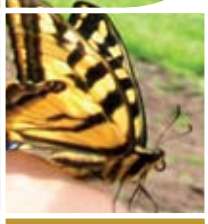
Fraser Basin Council

2009 State of the Fraser Basin Report

SUSTAINABILITY SNAPSHOT 4

09

The Many Faces of **Sustainability**



WELCOME TO SUSTAINABILITY SNAPSHOT 4

I am pleased to present the *2009 State of the Fraser Basin Report, Sustainability Snapshot 4: The Many Faces of Sustainability*. This report offers insights into important sustainability trends in the Fraser Basin across 18 topics, 50 headline indicators, regional data and notes on various studies. Whatever your walk of life, it can help answer the question: How well are we doing?

Inside these pages you'll see many findings we've labelled "mixed results": some positive, some negative. I think it is fair to say that, on the journey to sustainability, we are doing certain things better, but we still have a long way to go. Just over two years ago, at the 2006 State of the Fraser Basin Conference, James Hoggan and Associates presented research that confirmed a heightened environmental consciousness among Canadians. There nevertheless remained a measure of disconnect between our beliefs and our actions.

In the midst of the current financial turmoil, it seems the economy now trumps the environment in most headlines. A year ago the reverse was true. Such swings have little to do with sustainability. Sustainability calls for deeper understanding, long-term thinking and sustained action to set a better course. It is not only the economy, or the environment or social well-being that should concern us. It is all of these things and the need to integrate them and bring them into balance for future generations.

Sustainability Snapshot 4 looks beyond the headlines, flagging important trends and turning points. It also offers inspirational examples of people making change. Together with the Directors and staff of the Fraser Basin Council, I trust the report will help you on this journey towards sustainability. Sustainability Snapshot 4 is dedicated to the many faces of sustainability – people everywhere who care about the Fraser Basin, our home.

Dr. Charles Jago
Chair, Fraser Basin Council

ACKNOWLEDGEMENTS

This report would not have been possible without the support of the people who provided data and information, technical expertise, research, writing, stories, photographs, editing and financial assistance. The Fraser Basin Council expresses its sincerest gratitude to its many supporters.

The Council's Board of Directors and the Sustainability Indicators Standing Committee provided oversight for this initiative. Other advisors also contributed guidance, feedback and advice on information sources, as well as the analysis of trends. These included Fraser Basin Council Directors, staff and numerous individuals with expertise across a wide range of sustainability issues. For a complete list of data and information sources, see the references and notes for each sustainability topic.

A talented team collaborated on this report. Special thanks go to Clare Mochrie, Tracey Hooper and Peyman Dousti, who worked with several Council staff – Steve Litke, Denise Palmer, Amy Greenwood, Kim MacLean, Phil Hallinan, Peter Ostergaard, Carol Boutin, Terry Robert and Jessica Bratty – as researchers, contributing writers and editors.

The Council would also like to thank Environment Canada (Air Quality Health Index) for financial support of this report, and all of the sponsors noted on page 90, for their financial and in-kind support of the 2009 State of the Fraser Basin Conference.

TABLE OF CONTENTS

What's New in this Report?

The 2009 Sustainability Snapshot profiles the social, economic and environmental health of the Fraser Basin, and is the fourth in a series of reports prepared by the Fraser Basin Council since January 2003. The purpose of Snapshot 4 is to:

Increase public awareness and understanding of sustainability issues and trends

Identify critical issues and responses to improve progress towards sustainability

Inform and influence decisions and actions to advance sustainability.

Sustainability indicators are not complete measurements of sustainability, nor are they solutions in and of themselves. They can, however, help to simplify complex issues and build understanding by reflecting trends over time, comparing different geographic regions and helping identify areas where progress is being made and where change is needed.

Sustainability Snapshot 4 builds on the scope and approach of the Council's first three Snapshot reports and includes several refinements and new features.

Sheep Creek Bridge over the Fraser River

Refinements to the Scope of Topics

The scope of sustainability topics has been refined in a few cases, including:

- addition of "Biodiversity" (to include new data available for Snapshot 4);
- substitution of "Consumption & Waste" (to combine information previously reported in sections on "Population & Consumption" and "Wastes & Toxins;" and
- deletion of "Natural Hazards" (due to a lack of new data available for Snapshot 4).

Updates and Refinements to the Indicators

Indicator trends have been updated, where possible, since the release of Sustainability Snapshot 3. In many cases, recent data (such as 2006 census data) were available; however, in some cases, updated data were not yet available, so alternative indicators or approaches were used to refine the report and update the analysis. In some cases, a broader suite of indicators is presented to provide a more complete picture of the state of sustainability and to provide fresh insights.

Actions – The Many Faces of Sustainability

Complementing the quantitative indicators and data are examples of sustainability action, and some of the many "faces" of sustainability – the people who are leading positive change in communities across the Basin.

Regional Sustainability Highlights

Snapshot 4 profiles each of the five regions of the Fraser Basin – Upper Fraser, Cariboo-Chilcotin, Thompson, Fraser Valley and Greater Vancouver-Sea to Sky (GVSS) – along with highlights of indicator trends where there were data specific to those regions: see pages 76-79.

Summary of Sustainability Highlights

For each of the topics, two to three "headline indicators" have been selected as highlights. These are presented together in a concise format to show "at a glance" the status of each, which indicators are getting better or worse, and the overall state of sustainability in the Fraser Basin: see pages 80-83. In addition, an analysis has been undertaken to assess change across all the indicators since the publication of Sustainability Snapshot 3 in November 2006.

Steps for Sustainability

In previous Snapshot reports, actions to advance sustainability were offered for each of the topics. In this report, actions have been collated across all topics and combined in a separate section – Steps for Sustainability. These actions are tailored for individuals and organizations, including governments, businesses and non-profit organizations: see pages 84 to 87.

Maps

Sustainability Snapshot 4 includes two maps of the Fraser Basin (see enclosed map sheet in back pocket). Map 1 includes an overview of the Fraser Basin and each of its five regions, and Map 2 presents some of the key land uses in the Fraser Basin, including the history of forest harvesting, the Agricultural Land Reserve, Protected Areas and grasslands.

Fraser Basin Council Area of Interest

Part of the Greater Vancouver-Sea to Sky (GVSS) region, including the region from North Vancouver to Whistler, is technically outside of the Fraser River watershed boundary. The data analysis in this report, however, often includes this area in the Fraser Basin because it is an area of interest and operations of the Fraser Basin Council.

MORE INFORMATION

For information on the Fraser Basin Council's Sustainability Indicators Program, contact:

Steve Litke
Senior Program Manager
(604) 488-5358
slitke@fraserbasin.bc.ca

Fraser Basin Council
1st Floor
470 Granville Street
Vancouver, BC V6C 1V5

Mark Your Calendars!

The next State of the Fraser Basin Conference is coming **November 2010**

WE WANT YOUR FEEDBACK

This report was shaped, in part, by feedback and suggestions received following each of the previous Sustainability Snapshot reports released in January 2003, November 2004 and November 2006. The Council values the insights and perspectives of individuals, government representatives, people in the business community and those in civil society. Once again, we invite feedback. Please let us know:

- Is the report useful in guiding your actions and decisions to advance sustainability?
- In what ways are you using the report and the indicators?
- How can the report be made more useful and useable?
- What suggestions do you have to improve future Sustainability Snapshot reports?

A feedback form is available on the Fraser Basin Council website (www.fraserbasin.bc.ca), or by request.

ONLINE

Watch for the online versions:
www.fraserbasin.bc.ca

Sustainability Snapshot 4 will be available on the Fraser Basin Council website in PDF in February 2009. Following the release of the print and PDF versions of this report, watch for our interactive online report, coming mid-2009. Visit the Fraser Basin Council website at www.fraserbasin.bc.ca.

www.fraserbasin.bc.ca

We want to see the Fraser Basin as a place where **social well-being** is supported by a **vibrant economy** and sustained by a **healthy environment.**

The Fraser Basin and Fraser Basin Council

BC'S FRASER BASIN

High atop Mount Robson, small streams trickle down, merge, and transform into the headwaters of the Fraser River. As the river takes shape, it begins to reveal a character as stunning as the landscapes and communities it traverses. From small mountain river to raging rapids, the river proves its might at every turn, travelling 1,400 km to meet the Pacific Ocean at the Strait of Georgia.

On its journey, the Fraser carves an S-shape across British Columbia's heartland, anchoring an arterial network of tributary rivers and streams that fan out across 240,000 square km and carry fresh water to the land, the people and the animals and plants. The Fraser is BC's longest river, and the Fraser Basin the province's largest watershed.

The Basin has been home to the first faces of sustainability – those of First Nations, the original occupants – for more than 10,000 years. First Nations people bring a tradition of respect for the water and land and their inhabitants and an ethic of stewardship. These hold lessons for everyone who cares about sustainability.

The past 200 years have brought about rapid change. Today the Basin is home to 2.7 million people – two-thirds of BC's population – the faces of many cultures, languages and religions. Mutual acceptance, understanding and collaboration among different peoples is key to living peacefully together and ensuring all can fulfil their potential.

From Vanderhoof to Prince George, Williams Lake and Kamloops to the most populated stretches of the Fraser Valley and Greater Vancouver, the Fraser Basin is a place where many communities thrive. There are numerous natural resources, and many livelihoods directly or indirectly depend upon forestry, agriculture, tourism, transportation, industry and businesses of all kinds.

Yet there are social, economic and environmental challenges that confront communities of the Fraser Basin: rapid urban expansion, resource consumption, pollution, waste, water shortages, public health problems, economic uncertainties and disparities, social inequity, loss of biodiversity, and over-arching threats from global climate change – such as changes in air and water temperature, extreme weather events, sea level rise and changes in natural habitat, forest viability and agricultural productivity. All of this calls for a shift from short-term to long-term thinking, and for action that respects the well-being of future generations. In essence, it calls for sustainability.

Fraser Basin Council

THE FRASER BASIN COUNCIL

Formed in 1997, the Fraser Basin Council (FBC) is a charitable, not-for-profit body committed to advancing sustainability in the Fraser Basin.

FBC is led by 36 directors representing the diversity of the Basin, from the four orders of government – Federal, Provincial, Local and First Nations – and from the private sector and civil society. This governance structure and commitment to collaboration is one of the first of its kind in Canada and has served as a model for others in this country and abroad.

A CHARTER FOR SUSTAINABILITY

The Council fulfills its mandate by working with the vision, principles and goals articulated in its Charter for Sustainability. The Charter is a good-faith agreement among all those in the Basin to work collaboratively toward a more sustainable future. To ensure that the Council has a local presence and is addressing issues of real concern from all parts of the Basin, it has established regional committees and offices in each of the Basin's five sub-regions – Upper Fraser, Cariboo-Chilcotin, Thompson, Fraser Valley, and Greater Vancouver-Sea to Sky.

The FBC Directors commit to the vision, principles and goals of the Charter for Sustainability, signed by the founders of the Council and setting out 12 principles to guide its work. The Fraser Basin Council believes that sustainability must integrate social, economic and environmental considerations, and that long-term thinking should underpin all human endeavours.

Showing That Collaborative Governance Works

Inside the FBC boardroom, Directors make decisions through dialogue, collaboration and consensus. This is only possible with a commitment to respect each other, value diversity, consider multiple perspectives and foster trust. FBC is always pleased to work with other agencies, boards, committees and task forces, in the Basin and beyond, that want to undertake collaborative decision-making and ingrain the principles of sustainability into their work.

Facilitating Collaborative Solutions

Many of today's toughest public issues are, in essence, sustainability issues – with linkages between social, economic and environmental considerations.

The Fraser Basin Council is committed to bringing together decision-makers and others from diverse areas who wish to identify and respond to sustainability concerns, begin a dialogue and seek collaborative solutions.

Sustainability through Monitoring, Awareness and Action

FBC continually raises awareness of sustainability issues, offers opportunities for action and supports government, agencies, businesses and community groups in their work in the Fraser Basin and across BC. Current partnership programs include Smart Planning for Communities, Integrated Flood Hazard Management, Fraser Salmon and Watersheds Program (with the Pacific Salmon Foundation) and various climate change and clean air initiatives, including those to assist private and public sector fleets in adopting green practices and technologies. In each of FBC's five regions, many other programs are underway to build strong local economies and resilient communities.

The Fraser Basin Council's Sustainability Indicators Program, reflected in this report and in a series of Sustainability Snapshot reports, is an important way that FBC helps monitor the state of sustainability over time.

The Charter defines sustainability as "Living and managing activities in a way that balances social, economic, environmental and institutional considerations to meet our needs and those of future generations."

Reflections on Our Journey for Sustainability

SUSTAINABILITY ISSUES ARE CONNECTED

Stated simply, sustainability is about securing our future. That, of course, is anything but simple.

