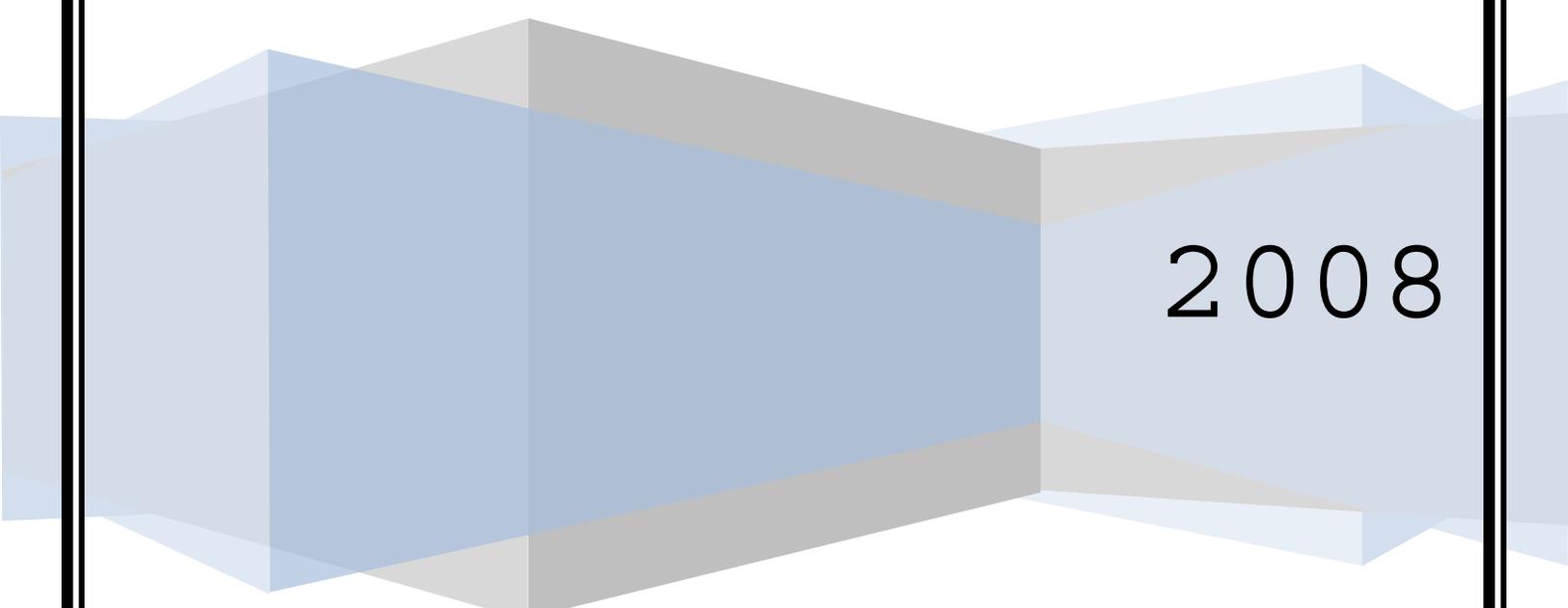


# HEALTHY ECOSYSTEMS HEALTHY COMMUNITY INITIATIVE (HEHCI)

**Phase 1: Perspective, Problems, Parameters and Prospects  
for Assessing the Health of Salt Spring Island's Eco-cultural  
Systems.**

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## Preface

In 1974, the Islands Trust Act of the Province of British Columbia brought the Gulf Islands under a “Preserve and Protect” mandate. The Act recognized the uniqueness of the Islands’ natural and cultural heritage, and that, in the absence of special protection, that heritage was at risk of being compromised by growing population and development pressures.

However, for this mandate to be carried out effectively, some key tools are needed. The Gulf Islands have certainly undergone a great deal of ecological, economic and social change before and after the establishment of the Act. Under these circumstances, how do we know for sure whether the natural and cultural heritage that has attracted so many of us to call the islands “home” is being sufficiently “preserved and protected”, so that it will remain vital and vibrant for generations to come? Is all well on the islands, or have things deteriorated in ways that should be of concern to us all? The answers to these questions are not only a matter of opinion. They are a matter of scientific assessment. A systematic, comprehensive assessment of the state of the Islands in relation to human activities and human well-being is essential for this purpose. Without science-based knowledge we cannot be sure whether or not the Islands’ unique natural and cultural heritage is in good health.

Local Trust Committees (LTCs) were established under the Act to carry out the “Preserve and Protect” mandate. As a Trust Island, Salt Spring Island has its own Local Trust Committee (LTC). Salt Spring Island also falls under the authority of the Capital Regional District (CRD), for matters relating to sewage treatment, water conservation, water quality, watershed protection, and health. The LTC and the CRD have undertaken a large number of studies relevant to assessing environmental conditions, as have various citizens’ groups – e.g., the recently completed management plan for the Cusheon Watershed (2007) and a similar plan currently in preparation for the management of the St. Mary Watershed. The CRD recently produced a State of Environment Indicators Report (2006), which is a valuable start towards periodic assessments of key aspects of the regional environment. However, despite these and many other efforts at local, regional, Provincial, and Federal levels, there remain glaring gaps in our understanding of the state of our environment. For example, in its 2006 indicators report, the CRD pointed to the lack of information on the health of most CRD watersheds. There is an even greater lack of systematic information on socio-economic, cultural, and health issues and their relations to the state of the environment and human well-being.

The goal of the HEHCI is to fill these gaps. It will provide a science-based integrative and ongoing assessment of the eco-cultural health of our island, that is, it will identify and monitor key indicators of the ecological, cultural, socio-economic, and human health dimensions of the state of our island. This report covers the initial phase of the HEHCI, which was devoted to identifying the issues, indicators, data sources and data gaps relevant to the assessment of all dimensions of eco-cultural health for Salt Spring

Island's main watersheds (Cusheon, St. Mary and Maxwell). In Phase 2 of the HEHCI, we will provide a "rapid assessment" of the various dimensions of health of these watersheds based on available data; in Phase 3 we will extend the scope of the work beyond watersheds to encompass all of Salt Spring Island's ecosystems (including marine) within an eco-cultural health perspective. The HEHCI, through its educational outreach and community participation will be living data bank providing updated periodic assessments of eco-cultural health of Salt Spring Island.

## Introduction

Islands, by their very nature, are especially unique and fragile and vulnerable to over-harvesting of resources, invasive species, and other sources of ecological imbalance. Islands also tend to be culturally unique and likewise vulnerable to cultural disruption. This is especially the case for relatively small islands that have become tourist destinations. Indeed, many former "island paradises" have succumbed to heavy cultural and ecological degradation, reversing the trend of their desirability for visitors and residents alike<sup>1</sup>.

Our Southern Gulf Islands, while under the Islands Trust's "Preserve and Protect" mandate, have nonetheless been subject to significant development and population pressures owing to their attractiveness and proximity to major urban centers. In particular, the population of Salt Spring Island has greatly increased since the 1950s (some statistics suggest a doubling of population in every decade from the 1950s to 2000), owing to its easy access from two main population centers (Vancouver and Victoria) and its desirability as a vacation and second-home destination<sup>2</sup>. Such significant population growth and rapid development have not gone without

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<sup>1</sup> J.B. Tourtellot. 2007. 111 Islands. National Geographic Traveler . November/December 2007, pp. 108-127. This survey, conducted with a panel of 522 experts in sustainable tourism and destination stewardship, reviewed conditions as of 2007 on 111 well-known destination islands. The panel ranked the 111 islands by numerical scores. Those islands at the top end of the scale were considered "in excellent shape, relatively unspoiled, and likely to remain so". The number 1 group of islands (score 87 out of 100) were the Faroe Islands – a remote autonomous archipelago northwest of Denmark in the North Sea. Other islands in this list of the top 14 (ranks 1-8, owing to more than one island earning the same rank) included the Azores (Portugal), Lofoten (Norway), the Shetlands (Scotland). Salt Spring Island (with a score of 69, rank 16<sup>th</sup>) was included in the bottom half of the second group – "Islands retaining sense of place, with a few surmountable problems". Islands with a score of 65 or less comprised the third group: "a mixed bag of successes and worries, with the future at risk". The final group, Islands with scores under 50 – were those islands that are considered to be in trouble: namely those "under severe pressure, excessive tourism". This group included Hatteras Island (Outer Banks, North Carolina), Key West (Florida), Oahu (Hawaii), among many others.

