

Highlands Sustainability Task Force

Final Report

November 2009



Executive Summary

In January 2009, the District of Highlands council established a Sustainability Task Force (STF) to examine multiple aspects of sustainability that relate to Highlands community, and to develop a set of recommendations to help move the community towards a sustainable future.

Over the course of 8 meetings, the task force brought together background information, and developed a suite of 42 recommendations. This document is the final deliverable from this process. Some recommendations can be adopted and implemented largely as presented, while some have complexities that require further exploration and so focus on initiating the first actions towards a longer-term goal.

To provide some structure and guidance to council and staff, the task force classified recommendations using two dimensions: significance of potential impact on sustainability, and difficulty of implementation (see Appendix 3). The recommendations within each group were then ranked to suggest a 'road map' that will make it easier for council to begin the process of addressing these recommendations (see Appendix 4).

The work of the task force should be seen as a positive step in an ongoing process towards strengthening and clarifying a vision of sustainability for the Highlands, combined with suggestions for concrete actions that can be taken to move towards that vision.

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Background

Mandate

The primary role of the task force was to identify, research and recommend key initiatives regarding sustainability issues for council to consider. While the key focus is on deliverables to council, the task force also made some recommendations for sustainability actions for other bodies (e.g. Highlands District Community Association). The terms of reference for the task force are available online at http://highlands.ca/boards_committees/documents/STF-website.pdf.

Membership

The task force was formed from a diverse cross-section of volunteer community members, many of whom were involved in other organizations, task forces, and committees.

Ann Baird, HDCA	Warren Lee, HSF
Eric Bonham, GWTF and Vice Chair	Dave Mackas, community rep
Allen Dobb, Councillor	Bob McMinn, CCTF
Andrew Fall, Chair	Greg Nuk, FESC
Bob Flitton, CISSC	

Sustainability Topics

Sustainability has an intuitive connotation: to maintain certain values over the long term. This broad definition, however, can lead to problems in application, since it can be ambiguous or have different specific meanings to different people. The Sustainability Task Force (STF) felt it was important to first adopt a clear, unambiguous working definition of sustainability (recommendation 1). Some background information on sustainability is included in appendix 1.

The task force identified a set of key topics, each with a lead representative to guide progress and bring recommendations forward. These topics overlap as a connected network of sustainability concepts, but they served to focus attention on key aspects for which action can be taken. The topics and leaders were as follows:

- Climate change mitigation (greenhouse gas emissions) and energy (A. Fall)
- Climate change adaptation (W. Lee)
- Resource and energy conservation in municipal operations and houses (G. Nuk)
- Sustainable building (A. Baird)
- Water conservation (E. Bonham)
- Ecological conservation and green space connectivity (D. Mackas)
- Transportation (B. Flitton)
- Local food production (B. McMinn)
- Demographics and housing (B. McMinn)
- Social sustainability, communication and education (E. Bonham)
- Municipal policies (A. Dobb)
- Sustainability checklist (A. Fall)

Guide to recommendations

The task force recognized the time and resource limitations of council and staff to increased workload arising from recommendations. To help, we aimed to be parsimonious, sufficiently concrete and structured. Recommendations followed a common format to aide staff and council deliberations.

Recommendations were grouped by topic. Each topic section first outlines the main problem(s) being addressed and its relevance to Highlands. This is followed by one or more recommendations, typically with a format along the lines of “The Sustainability Task Force recommends that council do the following...” A general title, indications of significance of potential impacts, difficulty of implementation, and timeframe to implement are included. Difficulty and timeframe to implement generally focus on the effort, resources and time required to initiate the recommendation. Many recommendations will evolve over time due to complexity or are ongoing in nature. The task force also followed a consensus-oriented approach. For each recommendation, level of support among the task force is also indicated. Also, implementation guidance is offered to give further clarity and provide action steps.

All recommendations endorsed by the task force are included to provide a complete vision of the discussions held. To help avoid overwhelming council and staff, the task force classified each recommendation into one of four groups: (a) high significance / easy to implement, (b) lower significance / easy to implement, (c) high significance / hard to implement, and (d) lower significance / hard to implement. Note that the ‘high/lower significance’ and ‘easy/hard to implement’ attributes are relative terms. The recommendations within each group were then ranked to suggest a ‘road map’ for council to organize and begin the process of addressing these recommendations.

Endorsed Recommendations

1. General

Sustainability permeates every aspect of our lives and society, and requires a broad vision and long-term perspective. Conditions that aren’t sustainable cannot continue over the long-term. The sustainability task force (STF) adopted the following definition:

Sustainability, in the context of the Highlands municipality and community, is defined as meeting the needs of the present community without compromising the ability of future generations to meet the same needs, and without degrading the functioning of local to global ecosystems as a result of resource use within the Highlands.

Recommendation 1: Incorporate sustainability throughout the decision process

Whereas sustainability relates to every element and decision within Highlands,

The STF recommends that council adopt the above definition of sustainability and communicate this to staff, advisory committees and task forces.

The STF further recommends that council commit to considering sustainability aspects of every major decision and encourage staff, advisory committees and task forces to consider sustainability aspects of their decisions, operations and recommendations.

Significance: high

Level of support from STF: unanimous

Difficulty: moderate

Timeframe: immediate

Implementation guidance

This recommendation would reflect a commitment to work on all aspects of sustainability that are woven through our municipal, social, economic and environmental networks.

Recommendation 2: Adopt a vision for a sustainable rural Highlands community

Whereas increasing time spent in the Highlands and promoting opportunities for social interactions will foster a stronger community, and

Whereas fostering a more local community will result in a stronger more resilient local economy, and

Whereas driving automobiles for work, services and social activities outside of the Highlands is the number one source of ongoing greenhouse gas emissions,

The STF recommends that council adopt a goal of reducing needs for motorized transportation in all policy and land use decisions in order to support and strengthen a rural Highlands community.

The STF further recommends that council, the Community Centre Task Force, the Highlands District Community Association and the Highlands Stewardship Foundation adopt a goal of promoting opportunities for social interactions for residents, with a particular focus on a community centre.

Significance: high

Level of support from STF: unanimous

Difficulty: low

Timeframe: immediate

Implementation guidance

Social sustainability is directly influenced by potential interactions among residents, yet Highlanders have limited options to meet and interact socially with other Highlanders within Highlands. This recommendation presents a vision of commitment to strengthen our rural community by ensuring decisions encourage Highlanders to spend more time in the Highlands, and fostering community interactions. These would result in dual benefits of reducing greenhouse gas emissions from transportation and strengthening our community network. This vision can be implemented through other specific recommendations presented in this document, and others that may arise over time, including but not limited to:

- a. Sustainable land use zoning on appropriate transportation corridors.
- b. Support for home-based business and promoting buying local food, goods and services.

- c. Support for community centre and/or village centre concepts that envision spaces for social interaction, for example a coffee shop, restaurant, neighbourhood pub, and community hall with refreshments during events.
- d. Support local community building activities, such as a sustainable community centre and/or village centre, affordable housing for essential service personnel (e.g. firefighters) and seniors, local food market, and collaboration with community groups (e.g. HDCA, HSF).

2. Climate change mitigation (greenhouse gas emissions) and energy

Highlands recognizes the importance of addressing climate change issues. The two main strategies are mitigation to reduce greenhouse gas (GHG) emissions and adaptation to plan for changes and build resilience. The recommendations in this section focus on mitigation.

According to the BC Climate Action Charter¹, “governments urgently need to implement effective measures to reduce GHG emissions and anticipate and prepare for climate change impacts.” Reducing GHG emissions is the responsibility of everyone, especially places that use more fossil fuels than elsewhere (such as Canada¹). Highlands committed to achieve the goals of (i) being carbon neutral in respect of operations by 2012, (ii) measuring and reporting on community GHG emissions profile, and (iii) creating complete, compact, more energy efficient communities. In conjunction with UBCM, a set of tools has been assembled online to help municipalities take action (climate action toolkit²).

References

1. http://www.cd.gov.bc.ca/ministry/whatsnew/climate_action_charter.htm
2. <http://www.toolkit.bc.ca>

Recommendation 3: Quantify and report GHG emissions

Whereas Highlands committed under the Climate Action Charter to measure and report on our GHG emissions profile, and whereas direct measurement of GHG emissions can be challenging given our limited human and financial resources,

The STF recommends that council adopt the Community Energy and Greenhouse Gas Emissions Inventory estimates produced by the province and Hyla Environmental Services as our 2007 base scenario, and coordinate with this service and the CRD for future updates to estimates as polices and changes get implemented.

Significance: high

Level of support from STF: unanimous

Difficulty: low

Timeframe: immediate

Implementation guidance

Provided council and staff are comfortable with the estimates in the above report, this can avoid the technically challenging task of accounting for GHG emissions, and make implementation very simple. The Community Energy and Greenhouse Gas Emissions Inventory (CEEI) estimates are imperfect (e.g. they don't adequately consider home heating and deforestation), but

represent the best available information at present. The CEEI update planned for November 2009 is aiming to account for some known areas of inconsistency in the 2007 report.

Once there is adequate quantification and reporting on GHG emissions, council can proceed with its obligations to establishing reduction targets.

Recommendation 4: Consider GHG emissions in decisions

Whereas Highlands commitments under the Climate Action Charter require a broader understanding, accounting and consideration of greenhouse gas emissions in municipal operations and decisions,

The STF recommends that council adopt a policy to explicitly include greenhouse gas implications on major decisions and request staff to include assessments of greenhouse gas implications in background information for major issues.

Significance: high

Level of support from STF: unanimous

Difficulty: moderate

Timeframe: immediate and ongoing

Implementation guidance

Quantifying GHG emission implications precisely may be challenging, but direction and general magnitude are generally much simpler. The primary capital stocks of carbon reside mainly in trees and soil, and to a lesser degree in buildings. The natural ecosystem can continue to sequester carbon from the atmosphere. The primary sources of carbon dioxide (CO₂) are from motorized transport and building maintenance (and manufacture of construction materials). Implementing this recommendation can partially be achieved via the sustainability appraisal form, and by using tools such as those available from Green Footstep (<http://www.greenfootstep.org/>).

Recommendation 5: Reduce GHG emissions in municipal operations

Whereas Highlands has committed to have carbon-neutral operations by 2012,

The STF recommends that council adopt a policy of monitoring GHG emissions in municipal operations, with a particular focus on decisions that change emission levels, and commit to reducing emissions over time.

Significance: moderate

Level of support from STF: unanimous

Difficulty: moderate

Timeframe: ongoing

Implementation guidance

Our municipal operations primarily produce GHG emissions in the municipal office, municipal vehicles and roads.

- a. Vehicles: Any future vehicles should be more fuel-efficient than the present vehicle. The energy use of the vehicle should be the lowest possible to achieve the required use.

- b. Office building: FCM administers Green Municipal Grants for alternative energy installations on municipal buildings (e.g. solar photovoltaic systems, solar hot water, geo-exchange). Staff could look into grant potential and inform council about opportunities.
- c. Roads: Road construction and maintenance: the longevity and life cycle of embedded GHG emissions should be included in road considerations.

In addition, achieving carbon neutrality may require purchase of carbon offsets (e.g. from Pacific Carbon Trust). Council may choose to request the CISSC to exploring this issue.

Recommendation 6: Acknowledge risk of dependence on fossil fuel and cheap oil

Whereas, the CRD and its citizens and businesses depend on oil and other fossil fuels for their economic welfare and their most critical activities, including transportation and food supply, and whereas there is mounting evidence that prices for fossil fuel could increase significantly,

The STF recommends that council acknowledge the risks posed by the end of cheap oil, commit to include energy issues in sustainability considerations, and aim towards reducing fossil fuel dependence.