People are accustomed to quickly shifting attention from one big issue to the next – from social inequity, to environmental threat, to economic downturn. But however compelling the headline of the day, it is the connections among all these issues that are most important when it comes to our future health and well-being.

Sustainability Snapshot 4 offers data and trends to help people understand social, economic and environmental issues and make critical connections. Energy and climate change offer a powerful example. The amount and type of energy people consume significantly affects greenhouse gas emissions, which are driving global climate change. As the climate changes, the natural environment responds and shifts. Like other species, humans are adapted to environmental conditions that have been relatively stable over long periods of time. When natural cycles, habitats and biodiversity change quickly, there are social, economic and environmental impacts.

To illustrate, warmer winters in BC have created favourable conditions for the mountain pine beetle infestation, which has resulted in large areas of dead pine trees and a dramatic drop in an important renewable forestry resource. Although this beetle is native to BC, the average area it has affected during the recent outbreak (2001–2008) has increased by 47 times compared to the previous 20-year average. Related impacts include an increase in the extent, frequency or magnitude of natural disturbances, such as forest fires, floods and erosion. These events, in turn, have harmful impacts on communities.

There are also strong connections and interdependencies within social and economic systems. The growth and decline of the economy can have far- reaching benefits and costs for communities. While quick economic growth can increase rates of employment and income, it may also be accompanied by higher consumption, waste generation, inflation and cost of living. There are particular challenges for those who may not be fully benefiting from the economy, such as those who are unemployed, under-employed or finding it difficult to make ends meet. Poverty impacts people's health and education. These dynamics demonstrate the importance of designing an economy that functions in a way that is respectful of the environment, equitably supports all members of society and leads to more stable communities over time.

SUSTAINABILITY SOLUTIONS DELIVER BROAD BENEFITS

Sustainability Snapshot 4 illustrates opportunities to deliver broad benefits through sustainability. For instance, by creating stronger connections with local farmers, citizens are more likely to buy food close to home. This, in turn, can strengthen the economic viability of local, family-operated farms, deliver economic benefits to workers in the agriculture and food sector, secure a local supply of fresh and nutritious food over time, and reduce energy consumption and greenhouse gas emissions that relate to shipping food long distances. There are additional benefits when people support farmers in protecting the long-term health of agricultural lands and stewarding the natural environment.

Principles and practices that improve efficiency of resource use and conservation also demonstrate the multiple benefits of sustainability. For instance, increased energy efficiency, particularly in consuming fossil fuels, can reduce greenhouse gases, mitigate global climate change and improve air quality. Energy efficiency also saves money. Improved air quality can contribute to health benefits, reduced healthcare costs, increased agricultural productivity, improved aesthetics and enhanced tourism values. Improved energy efficiency can also reduce the need to develop additional energy sources such as hydroelectric dams or fossil fuel reserves.

Smart community planning and development is another powerful opportunity for realizing widespread sustainability benefits. Smart planning encourages compact, multi-use development patterns, which reduce urban sprawl, protect agricultural lands and conserve fish and wildlife habitat. Such development patterns also create enhanced opportunities for public transportation, walking and cycling, which result in reduced traffic congestion and air pollution. Economies of scale for many community services and public infrastructure works can also result from smart planning and smart growth. Compact community development with increased density may strengthen community cohesion and enhance opportunities for affordable housing for lower income individuals and families.

WE ARE MAKING PROGRESS AND WE NEED TO DO MORE

The analysis of more than 70 indicators across 18 different topics shows there is a complex array of sustainability-related issues, trends and patterns. Many trends show signs of improvement, while others are deteriorating. Most issues and trends can be considered "Mixed Results" – that is, either "Fair" or "Poor". The magnitude and significance of the mixed results varies widely across different topics and indicators and in different regions. There are also differences in short- and long-term trends.

The following are some of the more notable "mixed results" identified in *Sustainability Snapshot 4*:

Agricultural & Food – There has been a net gain in the area designated as Agricultural Land Reserve in the Fraser Basin since 1974; however, there have been declines in four of five regions of the Fraser Basin and in the area classified as prime agricultural land.

Consumption & Waste – Ninety-nine percent of British Columbians who responded to a national survey in 2006 claimed they recycled; however, rates of solid waste disposal increased in the Fraser Basin by 18% between 1996 and 2006. BC households practise environmental activities at high rates compared with those in other Canadian provinces; but Canadian consumers ranked second worse compared with 13 other countries.

Economy, Income & Employment – Between 2000 and 2006, increases were recorded in the employment rate (3%), individual disposable income (16%) and gross domestic product per capita (12%); however, average household income declined (3%).

Energy & Climate Change – Between 2000 and 2006, total energy consumption increased by 1.6%; however, decreases were recorded for consumption per capita (5%) and per unit of real GDP (15%). While total and per capita greenhouse gas emissions were at a 15-year high in 2004, total emissions decreased by 5% between 2004 and 2006.

These examples illustrate that progress is being made on some fronts and that much more is needed to advance the state of sustainability.

A CALL TO ACTION

Sustainability Snapshot 4 is intended to inform and encourage action for sustainability, and is of particular importance for:

- local, regional, provincial, federal and First Nations governments
- civil society and non-government organizations
- businesses and private sector organizations
- citizens and residents of the Fraser Basin

This report can assist in:

- informing strategic, organizational and program planning
- informing decision-making by organizations and individuals
- reviewing, analyzing and developing policies
- setting research and monitoring priorities
- helping individuals set work priorities
- informing citizens for participation in public processes
- raising awareness and changing behaviour
- informing lifestyle choices and consumer decisions

The Fraser Basin Council invites all individuals and organizations to learn from the data and stories included in *Snapshot 4*, to acquire additional information from the cited references and resources, and to identify actions for creating more sustainable communities and regions. See also Steps for Sustainability on pages 84–87 for ways everyone can contribute to strong communities, vibrant economies and a healthy environment.

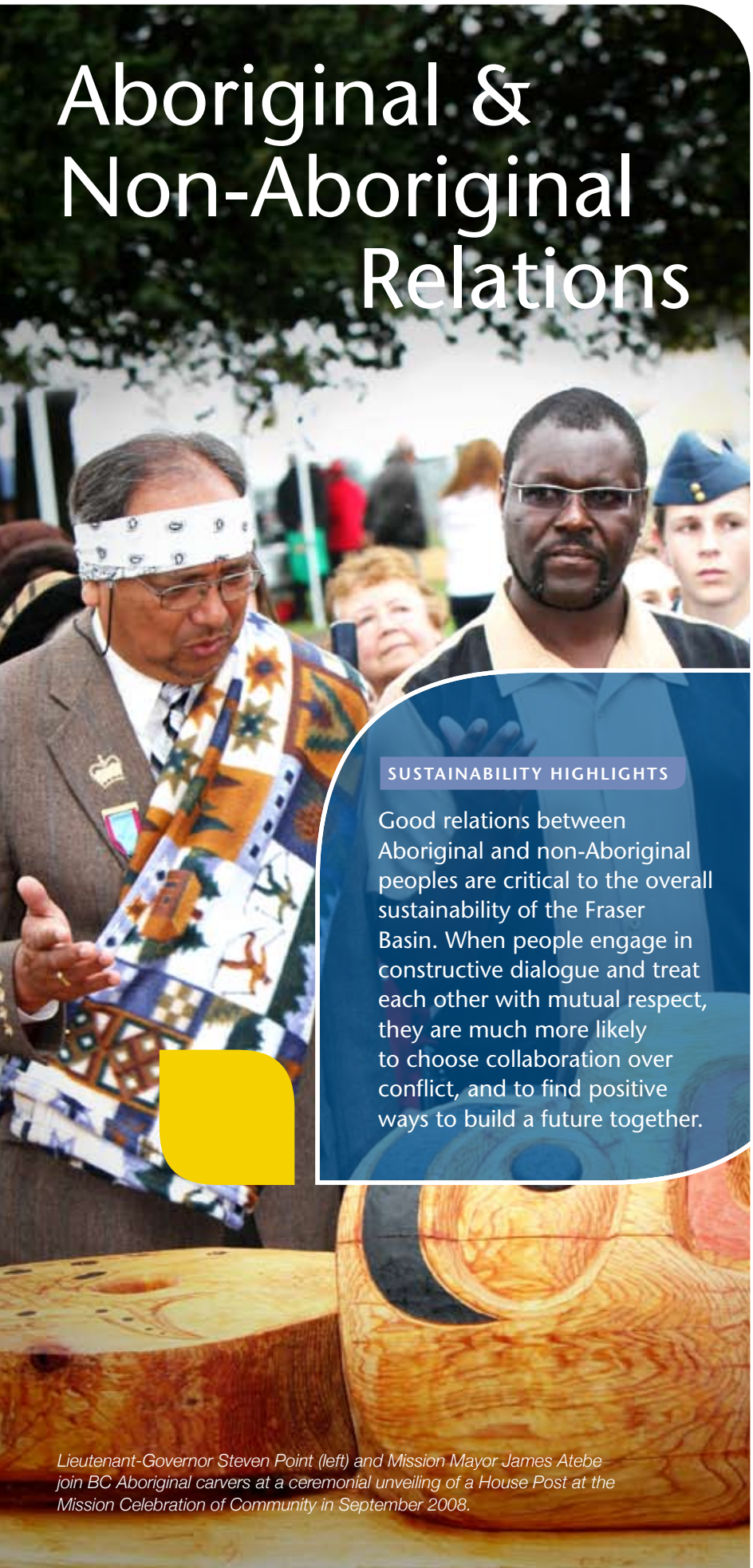
One way to advance action is for people in all walks of life to come together on bold, strategic targets to help define a sustainable future. Indicator data help describe current conditions and trends from past to present; targets help set a course for the future. They help answer the questions: Where do we want to be in five or ten years? What conditions are necessary for a sustainable future in the long term?

Some examples of targets that apply in BC include:

- 50% reduction in solid waste disposal (BC Ministry of Environment)
- attainment of water quality objectives (BC Ministry of Environment)
- Canada-Wide Standards for air quality such as particulate matter$_{2.5}$ and ground level ozone (Environment Canada)
- achievement of net zero greenhouse gas emissions for the public sector by 2010 (BC Climate Action Secretariat).
- no net loss of fish habitat (Fisheries and Oceans Canada)
- 33% increase in water efficiency by 2020 (BC Ministry of Environment)

Specific, measurable, attainable targets can help define a vision for governments, businesses, organizations and individuals to work together for mutual benefit. By bringing together science, dialogue, understanding and consensus, it is possible to set appropriate targets, explore opportunities for collaborative action and share responsibility for action.

Aboriginal & Non-Aboriginal Relations



Lieutenant-Governor Steven Point (left) and Mission Mayor James Atebe join BC Aboriginal carvers at a ceremonial unveiling of a House Post at the Mission Celebration of Community in September 2008.

SUSTAINABILITY HIGHLIGHTS

Good relations between Aboriginal and non-Aboriginal peoples are critical to the overall sustainability of the Fraser Basin. When people engage in constructive dialogue and treat each other with mutual respect, they are much more likely to choose collaboration over conflict, and to find positive ways to build a future together.

The history between Aboriginals and non-Aboriginals in BC has been rocky at times, marred by cultural misunderstandings, conflicts, and hurtful legacies such as those of the former residential school system. Today it is important to recognize and remedy disparities and to foster good relationships.

Aboriginal title and rights are among BC's most important issues, and resolution is in everyone's best interest. Court decisions have defined some aspects of Aboriginal title and rights. They have also described the Crown's duty in undertaking good-faith consultations with Aboriginal communities and in making accommodations on various issues that affect Aboriginal rights. Advances have also been made in treaty negotiations and other means of establishing self-determination, title and rights.

- In 2006, the Aboriginal population in the Fraser Basin numbered 98,240, an increase of 28,000 since 1996.
- In 2001, average life expectancy in BC was 72.1 years for Status Indians and 79.5 years for other residents.
- In 2008, seven Bands, represented at five treaty tables, had reached Stage 5 of the treaty process.

MIXED RESULTS / POOR

Aboriginal Health and Well-Being
Between 2000 and 2004, there were signs of improvement; however, significant differences in many key health statistics still existed between Aboriginals and non-Aboriginals in BC.

MIXED RESULTS / POOR

Children in Care
The total number and proportion of Aboriginal children in care in BC continued to increase between 2000 and 2008.

FAIR / MIXED RESULTS

Progress in the BC Treaty Commission Process
Since 2002, some progress has been made by some First Nations participating in the BC Treaty Commission process.