<sup>2</sup> The panelists in the survey of destination islands mentioned in footnote 1 (Tourtellot 2007) had the following to say about Salt Spring Island (comments taken verbatim from the article): Rural, tree-clad gulf island with "fine arts, music, creative organic cuisine"; well protected, but "the population is growing too fast", putting funky character at risk; "Increasing wealthy-retired second homes. Skyrocketing housing prices."

consequences for the ecological and cultural health of our island. Indeed, many residents feel that there already are signs of failing health in several of our main watersheds, such as St. Mary and Cusheon, as well as signs of fraying in the island's social fabric.

A periodic "eco-cultural health check-up" for our island—that is, a science-based assessment of all dimensions of health in these and other watersheds and ultimately throughout Salt Spring Island—will enable us to determine the health state of our eco-cultural systems, to identify and quantify the pressures on these systems, and to provide a solid basis for policy and decision making. The HEHCI will provide a system for such periodic and comprehensive "health check-ups" of our island. It will build on previous studies of our island's social and ecological condition, pinpoint critical concerns, identify and fill data gaps, and establish practical indicators for periodic monitoring of eco-cultural health. The HEHCI will seek to identify the main sources of stress on Salt Spring Island's eco-cultural systems, the degree to which these stresses have collectively impacted the health of our island's ecosystems and its social fabric, and the relationships between the changing health of our ecosystems and risks to our health, livelihoods, and social and cultural well-being. What is at issue here is not a matter of "development" or "no development". Rather, it is a question of how human occupation of the island can be harmonized with this unique and fragile eco-cultural environment, in order to safeguard the health of our island's ecosystems and the well-being of our community.

The HEHCI is a community-based initiative, informed by consultations with a variety of interest groups aiming to identify issues and concerns. In Phase 1, the focus is on identification of issues, indicators, data sources and data gaps for three of Salt Spring Island's watersheds: St. Mary, Cusheon, and Maxwell. Watersheds were chosen as a focal point for this phase of the HEHCI as a matter of convenience (that is, a manageable unit on which many studies have already been done). Not unexpectedly, this choice brought to the fore a great many of the environmental issues, particularly those relating to water quality and public health. The social, cultural, and livelihood dimension, as they are mostly island-wide, tend to be less prominent in a watershed context, although they were frequently brought up in the context of the island as a whole.

In Phase 2, there will be a rapid eco-cultural health assessment of these watersheds based on existing data. This phase will put the spotlight on the interrelationships between our changing socio-economic and cultural environment and the overall health of our island's ecosystems and community. In Phase 3, the focus will expand to coverage of the entire island, with the goals of filling data gaps and establishing a comprehensive and systematic monitoring of the eco-cultural health of our island. More specifically:

### **Phase 1:**

- Elaborated an eco-cultural health perspective, drawing upon a previous paper that set forth the relevance of ecosystem health for Salt Spring Island<sup>3</sup> (**the Perspective**).
- Pinpointed issues and concerns in each of the island's three main watersheds (Cusheon, St. Mary, and Maxwell) (**the Problems**).
- Identified the main indicators of the eco-cultural health of these watersheds (**the Parameters**).
- Identified many of the available sources of information for the purpose of carrying out a rapid eco-cultural health assessment in the watersheds, as well as some of the data gaps in need of being filled (**the Prospects**).

### **Phase 2 will:**

- Carry out a "rapid assessment" of the eco-cultural health of the three watersheds (St. Mary, Cusheon, Maxwell) on the basis of existing information.
- Identify some of the features of the complex interactions between changes in the health of our ecosystems, development pressures, and the physical and social health and well-being of our community.
- Provide, through the HEHCI website a means by which a SSI resident can access the information, provide comment and input to the study.

### **Phase 3 will:**

- Build upon the experience of Phases 1 and 2 to extend the scope of the initiative to all of Salt Spring Island.
- Initiate science-based research and monitoring programs to fill in the historic data gaps and establish ongoing and systematic data gathering to document the main indicators of the eco-cultural health of our island.
- Provide a capability for regular "health check-ups" on our island's eco-cultural systems in relation to human health and well-being.
- Provide educational modules suitable for schools and volunteer groups on the eco-cultural health concept and its applications to monitoring and diagnosing the health of Salt Spring Island.
- Provide a model for other communities to evaluate trends and conditions in their eco-cultural health.
- Provide a high-quality web-based HEHCI site which will contain the 'living data base' with ease of access to SSI residents and other interested communities, with links to related processes, ongoing elsewhere within the Gulf Islands.

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<sup>3</sup> Rapport, DJ and Maffi, L. 2007. An Ecosystem Health Perspective relevant to Salt Spring Island OCP's review. February 2007. Posted on the Islands Trust website: [www.islandstrust.bc.ca](http://www.islandstrust.bc.ca)

Thus, the HEHCI is ultimately designed to raise awareness of the interconnectedness between our individual and collective activities, the sustainability of our island's economy, risks to public health, the changing character of our rural landscape, and the health of our ecosystems. It aims at establishing an ongoing community involvement in an integrative science-based assessment of the health of our island in all of its dimensions. The HEHCI is based on the premise that healthy ecosystems and healthy communities are in everyone's interest, whether one is an organic farmer, a retiree, a developer, a real-estate agent, or a merchant. If we cannot maintain the health of our ecosystems and our communities, it can only be to the detriment of our future prosperity and well-being. Indeed, many communities have proclaimed the goal of achieving harmony between the social, economic and ecological aspects of our life, and this is also the stated objective of our provincial government. But to be successful, one must go beyond statements of intent; one must have a solid basis for assessment. The HEHCI will provide our community with periodic and updated science-based indicators of our progress towards achieving healthy ecosystems and a healthy community.

Such information provides a tool to help resolve potential conflicts, whenever a project may be proposed that enhances one or other dimension of healthy eco-cultural systems, while potentially compromising others. For example, an increase in island self-sufficiency in food production (which by itself is an unmitigated good) may, if not achieved with careful attention to impacts, contribute to further degradation of watersheds, through nutrient loading and wildlife habitat loss. However, through increased sensitivity and awareness of such interactions, one can seek ways and means of orienting development toward minimizing risks to the health of our ecosystems and the social, economic, physical and cultural well-being of our community.

Finally, a word about process: The intent of the HEHCI is to foster a comprehensive public involvement process throughout. The call for an HEHCI came from a public meeting (see below), and the process of developing Phase 1 involved extensive discussions with an Advisory Group and with the public in each of the three watersheds. As the Initiative moves on to Phases 2 and 3, the full involvement of the public in indicator development, education, and monitoring will be essential to the success of this initiative. Thus, in reality, the information generated from the HEHCI will not only serve as a "data bank" but more importantly, as a "living process".

## **Background and History of the Establishment of the HEHCI**

The call for this island-wide, community participatory initiative arose from a public meeting in August of 2007 at Lions Hall on the topic of "Healthy Ecosystems, Healthy Communities". The meeting was organized by Drs. David Rapport and Luisa Maffi and

sponsored by the LTC and CRD with support from the Salt Spring Island Conservancy<sup>4</sup>, the Water Preservation Society and The Earth Festival Society. A panel, consisting of Drs. Rapport and Maffi with two distinguished guests, Dr. Carol Herbert, Dean of Medicine at the University of Western Ontario,<sup>5</sup> and Dr. Glenn Albrecht, Professor of Environmental Philosophy at the University of Newcastle, Australia, introduced the topic from a variety of vantage points. A lively interplay between the panel and a large audience of community members served to focus the topic on issues and concerns of Salt Spring Islanders about their environment and health. This meeting was the culmination of over a year of informal discussions between Drs. Rapport and Maffi and health professionals on Salt Spring Island, including two seminars Rapport and Maffi presented at Lady Minto Hospital.