The STF further recommends that District of Highlands request the Capital Regional District to either establish an Energy Vulnerability Task Force or to enable an existing body (e.g. Roundtable on the Environment) to produce background information, recommendations and funding needs on vulnerabilities and opportunities regarding energy reduction and production in the Capital Region regarding, but not limited to, educating the public, land use and transportation policies, energy efficiency programs, potential for alternative energy, food production capacity, supporting sustainable economic development, strengthening social and economic support systems, and preparing for energy emergencies.

Significance: high
Difficulty: low for Highlands
 moderate for CRD

Level of support from STF: unanimous
Timeframe: immediate

Implementation guidance

Energy, in particular petroleum, is the foundation of our economy, from local to global. Fossil fuels are the basis of transportation, food production (e.g. fertilizers), plastics, etc. Oil is a finite resource, and at some point production must flatten and start to decline. The point of maximum production is known as ‘peak oil’, after which costs of production and exploration will rise. Although there is much debate on this issue, some oil and gas experts suggest that peak oil could occur between 2005 and 2012. At the very least, there is a growing consensus that the era of cheap oil is ending. Market economics suggest that at minimum oil prices will increase substantially, leading to the period of ‘peak cheap oil’. High and volatile oil prices could dramatically affect our economy, and it would be prudent to be proactive. A number of cities have taken peak oil seriously, in concert with greenhouse gas and climate change actions. For example, the City of Portland, Oregon, struck a Peak Oil Task Force that produced background material and recommendations¹. As a start, Portland passed a resolution to set the stage and to demonstrate leadership both to their constituents as well as to other jurisdictions. In addition, the

Post Carbon Institute has prepared information to help carbon reduction strategies for municipalities².

The above resolution is strategic in nature to help Highlands consider action on this issue, and provides a template for other municipalities and regions, with goals to

- Recognize the importance of potential declines in global energy availability.
- Recognize links between energy, climate change and sustainability.
- Raise awareness of how peak oil could affect various aspects of the Highlands.
- Formalize energy considerations in planning and operations.

Implementation effort mostly coincides with needs of the Climate Action Charter.

References

1. City of Portland Peak Oil Task Force <http://www.portlandonline.com/osd/index.cfm?c=42894>
2. Post Carbon Cities: Planning for Energy and Climate Uncertainty. Available for purchase at <http://postcarboncities.net>

3. Climate change adaptation

Climate change predictions for our area indicate that we are likely to experience warmer wetter winters and warmer drier summers. While the net water balance is uncertain, it would seem that we may experience more winter storms and more freeze/thaw events, as well as longer drought periods in the summer. Recommendations focus on practical actions Highlands can take to prepare for anticipated climate changes (e.g. education, emergency preparedness, roads, fuel reduction strategies and water conservation), and are integrated with the other topic areas.

4. Transportation

Motorized transportation is the largest source of greenhouse gas emissions in Highlands, and Highlands has one of the highest road lengths per capita in the province (at 23m). As transport hits the core of our lifestyles, and the geographic and infrastructure layout of Highlands, it is a complex issue with no simple solutions. We believe that Highlands can reduce greenhouse gas emissions from transportation by improving policies and practices regarding motorized and non-motorized transportation that reduce energy consumption (fewer, shorter trips using more efficient modes of transport), deliver appropriate levels of service, and assure an emphasis on public policy and spending that reflects the values of respect for the environment and prudent use of natural resources. These will in turn positively affect the health of the Highlands population.

Sustainable transportation refers to human behaviour, as well as use of appropriate technology. The objective is to consider not only non-polluting and greener transport choices, regardless of means and technology used, but also individual and social emphasis to promote these choices.

Recommendation 7: Initiate ongoing dialog on transportation

Whereas, from a carbon reduction and energy perspective, transportation is the most significant issue facing Highlands, and requires a multi-faceted solution,

The STF recommends that council establish a mandate for the Community Infrastructure and Services Select Committee to discuss and make ongoing recommendations regarding transport options to reduce car use.

Significance: high
Difficulty: low

Level of support from STF: unanimous
Timeframe: immediate

Implementation guidance

Sustainable transportation is a huge topic, and an Achilles' heel for a sustainable Highlands, as transportation is by far the largest source of GHG emissions. No single solution will reduce our dependence and frequency of automobile use, but many solutions enacted over time could add up to significant changes.

Recommendation 8: Improve pedestrian and non-motorized corridors

Whereas the majority of commuting from Highlands is along Millstream Road,

The STF recommends that council prioritize a multi-use trail near Millstream Road from Caleb Pike House to the border with Langford, preferably away from the road, the primary purpose of which is to provide non-motorized commuting alternatives.

Significance: high
Difficulty: high

Level of support from STF: unanimous
Timeframe: mid to long-term

Implementation guidance

Council should place a priority on provision and improvement of trails and corridors for non-motorized and high efficiency vehicle use (pedestrian, cycling, horseback riding, skateboarding, long-boarding, scooters) with a priority on the north south connector between the southern boundary near the Municipal Office and the Caleb Pike centre, with connections to Munn Road and the Thetis Lake trail system. Programs may include improvement to existing trails and establishment of near-road trails and point-to-point connectivity (non-roadside) trails. Council has prepared for more multi-use trails by formalizing the trails standards to support application for appropriate grants. This recommendation puts an emphasis on the Millstream corridor as the highest priority focal point for trails development.

Recommendation 9: Improve public transportation, park & rides, and carpooling

Whereas council should take a proactive approach to reducing automobile use and improving efficiency (e.g. reduced number of trips, shorter length of trips, traffic calming and slower-vehicle pull-outs), including supporting public transport, park and ride opportunities and connectivity links with Capital Regional District municipalities,

The STF recommends that council write a letter to BC Transit to communicate the importance of shuttle service in the Highlands. If and when a community centre is established, that council further write to BC Transit communicating the importance of a transit connection adjacent to the centre.

The STF further recommends that council identify and establish potential park and ride locations near shuttle stops, to support diversified links to urban centres.

The STF further recommends that council work with the HDCA and other community organizations to promote carpooling and to designate a central place where people can meet for carpooling near an existing shuttle stop, provide residents with information on the benefits of carpooling, and explore methods to help facilitate carpooling and communication (e.g. online scheduling, car-stop program).

Significance: high

Level of support from STF: unanimous

Difficulty: high

Timeframe: immediate

Implementation guidance

Other than the letter to BC Transit, the various initiatives in this recommendation may best be referred to the CISSC for consideration and prioritizing. Consideration should be given to the advantages of linking community centre and village centre concepts with park and ride, and park and carpool locations.

Recommendation 10: Adopt the Near Zero Emission Vehicles (NZEV) Policy

Whereas the CRD has created a model low-speed, low emissions vehicle bylaw for vehicles that cannot exceed 40 km/h (Near, or Neighbourhood, Zero Emission Vehicles), and whereas lower speeds reduce energy consumption,

The STF recommends that council adopt the CRD NZEV bylaw and designate appropriate roads with speeds of 40 km/h or lower as NZEV roads, and consider establishing other key connector roads under the bylaw where roads or transportation corridors may be designed to safely facilitate such vehicles, such as Munn Road, Finlayson Arm Road, Caleb Pike Road and Millstream Road,

Significance: moderate

Level of support from STF: majority (2 opposed)

Difficulty: moderate

Timeframe: immediate

Implementation guidance

The CRD has done the groundwork on a bylaw. Council needs to identify which roads in the Highlands are appropriate for the NZEV bylaw from road location/corridor and road standards/condition perspectives, with safety as a paramount consideration. Public consultation will be required. This matter may be referred to the CISSC for recommendations. The main reason at present to consider this is to prepare for a more region-wide NZEV network, given the limited connections with such routes at present.

5. Sustainable building

Sustainable building within the Highlands is a broad and diverse topic covering the actual structures, total energy and water use, total resource use, land use planning, ecological

connectivity, affordable housing, demographics, community building, and education. All of these relate either directly or indirectly to GHG emissions and rising costs of fossil fuels. All topics are intimately interconnected and must be considered as a whole rather than piecemeal. The focus should be on upgrading existing housing stock to become more energy and water efficient while requiring that all new construction have a minimal environmental impact including all new GHG emissions.

The built environment impacts total green house gas emissions on three levels, and far more than current graphs for sources of municipal GHG's account for. Most inventories of sources of GHG's only take into account the building operations and not the other major sources of GHG's:

1. *Reduced carbon sequestration in modified landscapes.* The footprint of new structures or other damage to existing ecosystems (loss of biodiversity) usually results in less sequestered carbon. Creating 'Living Buildings' that enhance the local biodiversity reduces this impact with dwellings that function as an integral part of the ecosystem that sustains them where resources, energy, and water flow between the dwelling and the environment thus fully connecting the inhabitants to the land.
2. *The carbon footprint for the manufacture and transport of the materials, and the construction of the structure.* Building style and use of local materials can greatly reduce this impact while at the same time stimulating the local economy (e.g. concrete used in the built environment is a significant source of GHG's). Increasing the life cycle of the structure reduces the amortized carbon footprint; this is called full life cycle cost analysis (e.g. rammed earth and cob homes easily can last 500 years). Certain types of natural buildings also have the ability to lock up large amounts of carbon in the form of cellulose (e.g. log homes, light clay and wood infill).
3. *The accumulating carbon footprint for the lifecycle of the buildings operations.* Building design, occupant habits, and green energy use can greatly reduce this carbon footprint. Building passive solar is the most cost effective energy saving technology available.

Recommendation 11: Create new Net Zero Zones (net zero energy, water and waste)

Whereas land use planning that considers all aspects of sustainability will increase the resiliency and inclusiveness of our community in the face of climate change and peak oil,

The STF recommends that council endorse the creation of new *NET ZERO* zoning that encourages mixed land use, increased density, and protective covenants to achieve truly sustainable buildings and lifestyles.

Significance: high

Level of support from STF: unanimous

Difficulty: low to start

Timeframe: immediate

possibly high to complete

Implementation guidance

This is a relatively simple way for council to help implement sustainable building and avoid prescriptive zone requirements by creating community based functional objectives of land use.

The recommendation focuses on a first step of endorsing in principal the merit of exploring this idea, after which council may choose to refer to the CISSC for further discussion and exploration, and to recommend next steps. Following are some initial ideas and elements of net zero zoning that might be considered in further explorations.

The term ‘land use’ implies ‘consuming’ the land. The land with this new zoning needs to be biologically productive now, in 5 years and in 500 years. This new zone should likely only occur on appropriate transportation corridors (*Refer to recommendations on sustainable transportation*), if and when new development is proposed. Some characteristics of net zero zoning may include:

- a. *Net Zero Zone (NZZ)* Higher density with protection of ecologically sensitive lands. (*Refer to recommendations on ecological connectivity*)
 - i. Clustered dwellings with size limitations
 - ii. Centralized energy and water systems; Net Zero energy and water.
 - iii. Zero waste (e.g. composting garden waste, recycling, composting toilets).
 - iv. Local food production (*Refer to recommendations on local food production*), and xeriscaping
 - v. ‘Green Building Scheme’ utilizing sustainable local building methods (post and beam, light clay infill, cob, other local and earthen architectural building styles).
 - vi. Built on previously impacted land or compensatory habitat created or otherwise justified
- b. *There could be three or more potential types of NZZ*
 - i. **NZZm** - **Municipal** land owned by the Highlands
 - Affordable housing (*Refer to recommendations on affordable housing*)
 - Individual dwellings owned by the home owner but land is owned municipally
 - ii. **NZZc** – **Community** land jointly owned by the inhabitants (common tenure such as strata)
 - iii. **NZZp** – **Privately** owned lots that have upgraded to net zero energy, net zero water, and zero waste
 - In established neighbourhoods, this zone could allow secondary suites (with, e.g., a maximum of 600 sq. ft.) in a small, detached dwelling or within the existing home – the secondary suite must also be net zero.
 - Neighbourhoods could also work together.
 - An alternative to creating new NZZp zones may be to allow all existing zones to have an NZZ ‘option’ (e.g. an NZZ ‘registry’ structured similarly to the registry maintained for ‘rezoning done with family considerations’). Home and land owners might apply for their property to join this option without the rezoning process. Joining the registry could entail a commitment on the property owner to reduce water and energy use to some sustainable benchmark levels (and perhaps following a plan submitted by the property owner with targets and timeframes). As a benefit, properties included in the registry might have access to certain incentives and support offered by the municipality to reach their plan targets.