ISSUES AND TRENDS

Aboriginal Population (1996–2006)[1,a]

In 2006, there were more than 98,000 Aboriginal people living in the Fraser Basin. In the Basin overall, the rate of Aboriginal population growth between 1996 and 2006 (39%) was triple the rate of total population growth (13%). The highest rate occurred in the Fraser Valley (60%). The Cariboo-Chilcotin region had the second highest rate (53%), even though its total population decreased by 7%. The Greater Vancouver-Sea to Sky (GVSS) region had the largest Aboriginal population in the Fraser Basin in 2006 (42,650 persons or 43% of all Fraser Basin Aboriginals). People identifying themselves as Métis increased by 122% in the Fraser Basin and almost 200% in the Cariboo-Chilcotin region between 1996 and 2006. Increasing in population by 17,750 between 1996 and 2006, Métis represent 62% of the total growth in the Aboriginal population in the Fraser Basin.

Aboriginal Health and Well-Being in BC (2000–2004)[2,3]

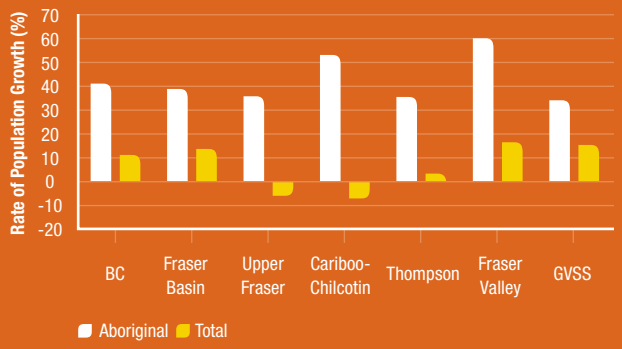
Aboriginal people in BC continue to face challenging health and socio-economic conditions. In February 2007, the Provincial Health Officer reported some improvements in these conditions had been made between 2000/2001 and 2003/2004, but noted that significant gaps between Aboriginals and other people in the province remained. In 2004, BC's First Nations had a higher percentage of low-weight births (6.5% compared to 5.5% for other BC residents) and pre-term births (11.3% compared to 7.3% for other BC residents); higher infant mortality rates (8.6 per 1,000 births compared to 3.7 for other BC residents); a higher percentage of births to teenage mothers (16.3% compared to 2.4% for other BC residents); and a higher incidence of diabetes (1.4 times the rate experienced by other BC residents). In BC, Aboriginal people are also more likely than non-Aboriginals to die before age 75 due to motor vehicle accidents, accidental poisoning, suicide, homicide, heart disease, cirrhosis or HIV.

Throughout the world, life expectancy is a key indicator of socio-economic conditions, and is strongly related to relative poverty and income inequality. Average life expectancy for Status Indians living in BC in 2001 was 72.1 years compared to 79.5 years for other residents. The largest difference between these two groups (more than 11 years) was in the GVSS region.[2]

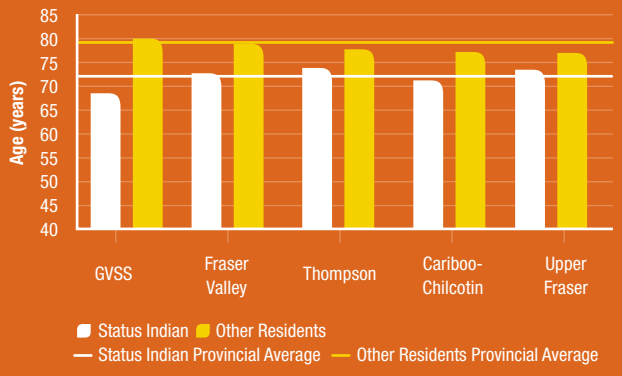
Aboriginal Children in Care (2000–2008)[4]

Between 2001 and 2006, the population of Aboriginal children and youth (under age 18) in BC increased by 10%, and the population of Aboriginal youth (age 15–18) increased by 23.5%. In 2008, approximately 52% of the 9,237 children in the care or guardianship of the Ministry of Children and Family Development were Aboriginal, although only 8% of children in BC were Aboriginal. The total number of Aboriginal children in care is on the rise, and Aboriginal children represent an increasing proportion of all children in care: up from 36% in 2000/2001 to 49% in 2005/2006 to 52% in 2007/2008.

Rate of Aboriginal and Total Population Growth in BC and the Fraser Basin (1996–2006)[1]



Life Expectancy for Status Indians and Other Residents in the Fraser Basin (2001)[2]

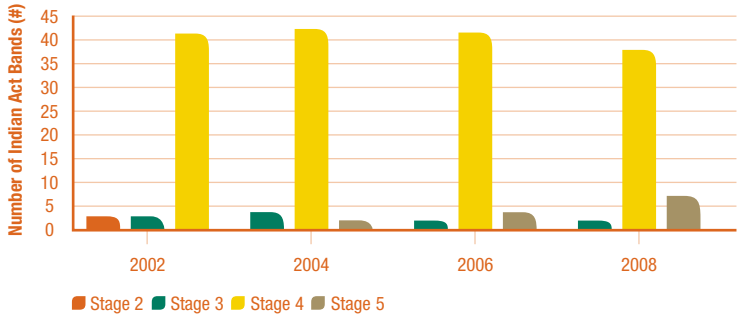


Aboriginal & Non-Aboriginal Relations

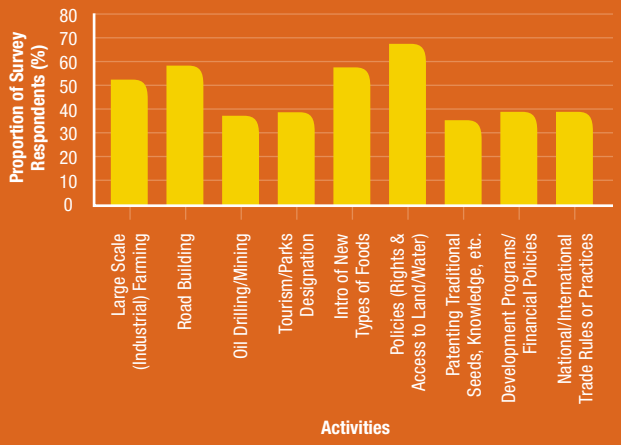
Participation in the BC Treaty Commission Process (2002–2008)[5]

The BC Treaty Commission (BCTC) facilitates treaty negotiations among the federal and provincial governments and BC First Nations through a six-stage process, which ultimately results in the signing of a final agreement. Of the 98 Bands in the Fraser Basin, 47 are participating in the Treaty Commission process via 17 different treaty tables, a number that has stayed constant since 2002. Thirty-eight Bands are represented at the 10 treaty tables that have reached Stage 4 in the BCTC process. The number of Fraser Basin Bands at Stage 5 (Negotiation to Finalize a Treaty) has increased gradually from 2002 (0) to 2008 (7), and includes In-SHUCK-ch Nation (3 Bands), Yekooche Nation, Lheidli T'enneh Band, Yale First Nation and Tsawwassen First Nation. While progress had been made at the Lheidli T'enneh treaty table through 2006 and a final agreement had been initialed in March 2007, the Lheidli T'enneh people voted (123–111) not to ratify a final agreement.[5,6] On December 6, 2007, Chief Kim Baird and members of Tsawwassen First Nation travelled to Ottawa to sign their treaty on Parliament Hill along with Federal Minister Chuck Strahl and Provincial Minister Mike de Jong.[5]

Status of Treaty Negotiations for Fraser Basin Indian Act Bands Participating in the BC Treaty Commission Process (2002–2008)[5]



Activities Negatively Impacting Indigenous Peoples' Traditional Foods and Practices in Canada and the United States (2003)[8]



Indigenous Food Sovereignty[7,8]

There is renewed interest in traditional Aboriginal foods that come from hunting, fishing, gathering and cultivation. Indigenous foods can positively impact community health and well-being; however, there are many threats to the sustainability of traditional foods. In March 2008, the Provincial Working Group on Indigenous Food Sovereignty, part of the BC Food Systems Network, identified threats to traditional Aboriginal food systems, such as widespread development and degradation of land. The Working Group found that one way to revitalize harvesting strategies is to actively cultivate traditional foods.[7] In 2003, the International Indian Treaty Council conducted a survey of indigenous peoples around the world about traditional foods.[8] There were 115 respondents in total and 61 respondents from Canada and the United States. The following are a couple of highlights:

- 90.4% of the respondents stated that traditional subsistence foods and practices are very important for maintaining their culture, and 87% stated that their traditional cultural activities (ceremonies, songs, dances, etc.) are very important for maintaining traditional foods and practices.

- Reasons given for the importance of traditional foods and practices included health and nutrition (89%), preservation of traditional knowledge/ practices/way of life (87%) and protecting land and the environment (83%).

Notes

[a] Data for the Aboriginal population are based on the Population Census, and include those who responded as being of Aboriginal identity.

References

[1] Statistics Canada. Semi-Custom Area Profiles (extracted from 1996, 2001 and 2006 census data).

[2] Office of the Provincial Health Officer. 2001. Report on the Health of British Columbians: the Health and Well-being of Aboriginal People in British Columbia. www.healthservices.gov.bc.ca/pho/pdf/phoannual2001.pdf.

[3] Office of the Provincial Health Officer. The Health and Well-being of the Aboriginal Population in British Columbia: Interim Update. February 2007. www.health.gov.bc.ca/aboriginal/pho.html [accessed December 2008].

[4] BC Ministry of Children and Family Development. 2008. 2007/08 Annual Service Plan Report. www.gov.bc.ca/mcf/index.html [accessed December 2008].

[5] BC Treaty Commission. Negotiation Update. 2008. www.bctreaty.net [accessed December 2008].

[6] BC Ministry of Aboriginal Relations and Reconciliation. www.gov.bc.ca/arr/firstnation/lheidli/default.html [accessed December 2008].

[7] Morrison, D. March 2008. Working Group on Indigenous Food Sovereignty: Final Activity Report to the Provincial Health Services Authority, Interior Health and BC Food Systems Network.

[8] International Indian Treaty Council. 2003. Final Report on an Indigenous Peoples' Initiative to Establish Cultural Indicators for SARD: Questionnaire on Indigenous Peoples' Traditional Foods and Cultures and Addendum. www.treatycouncil.org [accessed December 2008].

[9] Fonseca, A., and R. Gibson. 2008. Application denied: BC's Kemess North and Nova Scotia's Whites Point Projects Promised Jobs and Revenue, but the Communities were Looking for Overall Sustainability. Waterloo, Ontario. Alternatives Journal 34:4.

[10] Tse Keh Nay. 2008. First Nations Leaders Commended for Successfully Protecting Amazay Lake. www.tsekehnay.net/index.php?/news/article/72 [accessed December 2008].

[11] BC Ministry of Forests and Range. News Release. Cheslatta Carrier Issued Long-term Forest Agreement. November 16, 2007.

[12] Investment Agriculture Foundation of British Columbia (IAF). Media Release. August 19, 2008.

[13] Surrey-Delta Leader. Ancient Harvest. June 20, 2008.

ACTIONS

The Many Faces Of **Sustainability**

Sustaining Amazay Lake
In September 2007, the joint federal-provincial Environmental Review Panel rejected the expansion of the Kemess mine in favour of protecting the sustainability of Amazay Lake – a source of drinking water for the Tse Keh Nay people. This was the first such decision in Canada to recommend the rejection of a proposed mining project after applying a "contribution to sustainability" test that focused on environmental stewardship, economic benefits and costs, social and cultural benefits and costs, fair distribution of benefits and costs, and present versus future generations.[9] The decision was influenced, in part, by the dedication and leadership of the Tse Keh Nay people, which include Takla Lake, Tsay Keh Dene and Kwadacha First Nations.[10] See: www.sacredland.org/PDFs/Tse_Keh_Nay_Press_Release.pdf.

Community Forest Partnerships
Community forest agreements are a form of tenure by which the Province transfers responsibility for management and stewardship of local forest resources, along with exclusive rights to harvest timber, to local communities. A number of First Nations hold community forest licences, including the Cheslatta Carrier Nation, a community of about 120 located south of Burns Lake. Since 2002, under an initial five-year licence, the Cheslatta Carrier Nation harvested about one million cubic metres of timber. Most was processed at the Cheslatta Forest Products sawmill located at nearby Ootsa Lake and jointly owned by the Cheslatta Carrier Nation, local residents and Carrier Forest Products Ltd. The forestry operations have offered local employment and training, and the profits support various community projects, including a community bus, a public dock on Francois Lake and a hot lunch program at the Grassy Plains School.[11] A new 25-year licence will provide a framework for planning future forestry operations.

Healing Centre for Youth
A former youth detention camp in the Chilliwack Valley is being transformed into a healing and treatment centre to help BC Aboriginal youth overcome alcohol and drug addiction. The Stehiyaq Healing and Wellness Village – the first centre of its kind – opens in 2009 and will offer young people aged 13 to 17 treatment and traditional spiritual healing practices that include use of the medicine wheel and sweat lodge. The services of the centre may also become available to non-Aboriginal youth.

