments](#)
- [Climate Wise Islands](#)
- [Newsletter - December 2009](#)
- [Proposed Bylaw No. 101](#)

Ecosystem Mapping

- [Draft Saturna Island Local Trust Area ecosystem maps and feedback form](#)

East Point Water

- [Groundwater Conservation \(East Point\) Staff Report - October 20, 2009](#)
- [Ministry of Environment Report - January 2010](#)
- [Proposed Bylaw No. 99](#)

Affordable Housing

- [APC Terms of Reference](#)
- [Affordable Housing Background Report - August 21, 2009](#)
- [Subdivision Potential Map](#) (Please note that this map is a representation of potential subdivision under the current zoning. It does not account for limitations on future subdivision, including covenants, access, availability of water and other services, topography, etc)

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Committee Links

- [Committee Home](#)
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