Recommendation 12: Adopt ‘flush toilet ready’¹ and other green building policies

Whereas flush toilets account for 30% of indoor domestic water use, while septic systems and fields result in significant loss of habitat, may pose groundwater contamination risk, and the materials used are a significant source of GHG’s, and

Whereas there is a benefit of resource recovery within a composting toilet, and

Whereas waste treatment systems are a significant financial cost to homeowners, and there is a potential demand by homeowners for non-septic systems,

The STF recommends the adoption of a flush toilet ready policy and other green building policies that can be demonstrated to meet the functions and safety objectives of the building code while protecting the interests of future owners.

Significance: moderate

Level of support from STF: unanimous

Difficulty: low

Timeframe: immediate

Implementation guidance

Flush toilet ready for new home construction would allow new homes to be constructed without an installed flush toilet. The onsite waste treatment system would be engineered by a registered onsite wastewater practitioner (but not installed), the septic field site would be set aside in a covenant, and all black water pipes would be installed into the new home. A site appropriate grey water system would then be installed and the homeowners would then be free to install a composting toilet. Hence, a waste disposal system would be replaced by a resource recovery system. This recommendation effectively requests council to ask the Highlands Building Official to prepare a draft bylaw for ‘Flush Toilet Ready’ to submit to council for consideration.

Recommendation 13: Explore incentives for energy and water home upgrades

Whereas most ongoing sources of GHG’s in the built environment arise from the existing housing stock, and

Whereas all new construction within the Highlands has a negative impact on the environment and contributes to increases in total GHG’s,

The STF recommends that council explore the feasibility of creating a grant or incentive program to encourage individual water and energy upgrades for existing homes.

Further, the STF recommends that council adopt a green building standard to provide an objective basis for measuring changes to existing houses.

¹ “Flush toilet ready” refers a home with an engineered, but not constructed septic system, and with installed plumbing, but not an installed flush toilet.

Further the STF recommends that council explore the feasibility that all new construction (including renovations) pays a carbon tax offset to the community to be used to achieve carbon reductions in other areas within the community.

Significance: high
Difficulty: high

Level of support from STF: majority (1 opposed)
Timeframe: immediate and ongoing

Implementation guidance

In general, the goals should be to incur no net cost, other than staff time. Council may choose to refer this to the CISC for further consideration and to identify specific steps the municipality may take. The CISC may choose or be requested to look at several green building standards and recommend one to council. Consideration needs to be given to ensure these are aimed at people with the highest need, where the return is highest, and ways to ensure objective quantification of potential benefits.

- a. The program could be funded from carbon offset payments for new construction and renovation projects based on an appropriate carbon footprint calculator. This is already part of many existing ‘Green Building’ programs. This creates financial incentives to build more sustainably without the use of a prescriptive policy. Simple and objective methods of calculating offsets need to be applied. Other funding sources may be considered as well.
- b. Incentives for:
 - i. Low flush, dual flush, and no flush composting toilets
 - ii. Energy and water efficient appliances (e.g. front loading washing machine)
 - iii. Grants for rain water storage cisterns (e.g. 20% of cistern cost up to a max of \$500)
 - iv. Fully subsidized City Green Audits (see <http://www.citygreen.ca>)
 - v. Municipal matching of grants already offered (through City Green) for up to 20% in addition to other grants. Maximum \$500 per homeowner (e.g. if a home owner receives \$2000 from federal, provincial and other grants for energy upgrades, Highlands would contribute another \$400)
- c. All grants available on a first come first served basis as funds are available in the Highlands Grant Program account.
- d. Part time staff may be hired to oversee this program with expenses paid for out of the grant program account.

Recommendation 14: Adopt a no net increase policy for water and energy use

Whereas it is accepted that energy resources and water available to the Highlands are not unlimited, and

Whereas costs of energy are going to continue to rise, while climate change will potentially cause more interruptions in energy supply, and

Whereas water resources for drinking and food production are an essential requirement for all life in the Highlands, yet climate change poses risk to dry-season ground water levels when it is most needed,

The STF recommends that the Highlands adopt a vision of no net increase in community water use and reduced per capita energy use.

Significance: high
Difficulty: high

Level of support from STF: majority (1 opposed)
Timeframe: immediate and ongoing

Implementation guidance

This recommendation establishes a goal of explicitly considering water and energy use within the community during decisions. Aiming towards no net increase in water use implies that increased use in one area (e.g. new construction) is offset by efficiency gains or reductions in another area (e.g. installation of low flow toilets). The recommendation of ensuring access to water for local food production needs to be balanced with the goal of no net increase in water, and the critical need of keeping water use within sustainable limits. As such, council should consider all water related recommendations together. Council may also choose to refer this aspect of the recommendation to the Ground Water Task Force.

Aiming towards no net increase in per capita energy use implies that council will work to help reduce the energy usage of each person and each household through incentives, education and other policies. Monitoring this poses some challenges, and so council may choose to refer this aspect to one or both advisory committees to explore further steps once the vision is adopted.

Policies to meet the vision of this recommendation may be considered in the Official Community Plan. In addition, tools could be created or identified to determine base line energy use (electricity) and water use totals for the entire community, from BC Hydro and the ground water task force (*Refer to recommendations on water management, and Ground Water Task Force*). Consideration could also be given that would require all new structures to be *either* net zero (energy and water) *or* make an *offset payment* into a grant program so that funds can be available for energy and water upgrades on existing homes. This requirement would by its very nature likely cause new construction to be passive solar and highly efficient with regards to energy and water usage and will help to create a more resilient community well into the future.

6. Energy and resource use and conservation

Canadians use more energy per person than all other countries in the world except for Iceland and Luxemburg - in fact, we use 2.5 times more energy per person than the average of all developed countries¹. Highlanders live in relatively large, energy inefficient houses, at low density, and consume significant quantities of goods. After transportation, our energy and resource consumption is our 2nd largest source of carbon dioxide (CO₂) emissions.

There is tremendous scope to improve our energy and resource consumption patterns. Highlands has the opportunity to innovate, prosper and to positively influence others. Highlands council and community groups can act as highly effective catalysts in Highlands' quest to conserve energy and to reduce consumption. To create results, efforts should be focused in three strategic areas: (1) Facilitating deployment of economic and near economic technologies, (2) Building an ethic of conservation, and (3) Challenging our 'consumption status-quo'.

References

1. World Resource Institute, International Energy Agency (IEA) 2005 data, http://earthtrends.wri.org/searchable_db/index.php?theme=6&variable_ID=351&action=select_countries.

Strategic Focus 1 – Facilitating deployment of energy technology

Recommendation 15: Use local improvement charges to finance energy technology installations

Whereas adoption of energy efficiency and alternative energy technologies is low due to high initial costs and a reluctance to assume additional personal debt, and

Whereas there are many off-the-shelf technologies that provide an economic or near-economic rate of return while significantly reducing energy use and CO₂ emissions, and

Whereas homeowners' projects are typically too small to access carbon credit revenue and community level 'carbon aggregators' do not yet exist,

The STF recommends that council create the ability to levy a Local Improvement Charge (LIC) line item on municipal taxes that would allow financial institutions to pay for the high upfront cost of energy efficiency or alternative energy technology installation and to recover this cost over a long period of time through annual repayments that stay attached to the home.

Significance: high

Level of support from STF: unanimous

Difficulty: moderate

Timeframe: 1 year

Implementation guidance

This approach removes the largest barriers to higher adoption of energy efficiency and alternative energy technologies. Homeowners select the kinds of equipment (e.g. heat pumps, solar hot water) or upgrades (e.g. insulation, duct sealing) based on economic return or their desire to live more sustainably. A financial institution pays for the entire up front cost of the installation and enters into a simple agreement with the municipality for the annual amount to be repaid by the homeowner, which typically is the total up front cost portioned out over the 10-40 year service life of the equipment or upgrade plus a modest profit margin (2-6%). Highlands municipality can likely secure a small incremental source of revenue by charging a reasonable service fee.

Homeowners may like this because:

1. No up front cost, no additional debt
2. Payments are smaller as they are spread out over the service life of the equipment as opposed to traditional banking timeframes of 5-8 years for these types of loans
3. If they decide to move, the outstanding cost of the upgrade stays with the house, which now has a 'green' selling feature
4. Energy bills are likely to go down, and they will feel good about living more sustainably

Progressive minded financial institutions will be likely to do this because:

1. The default rate on municipal taxes is similar to that on utility bills at <1%. This is the reason no contract is required with the homeowner.
2. The per-house cost of upgrades and new technology can easily reach \$10,000 to \$30,000, which is an attractive way to grow their loan books.
3. The opportunity to aggregate the carbon offset credit revenue for the community will now exist, which could raise the modest return on funds lent to a level acceptable to the institution's investors.
4. The opportunity to organize and promote this program in the community will give them a new product to entice new customers to their institution.

Action plan for council:

1. Seek legal counsel or an example (e.g. would the District be a guarantor?)
2. Create a list of the types of applicable projects
3. Solicit interest from local financial institutions (e.g. Vancity, Island Savings). There are interested Highlanders who would be able to assist
4. Request proposals from interested institutions; they would have to organize, promote, and manage the program
5. Create the municipal capability to levy the Eco-LIC line item on taxes
6. Obtain legal counsel on how to structure standard form contracts
7. Green light the financial institution to roll out their program

Recommendation 16: Initiate a Mayor's eco-challenge

Whereas friendly competitive tension between municipalities to achieve energy conservation or alternative energy generation targets could move residents to act while simultaneously strengthening the fabric of Highlands community,

The STF recommends that the Mayor issue an Eco-Challenge to neighbouring Victoria municipalities.

Significance: moderate

Level of support from STF: majority (1 opposed)

Difficulty: moderate

Timeframe: 6 months

Implementation guidance

The Mayor's Eco-Challenge should be for a commercially available technology or practice that is likely to produce both environmental and economic benefits. Several technologies that presently fit this category include:

- a. Weatherization (e.g. adding attic insulation, crack/hole sealing)
- b. Solar hot water
- c. Air source heat pumps

For example, the Mayor could issue a '10% solar hot water' Eco-Challenge to Langford's mayor. The first municipality to achieve the installation of solar hot water heaters on 10% of their homes would capture the prize. Inter-community links would be created as task forces from both municipalities collaborate on ways to achieve the Eco-Challenge.

Action plan for council:

1. Convene a small group of Highlands volunteers who are familiar with energy efficiency and alternative energy technologies. Task the group to recommend a short list of Eco-Challenge technologies or practices and to outline the pros and cons of each from technical, economic, implementation, and political perspectives.
2. Select the Eco-Challenge technology at a Committee of the Whole
3. Mayor to issue the Eco-Challenge to neighbouring municipality
4. Both councils to establish joint task forces to create an Eco-Challenge implementation plan that will address issues such as how to generate interest, how to communicate, how to measure success, etc.

Strategic Focus 2 – Building an ethic of conservation

Recommendation 17: Support the BC carbon tax

Whereas Highland's largest source of CO₂ emissions come from transportation, and

Whereas many Highlanders commute into Victoria in fuel-inefficient vehicles, carrying no passengers, and

Whereas incentives are one of the most effective ways to modify behaviour and Highlands has limited ability to introduce consumption incentives,

The STF recommends that council write a letter of support for the BC Carbon Tax to the Premier and relevant Ministers and attempt to get other greater Victoria municipalities to write similar letters.