Aboriginal Tourism
There are now over 200 Aboriginal tourism ventures in BC, contributing $35 million to the provincial economy. For visitors to the Fraser Basin, there are many choices, including a luxury stay (or unforgettable conference) at Talking Rock Resort and Quaaout Lodge, owned and operated by Little Shuswap Nation; an introduction to traditional Aboriginal practices and places through St'át'imc Cultural Experiences in Lillooet; a peaceful canoe paddle and interpretive outing on the waters of Burrard Inlet with Takaya Tours; a look at BC's oldest house – a 9,000-year-old pit lodge and village site – at Xá:ytem Longhouse Interpretive Centre in the Fraser Valley or a fascinating river tour with Sasquatch Tours or Cariboo-Chilcotin Jetboat Adventures. For a closer look, visit: www.aboriginalbc.com.

First Nations Economic Development Action Plan
A BC First Nations Economic Development Action Plan was released by Aboriginal leaders from the Assembly of First Nations of BC, First Nations Summit and Union of BC Indian Chiefs in the fall of 2008. It outlines six strategies "to close the key gaps that exist between First Nations and other British Columbians, including income and employment levels, and quality of life indicators." The plan is also intended to attract investment, foster partnerships and opportunities for economic development and support self-determination. Visit: www.fns.bc.ca.

TRADITIONAL FOODS FOR THE FUTURE

The Canim Lake Band, near 100 Mile House, has taken steps to improve access to and use of traditional foods by offering a training program in horticultural techniques and in gathering and preserving indigenous foods. The Band is working on becoming self-sustaining in horticulture and vegetable production and is creating employment opportunities. Produce from the gardens is sold at local markets. Another program is underway in the Nemiah Valley near Alexis Creek where the Xeni Gwet'in First Nation operates the ?Eniyud Health Services Root Cellar and Greenhouse Project, and in Chase, where the Neskonlith Indian Band offers family gardening opportunities.[12]

What may not be widely known is that horticulture has a long history among First Nations. A recent discovery in Pitt Meadows illustrates this point. During Golden Ears Bridge construction, remains of a 3,600-year-old Katzie village were uncovered. Excavated at the site by Katzie First Nation were ancient wapatos (semi-aquatic root vegetables), perfectly preserved in the mud of a cultivated wapato garden. It was a unique find, which SFU Associate Professor Dana Lepofsky described as being of global significance because it is the oldest example of horticulture in BC and Canada.[13]

The Canim Lake Band is deepening community connections to the land through a horticultural program that includes the cultivation, harvesting and preservation of traditional foods.

Agriculture & Food

SUSTAINABILITY HIGHLIGHTS

A healthy, safe and secure food supply is vital to community well-being and individual health. Agriculture is an important part of the economy in the Fraser Basin. With the increasing economic and environmental costs of global shipping, rising food prices and concerns about food safety, local and safe food supplies are becoming even more important to community sustainability.

The communities of the Fraser Basin have a high interest in local food systems, yet a number of factors today threaten the long-term sustainability of agriculture in the Fraser Basin. In particular, a growing population – especially in the Fraser Valley and Greater Vancouver-Sea to Sky (GVSS) regions – increases the demand for urban development and drives up land prices. Farm Credit Canada has estimated that land value in the Fraser Valley has increased 76% since 2001.[1] High land prices make it increasingly difficult for farmers to buy land, and make it economically beneficial, in the short term, to sell or subdivide existing farmland for urban development. Furthermore, there are significant cost pressures on farmers and ranchers, largely due to the increasing cost of "inputs" such as fuel and animal feed.

• According to a recent study, BC produces the equivalent of 48% of the food consumed in the province. Interestingly, that figure drops to 34% if British Columbians were to eat all the fruit and vegetable servings recommended under the Canada Food Guide.[2] BC farmers will need to increase production by 30% over 2001 levels by 2025 to maintain BC's current level of food self-reliance.[2]

• In 2007, the agricultural sector in BC employed 362,000 people[3] and contributed $1.1 billion to BC's gross domestic product (GDP), while food manufacturing contributed an additional $1.6 billion to GDP.[4,a]

• The Fraser Basin includes about 53% of BC's farmland and more than 9,000 farms, which generate $225 million in net income annually.[5]

• On average, farms in the Fraser Basin earned $22,978 in 2006 – a 21% increase since 2001. However, incomes varied significantly among regions, with the Fraser Valley and Greater Vancouver-Sea to Sky (GVSS) regions accounting for most of the farm income.[5]

• Honeybee populations have been declining recently across BC. The average mortality rate in 2007 was 32%, which resulted in a reduction in honey production and a likely reduction in crop pollination.

MIXED RESULTS / POOR	**Average Farm Income** In 2006, average farm income was very low in interior regions and higher in the Fraser Valley and GVSS regions.
FAIR / MIXED RESULTS	**Agricultural Land Reserve** There was a net increase in ALR in the Fraser Basin, a net loss in 4 of 5 regions, and a net loss in prime agricultural land between 1973 and 2005.
GETTING BETTER	**Agriculture and the Environment** Between 2006 and 2008, there were increasing numbers of completed Environmental Farm Plans in all regions as well as a high use of organic farming practices.

ISSUES AND TRENDS

Average Farm Income (1986–2006)[5]

Average farm income[b] varies significantly across the Fraser Basin regions. In particular, farms in the lower Fraser regions (Fraser Valley and GVSS) earn significantly more than farms in the interior regions (Thompson, Cariboo-Chilcotin and Upper Fraser). This is largely due to the type and intensity of farming. Interior regions tend to be pastoral or ranching based, whereas farms in the lower Fraser regions have more intensive types of production, such as berry crops, dairy farming and greenhouse operations. The Fraser Valley region has the highest average farm income and the highest increase in income since 1996. While the GVSS region had significant increases between 1996 and 2001, it was the only region to report a decline in average farm income (-5.7%) during the 2001–2006 period. It is of particular concern that, over the past two decades, annual operating costs of farms in the Cariboo-Chilcotin region have exceeded their gross farm receipts. Although incomes in the Thompson region increased between 2001 and 2006 (176%), income levels remained below those in the 1990s.

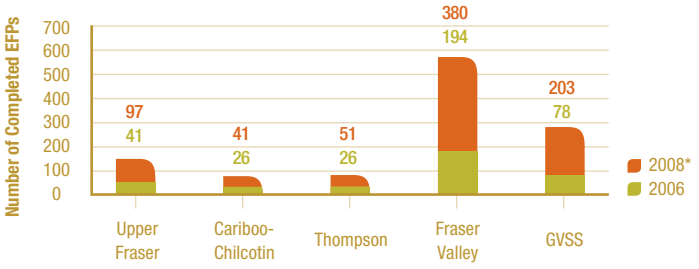
Agricultural Land Reserve (1974–2005 and 2008)[6]

The Agricultural Land Reserve (ALR), established in 1973, has largely prevented the conversion of farmland in the province into non-agricultural uses. In 2008, the area of ALR in the Fraser Basin was about 2.4 million ha, or 10% of the Basin (see Map 2). Most ALR land in the Fraser Basin (94%) is located in the interior regions. Since 1974, there has been a net increase (3.3%) in total ALR area in the Fraser Basin, due mainly to the inclusion of lower quality agricultural land classes (e.g., mixed and secondary) in the Upper Fraser and Cariboo-Chilcotin regions. Most high quality (e.g., prime) ALR land is in the lower Fraser regions, although there has been a net decrease in ALR area in these regions since 1974.

Environmental Farm Plans (2006–2008)[7,8]

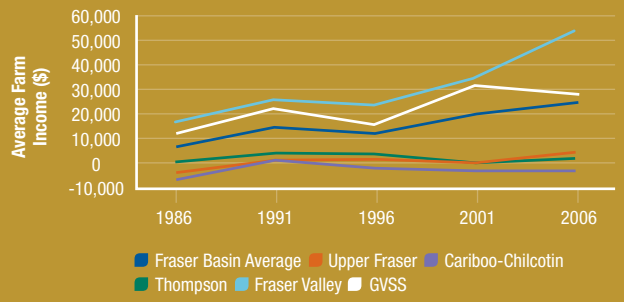
The Environmental Farm Plan (EFP) program is a partnership program designed to complement and enhance the stewardship practices of BC farmers. From 2006 to 2008, the number of completed EFPs in the Fraser Basin increased by 212%. In 2008, 1,137 or 12% of all Fraser Basin farms had completed an EFP.[c] Under the program, farmers have access to cost-sharing incentives for such things as nutrient management, irrigation planning, wildlife and riparian management, integrated pest management and grazing management. In 2006, 17% of all farms (1,700 in total) in the Fraser Basin had established or maintained buffer zones around water bodies while 36% (3,530 in total) were using rotational grazing (i.e., soil conservation) practices.[5]

Completed Environmental Farm Plans in Fraser Basin Regions (2006–2008)[8]

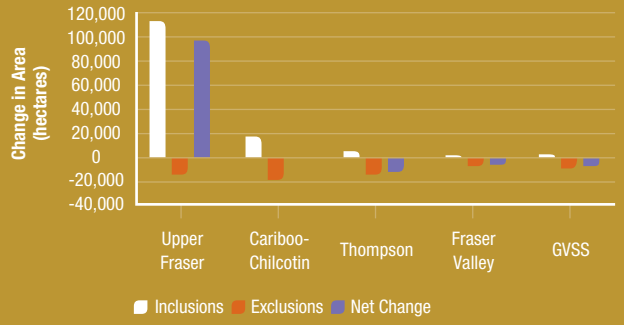


**2008 data represents new EFPs completed since 2006*

Average Farm Income for Farms in Fraser Basin Regions (1986–2006)[5]



Change in Agricultural Land Reserve Area in Fraser Basin Regions (1974–2005)[6]



Agriculture & Food

Organic Farming and Environmental Practices (2006)[5,9]

Organic farming does not use chemicals, such as pesticides, herbicides, or synthetic fertilizers, and it promotes the sustainable health and productivity of the whole ecosystem – soil, plants, animals and people. Organic foods are produced in a way that focuses on soil regeneration, water conservation and animal welfare. In the 2006 Census of Agriculture, many farmers in the Fraser Basin (1,313) reported using organic farming practices. Although the proportion of Fraser Basin farms that are certified as organic[d] is relatively low (1.6%), the proportion that reported using organic practices even though they are not certified is significantly higher (12%). The GVSS region has the highest proportion of farms (16.2%) producing organically grown products, followed by the Thompson region (15.7%).

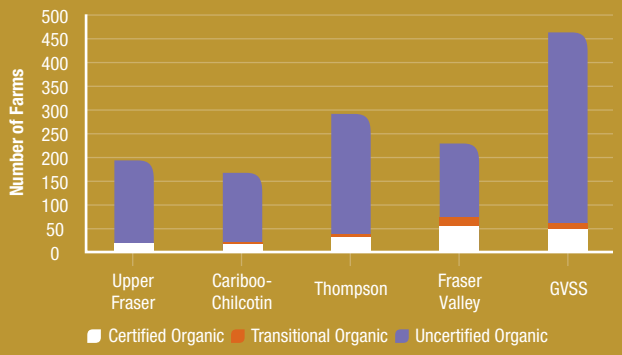
Bees and Crop Pollination[10,11,12]

Bees are an extremely important, but often overlooked, component of the food system. It has been estimated that one out of every three bites of food people eat comes from bee-pollinated plants, including stone fruit, apples, berries and greenhouse products. In 2004, bees contributed more than $265 million to BC's agricultural sector through crop pollination.[10] Recently, honeybee populations have been declining across BC. The average mortality rate in 2007 was 32%; an even higher mortality rate (58%) occurred in the Cariboo-Chilcotin region.[11] These declines have affected honey yields, which have dropped from an average of 104 pounds per colony in 2004 to 50 pounds per colony in 2007.[12] The historic average is about 70 pounds.[11]

Invasive Plant Species[13,14]

Invasive plant species negatively affect agriculture in the Fraser Basin by causing soil erosion, reducing forage quality and quantity, and increasing costs associated with weed control. Four of the 100 worst invasive plant species in the world are known to occur in BC: gorse *(Ulex europaeus)*, Japanese knotweed *(Fallopia japonica)*, leafy spurge *(Euphorbia esula)* and purple loosestrife *(Lythrum salicaria)*. A recent survey by the Invasive Plant Council of BC found that spotted knapweed *(Centaurea biebersteinii)* had the greatest impact on agriculture through lost grazing potential; an estimated annual loss of 300,000 Animal Unit Months (AUM)[e] was attributed to this species alone. Hawkweeds and Canada thistle also have significant impacts on grazing potential, with estimated annual losses of 200,000 AUM attributed to each. The Invasive Plant Council of BC has estimated that almost $7 million is spent annually in BC on invasive plant management activities, such as removal and containment, education and outreach, mapping, research, restoration and enforcement.