Following this event, a proposal for establishing the Healthy Ecosystems Healthy Community Initiative was submitted to both the LTC and the CRD. Together, the CRD and LTC provided 60% of the \$10,000 total cost of Phase 1 with the remaining support obtained from the Island Opportunity Fund and other contributors (both individuals and businesses).<sup>6</sup> An Advisory Group (AG) was established, comprising 20 members of the Salt Spring Island community who represent a broad spectrum of interests and expertise.<sup>7</sup>

The AG met in May 2008, providing input and perspective on a variety of social and environmental issues and concerns. Following the initial meeting of the AG, there were three public consultations, one for each of the watersheds (Cusheon, St. Mary, and Maxwell), which were the main focus of Phase 1 of the HEHCI.<sup>8</sup> The watershed-specific consultations provided an opportunity to further explain the goals of the HEHCI and to identify some of the issues of concern to residents living in these watersheds. During July 2008, the HEHCI team expanded to include collaborators and volunteers<sup>9</sup>. A website has been established for the HEHCI ([www.hehci.com](http://www.hehci.com))<sup>10</sup>.

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<sup>4</sup>This event, as reported by Salt Spring Island Conservancy's President Bob Weeden in the *Acorn* (President's Page article "Small Steps to Health", Number 36, Fall 2007), was deemed to be "a standout in the Conservancy's summer".

<sup>5</sup> Dr. Rapport (a coordinator of the HEHCI) was the main architect and co-founder of the program in Ecosystem Health within the Medical Faculty of the University of Western Ontario, established in 1997 and ongoing. He served as honorary professor within the Faculty from 1998 to 2004.

<sup>6</sup> Appendix 1 provides a list of Sponsors, Donors and Contributors to the HEHCI, as of August 29, 2008.

<sup>7</sup> The Advisory Group Members and their areas of interest/expertise are listed in Appendix 2.

<sup>8</sup> These public watershed meetings were advertised by means of posters and articles in the *Driftwood*. A listing of the watershed meetings is provided in Appendix 3.

<sup>9</sup> Volunteers included Clare Cullen, Lisa Roberts, Kelsey Mech, Chantal Rapport. Nikita Pardiwala serves as a paid assistant to the HEHCI. GISS students along with Chantal Rapport developed HEHCI promotional materials and had a display and fundraiser at one of the Saturday markets in July.

<sup>10</sup> The website was developed by Chantal Rapport.

## Establishing a Baseline

In order to assess the changes in the health of our eco-cultural systems, it is essential to choose a suitable baseline date. To be sure, the choice of a baseline date is always somewhat arbitrary. For instance, from the point of view of assessing the state of the island's ecological functions, we might want to look to a period before significant human pressures on the island's ecosystems. For this purpose, a period prior to European settlement (mid 19<sup>th</sup> century), that is, prior to agricultural and forestry development on the island, would perhaps be ideal. From the point of view of population, one might wish to consider the mid 20<sup>th</sup> century as a baseline, as this is the period prior to significant increase in the population on Salt Spring Island. From the point of view of the "Preserve and Protect" mandate, one could look to the mid 1970s, when the Island Trust Act came into force. And from the point of view of data availability, one might take the present period as the baseline from which future change could be assessed. Likewise, from cultural perspectives, things have changed considerably over time—from First Nations days to pioneer days to the present, as the island transformed from a pattern of seasonal transient settlement to light settlement to one of largely agricultural and forestry activity, to its present "mixed bag" of rural character with limited agricultural activity, concentration of artistic and artisanal creativity, growing tourism industry, and growth aimed significantly at vacationers, "second-homers", and well-off retirees.

Pragmatic considerations will guide the choice of baseline dates, with a preference for considering the period from the mid 20<sup>th</sup> century up to the period just prior to the establishment of the Trust as the ideal baseline period. Where possible we will also make reference to historical descriptions of the landscape prior to and during the earlier period of European settlement. Where there are data gaps, it may be unavoidable to make use of current (new) monitoring data as baseline from which to measure change going forward, although this is would in no way mean ignoring changes that may have taken place during the recent past.

## The Perspective

In developing the HEHCI, we adopt and merge two innovative perspectives for assessing the state of the environment:

The first is the statistical perspective pioneered by Statistics Canada, which today provides the basis for most national and international reporting and analysis of environmental conditions.<sup>11</sup> This framework, the Stress Response Environmental

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<sup>11</sup> Bird, PM and Rapport, DJ 1986. State of the Environment Report for Canada. Ottawa. 264 pp.

Statistical System (SRESS),<sup>12</sup> was described in a recent report prepared for Salt Spring Island's LTC.<sup>13</sup> Today this system, known universally as DPSIR (Drivers, Pressures, State [of Environment], Impacts, Responses), provides a comprehensive approach to statistical documentation of interactions between human activities and the environment. DPSIR is a holistic approach to the environment. It examines "environment" in terms of ecosystems, landscapes, or watersheds, and within these geographical units it takes into account interactions of plants and animals, including humans, with one another and with their abiotic (non-biological) surrounds. Thus, this approach contrasts with more conventional frameworks that compartmentalize "environment" into "air", "water" and "land" components, with a focus mainly on pollution and contaminant issues.<sup>14</sup>

The second approach is an eco-cultural health perspective on state of environment reporting.<sup>15</sup> The eco-cultural health perspective focuses on the capacity of social and ecological systems to maintain a dynamic balance that sustains both nature and culture. To assess the health of eco-cultural systems, one needs key indicators that are relevant to the three primary characteristics of healthy eco-cultural systems, namely: organization (structure), vitality (function), and resilience (capacity to rebound from disturbance). The great naturalist Aldo Leopold (an early pioneer in the use of the health metaphor for ecosystem analysis) first posed the question: "How can humans continue to occupy the earth without rendering it dysfunctional?" The growing field of eco-cultural health<sup>16</sup> is tackling this issue head-on, engaging an ever-expanding group of scientists from around the world with expertise in many relevant fields (e.g. public health, medicine, ecology, cultural anthropology, watershed management, sustainable livelihoods, governance – to name just a few). Within this context, human social and cultural well-being, individual and public health, and livelihoods depend critically on maintaining the health of our ecosystems. While in practice there are a large number of monitoring programs that employ the concept of ecosystem health and have developed associated indicators, and increasingly a number of programs that broaden the concept to include the socio-economic, human health, and governance dimensions<sup>17</sup>, there

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<sup>12</sup> Rapport DJ and Friend, AM 1979. Towards a comprehensive framework for Environmental Statistics: A Stress-Response Approach. Statistics Canada 11-510. Ottawa. 87pp.

<sup>13</sup> Rapport, DJ and Maffi, L. 2007. An Ecosystem Health Perspective relevant to Salt Spring Island OCP's review .February 2007. Posted on the Islands Trust Website: [www.islandstrust.bc.ca](http://www.islandstrust.bc.ca)

<sup>14</sup> This is not to deny the importance of these issues, nor the suitability of the "air, water, land" approach for specific purposes. However, the ecosystem based DPSIR approach by its integrative geography is the more suitable approach in situations in which a broad sweep of considerations are present, as for example, in evaluating the changing ecological and cultural aspects of our island.

<sup>15</sup> Rapport, DJ and Singh, A. 2006. An EcoHealth Approach to State of Environment Reporting. *Ecological Indicators* 6, 409-428; D.J. Rapport 2008. Resurgence Magazine. On line publication September 1 2008

<sup>16</sup>Rapport, DJ. et al (eds.) 2003. Managing for Healthy Ecosystems. Lewis Press. 1510 pp; Rapport, DJ. 2004. Ecosystem health and ecological integrity: Foundations for sustainable futures. In .Mitchell, B. (ed.) Resource and Environmental Management in Canada: Addressing Conflict and Uncertainty. Third Edition. Oxford University Press. pp24-53.

<sup>17</sup> For example, the World Bank Report on the Health of the Mesoamerican Coral Reef (2005) in which HEHCI coordinators contributed the framework for the assessment.

remain challenges in defining what is meant by social and economic vitality. Here too, as for human health, one more easily recognizes pathology than the condition of health.

What these conceptual developments imply for a practical approach to the HEHCI is the following:

1. We examine Salt Spring Island's watersheds (and eventually the entire island), not only as ecological entities, but also from the perspective of socio-economic, cultural (rural character, diversity), and human health aspects.
2. We seek indicators that relate to the sustainability of the island's eco-cultural systems, in all of the above aspects, along the dimensions of organization, vitality, and resilience. Even for well-studied ecosystems this is a tall order – because much of the data, while available in principle, have not been gathered for this purpose. However, in the absence of a) indicators of pressures on our eco-cultural systems; b) indicators of resulting stresses; c) indicators of the state of health of our eco-cultural systems; and d) indicators of our well-being (from the point of view of public health, sustainability of livelihoods<sup>18</sup>, rural character, etc.), we lack the essential information upon which to base future decisions with respect to the development of Salt Spring Island.