Significance: low

Level of support from STF: majority (1 opposed)

Difficulty: low

Timeframe: 1 month

Implementation guidance

Imposing a Highlands tax on transportation would be exceedingly difficult politically, despite the fact that doing so would achieve the highest possible reductions in transport resource consumption and carbon emissions. Purchases of small cars increased in 2008 as oil prices rose to nearly \$150 per barrel. Be it high oil prices or carbon taxes, an escalating price on carbon consumption and emission is essential. The BC Carbon tax is a first step in this direction.

Recommendation 18: Catalyze a Sustainable Neighbourhoods Project

Whereas making progress towards sustainable living requires a combination of economic incentives and behaviour modification, and

Whereas behaviour modification is easiest to achieve if there are local success stories created by residents, and

Whereas sustainable communities have strong social fabric that can be created through shared experience on projects of value to the community,

The STF recommends that council request the Highlands District Community Association to lead and embark on a ‘Sustainable Neighbourhoods Project’.

Significance: high

Level of support from STF: unanimous

Difficulty: low (for council)

Timeframe: 6 months

Implementation guidance

BC Hydro has come to the conclusion that presently available economic incentives are insufficient to achieve large-scale energy conservation. Behaviour modification has been recognized as the missing link. This conclusion applies not only to electricity but to general consumption as well.

How it could work:

The HDCA identifies and engages a ‘*Pilot Neighbourhood*’ of Highlands residents that are amenable to and already thinking about sustainability concepts. This could be linked with the existing Highlands Emergency neighbourhood groups. A skilled local facilitator could be appointed to gather the residents and to lead a discussion about how the ‘*Pilot Neighbourhood*’ could become an example of sustainable living. A documented project plan would include a baseline and targets for future evaluation. The timeframe of the project could be 1 year - long enough to evaluate trends over all four seasons, short enough to be motivational and to provide results for replication by subsequent ‘*Sustainable Neighbourhoods*’. A dedicated web page on the Highlands municipal site should be constructed to allow for information and success sharing. Curb-side or street signage recognition of achievement of the sustainability goals could be conferred by council, upon recommendation by the HDCA.

Strategic Focus 3 – Challenging our consumption status quo

Recommendation 19: Create a ‘Consumption Status Quo’ brochure

Whereas sustainable living will require us to challenge our current assumptions about the levels of consumption that are required to satisfy us, and

Whereas there are many examples from around the world of consumption choices that not only benefit the environment but also increase quality of life,

The STF recommends that council commission a small brochure, book, or pamphlet that focuses on ‘Challenging our Consumption Status Quo’ and distribute it to all Highland residents.

Significance: moderate

Level of support from STF: unanimous

Difficulty: moderate

Timeframe: 1 year

Implementation guidance

Highlands is fortunate to have a pool of highly creative and knowledgeable residents, a few of whom could be assembled into a volunteer group that would create the material for the brochure, book, or pamphlet. It might also be possible to hire a student (e.g. a co-operative education student from UVIC).

The tone should be light and humorous, but the intent serious and practical. Government and non-governmental organization grant funds should be sought for professional printing and distribution to every home in the Highlands. Regional or even international notoriety could be possible.

An example of a ‘consumption status-quo’ challenge is as follows:

“I live on an acreage therefore I need a pickup truck to transport blankety blank_____.”

Rebuttal:

“There are virtually no large pick ups in Australia, even in the outback. What you do see is 2/3 of all passenger cars with ball hitches for light trailers that are more than sufficient for carrying lumber, plywood, landscaping material, and other bulky items. Consider the savings both financially and environmentally next time you go to purchase a vehicle. Why not upgrade by decreasing size now?”

7. Water management

The climate of British Columbia is changing, and with these changes will come adjustments in watershed hydrology. As a result, the District of Highlands has been proactive in initiating a three-year groundwater study to provide the Highlands with the necessary tools and information to support the protection and conservation of the groundwater source. Since over 90% of Highlands’ residents depend upon a groundwater source for their domestic water supply, the next step should complement the groundwater monitoring program with active conservation and quality control measures at the individual household and community level.

This individual ‘closed loop’ household management approach will be comprehensive, including, but not limited to, water and energy conservation, water reuse, onsite sewage and domestic well management, rainwater harvesting, xeriscaping and an effective community education program. This conservation initiative will also depend upon changing behaviour, attitudes and values and a water ethic encouraged by council, the Groundwater Task Force and supporting community groups, such as the Highland District Community Association and the Highlands Stewardship Foundation.

It is important to note integration with other related components of the Highlands community water strategy such as watershed management, protection of the surface streams, wetlands and lakes, and recognizing the essential ecological role these elements provide as freshwater ecosystems.

Recommendation 20: Implement a water/energy household self-audit program

Whereas water sustainability relates to every element and decision within the Highlands and hence affects the environmental, social and economic stability within the community,

The STF recommends council endorse implementing a water/energy household self-audit program that provides relevant information to the homeowner to enable the adoption of effective conservation measures.

Significance: high
Difficulty: moderate

Level of support from STF: unanimous
Timeframe: immediate

Implementation guidance

Council may consider a cost sharing formula to encourage individual homeowners to identify conservation opportunities through an audit program and to provide each household with a conservation manual. It is estimated that water savings of 30% to 50% can be achieved in household use through the adoption of water saving devices, water reuse and rainwater harvesting.

Recommendation 21: Create a Highlands Water Smart incentive program

Whereas adoption of the Highlands Water Smart program will first identify conservation measures that will yield the maximum return in water savings with minimum effort,

The STF recommends that council initiate the creation of a Highlands Water Smart program that includes implementing and promoting dual flush toilets, composting toilets, showerhead retrofits, and installation of efficient appliances.

Significance: high
Difficulty: low

Level of support from STF: unanimous
Timeframe: immediate

Implementation guidance

The Highlands Water Smart Program will be a proactive initiative meeting the objectives of the provincial Living Water Smart Program². Council could choose to endorse the creation of a Highlands Water Smart Program in principal and refer to the CISSC for more detailed consideration and recommendations on how to roll out the program. Consideration should be given to a grant to encourage installation of efficient fixtures including dual flush toilets, showerheads, laundry and dishwashing machines.

The provincial plumbing code currently states that within the CRD all new construction or toilet replacement must include low flush toilets using 6 litres per flush or less and showerheads not exceeding 9.5 litres per minute. Highlands does not qualify for the CRD rebate program for either toilets or washing machines since the community is not on a centralized system. Given the importance of sustaining the groundwater source this policy should be discussed further with the CRD with the aim of being included within the regional rebate program.

² www.livingwatersmart.ca

Recommendation 22: Build a community water education strategy

Whereas the STF identified water as a fundamental interrelated set of issues for the community that includes watershed management, water quality and quantity, groundwater, storm water, lake stewardship and climate change, and

Whereas it is important to integrate information received from the Groundwater Task Force with the findings of the STF as well as with the Highlands Stewardship Foundation and the Highland District Community Association,

The STF recommends that council endorse information exchange and collaboration on a range of water related issues with community groups such as HDCA and HSF, and Eco-Sense on the delivery of educational programs.

Significance: high

Level of support from STF: unanimous

Difficulty: moderate

Timeframe: ongoing

Implementation guidance

Education and knowledge transfer will be an essential component of a successful water sustainability strategy. In combination with workshops, a groundwater model could be purchased for educational purposes. Consider creating a video demonstrating ‘closed loop’ household management issues.

Recommendation 23: Promote rainwater harvest, xeriscaping and efficient irrigation

Whereas Highlands is committed to a community conservation strategy, and it is recognized that outdoor irrigation practices can consume an inordinate amount of water,

The STF recommends that council encourage rainwater harvesting, xeriscaping with native plants and the adoption of efficient irrigation practices.

Significance: high

Level of support from STF: unanimous

Difficulty: moderate

Timeframe: ongoing

Implementation guidance

Rainwater harvesting is still in its early development stage in Canada. However Australia, through necessity, has adopted and refined it to the point where rainwater harvesting has become general practice. The results are convincing, for example a pilot project in New South Wales stores rainwater in tanks and uses it for hot water supply and toilet flushing noting a saving in water use of around 45% with considerable cost savings. Similar experiences have been the case in Germany. The Eco-Sense cob house in the Highlands provides an excellent local example of a successful application of rainwater harvesting. Xeriscaping has also shown that water savings of up to 50% can be achieved by planting native plants and adopting efficient practices such as drip irrigation.

Recommendation 24: Manage storm water as a resource

Whereas storm water is a by-product of development, and it is recognized that storm water runoff can and should be treated as a resource,

The STF recommends that storm water and surface runoff is managed such that impervious paved areas are reduced, and that storm water where possible is treated at source and returned to ground, both of which result in reduced flooding and augmentation of the aquifer and surface streams. Low Impact Development (LID) is to be encouraged throughout the planning and construction phase of development.

Significance: high
Difficulty: moderate

Level of support from STF: unanimous
Timeframe: ongoing

Implementation guidance

The Water Balance Model (WBM) is an effective planning tool to address storm water management³. The WBM is a tool to set performance targets that will protect watershed health by reducing runoff volume, hence maintaining the natural water balance and as a result, protect the groundwater resource and sensitive watercourses. When applied to land use planning decisions, the WBM assists in retaining pre-development hydrology on a developed site. The District of Highlands is a member of the Intergovernmental Partnership (IGP) that administers the WBM program.

Recommendation 25: Adapt to changes in precipitation due to climate change

Whereas potential climate change impacts on water supplies and changes in precipitation have been identified locally in the Groundwater Management Study, and globally in the UN IPCC climate change assessment scenario forecasts,

The STF recommends that council make land use decisions based on changes in, and projections of, aquifer levels, snow loads, extreme rain and droughts, as appropriate for Highlands, and revise snow load requirements, road drainage, and locally-adapted fire smart guidelines as needed.

Significance: high
Difficulty: high

Level of support from STF: unanimous
Timeframe: ongoing; long-term

Implementation guidance

Council could choose to take action, as appropriate, on the following issues:

- Request the ground water task force to monitor changes in aquifer levels, snow loads, extreme rain and droughts.
- Review snow load requirements for new construction as needed, as local conditions may exceed posted expected differences in updates to the national building code.
- Consider revision of a draft District 100-year floodplain map to ensure increased winter flooding does not impact new building construction setbacks and septic field locations.

³ The Water Balance Model can be viewed at: <http://bc.waterbalance.ca/>

- Consider any new road or drainage channel construction with the view that more intense storms are to be expected.
- Adapt guidelines (e.g. Fire Smart) and educational information, with the Emergency Coordinator, to help residents reduce fire risk around homes while taking into account synergies with ecological values (e.g. open areas for arbutus/wildflower ecosystems) and likely future forest conditions, with the view of potential increases in summer drought, and hence wildfire risk.

Enacting these steps would help increase the tools available, in conjunction with further knowledge of groundwater, surface water and potential climate change impacts, to address watershed management as well as land use decisions from an integrated and long term perspective.

Council may choose to ask the Groundwater Task Force, FESC and/or CISSC, as appropriate, to explore these issues further and refine action steps.

Recommendation 26: Use dynamic groundwater forecasting

Whereas water balance models do not account for seasonal changes in rainfall and so may not deal adequately with heavy winter rains or summer droughts that may be expected with climate change,

The STF recommends that council request the ground water task force to explore the use of a dynamic groundwater forecasting tool.

Significance: high

Level of support from STF: unanimous

Difficulty: high

Timeframe: medium term (3-5 years)

Implementation guidance

A first step may be to ask the Groundwater Task Force and FESC to develop an implementation strategy. As this could be expensive, budgeting will be important.