Number of Fraser Basin Farms Producing Organic Products by Certification Status (2006)[5]



A mesmerizing moment for a toddler at the Chilliwack Farmers' Market. There are over 100 farmers' markets across BC, nearly a third of those in the Fraser Basin. For many people, the market is an opportunity to invest in healthier eating, support local agriculture and meet the people who grow their food. For growers, it is a place to connect with customers and receive fair market prices for their many quality products. Visit www.bcfarmersmarket.org.

Notes

[a] GDP is a calculation of the total flow of goods and services produced over a specified time period. The value of BC's 2007 GDP is chained to 2002 prices.

[b] Average farm income was calculated from census data by subtracting the total farm operating expenses from total gross farm receipts and dividing by the total number of farms reporting for each region.

[c] Data on implementation status of completed EFPs are not currently available.

[d] Excerpts from Statistics Canada definitions: Certified organic product: an agricultural product that meets organic standards at each stage and is certified by a recognized certifying agency. Transitional: indicates fields in transition to becoming certified organic. The operator is actively adopting practices that comply with organic standards. Organic but not certified: an agricultural commodity produced and processed using organic practices but not officially certified.

[e] An Animal Unit Month is the amount of feed or forage required to maintain one animal for one month.

[f] Ministry of Agriculture and Lands. www.agf.gov.bc.ca/cropprot/invasiveplant.htm.

References

[1] Farm Credit Canada [cited in Penner, D. Land Prices Outstrip Economics of Farming. Vancouver Sun, 24 May 2008, p. G1-4].

[2] BC Ministry of Agriculture and Land. 2006. BC's Food Self-Reliance: Can BC's Farmers Feed Our Growing Population?

[3] BC Statistics. BC Employment by Industry, Table 1996–2007 (originally from Statistics Canada unpublished data) www.bcstats.gov.bc.ca [accessed October 2008].

[4] BC Statistics. Quick Facts about BC. 2008.

[5] Statistics Canada. (1986-2006). Census of Agriculture (various data tables and community profiles) www.statcan.gc.ca/ca-ra2006/index-eng.htm [accessed October 2008].

[6] Agricultural Land Commission. Agricultural Land Reserve database. Custom tabulation and website. www.alc.gov.bc.ca [accessed September 2006]. See also Map 2, reference 6.

[7] BC Agricultural Council website. www.bcac.bc.ca/EFP_pages/about_us/index.html [accessed October 2008].

[8] BC Agriculture Research Development Corporation. Completed EFPs by Regional District. Angela McKee, Senior Program Manager, personal communication via email June, 2008.

[9] Certified Organic Association of BC. www.certifiedorganic.bc.ca/aboutorganic/organicwhat.htm [accessed October 2008].

[10] BC Ministry of Agriculture and Lands. 2004. Apiculture – Estimated Value of Honeybee and Bumblebee Pollination in British Columbia. www.agf.gov.bc.ca/apiculture/statistics/indexstats.htm [accessed November 2008].

[11] BC Ministry of Agriculture and Lands. Beekeeping Production Summary 2007. www.agf.gov.bc.ca/apiculture/statistics/indexstats.htm [accessed November 2008].

[12] BC Ministry of Agriculture and Lands. BC Apiculture Production Figures 1999–2007. www.agf.gov.bc.ca/apiculture/statistics/indexstats.htm [accessed November 2008].

[13] Invasive Plant Council of BC. Economic Impacts Baseline Report, August 2008. www.invasiveplantcouncilbc.ca/resources/reports [accessed September 2008].

[14] Invasive Plant Council of BC. www.invasiveplantcouncilbc.ca [accessed October 2008].

[15] Agriculture and Agri-Food Canada. 2008. Census of Agriculture Summary.

[16] BC Ministry of Agriculture and Lands. www.agf.gov.bc.ca/cropprot/invasiveplant.htm [accessed November 2008].

ACTIONS

The Many Faces Of **Sustainability**

Small Farms on Sustainable Strategies

In sheer numbers, BC's small farms are in the majority, yet they face great challenges. Overall in Canada, food production and profit is overwhelmingly and increasingly concentrated in large farms.[15] Some small farms are choosing to sell food directly to the local market, emphasizing freshness, quality and sustainability. One strategy is to gain advance commitments from customers, such as through Community Shared Agriculture (CSA) arrangements. Glen Valley Organic Cooperative, a 50-acre farm in Abbotsford, is an example. The co-op has 70 members who lease the land for compatible farming enterprises, share in the output and sell products to a Vancouver restaurant and a local food-buying club. Bone Meadow Ranch & Gardens in Quesnel is another CSA, which offers customers the opportunity to buy shares in the season's harvest and receive weekly boxes of produce in return. The Ranch also sells through local farmers' markets and offers farm-stay vacations.

Communities "Pulling Together"

In several communities of the Fraser Basin, neighbours are pulling together to rid themselves of non-native invasive plants, such as spotted knapweed, oxeye daisy and field scabious. Invasive species threaten biodiversity and cost BC's economy well over $50 million annually through crop losses alone.[16] With support from the Invasive Plant Council of BC, BC Ministry of Agriculture and Lands and regional weed committees, community groups are manually weeding priority sites where other weed control options are limited, such as in riparian and pesticide-free zones. To connect with your regional weed committee and find out how to prevent the spread of invasive plants, visit: www.invasiveplantcouncilbc.ca.

Kids in the Murray Ridge Nordic Ski Club show their pluck by taking out tansy, one of BC's most aggressive plant species, during a weed pull hosted by the Northwest Invasive Plant Council. Community weed pulls are one way to tackle invasive plants found in sensitive areas, such as alongside streams and in other herbicide-free zones.

FARMLAND STEWARDSHIP IN ACTION

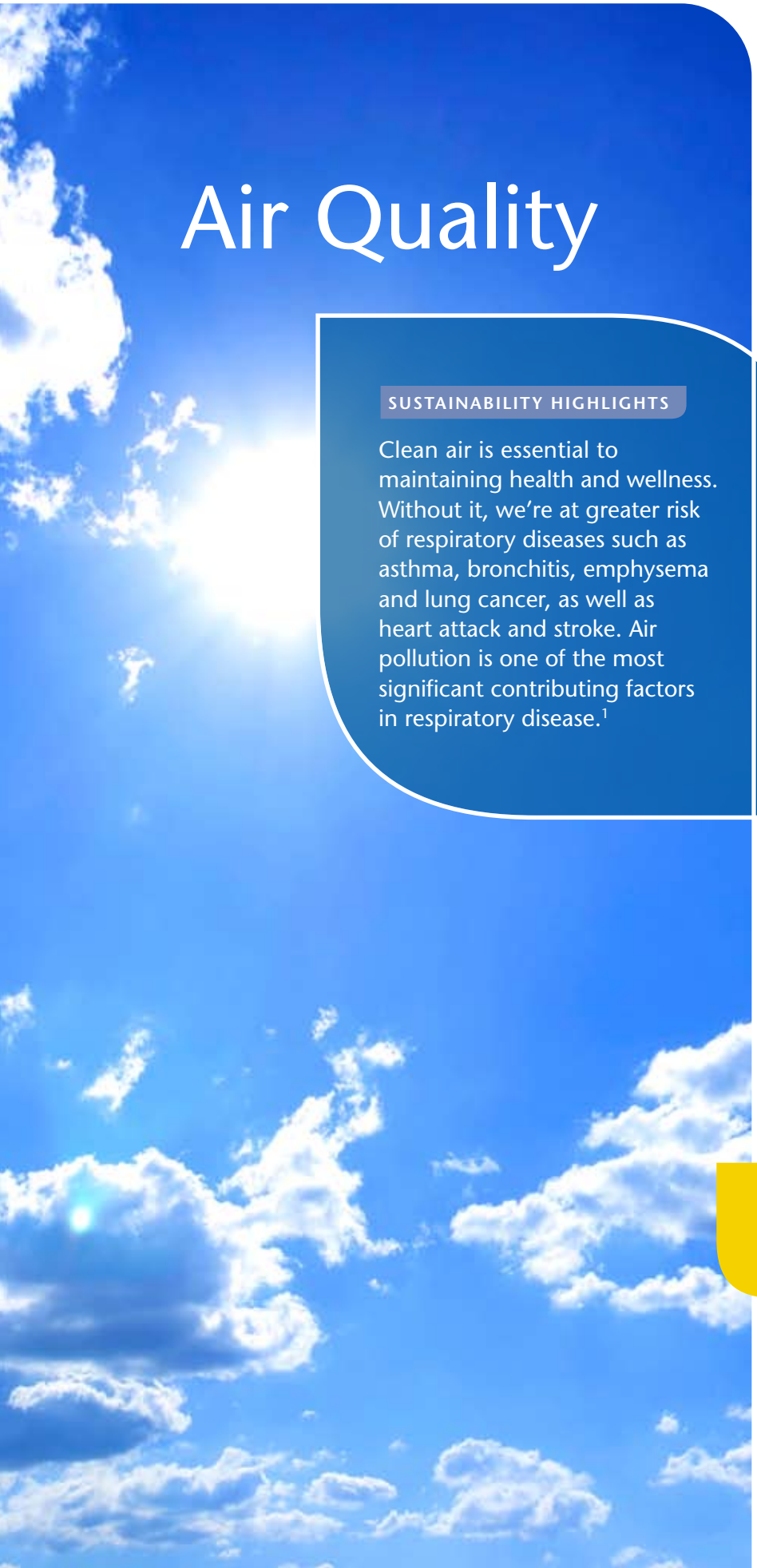
Through the Farmland Riparian Interface Stewardship Program (FRISP), the BC Cattlemen's Association is helping ranchers protect and enhance water quality and riparian vegetation, as well as prevent and mitigate agricultural impacts on streams and lakes.

FRISP offers consultations on management issues that involve environmental concerns, assists with major restoration projects – to prevent streambank erosion and loss of land and improve fish habitat – and assists with monitoring of completed projects. FRISP also provides mediation services for landowners and regulatory agencies when concerns arise over riparian damage considered to have resulted from agricultural practices.

The program recognizes that sustainable use of land to support agricultural activities is often a complicated issue in balancing environmental issues and production economics. Proper land management requires that individual ranchers and farmers understand riparian function and the significant impact that riparian mismanagement can have on an agricultural operations, fisheries and general watershed health.

Visit www.cattlemen.bc.ca.

Lumby Rancher Lee Hesketh discusses a new biodiversity assessment tool during a field tour at his Silver Hills Ranch in April 2008. As Program Manger for the Farmland Riparian Interface Stewardship Program (FRISP) of the BC Cattlemen's Association, Hesketh helps ranchers develop land management and stewardship plans for their land.



Air Quality

SUSTAINABILITY HIGHLIGHTS

Clean air is essential to maintaining health and wellness. Without it, we're at greater risk of respiratory diseases such as asthma, bronchitis, emphysema and lung cancer, as well as heart attack and stroke. Air pollution is one of the most significant contributing factors in respiratory disease.[1]

Fine particulate matter (PM) – very small particles that we inhale deep into our lungs – is considered to be the most serious form of air pollution in BC.[2] In particular, children, the elderly and those with asthma and cardio-respiratory diseases are most at risk. Significant health impacts come from traffic-related pollutants, including ultrafine particulate matter (microscopic solid and liquid particles) and nitrogen dioxide, and from indirect traffic pollutants such as Ground Level Ozone (GLO). Such pollutants contribute to childhood asthma and more recently have been linked to low birth weight and premature births. Air pollution also has economic implications. In particular, it negatively impacts agricultural crop productivity and the tourism industry.

• A single poor visibility day (increased haze and lower aesthetic quality) could result in a loss of almost $9 million in future tourist revenues for the Lower Fraser Valley.[3] The BC Ministry of Health has estimated that the annual health-related economic cost of outdoor air pollution in British Columbia is at least $85 million.[1]

• Among eight Fraser Basin communities, the largest improvements (i.e., decreases) in $PM_{2.5}$ concentrations since 2004 were recorded in Kamloops (46% decrease) and Prince George (36% decrease).

• Following a period of notable increases at seven of nine Fraser Basin monitoring locations, GLO concentrations have generally decreased since 2004, with considerable improvements recorded at Kamloops, Squamish and Chilliwack.

GETTING BETTER	**Particulate Matter $_{2.5}$** Levels have either improved or remained low and stable since 2004.
GETTING BETTER	**Ground Level Ozone** Levels have either improved or remained low and stable since 2004.
GOOD	**Air Quality Health Index** Ratings were consistently good (Low Health Risk) between 2000 and 2006.

ISSUES AND TRENDS

Air quality data for $PM_{2.5}$ and GLO from monitoring stations in eight communities throughout the Fraser Basin are presented in this report. For additional data, see the National Air Pollution Surveillance website.[a] It is important to note that, although the Canada Wide Standard (CWS) for $PM_{2.5}$ is 30 micrograms per cubic metre (ug/m^3)[b] and 65 parts per billion (ppb) for GLO,[c] research has not been able to determine an effect-free or safe level. Even very small amounts of air pollution can have negative health impacts on people of all ages. In addition, health risks are known to increase with exposure to $PM_{2.5}$ and negative health effects occur at very low concentrations of GLO.[2] It is important to note that the annual data and three-year averages presented in this report do not detect daily or seasonal differences in air quality.