## The Problems

Based on the community consultations with residents of three of our island's watersheds (St. Mary, Cusheon, Maxwell) and input from the HEHCI Advisory Group<sup>19</sup>, the following is a listing of expressed concerns about the ecological, socio-economic, cultural and public health of Salt Spring Island and its relation to our well-being. An important caveat: it should be noted that we are reporting neutrally on these concerns, such as they were put forth by participants in the consultations, and the opinions on various topics are not necessarily consistent. Until the further studies planned for Phase 2 of the HEHCI are carried out, it will not be possible to have a solid assessment of the actual significance of these and other factors in the eco-cultural health of the watersheds.

1. **Water Quality** (smell, appearance, health risks): Concerns were expressed, particularly in the case of the St. Mary and Cusheon watersheds. In both of these watersheds there have been episodes of abundant algal blooms, a pungent reminder that all is not well within these lake bodies. Indeed, there are reports (e.g., in the Cusheon Watershed Management Plan) of toxic algal

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<sup>18</sup> Although for some Salt Spring Island residents, sustainability of livelihoods is dependent on conditions off-island (e.g. Toronto TSX, Wall St. , etc.).

<sup>19</sup> See Appendix 3.

blooms that pose definite health risks. Residents believe that this is the consequence of human activities within the watersheds, in particular runoff from septic fields and farms, as well as soil erosion from tree cutting, road building, and other land disturbances<sup>20</sup>. A large number of people are drinking bottled water and/or use filters.

2. **Air Quality:** There were multiple concerns about air quality. First, there is a general awareness, particularly in the Maxwell watershed, that not infrequently residents are downwind of the Crofton Mill and thus breathe polluted air. This concern is also relevant to the St. Mary watershed and other areas of the north-western part of our island. Second, the traffic, particularly in town, is believed to generate considerable local pollution, adversely impacting air quality. Further, some participants feel that BC Ferries is a major source of air pollution. Pleasure boats and float plane traffic in Ganges Harbor also are thought to contribute to air pollution (as well as noise pollution, see below). Finally, the custom of burning leaves and other debris in the fall is seen as contributing significantly to poor air quality, as well as the use of wood-burning stoves during the winter.
3. **Current Development Practices in the Watersheds:** Questions were asked as to whether “best practices” are being implemented during construction, e.g., to prevent soil erosion and water runoff. Problems with failure of septic systems were also mentioned. One consultation participant wondered what kinds of revegetation approaches might lead to restoration of ecosystem health in the watersheds. Fencing causing habitat fragmentation was also mentioned as a problem, although it seems inevitable in the case of agricultural lands.
4. **Development Potential in Sensitive Watersheds:** Residents in the St. Mary and Cusheon Lake watersheds were concerned that further development in these sensitive areas would exacerbate an already serious concern about water quality – and contribute to an increase in toxic algal blooms.
5. **Ongoing Deforestation in the Watersheds:** Large-scale commercial logging operations on Salt Spring Island have been and are vehemently opposed by a

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<sup>20</sup> One participant in the Cusheon Watershed consultation suggested that research described in the Cusheon Watershed Management Plan as well as several background reports by Dr. John Sprague show that over 50% of phosphorus entering Cusheon Lake is coming from sediment-laden runoff moving quickly over land and that twice as much phosphorus enters the water from un-vegetated land compared to vegetated land. This participant noted say that, as phosphorus is the “limiting nutrient” for algal blooms, including the toxic cyanobacterial algal blooms that are a serious health risk, a significant increase in frequency of algal blooms may require lake closure by law.

majority of islanders.<sup>21</sup> However, there remains ongoing deforestation on smaller private parcels, which escape the “public radar”. This leads to concerns that the many instances of small-scale logging in the watersheds could have a significant cumulative impact on forest ecosystem health, entailing loss of forest cover, reduction of water table (thus reducing potential water supply), reduction in biodiversity, soil erosion, potential for floods and mudslides, etc. Concern was also expressed that logging and soil disturbance contribute significantly to our CO<sub>2</sub> emissions, and thus to global climate warming.

6. **Loss of Biodiversity:** Concerns expressed by participants here related to:
  - a. Loss and endangerment of native species (e.g., fish and turtles in lakes, forest birds)
  - b. Loss of native amphibians, owing to invasive species such as bullfrogs.
  - c. Loss of diversity and health of trees and understory plants; low plant diversity in “second growth” forests; seemingly, lack of adequate recovery of Garry Oaks on Mt. Maxwell.
  
7. **Non- native Invasive Species:** Scotch broom and bullfrogs were mentioned in particular. While the distribution of broom is island-wide, and that of bullfrogs is not specific to the watersheds under discussion, there is a general undercurrent of concern relating to invasive species undercutting our island’s native biodiversity.
  
8. **Ecological Imbalances:** It was noted that the loss of natural predators (wolves, cougars) and increasing suburbanization of the island have resulted in ecological imbalances, particularly in a very abundant deer population.<sup>22</sup> Deforestation and development were thought by some to compromise both freshwater and marine fisheries, and contribute to the loss of native fish species in our lakes.
  
9. **Food Security and Food Quality:** Several points were made in this connection. Over the past two centuries, the island has transformed from being at least seasonally self-sufficient in its food needs, to supplying about a

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<sup>21</sup> E.g. the outrage and public action against the 2000-2001 logging by Texada of Mt. Tuam and Mt. Maxwell. A Dale *et al.* 2006. Royal Roads University. Community research connections: Interactive case studies in sustainable community developments. Community action on Salt Spring.

<sup>22</sup> Deer are potential reservoirs of human pathogens: e.g., in Ontario and Eastern Canada they are hosts of ticks bearing the severely debilitating Lyme disease, which is widespread in that region. Lyme disease has been reported in BC, although it is not yet common. *Borrelia burgdorferi*, the organism that causes Lyme Disease, has been found in ticks collected from many areas of British Columbia, and dozens of Lyme Disease cases have been identified in the past 15 years. As many people with Lyme Disease have not traveled outside of the province, it is likely they have contracted the disease in B.C. Source: BC Health File #01, May 2008.

mere 5% of those needs. Bringing in food from elsewhere affects both food quality and food security, in addition to being a contributor to traffic, deteriorating air quality, and climate change. Health regulations relating to food, coming from trade-orientated concerns, are threatening community food security by crimping small-scale agriculture and husbandry. One participant in the consultation quipped: “We import 95% of our food, and our main export is garbage... so what kind of an indicator of community health is that?” It was suggested that we need to look at examples of sustainable community farming in other parts of North America as possible models for Salt Spring Island.

10. **Noise Pollution:** This was frequently mentioned as a source of stress to our community<sup>23</sup>. At the August 2007 meeting, one resident who lives close to Ganges Harbor commented that he did not move to Salt Spring Island to live near what is in essence an airport runway. There was frequent mention of noise pollution from increasing intensity of traffic on many of Salt Spring Island’s main roads, especially on Ganges Hill, but also on Cusheon Lake Road and elsewhere.
11. **Sight Pollution:** The issue mentioned here was loss of aesthetic, recreational, and spiritual values due to inappropriate development that does not seek to integrate and harmonize with the landscape and with the island’s rural character.
12. **Changing Demographics:** The island’s population is perceived as aging, particularly as Salt Spring Island has become an attractive location for retirees. As well, Salt Spring Island is increasingly becoming an island of wealthy part-time residents. There appear to be contrasting perceptions about these factors. On the one hand, there is a concern that the social vitality of the island, the maintenance of its services and school programs, the participation of residents in volunteer services, and other activities that benefit from or require permanent and younger community members are under threat. On the other hand, it was argued that older and wealthier people are better able to contribute to the local economy and to volunteering.
13. **Cost of Living:** There also is a perception that these demographic changes are contributing to raising the cost of living on Salt Spring Island, thus in turn contributing to the difficulty of maintaining age, income, and occupation diversity on our island, and thus maintaining services and community vitality.

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<sup>23</sup> Although many people who come here are from much noisier places!