8. Ecological conservation and green space connectivity

Green space connectivity at local-to-regional scales is essential for the persistence and resilience of natural populations. Connections allow habitats depleted by disturbance to be re-colonized (and often to recover toward its previous state). Even in the absence of severe disturbance, connectivity helps maintain within-region genetic and taxonomic/structural diversity. Connection corridors are especially important where the local populations and their individual habitat patches are small in size. Patch and connectivity requirements vary among species. But in general, native animal species prefer ‘undisturbed’ habitat and corridors that provide enroute cover and refuges. Animals that are bigger, more mobile, or more reclusive require bigger patches of habitat, and broader connecting corridors. Conversely, the connectivity corridors for people (especially paved corridors for motorized vehicles) are barriers (sometimes lethal barriers) for native animals and plants.

The integrity and connectivity of Highlands ecosystems are important at more than one scale. At the largest (provincial to global), the Highlands contain one of the few remaining ‘large’ areas of the Coastal Douglas-Fir ecological zone (one of the smallest, and most taxonomically diverse, of the 14 biogeoclimatic zones in B.C.). The integrity of the CDF ecozone is threatened by the fragmentation that has accompanied expanding human settlement, and also by invasive species. Preservation of representative and intact areas within the Highlands is a significant stewardship responsibility. At the regional scale, the District of Highlands forms the main corridor between the Saanich Peninsula and the coastal forest and upland that extend west to Port Renfrew and beyond. The location and role of the Highlands is recognized in the regional system of parks and conservation areas. However, important corridors and habitat patches continue to be lost from the region¹. Region-wide analyses of present ecological connectivity, and ongoing commitments to future connectivity, would be both timely and cost effective (experience in other jurisdictions has shown that restoration is almost always more expensive than preservation).

Recommendation 27: Protect/restore natural habitat representative of the Coastal Douglas-Fir ecological zone

Whereas the Coastal Douglas-Fir ecological zone is one of the smallest and most taxonomically diverse of the 14 biogeoclimatic zones in B.C., and is seriously threatened by the fragmentation that has accompanied expanding human settlement as well as by invasive species, and

Whereas the District of Highlands contains some of the last remaining contiguous and relatively intact areas of CDF habitat,

The STF recommends that council adopt ‘protection and restoration of representative Coastal Douglas-Fir habitat’ as a key objective for existing and new zoning, development permit, tax incentive, and land acquisition decisions.

Significance: high

Level of support from STF: majority (1 opposed)

Difficulty: low to moderate

Timeframe: immediate and ongoing

Implementation guidance

Within the Highlands, much of the area protected to date as public parkland has been the high, dry ridges (Gowlland-Tod Provincial Park, and Lone Tree, Mount Work and Thetis Lake Regional Parks). Lowland/wetland corridors have been less protected, more occupied and more fragmented. Within-Highlands diversity and interconnection of habitat types is essential to maintain local species diversity, and also to allow many organisms to satisfy their needs in different seasons and phases of their life cycles. The District can and should maintain and enhance areas of Coastal Douglas-Fir habitat & connecting corridors by acquiring new publicly-owned green space (e.g. through ecological gift programs) AND by developing zoning, taxation and land use policies that encourage strong and enduring protection of privately-owned green space.

Recommendation 28: Catalyze a region-scale analysis of green space connectivity

Whereas the District of Highlands provides the main green space connection between the Saanich Peninsula and the coastal forest and upland of the Sooke Hills (and beyond), and

Whereas green space corridors must connect across municipal boundaries to be effective at the regional and larger scale,

The STF recommends that council propose to CRD a region-scale analysis of the requirements, opportunities, and obstacles for good ecological connectivity.

Significance: high

Level of support from STF: unanimous

Difficulty: low to moderate

Timeframe: one to three years

Implementation guidance

The importance of the Highlands to region-scale ecological connectivity is recognized in the regional system of parks and conservation areas. However, adjoining and connecting corridors and habitat patches continue to be lost from the region. Region-wide analyses of present ecological connectivity, and ongoing commitments to future connectivity, would be both timely and cost effective (experience in other jurisdictions has shown that restoration is almost always more expensive than preservation).

Recommendation 29: Minimize adverse barrier and corridor effects of infrastructure

Whereas roads, wide and clear-cut road verges, and power lines act as barriers to the normal and necessary movements and migrations of many native species, and

Whereas the same landscape features, plus their use for transporting freight and people, can greatly increase the rate and extent of colonization by harmful invasive species,

The STF recommends that council include ecological connectivity in the design and maintenance of roadways and power line corridors

Significance: moderate

Level of support from STF: unanimous

Difficulty: low to moderately high
(depending on species and situation)

Timeframe: ongoing

Implementation guidance

A number of decision tools (see <http://www.wildlifeandroads.org/>) are available to mitigate the risk to wildlife of road crossings (e.g. identification of key wildlife corridors, separation of road and wildlife corridors when possible, warning signage, wildlife overpass and culverts, and roadside barricades and channels when road-corridor separation is not feasible). Transport inspections, extent and frequency of clearance along roadways and power lines, removal of invasive plants, and replacement by suitable native plantings, can all be used to limit the spread of invasive species. (BC Hydro should become part of the solution instead of part of the problem)

References

1. Between 1992 and 2002, 1,722 hectares of sensitive or important ecosystems were disturbed by logging, housing, road development and other human activities. Victoria's Vital Signs 2007, Victoria Foundation. Available online at:

http://www.victoriafoundation.bc.ca/web/files/VICFO_4253_VitalSigns_FINAL_0.pdf

9. Local food production

Locally grown food contributes to community sustainability by reducing the carbon footprint resulting from long distance transportation, with its inherent future unreliability and higher costs, by improving freshness and nutritional value and by fostering conviviality among growers and consumers. Organically grown produce is commonly considered to have improved health benefits.

Fertile growing beds can be created within most residential parcels in the Highlands with the removal of stones and the addition of organic matter. Water is an essential element that must be protected by policy. Bee keeping and egg and meat production on a limited scale is also considered feasible.

Recommendation 30: Enact a Highlands Food Charter

The STF recommends that council enact a 'Highland Food Charter' to promote local food production.

Significance: moderate

Level of support from STF: unanimous

Difficulty: low

Timeframe: immediate

Implementation guidance

A charter would promote the importance of local food production, including wild harvest from forests, as an element in community sustainability. North Saanich has a charter that could be used as template.

Recommendation 31: Implement farm- and forest-friendly tax policies

The STF recommends that council enact farm- and forest-friendly policies to support continuation of these land uses.

Significance: moderate

Level of support from STF: unanimous

Difficulty: low

Timeframe: immediate

Implementation guidance

While the OCP is supportive of farm and forest land use, council's current tax policy of higher rates than the provincial standard sends a contradictory message. While not a major deterrent, council could consider reducing the tax rate for farm and managed forestland to the provincial standard.

Recommendation 32: Ensure access to water for food production

The STF recommends that council ensure that water for food production, in addition to ensuring water for residential use, is a District priority

Significance: high
Difficulty: high

Level of support from STF: unanimous
Timeframe: immediate

Implementation guidance

Given that the Highlands usually has dry summers and that most growing will be in upland areas, adequate water is an essential element for local food production. The need to retain sufficient ground water for food production should be given proper consideration when contemplating new residential development. A conservative approach to the allocation of ground water is warranted, while encouraging efficient water use, such as drip irrigation systems.

Recommendation 33: Control invasive species on municipal land

The STF recommends that council establish an annual program to control noxious weeds on municipal lands

Significance: moderate
Difficulty: low

Level of support from STF: unanimous
Timeframe: annual (starting next growing season)

Implementation guidance

The District should demonstrate leadership in land stewardship. Some rights-of-way adjacent to municipal roads and other municipal land (e.g. some areas adjacent to the West Fire Hall) are rife with thistles, a noxious weed which can be a bane for gardens and agricultural land. Thistle flowering should be controlled by mowing before it reaches the stage when wind spreads the mature air-borne seeds far and wide. The District should lead by example to encourage similar practises among private landowners. The need and feasibility of controlling other noxious weeds should be evaluated.

Recommendation 34: Promote local meat production-friendly regulations

The STF recommends that council lobby the provincial government to enact local meat production-friendly regulations.

Significance: high
Difficulty: low

Level of support from STF: unanimous
Timeframe: immediate

Implementation guidance

Current regulations that effectively prohibit on-farm slaughtering for local distribution are counter-productive because the cost of meat production is increased to the point of economic non-viability. On-farm slaughtering can also eliminate animal stress and hence adrenalin in the meat, thus improving meat quality. Council could aid farm food production by lobbying the provincial government for farm friendly meat production regulations. While this may have limited effectiveness, it will add to the mounting pressure on this issue.

Recommendation 35: Create a volunteer Local Food Production Task Force

The STF recommends that council appoint a ‘Local Food Production’ task force.

Significance: moderate

Level of support from STF: unanimous

Difficulty: low

Timeframe: immediate

Implementation guidance

A Local Food Production task force could undertake the many initiatives that would promote local food production. These might include promotion in the Essential Highlands Guide, ensuring that the new Community Centre is supportive of a farm market, organizing local food production facility tours, community gardens, demonstration operations, and facilitation of farm gate, brown box and specialty product sales to restaurants. A ‘Local Food Production Task Force’ appointed by council could evolve over the longer-term into a permanent ‘Local Food Production Council’.

10. Affordable housing and demographics

It is generally recognized that a complete community is made up of people with diverse interests, ages and economic levels. The high price of land has changed the Highlands from a rural community with a diverse population into one accessible only to the relatively wealthy or those who feel they can handle a large mortgage. At least one essential service, the Volunteer Fire Department is impacted by this demographic shift. Young people leave the District (and the Fire Department) when they cannot establish their own home in the Highlands because the high cost of land is not affordable to them. Others who buy land in the Highlands work long hours to pay the mortgage and have no time for volunteering. Volunteers are in short supply for the Volunteer Fire Department, sports coaches, outdoor recreation program leaders and even a volunteer coordinator.

Part of this problem has been addressed in the resort community of Whistler by forming a Municipal Housing Corporation that acquires land through amenity rezonings and sells housing at affordable prices to persons on the municipal list of essential community services, such as firefighters and schoolteachers. Affordability is retained by limiting resale to the person at the top of the essential service priority list at a price reflecting the increase in Consumer Price Index since purchase. Illicit resale for greater profit is prevented by a covenant restricting the sale to eligible persons.

Affordability in the *Coop Housing Model* is achieved by reducing land cost by zoning to greater density than is usually allowed for coops and including specific requirements of value to the community (e.g. persons on the list of essential/significant community services, green building, water conservation). Affordability can be retained, for example, by restricting resale to the Municipal Housing Corporation to prevent the vendor from obtaining an illicit bonus above the controlled resale price.

Other models to provide land at affordable cost have been developed. Models requiring input of public funds may have lower relevance in the Highlands. While the development and maintenance of an essential services list has problems, it seems an essential element in community sustainability.

Recommendation 36: Set a goal to obtain land for affordable housing

The STF recommends that council set a goal of obtaining land for affordable housing, e.g. through amenity rezoning. Upon obtaining such land, the STF recommends that council establish a Highlands Housing Corporation with directors including volunteers, council and District staff members.

Significance: high	Level of support from STF: majority (1 opposed)
Difficulty: low (for council) high for the corporation	Timeframe: immediate

Implementation guidance

The Highlands Housing Corporation would be charged by council to make recommendations to council and implement a program that establishes a list of essential and important services, policies whereby affordability is maintained on resale, a tenure system recognizing length of community service and such other matters found to be important in the establishment and maintenance of affordable housing.