Particulate Matter ($PM_{2.5}$) (2001–2007)[4]

$PM_{2.5}$ refers to all airborne particles that are smaller than 2.5 microns in diameter (by comparison, a human hair is about 70 microns in diameter). $PM_{2.5}$ is most commonly emitted from vehicles, woodstoves and fireplaces, but is also produced by forest fires and industrial sources, such as pulp mills and smelters.[5] In the Fraser Basin, $PM_{2.5}$ concentrations (three-year running mean)[b] since 2004 have decreased or remained low and stable at all eight monitoring locations.

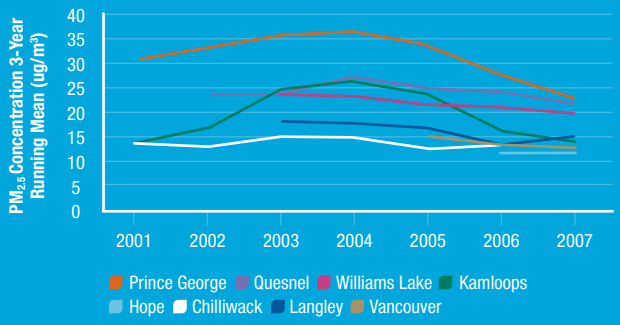
Ground Level Ozone (2001–2007)[4]

GLO can irritate lung airways and cause inflammation, leading to permanent lung damage. GLO is the main component of smog and is formed when compounds such as nitrogen oxide and volatile organic compounds – mainly from vehicle exhaust – react in the atmosphere in the presence of sunlight.[1,2] Following a period of notable increases at seven of nine Fraser Basin monitoring locations, GLO concentrations have generally decreased since 2004, with notable decreases (i.e., improvements) recorded at Prince George, Kamloops, Squamish and Chilliwack. The CWS of 65 ppb has been exceeded at Hope every year since 2003, although a slight decrease in GLO concentration has been recorded since 2005. Vancouver has recorded a slight reduction in GLO concentration since 2005. Following an increase between 2003 and 2005, Williams Lake GLO concentrations have remained stable. GLO concentration has been declining in Prince George, Quesnel and Whistler since 2003.

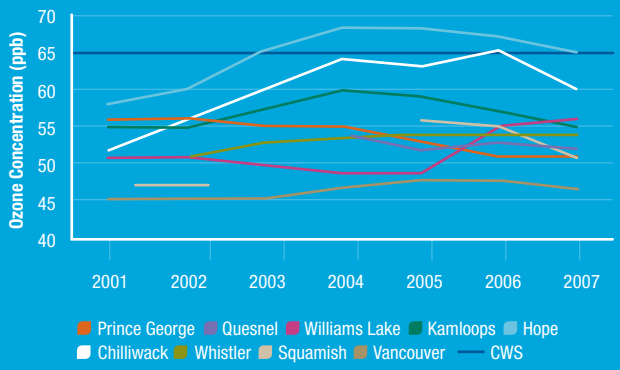
Air Quality Health Index (2000–2006)[6]

The Air Quality Health Index (AQHI) is an online public information tool that provides an hourly measurement and two-day forecast of air quality in 14 communities across British Columbia to better enable people to reduce their exposure to outdoor air pollution during periods of higher risk. The underpinning of the AQHI was a study that found relationships between daily mortality and daily concentrations of air pollutants. The AQHI is an index based on hourly concentrations of three key pollutants that negatively affect human health: $PM_{2.5}$, GLO and nitrogen dioxide (NO_2). These three pollutants were chosen, in part, because they are routinely measured across Canada. Other pollutants are likely important, including PM_1 and

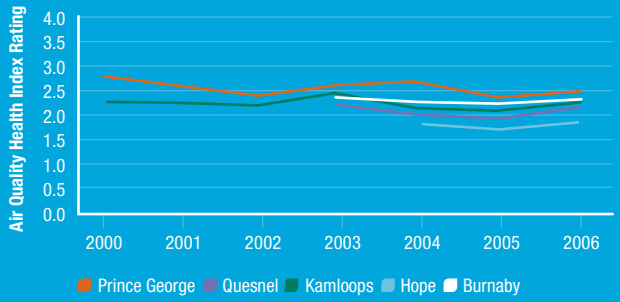
$PM_{2.5}$ Concentration for Fraser Basin Communities (2001–2007)[4,b]



Ground Level Ozone Concentrations Based on CWS Metric for Fraser Basin Communities (2001–2007)[4,c]



Annual AQHI Health Risk Category for Select Fraser Basin Communities (2000–2006)[6]



Air Quality

$PM_{0.1}$, but these are not currently monitored widely. Nitrogen dioxide and perhaps other pollutants are likely acting as proxies for these pollutants.

The AQHI provides hourly health risk values using a four-tiered scale: Low Health Risk (1–3), Moderate Health Risk (4–6), High Health Risk (7–10) and Extreme Health Risk (above 10). AQHI data from one community in each of the five Fraser Basin regions are presented in this report. Typically, AQHI readings in these communities are in the Low Health Risk category; however, on occasion the AQHI has risen into the Moderate and High Health Risk categories. Of the five Fraser Basin communities reported here, Prince George has consistently recorded the highest (worst) annual average AQHI, while Hope has recorded the lowest (best), although data for Hope are available only for 2004–2006.

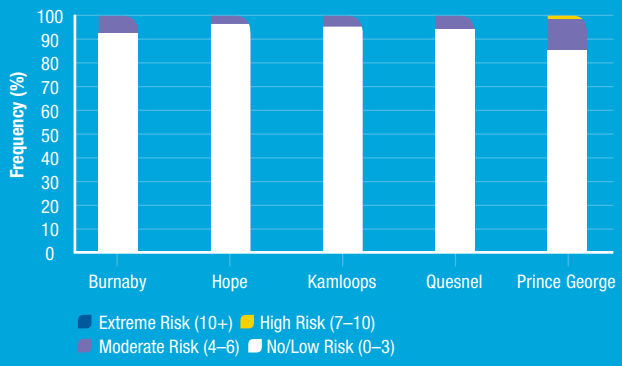
In four of five Fraser Basin communities, the AQHI health risk was Low (1–3) more than 90% of time during the 2000–2006 period. Quesnel and Prince George are the only communities to record a "High" risk level, although this occurred less than 1% of the time during the seven-year period. Although annual data are presented in this report over a seven-year period, the index was designed to notify people of short-term (hourly) health risks related to outdoor air pollution. More information about the index and hourly AQHI values are available at www.AirHealthBC.ca.

Air Quality and Health

The Border Air Quality Study (BAQS) involved research on air quality and health throughout the entire Puget Sound–Georgia Basin airshed (see map). The results indicated that low birth weights and premature births were associated with poor air quality. Premature babies[d] and those with a low birth weight[e] tend to have a higher risk of ill health throughout their lives. A large number of people living in the study region, which includes a significant portion of the Fraser Basin population, are exposed to traffic-related pollution and an increased risk of illness and disease throughout their lives.[7]

A different study of 70,000 births that occurred between 1999 and 2002 identified a direct link between air pollution and low-weight births. The study evaluated the impacts of air pollution on "small for gestational age" (SGA) birth weight and low full-term birth weight (LBW). The results showed a 26% increase in SGA and a 22% increase in incidence of LBW among babies born to women who lived within 50 m of a highway.[8]

Frequency of Occurence of AQHI Health Risk Categories for Select Fraser Basin Communities (2000–2006)[6]



Border Air Quality Study Airshed: www.cher.ubc.ca/UBCBAQS/studyarea.htm.

Notes

[a] The National Air Pollution Surveillance program measures a number of air pollutants at 152 stations in 55 cities across Canada: www.etc-cte.ec.gc.ca.

[b] The annual $PM_{2.5}$ Canada-Wide Standard is related to a very high concentration recorded during a year. It is based on daily average concentrations and is calculated from the 98th percentile (approximately the 7th highest daily average concentration) averaged over three consecutive years.

[c] The annual GLO Canada-Wide Standard is related to a very high concentration during a year. It is calculated from the fourth highest daily 8-hr maximum value averaged over three consecutive years. It does not reflect the highest concentration recorded at each site.

[d] Babies born more than three weeks before their due date

[e] Low birth weight is due to premature birth and/or poor fetal growth.

References

[1] BC Lung Association. State of the Air in British Columbia 2008. www.bc.lung.ca [accessed November 2008].

[2] BC Ministry of Health Services. Provincial Health Officer's Annual Report 2003. Every Breath You Take – Air Quality in British Columbia, a Public Health Perspective (Chapter 4).

[3] McNeill, R., and A. Roberge. 2000. The Impact of Visual Air Quality on Tourism Revenues in Greater Vancouver and the Lower Fraser Valley. GBEI report number EC/GB-00-028 (cited in BC Lung Association State of the Air in British Columbia 2008).

[4] Environment Canada. 2008. National Air Pollution Surveillance Network. www.etc-cte.ec.gc.ca/NAPS/index_e.html and custom tabulation. Roxanne Vingarzan Senior Scientist, Air Issues, personal correspondence via email September 2008.

[5] BC Lung Association. State of the Air in British Columbia 2007. www.bc.lung.ca [accessed November 2008].

[6] BC Ministry of Healthy Living and Sport. Eric Taylor, Air Quality Meteorologist, custom tabulation and personal correspondence by email November 2008.

[7] University of British Columbia. 2008. Summary Findings from the Border Air Quality Study. www.cher.ubc.ca/baqs [accessed November 2008].

[8] Brauer, M., C. Lencar, L. Tamburic, M. Koehoorn, P. Demers, and C. Karr. 2008. A Cohort Study of Traffic-Related Air Pollution Impacts on Birth Outcomes. Environmental Health Perspectives 116:680–686. www.cher.ubc.ca/baqs [accessed November 2008].

ACTIONS

The Many Faces Of **Sustainability**

Bicycle Trek for Life and Breath
More than 400 cyclists participated in the annual 200-km return trip from White Rock to Cultus Lake in the Lower Mainland to increase awareness about the link between air pollution and lung cancer and to raise money to help fight the disease: www.bicycletrek.ca

BC Air Action Plan (2008)
BC Air Action Plan (2008) identifies 28 key actions the provincial government is initiating in partnership with others to improve air quality. These actions focus on clean technology and reducing emissions from transportation, industry and communities. Visit www.bcairsmart.ca to see how you can benefit from and contribute to improved air quality.

Airshed Management Planning
Airshed management planning is a collaborative approach to managing all air pollution sources, and involves various levels of government, industry, utilities and community members. Airshed management planning processes are underway in a number of communities across the Fraser Basin, including Quesnel, Prince George, Williams Lake, Metro Vancouver and the Sea to Sky corridor.

Clean Air Day
Clean Air Day is held on the first Wednesday in June. It originally started as a BC event in 1992, but has since become a national day. The aim of Clean Air Day is to encourage people to adopt clean air choices as lifelong habits: www.env.gov.bc.ca/air/cad/index.html.

IDLE-FREE AMBASSADORS

In the summer of 2008 10 Idle-Free Ambassadors hit the pavement in communities across BC. As part of the BC Youth Climate Leadership Alliance, the Ambassadors wanted to inspire a fresh commitment to cleaner air and climate change action. They asked BC drivers to say “no” to unnecessary idling whenever they can – such as at ferry terminals, border line-ups, parking spots, passenger pick-up zones, railway crossings and school grounds.

When it comes to idling, old myths die hard: Won’t it take more gas to re-start the car than leave it running? (No, after 10 seconds, there is no savings). Will I burn out my starter? (Really, not a worry). There’s also the over-arching, and sometimes unspoken question: Can one person really make a difference?

Research shows that Canadians idle five to 10 minutes a day on average. If every driver of a light-duty vehicle avoided idling for just five minutes a day, it would save 1.8 million litres of fuel, $1.7 million in fuel costs, 4,500 tonnes of greenhouse gas emission and 8 tonnes of smog-forming pollutants each day.

“When ordinary people start to do their part and try to make a difference, it starts to matter to them what other people are doing, or not doing,” reports Jeannie McCormack of Quesnel. Another Ambassador, Geoff Smith in Metro Vancouver, says that strength comes in numbers. “Parents who turn their engines off will pass the habit on to their children, and motorists who see the car beside them do it are more likely to follow suit,” he says.

As with other sustainability issues, it’s important to recognize a disconnect between belief and behaviour. An Idle Free Ambassador who worked at the Peace Arch border crossing in 2008 discovered that, of the 60 drivers he surveyed, half said they do not idle their vehicles, yet 73% of these people were idling! Since then, a series of traffic lights at Peace Arch ensure that cars advance in groups, making it easy for drivers to stop, switch off the engine and wait for their turn to move forward.