14. **Affordable Housing:** This issue surfaced in all the consultations. The concern here is that, owing to a lack of affordable housing, Salt Spring Island is at high risk of losing people who have provided the island with essential services, as well as its reputation for unique arts and crafts, local cuisine, etc. The concern is particularly acute in the health providers sector. If workers providing essential services (including in the hospital and in doctor’s offices) cannot be obtained on-island, then hospitals and clinics, as well as businesses, may be forced to either curtail services or rely more heavily on off-island help. Rising ferry fares, however, are also making it more difficult to obtain off-island help. One question raised was how to increase the amount of affordable housing without increasing the amount of real estate and thereby further impacting the environment.
15. **Maintaining Our Hospital:** This was said to be critical to the sustainability of our island. Hospital care enables older people to live on the island with the security that essential health services they require are nearby. Without the hospital they would likely have to leave the island, and thus we would lose their contributions to our economy, artisan community, farming community, etc.
16. **Economic Sustainability:** The question was raised as to whether we actually are economically sustainable, when so many islanders are on pensions or earning off-island incomes, and retirement and recreation are becoming our primary economies, while the ability of maintaining services on the island is at risk. In agriculture, there are not enough on-island workers, so there may be an emerging trend to bring in “guest workers”—but affordable housing is a problem in this connection. There was a call for returning to more self-sufficient, sustenance economies.
17. **Cultural Values:** Mention was made that demographic changes—to the extent that they may contribute to a loss of, or failure to develop, a strong sense of place and community and caring for the natural and cultural uniqueness the island—may threaten not only livelihoods, but also Salt Spring Island’s rural character (which may be somewhat idealistically characterized as comprising quiet country roads, a mosaic of farms, artisan’s studios and rural properties nestled in valleys and forested hillsides, and unspoiled vistas of lakes, bays, harbors, and mountains). It was suggested that the influx of people with urban backgrounds who expect the same kind of services as in cities conflicts with the rural values of others. One poignant comment was that we shouldn’t talk about “how to get the island we want”, but rather “how to keep the island we got”—that is, how to enact the stewardship implied in the “Preserve and Protect” mandate.

18. **Attitudes:** A concern was expressed that we need to change our prevailing paradigm of self-centeredness from “me, more, now” to “we, enough, forever” and respect natural limits. A “sense of place” can be an antidote to self-centeredness and a focus on self-interest.
19. **High Levels of Stress in Our Population.** A recurrent observation (particularly among health providers) was that our island’s population presents high levels of stress, and that this likely contributes to a number of health issues. Although there are many possible causal factors here, there are several that are particularly related to changes in our natural and cultural environment:
- a. Stress from observing that the ecosystems of which we are part are in decline: loss of cherished landscape features, loss of aesthetic, spiritual and recreational values; loss of biodiversity; overdevelopment; etc.,<sup>24</sup>
  - b. Stress from concerns about livelihoods and maintaining the social structure and character of Salt Spring Island – and thus having economic viability and the services of a diverse work group, as well as a diversity of ages, incomes, and backgrounds within a shared rural lifestyle.
20. **The Need for Education:** This point was brought out repeatedly, concerning both children and adults. It was suggested that Salt Spring Island’s “old-timers” might be brought in to teach younger generations about the “old ways”—how the island used to be. It was also suggested that it is important to educate the “non-converted”, and this has to be done year after year as new people come in.
21. **Concerns Relating Specifically to Cusheon Watershed:** In addition to many of the general points above, specific concerns related to Cusheon included:
- a. Toxic algal blooms (cyanobacteria) and risks to human health through contaminated water supplies and human contact by swimming/wading in lake waters.
  - b. Water unfit for drinking (many residents using bottled water).
  - c. Leaking septic systems, which in the absence of remediation will increase the problem of eutrophication (high phosphorus loading).
  - d. A lack of regulation and enforcement for sewage and septic (which applies island wide).
  - e. Lack of restrictive covenants on properties bordering Cusheon Creek.

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<sup>24</sup> Studies have shown that this “loss of sense of place while still in place, or “Solastalgia” as it has been called may be the source of significant psycho-physical distress. Dr. Glenn Albrecht, one of the featured speakers in the August 2007 meeting that led to the development of the HEHCI, is the originator of the concept of Solastalgia. See for example: Albrecht, Glenn, Sartore, Gina-Maree, Connor, Linda, Higginbotham, Nick, Freeman, Sonia, Kelly, Brian, Stain, Helen, Tonna, Anne and Pollard, Georgia (2007) ‘Solastalgia: the distress caused by environmental change’, *Australasian Psychiatry*, 15:1, S95 - S98.

- f. Traffic volume on Cusheon Lake Road.
- g. Asphalt on Stewart Road may have resulted in deterioration in well water in the area.
- h. A perception that the recommendations from the Cusheon Watershed Management Plan Steering Committee in their report “Cusheon Watershed Management Plan 2007” have not been implemented.<sup>25</sup>

**22. Concerns Relating Specifically to St. Mary Watershed:** In addition to many of the general points above, specific concerns related to St. Mary included:

- a. Toxic algal blooms (cyanobacteria) and risks to human health through contaminated water supplies and human contact by swimming/wading in lake waters (e.g., “swimmer’s itch”).
- b. Notable water quality deterioration over time. One long-term (45 yrs) resident had never seen the lake in worse condition than currently, with blue-green algae and then a thick green algal mat.
- c. Water odors and discoloration during acute periods of algal blooms.
- d. Contributions of farms, resorts, and other commercial and non-commercial activities to nutrient loading.
- e. Recycling of phosphorus from sediments to water column.
- f. Leaking septic systems, which in the absence of remediation will increase the problem of eutrophication (high phosphorus loading). Some residents believe that the majority of septic systems around St. Mary Lake are in poor condition and not working properly according to the CRD standard. Further they believe that if a septic field is within 100 meters of the lake, then it is likely to have an impact regardless.
- g. Runoff from septic fields is a potential source of *E. coli* contamination and related health risks. Amoeba infections were also mentioned, although it was unclear whether the source may be waterworks water or groundwater.
- h. Lake streams once thought to be salmon-bearing no longer are; currently it is thought that all lake fish today are stocked and introduced species which, while excellent for a sports fishery, signals the loss of native fish.

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<sup>25</sup> However, it is our understanding that many of the recommendations have been addressed in the revised OCP which has been approved by the Ministry and is to be considered for adoption at the LTC meeting in early October, 2008. The LTC and CRD will jointly develop a program to monitor, detect and correct failing septic systems, particularly within environmentally sensitive areas such as community water system supply watersheds and community capture zones. Extensive mapping of both Cusheon and St. Mary watersheds will be undertaken once ground-truthing of boundaries, currently underway, is complete.

- i. Gas powered boats are banned on St. Mary, but electric motors are allowed; float planes are allowed, as they fall under federal rather than local regulations.
- j. Runoff of pollutants from roads around the lake.
- k. Need for monitoring of activities by households and businesses and how they cumulatively impact the health of the Lake and water quality.
- l. Fernwood School is on St. Mary water. One participant mentioned that the school is concerned about water safety and that the parents have asked, through the parent's advisory council, for more frequent and accurate water quality testing..

23. **Concerns Relating Specifically to Maxwell Watershed:** In addition to many of the general points above, specific concerns related to Maxwell included:

- a. Fire hazard from carelessness on the part of users of Maxwell Lake (locals patrol the area in summer); impossibility of quick response from our firefighters (owing to the area's isolation) is a source of extreme anxiety on the part of the residents during the dry season.
- b. Deforestation and subsequent impacts on water quality.
- c. Algal build-up<sup>26</sup>
- d. Air pollution from Crofton Mill.
- e. Lack of vigilance. Some participants believe that since there is the perception that there are covenants in place, there is no need for vigilance.

In conclusion, the various concerns that were raised by participants in the watershed meetings (and the above list is by no means exhaustive) suggest that the indicators of the health of our island must relate not only to the ecological conditions, but also to the associated socio-economic, cultural, and public health issues. We are part of our ecosystems and if our ecosystems become increasingly stressed (dysfunctional) there are important ramifications for the health and well-being of our community – economic, social, cultural, and from the standpoint of public health.

**The Parameters (Indicators)** There are many ways to identify key indicators of eco-cultural conditions. Most commonly, these are chosen on pragmatic grounds, representing data readily available and pertaining in some relevant ways to the environment. However, as noted in “The Perspective” above, since the mid-1970s, a science-based statistical system has been widely used in Canada and worldwide. This system, the DPSIR system, provides a solid basis for identification of the kinds of information that are critical to establishing a baseline for evaluating the health of our

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<sup>26</sup> Recent algal clogging of Maxwell water main and consequent contamination of water delivery as reported in the Driftwood may be a case in point).

island's ecosystems and community.<sup>27</sup> Here we apply the DPSIR in a simplified Pressures-State-Responses form to suggest an initial set of potential indicators useful for the assessment of Salt Spring Island's eco-cultural health.