11. Sustainability Appraisal Form

A sustainability appraisal form, or checklist, articulates key sustainability aspects relevant to land use change. Council should include the most important elements and values, as well as indications of priority. A sustainability appraisal form can be used to serve two key purposes. One role is to provide proponents (applicants to rezonings, subdivisions, permits, etc.) with a means to rate their projects in the terms encapsulated in the form. This can help staff and council evaluate proposals with respect to sustainability goals. Given the importance of large private lots for ecological and rural values, the appraisal form should be designed to provide guidance to owners of large lots in communication with the municipality to reach net mutual benefit on land use changes. Councillors can also use this form to rate proposed projects (whether or not there is an appraisal form from a proponent) to ensure all aspects of sustainability goals are explicitly considered.

Recommendation 37: Adopt and utilize a sustainability appraisal form

Whereas the unique character of Highlands necessitates a locally adapted sustainability appraisal form (also called a checklist),

The STF recommends that council revise and adopt the attached sustainability appraisal form (appendix 2) to encourage community sustainability objectives in new development and buildings, and request its completion for significant projects by proponents, as well as council, to ensure sustainability objectives are explicitly considered.

Significance: high
Difficulty: moderate

Level of support from STF: unanimous
Timeframe: ongoing

Implementation guidance

As a non-regulatory tool, this sustainability appraisal form can be easily integrated with existing decision processes to enable council and staff to assess the degree to which proposals (e.g. DVPs, DPs, rezoning applications, subdivision applications, building permits) meet their sustainability and climate change objectives. Once adopted, Highlands would require applicants to complete an appraisal form as part of the approval process. Staff may advise on whether the appraisal form is simplest as a separate form, or integrated into existing forms. Completed appraisal forms can be used by staff, council and the applicant to discuss the proposal, and if necessary, explore ways to improve performance in relation to sustainability objectives. Council should review the form after a year to assess costs/benefits, to seek improvements and to identify ways to quantify some elements.

12. Social sustainability, communication and education

The identification of common values will be the foundation for successful collaboration that will encourage the community to collectively work towards a sustainable future. Time should be allotted for such discussions through dialogue and social marketing opportunities. Understanding sustainability can often lead to different interpretations, and hence it is important to qualify the term in the context of the Highlands as defined by the Task Force definition.

Communication and education are interdependent and will form the basis for successful community involvement and acceptance of the sustainability initiatives identified by the Task Force. Networking therefore is fundamental, and in that regard it is recommended that there be a parallel process, one internal and the other external. It would be wise to establish at the outset a ‘big picture’ communications and education strategy for it is vitally important to engage the community throughout and ‘buy in’ on the part of the community is unlikely without the opportunity to participate.

Recommendation 38: Develop a sustainability communication and education strategy

Whereas engagement of the community is essential to encourage the adoption of sustainability principles,

The STF recommends that council endorse and initiate the creation of a Sustainability Communications, Engagement and Education Strategy utilizing a range of resources and methods that is both inclusive and practical.

Significance: high
Difficulty: low to start

Level of support from STF: unanimous
Timeframe: immediate

Implementation guidance

It is important for council to demonstrate leadership through the adoption of a communications strategy in partnership with community groups on why it is important for the District of

Highlands to develop a ‘Sustainability Road Map for the Future.’ This could be initiated in a Committee of the Whole meeting. A summary document from council outlining the recommendations from the final report, delivered to each household, would set the stage for further discussions and community involvement. A key challenge is how to connect with residents, in particular youth.

Recommendation 39: Include a ‘Sustainability’ section in Highlands newsletter

Whereas the Highlands newsletter regularly reaches a large number of residents with community information, and

Whereas making progress on sustainability will be enhanced by regular coverage of the topic, and

Whereas behaviour modification is achieved through education, progress information, peer influence, competition, recognition, and inspiration,

The STF recommends that council pass a motion to add a dedicated Sustainability section to the monthly Highlands newsletter.

Significance: high

Level of support from STF: unanimous

Difficulty: low

Timeframe: 6 months and ongoing

Implementation Guidance:

Past newsletters have included sustainability tips. This should be an ongoing element. Topics for the section on sustainability could include:

- a. Statistics on Highlands current resource use (e.g. power consumption trend).
- b. Success stories of Highlands residents (e.g. installation of alternative energy or energy efficiency technologies that are providing the anticipated benefit: solar hot water, air source heat pumps, insulation upgrades, etc).
- c. Feature short articles on impacts of our lifestyles, options, alternative energy technologies, energy efficiency technologies, consumption choices and their effects.
- d. Information on success stories from other communities.
- e. Recognition to individuals or groups that are taking solid actions towards sustainable living.
- f. Challenging our ‘Consumption Status-quo’ (see strategic focus 3).

Input could also be sought from residents.

Recommendation 40: Create a ‘Sustainability’ section on Highlands website

Whereas there are a large number of energy efficiency and alternative energy technologies available to Highlands homeowners, and

Whereas there is significant confusion about the financial and environmental benefits of various technologies, while information about these technologies is not located in a central place and often includes some degree of misinformation or is not applicable to Highlands living conditions, and

Whereas there is presently no forum for Highlands residents to easily access and share success stories and lessons learned,

The STF recommends that council construct a ‘Sustainability’ page on the Highlands website that will make it easier for residents to educate themselves on available clean technologies, and to share success stories, local experience and lessons learned.

Significance: moderate

Level of support from STF: unanimous

Difficulty: moderate

Timeframe: 8 months

Implementation guidance

Key elements of the ‘Sustainability’ page should include:

- a. A list of all practical technologies that homeowners could consider.
- b. Links to information sources on these technologies.
- c. A commentary, prepared by knowledgeable professionals, on which technologies are likely to be economic in the Highlands and under what type of conditions.
- d. A link to financial institutions that presently offer ultra low interest loans for energy efficiency and alternative energy upgrades.
- e. Potential for user input (e.g. using a wiki).
- f. A summary of what other communities are achieving.
- g. Overarching theme: simplify the issues so that people can make easier decisions.

Action Plan for council:

1. Seek a group of volunteers with the requisite technology and web design experience to manage the project. Consider issuing a ‘call for volunteers’ in the newsletter. This might be facilitated by the CISSC and/or FESC.
2. Provide the group with a Terms of Reference

Recommendation 41: Engage existing networks within the community

Whereas the delivery of a social sustainability, communications and education strategy requires partnerships,

The STF recommends council collaborate with committees and community groups such as the Fiscal and Environment Select Committee, the Community Infrastructure and Services Select Committee, Highland District Community Association, Neighbourhood Groups, the Highlands Stewardship Foundation, the Highlands Fire Department, and the Garden Club to articulate the concept of sustainability within the context of the definition developed by the STF.

Significance: high

Level of support from STF: unanimous

Difficulty: low

Timeframe: ongoing

Implementation guidance

Community events and or workshops, similar to the Fire Forum, would serve as an effective approach to engage the community in information exchange and to hear from experts on implementing sustainability practices. The Highlands News community newsletter as well as

the Wiki and district website would serve as additional sources of information throughout the community. A key challenge will be to find ways to connect with people not involved in the above networks and organizations.

Recommendation 42: Engage external organizations and develop networks

Whereas the challenges of implementing sustainable practices are universal,

The STF recommends that the District of Highlands participate in an outreach program that connects with other communities and agencies in the region similarly engaged in sustainability planning.

Significance: high

Level of support from STF: unanimous

Difficulty: moderate

Timeframe: ongoing

Implementation guidance

Council could request the FESC to establish contacts and share information with other communities who have already created a sustainability task force such as Langford, View Royal and Oak Bay. This would be beneficial and would provide the opportunity to share information and learn from each other. There may be merit in developing a Western Communities network given the common interests of the area and to develop a working relationship with the CRD sustainability coordinator and Intermunicipal Climate Action Steering and Working Groups. Attending the ‘Green Drink’ network in the Western Communities would be of further benefit. Other beneficial connections include Royal Roads University, University of Victoria and CAVI (Convening Action on Vancouver Island), as well as contacts in appropriate ministries in the provincial government.

Prioritizing Recommendations: A Roadmap

To provide some structure and guidance to council and staff, the task force first classified recommendations using two dimensions: significance of potential impacts, and difficulty of implementation. ‘Higher/lower significance’ and ‘easier/harder to implement’ attributes are relative terms, and recommendations were classified with these attributes using open discussion and consensus. This led to four key groups of recommendations: (a) high significance / easy to implement (often called ‘low hanging fruit’), (b) lower significance / easy to implement, (c) high significance / hard to implement (‘big ticket items’), and (d) lower significance / hard to implement. The results of this classification process are shown in Appendix 3.

Next, the recommendations within each group were prioritized to suggest a ‘road map’ for council to organize and begin the process of addressing these recommendations. An initial step was done by group discussion. Each task force member then proposed a ranked order for each group, and the final ranked order was taken by averaging the suggestions. Overall, there was significant correlation among proposals, suggesting a fairly high level of agreement among task force members as to a reasonable ordering.

This prioritization process resulted in partitioning recommendations into 4 ‘steps’, shown in Appendix 4. Icons indicate the portion of the classification matrix from which recommendations were taken. The idea of using the roadmap is to help focus on a limited set of recommendations at a time. Once the recommendations within a group are completed for a step, others from subsequent steps can be considered. It can be expected that recommendations that are easier to implement would proceed through consideration and implementation faster than those that are hard. Council should anticipate that the addition of follow on steps (5,6, etc) will be necessary to continue to work towards achieving a sustainable community as new action items arise from implementing recommendations.

The goal of the roadmap is to help focus energy towards action and to help council, staff and the community avoid becoming overwhelmed by the level of effort needed to move forward on the multiple fronts of sustainability. That said, the roadmap represents a high level recommendation from the task force, and it might be useful for council to make adjustments to the classification or ranking of recommendations, and then to adopt a revised roadmap as a commitment to take structured action to address sustainability issues. The roadmap could be periodically updated as progress is made (e.g. in strategic planning sessions) and as further recommendations are developed (e.g. as recommendations are explored and implemented, or arise from a future sustainability task force). Moving towards a sustainable Highlands will require dedication, leadership, creativity and adaptability.

Appendix 1: Background on Sustainability

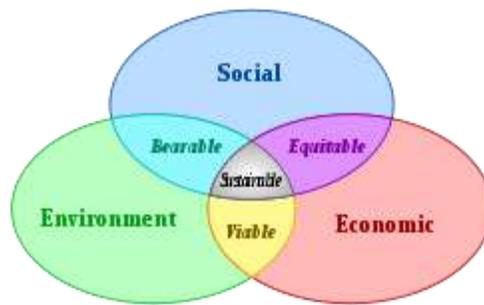
Below is a synopsis of some relevant aspects of sustainability from the entry on Wikipedia (<http://en.wikipedia.org/wiki/Sustainability>).

Definition

Sustainability, in a broad sense, is the ability to maintain a certain process or state. It has become a complex term that can be applied to almost every facet of life, particularly for different levels of biological organization such as forests and biodiversity, for human organization concepts such as eco-municipalities, and human activities and disciplines such as sustainable agriculture and renewable energy. For humans to live sustainably, the Earth's resources must be used at a rate at which they can be replenished. However, there is now clear scientific evidence that humanity is living unsustainably, and that unprecedented collective effort is needed to return to sustainable limits⁴.

Definitions may be expressed as statements of fact, intent, or value with sustainability treated as either a "journey" or "destination."⁹ In 1989, the World Commission on Environment and Development (Brundtland Commission) articulated what has now become a widely accepted definition of sustainability: "[to meet] the needs of the present without compromising the ability of future generations to meet their own needs."⁵ The IUCN, UNEP and WWF defined sustainability as: "improving the quality of human life while living within the carrying capacity of supporting eco-systems."²⁵

The dimensions of sustainability are often taken to be: environmental, social and economic²⁰, depicted as three overlapping ovals to show that they are not mutually exclusive. An alternative view is that societies and economies are fundamentally reliant on the natural world, so the economy is a subsystem of human society, which is itself a subsystem of the biosphere, depicted



by embedded ovals.