Overall, the Ambassadors found drivers were supportive. As Brooke Carere, Ambassador in the Sea to Sky corridor, put it, “The majority of BC citizens I have encountered are 150% on board the idle-free movement.” Learn more at www.ycla.ca.

Biodiversity
Wildlife & Habitat

SUSTAINABILITY HIGHLIGHTS

Biological diversity, or biodiversity, includes all living things, such as mammals, birds, fish and insects and the habitat in which they live. It also includes genetic diversity, which allows species to adapt to changing conditions and occupy different biogeoclimatic zones[a] and habitat niches.

Biodiversity provides essential ecological goods and services that support life on earth, including clean air and freshwater, food and fibre, flood and erosion control, and natural resources, such as wood for building and energy production.[1] Our natural environment also offers aesthetic, spiritual and recreational values.

The most significant threats to biodiversity in BC include habitat loss, degradation and fragmentation resulting from human-related impacts such as urban development (including housing, roads and industrial areas), land development for agricultural production and invasive species introductions.[2] In fact, 86% of the species at risk in BC are at risk because of habitat loss from human-related land use and development.[1]

The Fraser Basin supports a wide range of biodiversity, including numerous species of birds, reptiles, amphibians and mammals, as well as trees, plants and insects. The Fraser River is home to five species of salmon and 65 other fish species, including steelhead and sturgeon. The Basin also includes one of BC's most productive waterfowl breeding and overwintering areas, and is a crucial staging area on the Pacific Flyway for migratory birds.[3]

- In total, 14% of the Fraser Basin is formally protected for conservation purposes or amenity values (see Map 2).[4]

- In the lower Fraser Valley,[b] the annual value of recreational uses of natural areas and ecosystem services provided by these areas has been estimated at nearly $32,000 per hectare. If ecosystem services such as carbon sequestration, waste treatment, flood protection and other services provided by wetlands are added to the equation, the value is estimated to be as high as $60,261 per hectare per year.[5]

POOR	**Ecosystems at Risk** Six of eight BC ecosystems assessed as being "At Risk" in 2008 were in the Fraser Basin.
FAIR / MIXED RESULTS	**Protected Areas** In 2008, the Fraser Basin overall and four of five regions had 14% or more of the land base designated as Protected Areas; however, Protected Areas were not representative of all types of ecosystems in the Fraser Basin.
MIXED RESULTS / POOR	**Woodland Caribou** Of 12 caribou herds in the Fraser Basin in 2008, six were declining in population, four were stable, one was increasing and one was of unknown status.

ISSUES AND TRENDS

Species Richness and Ecosystem Diversity in BC

British Columbia is the most biologically diverse province in Canada, and includes many regionally, nationally and globally significant species and ecosystems. The province supports 2,790 known species of vascular plants and 1,138 species of vertebrates, including 488 bird, 142 mammal, 18 reptile, 22 amphibian and 468 fish species. In addition, more than 50,000 invertebrate, 1,600 lichen and 10,000 fungi species occur in BC, many of which are relatively unknown.[2]

There are 16 distinct biogeoclimatic ecosystem zones in BC; four are recognized as being of "Imperiled" or "Vulnerable" conservation status.[2] Furthermore, the entire Fraser River drainage area was recently classified as being of "Imperiled/Vulnerable" conservation status.[6] The Fraser River was formally recognized as a Canadian Heritage River[c] in 1998 for the environmental, economic, social and heritage value it provides to Canada.[7]

Forest is the most common land cover type in BC, accounting for approximately 70% of the province's 95 million ha land base. Human-dominated lands comprise only 2% of the provincial land base (approximately 2 million ha);[2] however, most of these lands are located in places that have high species diversity, such as river valleys and other lowland areas. In many instances, human-related development has significantly altered ecosystems and habitat, resulting in species being threatened, endangered or at risk of extinction.[8]

Ecosystems at Risk

Six of eight BC ecosystems that have been assessed as being "at risk"[d] occur in the Fraser Basin. At risk ecosystems include grasslands, estuaries, wetlands, coastal Douglas-fir, Garry oak and cottonwood riparian ecosystems.[9] Across BC, 49% of bunchgrass grasslands (which occur primarily in the Thompson and Cariboo-Chilcotin regions) and 21% of coastal Douglas-fir forests are listed as "globally imperiled" due to loss or degradation of habitat.[2]

Protected Areas in the Fraser Basin (2008)

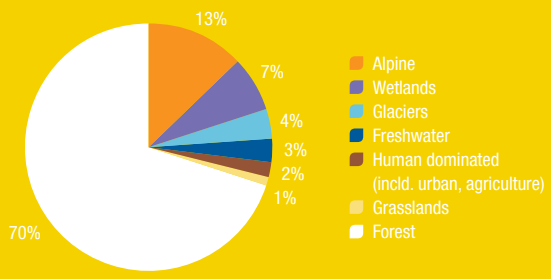
Over 3.3 million ha of land in the Fraser Basin (14%) is designated as Protected Areas (see Map 2).[e] The Upper Fraser region has the largest total area of protected land (1.15 million ha). The Fraser Valley has the highest proportion of land protected (21.5%), followed closely by the GVSS region (19.3%).[4]

Grasslands in the Fraser Basin

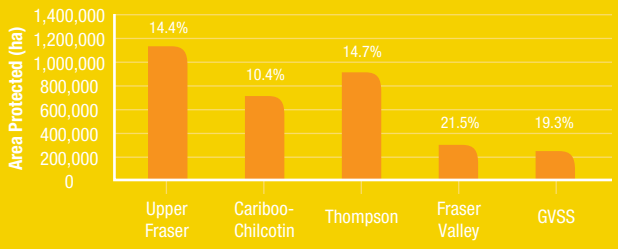
Grasslands are diverse ecosystems that are typically found where the climate is dry and hot in summer and varies from cool to cold in the winter (see Map 2). Although grasslands cover less than 1% of BC's land base (about 700,000 ha),[10] they are home to many species that have adapted to dry climatic conditions.[11] In fact, nearly 42% (1,190) of the 2,854 vascular plant species that occur in BC are found within grasslands; 4.8% of all BC species are found only in grasslands.[12] Although grasslands are home to over 30% of the species at risk[f] in BC, less than 8% of the province's grasslands are formally protected.[11,13]

The Fraser Basin includes almost 70% of BC's grasslands. Most (99%) of the grassland ecosystems in the Fraser Basin occur in the Cariboo-Chilcotin and Thompson regions.[10] Between 1995 and 2004, more than 5,230 ha (1.1%) of grasslands in the Fraser Basin were lost due largely to human-related activities, such as urban development, highway expansion and orchard and vineyard developments.[10,11]

Land Cover Types in BC as a Percentage of Total Land Area (2008)[2]



Area and Proportion of Land Designated as Protected Areas within Fraser Basin Regions (2008)[4]



Biodiversity, Wildlife & Habitat

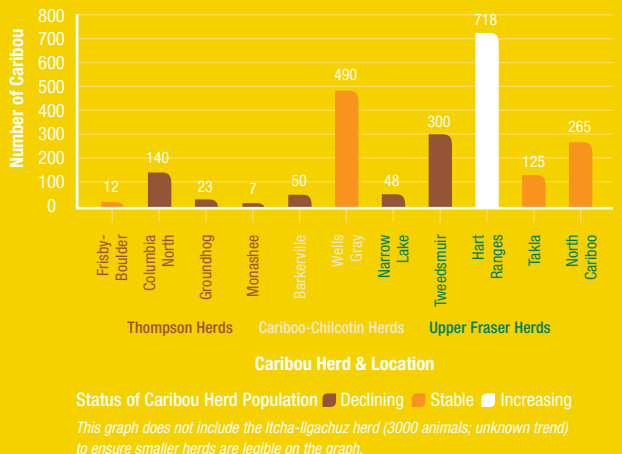
Invasive Plant Species in the Fraser Basin[14]

Impacts associated with the introduction and spread of invasive plants are not unique to one industry, organization or community – many citizens, regions and industries in BC are affected. Invasive plant species negatively affect wildlife habitat by competing with native plants for light, nutrients and water. Invasive plants also impact water quality by causing increased rates of erosion and sedimentation. As native plant communities are replaced by invasive plant infestations, biodiversity declines and habitats change. These impacts are often irreversible, and restoration can be extremely difficult, if not impossible; therefore, preventing the establishment and spread of invasive plant species is vitally important.

Species at Risk – Woodland Caribou in the Fraser Basin (2008)[15]

Approximately 5,178 woodland caribou[g] reside in the Upper Fraser, Cariboo-Chilcotin and Thompson regions of the Fraser Basin. There are 12 distinct caribou herds, including nine mountain caribou and three northern caribou herds. Caribou herd sizes in the Fraser Basin range from 7 (Monashee herd in the Thompson) to 3,000 (Itcha-Ilgachuz herd in the Cariboo-Chilcotin). Of the 12 herds currently inhabiting the Fraser Basin, only the Hart Ranges herd is increasing in population. Four others are stable, six are declining and one is of unknown status. Woodland caribou once ranged throughout a much greater area of the Fraser Basin, but no longer inhabit many of those areas. Mountain caribou herds in the Fraser Basin are designated as Threatened under the federal *Species at Risk Act* (Committee on the Status of Endangered Wildlife in Canada) and as critically imperiled and red-listed under the *BC Wildlife Act*.[16]

Woodland Caribou Population and Trends in Fraser Basin Regions (2008)[15]



This graph does not include the Itcha-Ilgachuz herd (3000 animals; unknown trend) to ensure smaller herds are legible on the graph.

Notes

[a] Biogeoclimatic zone: a geographic area having similar patterns of energy flow, vegetation, and soil as a result of a broad, regional climate patterns.

[b] For the purpose of the study, the lower Fraser Valley included both Metro Vancouver and Fraser Valley Regional Districts.

[c] The Canadian Heritage Rivers System is a national program for freshwater heritage conservation. The program aims to recognize Canada's outstanding rivers and ensure their natural, cultural and recreational values are maintained for the benefit and enjoyment of Canadians, now and in the future.

[d] This refers to ecosystems that are at risk of extinction as they have been drastically reduced in area and/or are in danger of being lost completely.

[e] Protected Areas within the Fraser Basin include ecological reserves, Class A, B and C provincial parks, conservancies, recreation areas and protected areas that fall under the *Environment and Land Use Act*: www.env.gov.bc.ca/bcparks/legacy.html [accessed August 2008].

[f] Species at risk are species that are small in number, limited in range, and/or associated with habitats that have been drastically reduced or are in danger of being lost completely.

[g] Woodland caribou include both the mountain caribou and northern caribou ecotypes.

References

Note: *Select data analysis that was specific to the Fraser Basin and five Fraser Basin regions was undertaken by Kim MacLean, Fraser Basin Council (2008). This included GIS data on the Agricultural Land Reserve, protected areas, grasslands and woodland caribou.*

[1] BC Ministry of Environment. 2007. Environmental Trends in British Columbia: 2007. www.env.gov.bc.ca/soe/et07.

[2] Biodiversity BC. 2008. Taking Nature's Pulse: The Status of Biodiversity in BC.

[3] Nature Conservancy of Canada. The Fraser Basin Pilot Project. http://science.natureconservancy.ca/centralinterior/fraser.php [accessed September 2008].

[4] Ogbourne, C. 2008. Geo-spatial Coverages of Provincially Protected Areas in BC (September 2008). BC Integrated Land Management Bureau, Victoria.

[5] Olewiler, N. 2004. The Value of Natural Capital in Settled Areas of Canada. Ducks Unlimited Canada and the Nature Conservancy of Canada.

[6] Kremsater, L. 2007. Draft S Ranks and Surrogate G Ranks for BEC Zones and Draft S Ranks for Ecoprovinces and Major Drainage Units of BC. Preliminary Rankings for Informing the Report on the Status of Biodiversity in BC. Prepared for the Biodiversity BC Technical Subcommittee for the Report on the Status of Biodiversity in BC.

[7] Canadian Heritage Rivers. www.chrs.ca/Rivers/Fraser/Fraser_e.htm [accessed December 2008].

[8] Gayton, D. 2007. Major Impacts to Biodiversity in British Columbia (excluding climate change). Prepared for the Biodiversity BC Technical Subcommittee for the Report on the Status of Biodiversity in BC.

[9] BC Ministry of Environment. Ecosystems at Risk in BC. www.env.gov.bc.ca/wld/list.htm [accessed December 2008].

[10] MacKenzie, I. 2008. Geo-spatial Coverages of Grasslands Change in BC (2004). Grasslands Conservation Council of BC.

[11] Grasslands Conservation Council of British Columbia. www.bcgrasslands.org [accessed December 2008].

[12] Wikeem, B. and S. Wikeem. 2004. The Grasslands of British Columbia. Grasslands Conservation Council of British Columbia. www.bcgrasslands.org/projects/conservation/characterization.htm [accessed December 2008].