***Pressures:*** Some of the factors involved here include: Changing demographics; Rising property values; Increasing cost of living; Limited affordable housing; Existing and potential build-out; Road density (habitat fragmentation); Fencing (habitat fragmentation); Traffic (noise and air pollution); Changes in forest cover and species composition; Habitat disturbances owing to shoreline modification (docks, clearing of vegetation); Nutrient runoff from septic and agricultural operations; Microbial, viral contamination from septic and agricultural operations; Soil and sediment runoff from land-use change; Smoke from fires and seasonal burning. See Table 1 for how some of these factors translate into potential indicators for dimensions of the health of eco-cultural systems.

**Table 1**  
**Examples of Potential Indicators of Pressures on the Health of Salt Spring Island Eco-cultural Systems**

Indicators	Dimensions			
	Ecological	Socio-Economic	Cultural	Public Health
Changing Demographics	x	x	x	
Potential Build-out	x	x	x	x
Increased Road Density	x	x	x	x
Loss of Forest Cover	x	x	x	x
Nutrient Loading	x	x	x	x
Microbial Contamination	x		x	x
Soil and Sediment Disturbance	x	x	x	x
Seasonal burning	x			x
Affordable Housing		x	x	x
Cost of Living	x	x	x	x
Rising Property Values	x	x	x	

<sup>27</sup> See for example: Bird, P. and Rapport, D.J. 1986. State of Environment Report for Canada. Canadian Government Publishing Centre. 264 pp.; Rapport, D.J. and Whitford, W. 1999. How ecosystems respond to stress: Common properties of arid and aquatic systems. *BioScience* 49(3): 193-203. See Rapport, D.J. 2004. Ecosystem health and ecological integrity; foundations for sustainable futures. In: B. Mitchell, ed. *Resource and Environmental Management in Canada: Addressing Conflict and Uncertainty*. 3<sup>rd</sup> Edition. Oxford University Press, pp 24-53- for specific examples of eco-system health monitoring in Canada. See also Rapport, D.J., Hilden, M., Weppling, K. 2000. Restoring the health of the earth's ecosystems: A new challenge for the earth sciences. *Episodes* 23(1) 12-19.

**State:** Some of the aspects to be considered here include: Primary productivity; Algal blooms; Toxic algal blooms (especially cyanobacteria that release toxins injurious to human and animal health); Nutrient status; Composition of key biotic communities (species diversity and relative abundance for fish, amphibians, trees, nesting avian species); Forest cover; Species at risk (including endangered, threatened species); Recent paleoecological history; Disease prevalence (in humans and wildlife); Sustainability of livelihoods; Trends in land occupied by family farms, homes on acreage, artists studios; Net changes in numbers of artisans, organic farmers, etc; heritage and unpaved roads that are characteristic of rural areas; Threats to human health (due to water-borne diseases, vector-borne diseases, air and water pollution). See Table 2 for how some of these aspects translate into potential indicators for dimensions of the health of eco-cultural systems.

**Table 2**  
**Examples of Potential Indicators of State of Health of Salt Spring Island**  
**Eco-cultural Systems**

Indicators	Dimensions			
	Ecological	Socio-Economic	Cultural	Public Health
Change in Forest Cover	x	X	x	x
Phosphorus in Lakes	x	X	x	x
Toxic Algal Blooms	x	X	x	x
Species Diversity	x	X	x	x
Disease Prevalence in Human population		X	x	x
Disease Prevalence in Wildlife	x		x	x
Livelihood Sustainability	x	x	x	x
Trends in land occupied by family farms, homes on acreage, artists studios	x	x	x	
Net change in numbers of artisans and in numbers of organic farmers on Salt Spring Island		x	x	

**Responses:** Some of the factors to be examined here include: Policies and regulations to prevent erosion of eco-cultural health; Policies and regulations to remediate eco-cultural health erosion; Effectiveness of enforcement; Educational campaigns to inform the public of acceptable practices consistent with maintaining eco-cultural health. See Table 3 for how some of these factors translate into potential indicators.<sup>28</sup>

**Table 3**  
**Examples of Potential Indicators of Response to Threats to the Health of Salt Spring Island Eco-cultural Systems**

Indicators	Dimensions			
	Ecological	Socio-Economic	Cultural	Public Health
Monitoring of Health of Salt Spring Island Ecosystems	x	x	x	x
Enforcement of Bylaws	x	x	x	x
Health Assessments as Precondition for Development	x	x	x	x
Policies to Restore Health of Ecosystems	x	x	x	x
Educational Programs for Physicians and Health Providers re. Links Between Human and Ecosystem Health	x	x	x	x
Educational Programs in Schools re. Actions Promoting Healthy Ecosystems and Healthy Communities	x	x	x	x
Educational Programs re HEHCI for Newcomers to Salt Spring Island	x	x	x	x

<sup>28</sup> A huge issue for any community is that local policies, controls, and regulations, while important, cannot contravene provincial and federal regulations. This severely limits local policy/regulatory control. Added to this is that local governing bodies (and most certainly the LTC) have very limited financial or human resources at their disposal to take action on many of the "Responses" to "Problems" identified, even if there is a will within the community to do so. Without the ability to raise sufficient funds they can only take very limited action, which paradoxically may contribute to community stress levels from a feeling of impotence. This is not a comment on the particular form that local governance might take in any given community, but rather a reflection of the realities of any form of governance in a multi-tiered system. As eco-cultural health issues on Salt Spring Island become better understood and communicated, this should provide the stimulus for acquiring the resources to act.

## The Prospects

Here we examine the prospects for the development of a rapid assessment of the eco-cultural health of Salt Spring Island's three main watersheds, with reference to existing sources of information as well as data gaps that need to be filled. We consider the prospects from the point of view of three key methodologies that are commonly used to carry out comprehensive environmental assessments: mapping, monitoring, and modeling (diagnosis). In Appendix 4, we list some of the main reports and web-based sources of data relating to our indicators. We are also aware of a large number of individuals on Salt Spring Island with long-standing interest and knowledge about the various dimensions of the state of the watersheds that we have selected as an initial focus. In Phase 2, we plan to have extensive interviews with these key people.

***Mapping:*** The starting point for analysis is an inventory and map of the land use and key environmental features of the watersheds, particularly the riparian areas within the boundary of each watershed. These maps need to be fully compatible with the OCP and Land Use Bylaws, as recommended in the Cusheon Lake Management Plan (2007). Recent mappings of Maxwell and anticipated mapping of St. Mary should contribute to a better definition of the watersheds for eco-cultural assessment purposes, but they too need to identify the whole range of relevant ecological and cultural features and be compatible with planning maps. For Phase 2 of the HEHCI, it should be possible to work with the existing maps (which include those developed by Grange Engineering Assocs. Ltd for Maxwell , Cusheon (nearly complete) and St. Mary (anticipated in the near future) watersheds, as well as those published as part of the Cusheon Watershed Management Plan, the OCP reports (e.g. the recent build-out maps), and the recent Community Atlas produced by Parks Canada ("Gulf Islands Ecosystems") and related online "Community Mapping Network". In addition, Google Earth will be invited to participate with us in undertaking the first application of its technologies to an eco-cultural health assessment. In mapping, we will take account of the lack of congruence between ecological regions and administrative areas.

***Monitoring:*** Within the framework for assessing the eco-cultural health of Salt Spring Island, data for many of the indicators are obtainable in principle – although few have been collected or compiled to date. An important exception is represented by the data on total phosphorus levels for Cusheon Lake and St. Mary Lake, where annual measurements have been taken for most years over the past 20-30 years. There are also records (although less complete) on algal blooms, particularly toxic algal blooms. Further, since 1978 there have been mid-winter annual counts of aquatic birds<sup>29</sup>.

Large data gaps exist with respect to critical ecological conditions in the watersheds. For example, science-based surveys on fish communities are lacking for native fish present

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<sup>29</sup> Gil Schultz of North End Road currently has these records.

in the lakes prior to the rapid increase in population on the island beginning in the 1950s. Anecdotal information suggests that currently St. Mary Lake and Cusheon Lake may contain only introduced and stocked fish. In addition to fish, it would be desirable to have records of at least nesting birds, mammals (particularly deer populations, but also rodents), and vegetation, including aquatic macrophytes. Hence, surveys are needed for all major faunal and floral groups within the watersheds, including comparison with previous data (where available) in order to document change over recent decades.