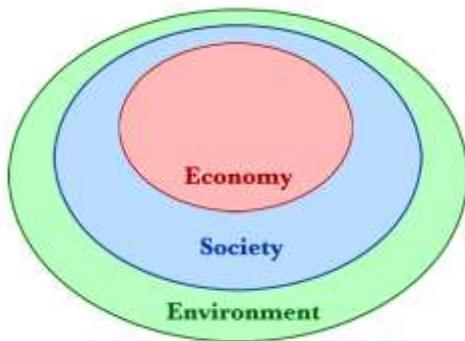


Figure 1. Left: Scheme of interaction of the three "pillars" of sustainable development⁶. Right: Another representation with economy and society bounded by the environment¹⁹.

From the Earth Charter: "We must join together to bring forth a sustainable global society founded on respect for nature, universal human rights, economic justice, and a culture of peace. Towards this end, it is imperative that we, the peoples of Earth, declare our responsibility to one another, to the greater community of life, and to future generations."

Key global goals⁶⁹

- *Intergenerational equity* - providing future generations with the same environmental potential as presently exists
- *Decoupling economic growth from environmental degradation* - managing economic growth to be less resource intensive and less polluting
- *Integration of all pillars* - integrating environmental, social and economic sectors when developing sustainability policies
- *Ensuring environmental adaptability and resilience* - maintaining and enhancing the adaptive capacity of the environmental system
- *Preventing irreversible long-term damage to ecosystems and human health*
- *Ensuring distributional equity* - avoiding unfair or high environmental costs on vulnerable populations
- *Accepting global responsibility* assuming responsibility for environmental effects that occur outside areas of jurisdiction
- *Education and grassroots involvement* - people and communities investigating problems and developing new solutions

Measurement

By establishing quantitative measures for sustainability it is possible to set goals and measure progress. The Natural Step framework examines use and equitability of access to natural capital⁷⁵, including resources from the earth's crust (e.g., minerals, oil), those produced by humans (synthetic substances), and those of the biosphere. The energy generated in use of resources can be measured over the life cycle of a product or service using methods such as Life Cycle Analysis or Ecological Footprint⁷⁷.

There is now a vast number of sustainability indicators, reporting procedures, etc. that include environmental, social and economic measures over many scales and contexts from the biosphere as a whole to households, national economies, wetlands and cities. Some of the best known and most widely used measures include corporate sustainability reporting, and Triple Bottom Line accounting.

The general trend is for higher standards of living to become less sustainable. Ecological deficits must be met from unsustainable sources. The *extra* resources needed to maintain unsustainable levels of consumption are gained in three ways: embedded in the goods and services of world trade, taken from the past (e.g. fossil fuels), or taken from the future as unsustainable resource usage (e.g. "mining" forests and fisheries at greater than their rate of regeneration). The sustainability goal is to raise the global living standards while using resources within sustainable levels; that is, to not exceed "one planet" consumption.

Implementation of Sustainability Policies

Healthy ecosystems provide vital goods and services to humans and other organisms. There are two major ways of reducing negative human impact and enhancing ecosystem services:

2. Environmental management based largely on information gained from earth science, environmental science and conservation biology.
3. Management of human consumption of resources, through demand management of human resource use.

Environmental management

At the global scale and in the broadest sense environmental management involves the oceans, freshwater systems, land and atmosphere, but environmental management can be applied to any ecosystem from a tropical rainforest to a home garden.

Atmosphere: Air pollution produces smog and acid rain, chlorofluorocarbons that degrade the ozone layer, and anthropogenic particulates that decrease sunlight reaching Earth's surface. In the context of human-induced climate change, 2,500 climate experts from 80 countries at an emergency 2009 climate change summit in Copenhagen, the Copenhagen Climate Council, issued a keynote statement that there is now "no excuse" for failing to act on global warming, and that without strong carbon reduction targets at political negotiations this year, "abrupt or irreversible" shifts in climate may occur that "will be very difficult for contemporary societies to cope with"⁸⁸.

Oceans: suffer from overfishing, pollution, CO₂ acidification, etc. Climate change also poses risk of coral bleaching and sea-level rise.

Freshwater: the world's most vulnerable of all major biological systems. Human freshwater withdrawals make up about 10% of global freshwater runoff. Water security, and therefore food security, is fundamental to sustainability.

Land: Land use change is fundamental to the operations of the biosphere because changes in proportions of land dedicated to agriculture, forest, woodland, grassland and pasture have a marked effect on global water, carbon and nitrogen biogeochemical cycles that can negatively impact both natural and human systems.

Forests: can moderate the local climate and the global water cycle, conserve biodiversity, protect water quality, preserve soil, provide fuel and pharmaceuticals, and purify the air. The United Nations Food and Agriculture Organisation (FAO) estimated that trees store about 90% of the carbon stored in land vegetation. Land use changes currently contribute about 20% of total global carbon emissions⁹⁷. Wood biomass is a renewable carbon-neutral fuel. The FAO has concluded that, over the period 2005–2050, effective use of tree planting could absorb about 10–20% of man-made emissions⁹⁸.

Cultivated land: Humans have appropriated about 38% of the Earth's land surface and about 20% of its net primary productivity¹⁰⁰. The list of environmental costs of food production is long: topsoil depletion, erosion and desertification; overgrazing; salinization; sodification; waterlogging; high levels of fossil fuel use; reliance on inorganic fertilisers and synthetic organic pesticides; reductions in genetic diversity by mass use of monocultures; water resource depletion; pollution of waterbodies by run-off and groundwater contamination; social problems including the decline of family farms and weakening of rural communities¹⁰¹. The environmental problems associated with industrial agriculture and agribusiness can be addressed through sustainable agriculture, organic farming and more sustainable business practices.

Extinctions: In line with human migration and population growth, species extinctions have progressively increased to a rate unprecedented since the Cretaceous–Tertiary extinction event. Some scientific estimates indicate that up to half of presently existing species may become extinct by 2100¹⁰³.

Biological invasions: Increasingly efficient global transport has facilitated the spread of organisms and diseases across the planet. Non-indigenous organisms often quickly occupy disturbed land but can also devastate natural areas where, in the absence of their natural predators, they are able to thrive. Increasingly at the local level, public awareness programs are alerting communities, gardeners, the nursery industry, collectors, and the pet and aquarium industries, to the harmful effects of potentially invasive species.

Management of human consumption

Direct human impacts on the environment are reduced by not only consuming less but by also making the full cycle of production, use and disposal of goods and services more sustainable. Analysis of our individual and collective consumption patterns takes account of total resource use and this is then related to the environmental, social and economic impacts of that resource use. The ideas of embodied resource use (the total resources needed to produce a product or

service), resource intensity (the resources needed for each dollar spent on a good or service), and resource productivity (the amount of good or service produced for a given input of resource) are important aspects of consumption management. At a simple level human consumption can be examined through the demand for the basic resources energy, water, food and materials.

Energy: Life is supported by the Sun's energy that gets captured by plants (primary producers) during photosynthesis. This is passed through the food chain to other organisms and it ultimately powers nearly all living processes. Since the industrial revolution the concentrated energy of the Sun stored in fossilized plants as fossil fuels have been a major driver of technology that, in turn, has been the source of both economic and political power. In 2007, climate scientists of the IPCC concluded that there was high probability that the atmospheric increase in CO₂ was human-induced - essentially due to fossil fuel emissions and, to a lesser extent, the CO₂ released from changes in land use. Stabilising the world's climate will require high income countries to reduce their emissions by 60-90% over 2006 levels by 2050. This should stabilise atmospheric carbon dioxide levels at 450-650 ppm from current levels of about 380 ppm, above which temperatures would probably rise by more than 2° C to produce "catastrophic" climate change¹⁰⁹. Reduction of current CO₂ levels must be achieved against a background of global population increase and developing countries aspiring to energy-intensive high consumption Western lifestyles¹¹¹. Attempts to reduce greenhouse emissions have ranged from tracking the passage of carbon through the carbon cycle to the exploration of renewable energies, developing less carbon-hungry technology and transport systems and attempts by individuals to lead carbon neutral lifestyles by monitoring for their fossil fuel use all the products and services they use.

Water: Humans currently use 40-50% of the globally available freshwater in the approximate proportion of 70% for agriculture, 22% for industry, and 8% for domestic purposes and the total amount is progressively increasing being about five times that at the beginning of the 20th century¹¹³. The path forward appears to lie in improving water use efficiency through: demand management; maximising water resource productivity of agriculture; minimising the water intensity (embodied water) of goods and services; addressing shortages in the non-industrialised world; moving production from areas of low productivity to those with high productivity; and planning for climate change¹¹⁶.

Food: A "sustainable food system" can be defined as "one that provides healthy food to meet current food needs while maintaining healthy ecosystems that can also provide food for generations to come with minimal negative impact to the environment"¹¹⁷. A sustainable food system encourages local production and distribution infrastructures and makes nutritious food available, accessible, and affordable to all. Further, it is humane and just, protecting farmers and other workers, consumers, and communities¹¹⁹. At the local level there are various movements working towards more sustainable use of wastelands, peripheral urban land and domestic gardens, including permaculture, urban horticulture, local food, slow food, and organic gardening.

Materials: Increases in population and affluence has led to increased use of materials— the volume and transport of raw materials, minerals, synthetic chemicals and products (especially plastic), manufactured products, food, living organisms and waste. Much of the sustainability effort with materials is directed at dematerialization, converting the linear path of materials

(extraction, use, disposal in landfill) to a cyclical one that reuses materials indefinitely, much like the cycling and reuse of waste in nature. This is being assisted by product stewardship and the increasing use of material flow analysis.

Chemicals: Synthetic chemical production has escalated since the second World War, and includes everything from herbicides, pesticides and fertilizers to domestic chemicals and hazardous substances¹²⁸. Although most synthetic chemicals are harmless, there has been concern expressed over the reliability of chemical testing before the introduction of new products and their possible long-term toxic effects on humans and other organisms, of a host of domestic and commercial chemicals, agricultural pesticides, herbicides etc.

Waste: The average human uses 45-85 tonnes of materials each year.^[126] Industry, business and government are adopting the ideas of industrial metabolism, industrial ecology, ecodesign http://en.wikipedia.org/wiki/Sustainability_-_cite_note-130 and ecolabelling to make use of materials more sustainable. In addition to the well-established “reduce, reuse and recycle” shoppers are using their purchasing power for ethical consumerism¹³².

Economics

Sustainability interfaces with economics through the social and ecological consequences of economic activity¹³³. The expression *ecosystem services* refers to the economic significance of natural resources. However, nature and natural resources are usually regarded as unlimited and free by treating them as unpriced economic externalities, and hence they tend to be overused and degraded in a Tragedy of the Commons¹³⁷. The biological world can be better protected by "internalising" market strategies including ecotaxes and incentives, tradable permits for carbon, water and nitrogen use etc., and an increasing willingness to accept payment for ecosystem services.

Decoupling environmental degradation and economic growth: In the second half of the 20th century world population doubled, food production tripled, energy use quadrupled, and global economic activity quintupled¹³⁹. Historically economic growth and environmental degradation have been closely correlated: as communities grow, so the environment declines. Many past civilizations have collapsed through overexploitation of their resource base¹⁴³. There is a need to reduce (decouple) the amount of resources to produce, consume and dispose of a unit of good or service based on the assumption that reducing resource use generally equates to reduced environmental degradation¹⁴⁴.

Social concerns

Issues of sustainability are often expressed in scientific terms, but solutions are a social challenge, at all scales and in different contexts, from international and national law, urban planning and transport, to local and individual lifestyles and ethical consumerism.

Human settlements: While sustainability is a major global issue, implementation must occur first within our communities, households, and organizations¹⁵⁵. One approach to sustainable living, embodied by urban and rural ecovillages, seeks to create self-reliant communities based on principles of simple living, which maximise self-sufficiency particularly in food production. Other approaches, loosely based around new urbanism, reduce environmental impacts by altering

the built environment to create and preserve livable cities that support sustainable transport. Ultimately, the degree of human progress towards sustainability will depend on large-scale social movements that influence both community choices and the built environment. The emerging eco-municipalities movement is participatory, involving community members in a bottom-up approach based on sustainability principles that are implemented systematically throughout municipal operations¹⁵⁷. The resort community of Whistler in Canada recently won first place in a United Nations international competition for its long-term comprehensive sustainability plan, “Whistler 2020.”¹⁵⁹

Sustainability principles¹⁵⁸

1. Reduce dependence upon fossil fuels, underground metals, and minerals.
2. Reduce dependence upon synthetic chemicals and other unnatural substances.
3. Reduce encroachment upon nature.
4. Meet human needs fairly & efficiently.

Towards a sustainable future
At its

core sustainability is about cultural, socio-political, psychological and behavioural change at all levels and contexts of society¹⁶⁰. The urgency of the present situation cannot be doubted⁴. Even so, weight of information and scientific evidence is often insufficient to produce necessary social change, especially if that change entails moving people out of their comfort zones¹⁶⁰. Small painless steps can bring about small changes, but big changes will also be needed to achieve sustainability. This in turn requires a political strategy that tackles underlying individualistic and materialistic societal values head-on by offering an unequivocal statement of alternative values. Change to behaviour is more easily achieved by encouraging ‘intrinsic’ values (personal growth, community, relationships) than ‘extrinsic values’ (material goods, social status, financial reward). Below are eight practical steps for change¹⁶⁴:

- Establish greater clarity on environmental values
- Emphasise intrinsic goals in environmental communication
- Use a broader vocabulary of values in policy debates
- Find common ground between these values and those of development agencies
- Help business to think beyond “the business case for sustainable development”
- Highlight the way marketing manipulates our behaviour
- Support public figures who promote intrinsic values
- Identify and promote ways to of making public appreciation of nature more relevant

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Appendix 2: Highlands Sustainability Appraisal Form

The District of Highlands is committed to ensuring all elements of sustainability are taken into account in land use planning and other major decisions. The purpose of this sustainability appraisal form is to provide structured tool to identify how an application, proposal or decision changes elements of value. Since this form includes key values currently identified by council to sustain or reduce, it can provide guidance to proponents on ways to reach net mutual benefit on land use changes

All applicants must complete this sustainability appraisal form for Development Variance Permits, Development Permits, rezoning applications, subdivision applications, and major building permits. Staff and council may choose to complete this form for some of these applications as well as for other major decisions.

Given the diversity of decisions and values in Highlands, the appraisal form is designed to balance flexibility with structure. The key values are classified based on the Five Capital Stocks model (see entry on www.wikipedia.com). A capital stock can be considered like an account. Some contain assets of value (e.g. forests, water, cash, social connections), while some contain liabilities we want to minimize (e.g. atmospheric carbon). Natural capital contains all the stocks provided by nature. Manufactured capital contains all stocks constructed by humans, both public and private, such as buildings and infrastructure. Financial capital contains monetary assets and liabilities. Human capital refers to skills of people, while social capital refers to relationships between people, organizations and institutions. Each general capital stock has sub-categories identified as particularly important in Highlands. Others can be added as appropriate.

Existing land use and municipal operations lead to changes, or flows, in these accounts over time, like deposits or withdrawals in a bank account (e.g. forest protection, planting or clearing). This column identifies key flows relevant to the stock sub-category to the left. The sign ('+' or '-') indicates the desired direction of the flow. Cases where desired direction is not clear are left unsigned. Other flows can be added as appropriate.

The description column should identify briefly how the application, proposal or decision will change the capital stocks and flows from existing conditions. This is the main place to identify whether the proposal, application or decision would increase/decrease the stock or flow rate. Care should be taken to consider each capital stock and flow, and identify both positive and negative implications with respect to sustainability values.

The amount column is provided so that the magnitude of effects can be noted. This can be in quantities relevant to the value (e.g. hectares, dollars, tons of CO₂) or a qualitative ranking (e.g. high, medium, low).

The overall rating column is provided to indicate the desirability of the change (e.g. --- for very negative, -- for negative, - for somewhat negative, 0 for neutral, + for somewhat positive, ++ for positive, +++ for very positive).

Capital stock and sub-items	Relevant flows	OCP policies	Description: How proposal, application or decision affects capital stock or flow	Amount	Overall rating
<u>Natural</u> Atmosphere	- greenhouse gas emissions + air quality	3.6			
Water (surface and ground)	+ quality + quantity	multiple			
Forests and riparian areas	+ protection + covenants - deforestation - pests - wildfire risk	multiple 2.2.16 3.9 3.1.4 3.1.13			
Sensitive ecosystems & wildlife habitat	+ protection - damage + connectivity	2.2, 3.3 3.4			
Natural hazards	+ risk avoidance	3.2			
Arable land & soils	+ soil protection	3.8.1, 3.10			
Natural ambience	- noise level - light level + visual	3.1.11 3.7 2.2.9, 3.1.12			

<u>Manufactured</u> Buildings and structures	+ sustainable material - maintenance costs - energy requirements for operations + community hall + affordable housing	2.2.15 7.3, 2.8.4 2.2, 7.1			
Municipal assets	office and fire halls: buildings + green equipment & supplies - usage of supplies + efficient vehicles + parks + protective services	 2.9.1, 4.3 6.6			
Roads and driveways	+ quality - quantity	5.1, 5.3			
Public transit	+ quantity	5.4			
Trails	+ quality + quantity	4.2, 4.4, 4.6, 5.2			
Gardens, farms and markets	+ quality + quantity	2.2.21, 8.1			
Commercial and industrial (incl. utility corridors)	+ quality quantity - negative impacts	2.7, 2.8.3, 6.7, 6.8 2.4.4			

<u>Human</u> Residents Volunteers Local business and jobs Staff Council Knowledge	+ health and safety + education + emergency preparedness + diversity + energy efficiency of lifestyle + recognition + ability to contribute + diversity + number - workload + training - workload + training + local information & knowledge	2.2.8, 7.2, 7.6.1 6.6, 7.2.2 7.6.3 7.6 2.3, 2.4, 8.1, 8.2, 8.3 3.1.2, 3.1.6			
<u>Social</u> Quality and quantity of relationships	between: + residents & district + volunteers & district + staff & council + Highlands & elsewhere	7.6 2.1.3, 3.1, 7.6 7.6			

Families	+ cohesion	2.2.12, 2.2.22			
Neighbourhood groups	+ active groups				
Community groups (e.g. HDCA)	+ membership and action				
Heritage, Arts and Culture	+ historic sites and structures + cultural events	7.4 7.5			
<u>Financial</u>					
Operating and capital reserves	property taxes + amenities + property class diversity - expenses	2.2.11 8			
Land assets	+ municipal lots				
Debt	- borrowing + repayment				

Appendix 3: Recommendation Classification Matrix

Impact on Sustainability	High	<ul style="list-style-type: none"> #1 – Incorporate sustainability throughout the decision process #2 – Adopt a Highlands Sustainability Vision #3 – Quantify and report GHG emissions #6 – Acknowledge risk of dependence on fossil fuel and cheap oil #7 – Initiate ongoing dialogue on transportation #14 – Adopt a no net increase policy for water/energy use #15 – Use LICs to finance energy technology installations #22 – Build a community water education strategy #23 – Promote rainwater harvest, xeriscaping, efficient irrigation #24 – Manage storm water as a resource #27 – Protect/restore Coastal Douglas-Fir ecological zone #28 – Catalyze a regional analysis of greenspace connectivity #35 – Create a volunteer Local Food Production Task Force #37 – Adopt and utilize Sustainability Appraisal Form #40 – Create a ‘Sustainability’ section on Highlands website #41 – Engage existing networks within the community #42 – Engage external organizations, develop networks 	<ul style="list-style-type: none"> #4 – Consider GHG emissions in decisions #8 – Improve pedestrian and non-motorized corridors #9 – Improve public transportation, park/rides, carpooling #11 – Create new Net Zero Zones #13 – Explore incentives for energy/water upgrades #18 – Catalyze the Sustainable Neighborhoods Project #21 – Create Highlands Water Smart incentive program #25 – Adapt to changes in precipitation from climate change #26 – Use dynamic groundwater forecasting #32 – Ensure access to water for food production #36 – Set a goal to obtain land for affordable housing #38 – Develop a sustainability communication and education strategy
	Low	<ul style="list-style-type: none"> #5 – Reduce GHG emissions in municipal operations #10 – Adopt the Near Zero Emissions Vehicles policy #12 – Adopt ‘flush toilet ready’ building policy #16 – Initiate a Mayor’s Eco-Challenge #17 – Support BC carbon Tax #19 – Create a ‘Consumption Status Quo’ brochure #20 – Implement a water/energy household self-audit program #30 – Enact a Highlands Food Charter #31 – Implement farm and forest friendly tax policies #34 – Promote local meat production-friendly regulations #39 – Include a ‘Sustainability’ section in Highlands newsletter 	<ul style="list-style-type: none"> #29 – Minimize barrier/corridor effects of infrastructure #33 – Control invasive species on municipal land
		Low	High
		Challenge to Implement	

Appendix 4: Highlands Sustainability Roadmap

Step 1



- #9 – Improve public transportation, park/rides, carpooling
- #38 – Develop a sustainability communication and education strategy



- #2 – Adopt a Highlands Sustainability Vision
- #1 – Incorporate Sustainability throughout the decision process
- #37 – Adopt and utilize Sustainability Appraisal Form
- #7 – Initiate ongoing dialogue on transportation
- #3 – Quantify and report GHG emissions



- #17 – Support BC Carbon Tax
- #5 – Reduce GHG emissions in municipal operations
- #39 – Create ‘Sustainability’ section in Highlands newsletter
- #20 – Implement a water/energy household self audit program

Step 2



- #8 – Improve non-motorized corridors
- #4 – Consider GHG emissions in decisions
- #13 – Explore incentives for energy/water upgrades



- #6 – Acknowledge risk of dependence on fossil fuel and cheap oil
- #40 – Create a ‘Sustainability’ section on Highlands website
- #41 – Engage existing networks in community
- #22 – Build community water education strategy
- #14 – Adopt a no net increase policy for water/energy use
- #35 – Create Local Food Production Task Force



- #19 – Create “Consumption Status Quo” brochure
- #12 – Adopt “flush toilet ready” building policy
- #30 – Enact a Highlands Food Charter
- #31 – Implement farm/forest friendly tax policies

Step 3



- #18 – Catalyze Sustainable Neighborhoods Project
- #21 – Create Highlands Water Smart program
- #26 – Use dynamic groundwater forecasting



- #15 – Use LICs to finance energy technology installations
- #23 – Promote rainwater harvest, xeriscaping, efficient irrigation
- #42 – Engage external organizations /networks
- #27 – Protect/restore Coastal Douglas-Fir ecological zone
- #24 – Manage storm water as a resource
- #28 – Catalyze a region-scale analysis of green space connectivity



- #16 – Initiate a Mayor’s Eco-Challenge
- #34 – Promote local meat production friendly regulations
- #10 – Adopt Near Zero Emission Vehicles policy

Step 4



- #11 – Create new NetZero Zones
- #25 – Adapt to changes in precipitation from climate change
- #32 – Ensure access to water for food production
- #36 – Set a goal to obtain land for affordable housing



- #29 – Minimize barrier/corridor effects of infrastructure
- #33 – Control invasive species on municipal land