Another critical missing data set pertains to changes in forest cover in recent decades (i.e. following logging in earlier periods) - due to land-use changes within the watershed, particularly changes related to farming, building of residences, road construction and clearing for views, which collectively and progressively have likely reduced forest cover. One likely source of information would be a detailed comparison of the ecosystem mapping found in the Gulf Islands Ecosystems Community Atlas—Version 1, based on aerial photos from 1990-92, with that in Version 2, based on aerial photos from 2002 (data interpretation 2004). The Sensitive Ecosystem Inventory appears to be the best readily available guide to where these ecosystems are located and their extent. However, the details of fragmentation and development within the areas are for the most part not shown. The Atlas itself testifies that this kind of information is available from remote sensing data, but a great amount of work would be required to see the trends over time in forest cover in the watersheds.

Another significant set of data, that in principle could be gathered, is a record of human activities in each of the watersheds, such that changes over time could be documented. Such activities would include forestry, mining, agriculture, housing developments, road construction, etc. In addition, data on population (age distribution, occupations, income distribution) by watershed and changes over time are needed. Some of these data would help establish indicators of “rural character” of our island.

When it comes to community health issues, published data are very limited, and practitioners are reluctant to provide data on critical health issues, for reasons of doctor-patient confidentiality. One can surmise from reports (these need to be verified) that there have been cases of vector-borne diseases in the region (e.g. Lyme disease has been reported on Vancouver Island) and a few cases of individuals contracting Hanta Virus, but probably these occurrences are under-reported. Air quality in the watersheds is another area for which we are unaware of data that have been systematically gathered or monitored for Salt Spring Island. Poor air quality (e.g., from emissions from industrial plants such as the Crofton Mill, from traffic on Salt Spring Island, and from BC Ferries operations) is a well-known trigger of asthma attacks, and thus might constitute a real risk factor for some of the island’s population. While eco-cultural health assessments are unable to pinpoint cause and effect links for particular cases of disease, using the precautionary principle one can identify certain risk factors.

In order to do this, however, reliable and consistently gathered data on air/water/food quality and human exposure over time to contaminants would be required. Health data relating to emotional and mental stress are also very difficult to come by, although some indicators (e.g. measures of tranquilizer use on Salt Spring Island compared to other locations) may shed light on this aspect. Again, while cause and effect are not possible to tease out, it is possible to pinpoint risk factors to the population owing to environmental degradation, socio-economic and cultural issues (such as affordable housing, sustainable livelihoods, loss of rural character).

Importantly, with regard to much of the information relevant to Salt Spring Island, it appears that few data are held locally and data must be extracted from databases compiled by Provincial and Regional Ministries and Authorities (e.g. Environment, Highways, VIHA, CRD). Some data that are collected locally, such as data on the distribution of rare and endangered species, are not released owing to confidentiality issues. Here, through data aggregation, it should be possible to provide a perspective on endangered species for areas of Salt Spring Island without compromising confidentiality pertaining to particular properties and arrangements with individual landholders.

***Modeling (Diagnosis)***: As in other health-related fields, assessing the health of eco-cultural systems is a complex task and in most cases cannot be carried out by formulae. For example, with respect to the human health aspect of eco-cultural health, while there are provincial and federal guidelines for contaminants in air, water and food, the guidelines are by and large designed to look at the effect of one contaminant at a moment in time rather than, as happens in the real world, exposure to multiple contaminants over time. Further, these health guidelines do not take into account what may actually turn out to be the main risks to human health—those arising from ecological imbalances that favor an increase in human pathogens. Ecological imbalances may be triggered by a variety of anthropogenic stresses, including land-use changes (resulting in habitat loss and fragmentation), pollution loadings, and overharvesting. Finally, in evaluating the health of our eco-cultural systems we must factor in various sources of stress on our community, such as concerns about sustainability of livelihoods, anxiety about affordable housing, stress owing to deteriorating environmental conditions (such as noise pollution, air pollution, loss of landscape integrity and rural character, etc.). Stress due to these causes results in increased vulnerability to human pathogens and other health problems. Similarly for the ecological aspects, the socio-economic aspects and the cultural aspects, diagnostics must account for a complex and interrelated suite of factors impacting these dimensions.<sup>30</sup>

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<sup>30</sup> The HEHCI coordinators have been involved in a large number of studies that focus on the complexities of diagnosis of ecological, cultural, and socio-economic health in the context of an eco-cultural health framework. See for example: World Bank 2005. Measuring Coral Reef Ecosystem Health- Integrating Societal Dimensions. 65pp.

In summary, despite the large number of comprehensive reports on particular aspects of the Salt Spring Island environment, there is an almost complete lack of systematically assembled information on many of the critical indicators on the health of the island's eco-cultural systems. We find a paucity of current data (as also noted in the CRD State of Environment Indicators Report referred to in the preface) on indicators that are essential in order to have a comprehensive picture of the state of our eco-cultural systems and its implications for the health and well-being of our community. The present lack of data is not owing to the impossibility of gathering such information; indeed, such information is unquestionably obtainable in principle, as many in-depth ecohealth assessments of Canada and other regions clearly demonstrate.<sup>31</sup> By drawing upon and integrating many of the findings of previous studies, as well as identifying and filling data gaps, the HEHCI will provide a sound basis for the systematic monitoring of our Island's eco-cultural systems, in order to yield a comprehensive picture of human activities and the environment as it pertains to our well-being, health, and sustainability.

## **Phases 2 and 3 of the HEHCI - Outlook**

Here we provide a “thumb-nail” sketch of the opportunities, threats, strengths and weaknesses related to developing a science-based eco-cultural health monitoring system for Salt Spring Island, as we move forward to Phases 2 and 3 of the HEHCI.

### **Opportunities:**

- Our island's remarkable human resources and their in-depth knowledge of various aspects relevant to assessing the health of our island.
- Strong interest in establishing a baseline monitoring system for the health of our island expressed by a broad spectrum of our community (reflected in part by the diversity of interests on the HEHCI Advisory Group).
- Community interest in having sound information about ways and means in which, individually and collectively, we can have a positive impact on the health of our island's eco-cultural systems.
- Strong support from our local governance (Local Trust Committee and Capital Regional District).
- Interest on the part of our schools in looking at applications of the HEHCI in existing and new curricula. The most important aspect of the HEHCI will likely be in education for both public understanding and as a stimulus for behavioral change. The audience should be both children and adults.
- “Old-timers” might be involved in teaching the youth – to rekindle the knowledge of the “old ways”.

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<sup>31</sup> See for example the case studies referred to in Rapport, DJ. 2004. See footnote 23 on page 15. While most previous studies have focused on ecohealth, the study that Ecohealth consulting carried out for the World Bank (see ref in footnote above) took in the full range of eco-cultural health dimensions.

- There is a perceived increase in interest in personal (physical, psychological and spiritual) health as related to environmental conditions. “No healthy ecosystems, no healthy us”, as one participant in the consultations put it.
- Potential collaboration with Provincial Ministry of Environment and Federal Department of Fisheries and Oceans.

**Threats:**

- There may be challenges in bringing some individuals and sectors “on side”, because of established interests, reluctance to contemplative attitudinal and behavioral change, etc., unless people come to see eco-cultural health as an asset in their enlightened self-interest.
- The increasing loss of touch with nature in contemporary society often results in people not understanding or underestimating the functions that nature performs – e.g. the importance of forest cover, of undisturbed riparian and coastal areas, etc. – and from which we derive essential benefits, including for our health and security.
- Belief that nature will always recover from damage may be an impediment to commitment to taking action (“Salt Spring has been logged before”).

**Strengths:**

- HEHCI monitoring will be a community-based and community-maintained system, including participation and input from a variety of interests and perspectives (business, health, conservation, livelihoods, etc.).
- HEHCI indicators, assessment and monitoring protocols are science-based.
- HEHCI vision is holistic, integrating the social, natural, and health sciences, in both theory and application.
- HEHCI coordinators are internationally recognized as pioneers in the relevant fields of ecosystem health and biocultural diversity; they have significant experience in carrying-out integrative assessments at scales ranging from local to regional and sub-global.

**Weaknesses:**

- The paucity of information about the current state of health of our watersheds.
- Historical data for some of the essential indicators may be difficult or very costly to obtain.
- Existing studies relating to Salt Spring Island social and natural environments are fragmented and isolated.
- The notion of eco-cultural health is new and will take time to be seeded within our community.

In summary, while there are many challenges in going forward to achieve a science-based, ongoing health check-up on our island, including the ecological, socio-economic, cultural, and public health aspects, the strengths and opportunities of the HEHCI and of our community vastly outweigh the weaknesses and threats. We are confident that, with well-seeded community support, the HEHCI will provide the essential monitoring, assessment, and diagnostics to enable our community to develop in a manner that enhances the health of our island and community well-being.

### **Next Steps:**

This report completes Phase 1 of the HEHCI.

Fundraising for Phase 2 (rapid assessment of the health of the Maxwell, Cusheon, and St. Mary watersheds) will begin immediately. We anticipate work on Phase 2 to start in early 2009. With the start of work on Phase 2, fundraising from foundations, provincial and federal sources will commence.

## **Appendix 1**

### **Sponsors, Donors and Contributors to HEHCI- Phase 1**

#### **Sponsors: (\$1,000 and over)**

Alan Bloch and Nancy Berman  
Capital Regional District (CRD)  
Local Trust Committee (LTC)  
The Island Opportunity Fund

#### **Major Donor: (\$500-999)**

Mouats Trading Company Ltd.  
Tania Aguila ("in kind" donation for establishing the data base for HEHCI)

#### **Donors: (\$250-499)**

Derek Crawford Architect Inc.  
Thrifty Foods  
Matt Steffich Gallery  
David Woodley M.D. Inc.

#### **Contributors: (to \$249)**

Apple Photo  
Arthur Black & Lynne Raymond  
Dorothy Cutting  
Ron Hawkins  
Arno Keinonen  
Maxine Leichter  
Dr. David & K.V. Lewis  
Neil Morie Architect  
Electronic Ark  
Ganges Village Market  
Island Star Video  
Ronald Reznick, MD  
Salt Spring Books  
Salt Spring Gelato  
Jane & Jeremy Winter

Additional pledges have been made and the list of funders will be continually updated as pledges are received.

## Appendix 2

### HEHCI Advisory Group & Areas of Expertise

Name	Tel:	Email or Fax	Affiliation	Focus/ Area of Expertise
<b>Abelman,</b> Michael	7- 1989	<a href="mailto:m.ableman@fieldsofplenty.net">m.ableman@fieldsofplenty.net</a>	Fox Glove Farm	<b>Organic Farming</b>
<b>Bell ,</b> Kevin	7-5593	kevin@mouatstrading.com	Mouat's Trading	<b>Sustainability and Livelihoods</b>
<b>Bloch,</b> Alan		abloch@earthlink.net		<b>Sustainability</b>
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<b>Fowles,</b> Carol	7-5993	cfowles@saltspring.com	Royal LePage	<b>Sustainability</b>
<b>Gelwicks,</b> Jean	7-4859	gellam@saltspring.com		<b>Environmental Education</b>
<b>Grange,</b> Philip	7-1948	pgrange@telus.net	Grange Engineering	<b>Watershed Hydrology</b>
<b>Hawkins,</b> Ron	7-5052	rrhawkin@telus.net	Watershed Pres Society	<b>Watershed Management</b>
<b>Hayden,</b> Richard	7-8314	mail4radish@yahoo.ca	Island Dental Centre	<b>Health and Ecology</b>
<b>Moore,</b> Maureen	8-1732	m@gulfislands.com	Writer	<b>Conservation</b>
<b>Puhky,</b> Ron	653-4267	Puhky@telus.net	Integrative Healing	<b>Health and Ecology</b>
<b>Reznick,</b> Ron	7-5321	jeansouthgate@yahoo.ca	R. Reznick, Inc.	<b>Health and Environment</b>
<b>Seedhouse,</b> Craig	7-2325	natureworks@telus.net	SS Nature Works	<b>Organic Growing and Marketing</b>
<b>Spendjian,</b> Greg	7-0704	Spendjian@shaw.ca	Bite Me! Treats	<b>Socio- economic and ecological Sustainability</b>
<b>Torgrimson,</b> Christine	8-0199	rosehip@saltspring.com	Gulf Islands Alliance	<b>Governance and Sustainability</b>
<b>Weeden,</b> Bob	7-5403	weeden@saltspring.com	Salt Spring Island Conservancy	<b>Cons. and Ecology</b>
<b>Wilcox,</b> John	7-5942	duckcreek@telus.net	Duck Creek Farm	<b>Organic Farming</b>
<b>Wood,</b> David	653-2300	wood@saltspring.com	Salt Spring Cheese	<b>Socio-economic Sustainability</b>
<b>Woodley</b> David	7-4811	Fax 7-1610	David G. Woodley, MD	<b>Health and Ecology</b>
<b>White,</b> Elizabeth	7-2616	elizwhite@saltspring.com		<b>Energy Efficiency &amp; climate change</b>

**Appendix 3**  
**Consultations for Phase 1 of the HEHCI**

May 21, 2008	HEHCI Advisory Group Meeting
June 24, 2008	Cusheon Watershed consultation
July 21, 2008	St. Mary Watershed consultation
July 24, 2008	Maxwell Watershed consultation
August, 2008	Consultation with Dr. John Sprague re Cusheon Watershed Management Plan

## **Appendix 4**

### **Sources of data and information relevant to eco-cultural health assessments of the watersheds of Salt Spring Island**

This is a preliminary list which will be updated. In addition to specific reports on watersheds, this list also contains general references relevant to the HEHCI

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## **Appendix 5**

### **HEHCI Coordinators' Bionotes**

**David Rapport, PhD, F.L.S.**, is Principal of EcoHealth Consulting, a Salt Spring Island-based international consulting group ([www.ecohealthconsulting.com](http://www.ecohealthconsulting.com)) focusing on integrative environmental assessments. Dr. Rapport is one of the originators of the concept of ecosystem health. He served as Founding President of the International Society for Ecosystem Health (1993-2000) and as editor-in-chief of the international peer-reviewed journal *Ecosystem Health* (Blackwell, 1995-2002). Dr. Rapport co-founded the program in environmental statistics at Statistics Canada, where he led the development of the Stress-Response-Environmental Statistical System. He is co-author of Canada's first national State of Environment Report (1986). He held the Tri-Council Eco-Research Chair in ecosystem health at the University of Guelph and co-founded the ecosystem health program in the faculty of medicine at the University of Western Ontario, where he held an honorary professorship in the Department of Physiology and Pharmacology, 1998-2004. He currently is a co-professor with the Institute of Applied Ecology, Chinese Academy of Science, Shenyang and was Visiting Professor, Department of Landscape Ecology, The University of Tokyo (March-May 31 2007). Dr. Rapport serves on the editorial boards of *Ecological Economics* (Elsevier), *EcoHealth* (Springer) and *Ecological Indicators* (Elsevier). He has carried out eco-health assessments on three continents (Europe, North America and Australia). His most recent book is *Managing for Healthy Ecosystems* (Lewis Press, 2003).

**Luisa Maffi, PhD**, is co-founder and Director of Terralingua, an international NGO devoted to promoting the integrated conservation of biological and cultural diversity. She is one of the originators of the concept of biocultural diversity. Her edited volume *On Biocultural Diversity*, published by Smithsonian Institution Press (2001), is widely considered a foundational work in this field. Dr. Maffi's own research and the work she has done with Terralingua have been supported by major grants from the US National Science Foundation, US National Institutes for Health, Ford Foundation, and The Christensen Fund. This work includes both global and regional assessments of biocultural diversity, as well as participatory community projects. Terralingua's collaboration has been sought by major international organizations such as WWF, Conservation International, IUCN, UNEP and UNESCO, as well as academic institutions such as the Smithsonian Institution, the Field Museum of Natural History, Northern Arizona University, and the University of Florida. In April 2008, Dr. Maffi co-organized the international symposium "Sustaining Cultural and Biological Diversity in a Rapidly Changing World - Lessons for Global Policy", hosted by the American Museum of Natural History, New York. Terralingua will have a major role in promoting the conservation of biocultural diversity at the World Conservation Congress (Barcelona, October 2008).