[13] BC Ministry of Environment. 2007. Environmental Trends in British Columbia: 2007. Ecosystems. www.env.gov.bc.ca/soe/et07.

[14] Invasive Plant Council of BC. www.invasiveplantcouncilbc.ca [accessed December 2008].

[15] BC Ministry of Forests and Range. Dale Seip, personal communication by email November 2008.

[16] BC Ministry of Environment. 2008. Endangered Species and Ecosystems. www.env.gov.bc.ca/atrisk/red-blue.htm [accessed December 2008].

ACTIONS

The Many Faces Of **Sustainability**

Nature Conservancy of Canada's (NCC) Watershed Assessment Tool
The NCC is currently developing a watershed assessment and decision support tool for the Fraser Basin as part of a larger initiative to identify the most important places for biodiversity conservation within the Central Interior ecoprovince. The tool is designed for agencies, governments and organizations to use in decision-making. The project will show cumulative impacts to watersheds in order to prioritize areas for conservation, restoration and enhancement based on the current state of biodiversity. The tool will model regional management scenarios, evaluate threats and identify potential future scenarios for key watersheds: http://science.natureconservancy.ca/centralinterior/fraser.php.[2]

Grasslands Conservation Council of BC
The Thompson Basin Ecosection Grassland Portfolio includes a compilation of information on grasslands in the Thompson Basin that will be used to inform land use planning and decision-making. This is a collaborative project between the City of Kamloops, Grasslands Conservation Council of BC and many other federal, provincial and non-profit organizations. Visit www.bcgrasslands.org.

Biodiversity Practices in Farming
With care, farms can play an important role in supporting natural ecosystems. *Planning for Biodiversity – A Guide for BC Farmers and Ranchers* outlines the key principles for maintaining and enhancing biodiversity on farmlands and ranch lands. The guide is designed to complement the Environmental Farm Planning process: www.bcac.bc.ca/EFP_pages/documents/index.html.

The Many Faces of Stewardship
Environmental stewards advance sustainability in numerous ways: through stream and fish protection, habitat enhancement and restoration; animal relocation; environmental clean-ups; invasive plant and animal species control; species at risk recovery; fostering cooperation among watershed users; promotion of sustainable land management practices; and education of landowners and other residents. For ways to invest your time, money or land, visit www.greenlegacies.ca and www.planetfriendly.net for links to BC's conservation organizations and programs. The Stewardship Centre of BC (www.stewardshipcentre.bc.ca) offers a series of publications for people who want to support ecosystem health in various sectors. Of particular interest to local government is a new online tool about BC species at risk, searchable by species name, ecosystem and regional district: Visit www.speciesatrisk.bc.ca.

Tom Swann of the Nature Conservancy of Canada and Ray Frolek, Trinity Frolek-Dale and Lucille Dempsey of the Frolek Cattle Company discuss the conservation value of the Frolek ranchlands.

GRASSLANDS AT FROLEK RANCH

It was 1906 when George and Teresa Frolek arrived in the lush Nicola Valley and began homesteading on a quarter section. Over the decades, the family established a successful cattle ranch and acquired numerous parcels of land throughout the Kamloops area. Today, more than 100 years and five generations later, the Frolek family oversees one of BC's most expansive cattle ranches. Growing hand in hand with their business was an appreciation for the ecological importance of the grasslands on which they raised their cattle.

Recognizing the threats from urban sprawl, development and habitat fragmentation, lifetime rancher Ray Froleck approached the Nature Conservancy of Canada (NCC) in 2007 to work out a plan to conserve the natural ecological values of the land while allowing ranching operations to continue. Through a partnership of the Frolek Cattle Company, NCC, the Government of Canada and the Tula Foundation, NCC has acquired 948 hectares of flourishing grassland in the Lac Du Bois area, northwest of Kamloops, and have provided a long-term lease back to the Frolek Cattle Co. An additional 2,220 hectares of Frolek ranchland is protected by a conservation covenant that prevents the subdivision or development of those lands in perpetuity. Thanks to this successful collaboration – announced late in 2008 – almost 3,200 hectares of intact grassland habitat is now protected, and a better future is possible for several species at risk, including the provincially red-listed burrowing owl, the provincially blue-listed Columbian sharp-tailed grouse and the badger, now federally listed as endangered.

Business & Sustainability

SUSTAINABILITY HIGHLIGHTS

The business sector has a significant influence on sustainability because of its reliance on resources in BC and beyond and because of the wastes it generates, including solid and liquid waste, air pollution and greenhouse gas emissions.

More than ever before, businesses are expected by policymakers and the public to demonstrate their commitment to sustainability through sound environmental management, social inclusiveness and transparency in business practices. As many businesses are discovering, there are other good reasons to embrace change early.

The companies that will thrive in the 21st century are those that have ingrained the principles of sustainability and corporate social responsibility (CSR) into their strategic planning and operations. This includes accounting for and mitigating the environmental and social footprints of the products they design, manufacture, sell or buy. Sustainability also depends on innovation in developing the technologies and services businesses need to drive economic development while reducing their impact on the earth, its inhabitants and future generations.

- A 2008 survey showed there are high rates of environmental and social sustainability practices being used by small- and medium-sized enterprises in the Lower Mainland and southern Vancouver Island.

- British Columbia has the second highest number of LEED-certified projects in Canada (38); Ontario has 44.

- BC is building a vibrant sustainable technologies sector. In 2006, the sector included 1,300 companies and more than 18,000 employees, and generated $1.9 billion in revenues.

FAIR / MIXED RESULTS	**Corporate Social Responsibility** In 2007 and 2008, several companies based in the Fraser Basin and BC continued to be recognized by Stratos Inc. and Corporate Knights as CSR leaders in Canada.
GETTING BETTER	**Carbon Disclosure** Between 2005 and 2008, the number of Canadian companies participating in the Carbon Disclosure Project increased from zero to 106.

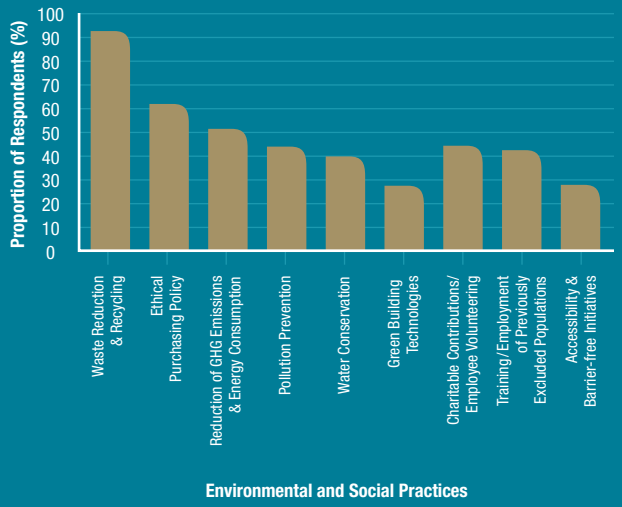
ISSUES AND TRENDS

Sustainability in Small and Medium Enterprises[1,2]

In December 2007, there were over 357,000 small and medium enterprises (SMEs) in BC.[1] These are defined as organizations with 1 – 50 employees. Individually, SMEs may appear to have little impact on the social, environmental and economic footprints of society; however, collectively, and as the fastest growing part of BC's economy, they have an increasingly important role to play in advancing sustainability.

Vancity and the Fraser Basin Council participated in a joint project in 2008 to learn more about what is needed to further advance SME leadership in sustainability.[2] SMEs in the Lower Mainland and southern Vancouver Island were invited to participate in a survey. An impressive proportion of the 331 respondents – despite their size – are "walking their talk" on sustainability in creative ways. For example, almost all cited one or more initiatives. These included waste reduction (92.5%), ethical purchasing (61.1%), reduction in greenhouse gas emissions and energy consumption (51.1%) and water conservation (39.6%). Many of these businesses expressed interest in receiving support for their sustainability efforts through education and training, access to incentive programs and connections with others through online databases. However, less than half of the SMEs surveyed said they are involved in programs that advance social sustainability such as charitable contributions or employee volunteering (44.9%) or accessibility and barrier-free initiatives (28.7%). It is not known how representative the 331 respondents are of SMEs generally.

Environmental and Social Practices of 331 Small and Medium Enterprises in South Coastal BC (2008)[2]



Business & Sustainability

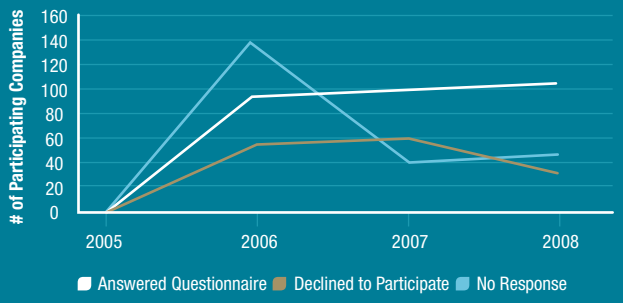
Corporate Social Responsibility

Companies that have adopted CSR policies are trying to integrate better social, environmental and governance practices into their operations. Leaders in CSR set goals, track their progress and publicly report on their achievements. According to Stratos Inc., there has been a slight drop in the number of CSR reporters in Canada from 2005 to 2007 (from 114 to 108) and a decline in the number of Toronto Stock Exchange (TSX) companies producing stand-alone sustainability reports (from 25% in 2005 to 18% in 2007).[3] However, Stratos reports that 45% of Canadian companies that produce sustainability/ CSR reports used the Global Reporting Initiative (GRI) in 2007, up 10% from 2005. The GRI is the gold standard of CSR reporting around the world. It outlines the principles and indicators that organizations can use to measure and report their economic, environmental and social performance.[4] Three of the 20 Canadian companies using the GRI reporting standard are from BC: BC Hydro, Catalyst Paper and Vancity.[4] In addition, seven BC-based companies made Corporate Knights' Best 50 Corporate Citizens list in 2008.[5]

Carbon Disclosure (2005–2008)[6]

Climate change is one of the most important issues of our time. Faced with a lack of information on how companies were managing the risks posed by climate change, a group of institutional shareholders spearheaded the Carbon Disclosure Project (CDP) in 2000 to address this information gap. In 2008, the CDP included 285 signatories representing $57 trillion in assets around the world. This provided a powerful impetus for companies to complete a standard carbon disclosure questionnaire. The old adage of "what gets measured gets managed" applies here. Companies that have a thorough understanding of their exposure to the effects of, and opportunities arising from, climate change can better manage for a future carbon-constrained world – that is, a world in which the availability of, access to, and/or costs associated with fossil fuels constrain economic activities. In 2005, all Canadian companies listed on the S&P/TSX Index were invited to respond to the annual carbon disclosure questionnaire; they started to do so in 2006. Since then, there has been a steady increase in the number of companies disclosing information. Almost 60% of the companies listed on the S&P/TSX Index reported in 2008.

Participation in the Carbon Disclosure Project (2005–2008)[5]



LEED™ Certification[7]

Reducing a building's environmental footprint is the concept behind Leadership in Energy and Environmental Design (LEED™). LEED is a building standard that promotes energy efficiency, minimizes waste and the use of toxic materials, and conserves water and materials. British Columbia has the second highest number of LEED-certified projects in Canada (38). Only Ontario has more (44). Of the BC projects, 28 are in the Fraser Basin. They include Spring Creek Fire Hall in Whistler, Heritage Woods Secondary School in Port Moody, the Township of Langley's Civic Facility, MCW Consultants Ltd. in Vancouver, Envision Credit Union in Chilliwack and the Kamloops Centre for Water Quality. BC also has two of the eight Platinum-level projects in the country – the highest rating possible for sustainable construction and energy efficiency.

Venture Capital and the Sustainable Technology Sector

BC is building a vibrant industry in sustainable technologies. In 2006, this sector was worth $1.9 billion in revenues and included 1,300 companies with more than 18,000 employees. Sixty-nine percent of those companies were located in the Lower Mainland (890). Another 10% (131) with more than 1,800 employees were located in BC's interior.[8] The amount of venture capital coming into the province is supporting the development of new technologies. In 2007, 15% of all Canadian venture capital went to projects in BC: an increase of 3% over the previous year. However, the economic downturn in the third quarter of 2008 caused this number to drop significantly from levels in 2007.[9]

References

[1] BC Statistics. 2008. Establishment Counts by Employee Size, 1998–2007.

[2] Fraser Basin Council and VanCity Credit Union. 2008. SMEs and the Growth of the Social Economy: Evaluating Lessons Learned – Setting the Stage for the Future.

[3] Stratos Inc. Canadian Corporate Sustainability Reporting – Best Practices 2008.

[4] Global Reporting Initiative. What We Do. www.globalreporting.org/AboutGRI/WhatWeDo [accessed December 2008].

[5] Corporate Knights. www.corporateknights.ca/special-reports/63-best-50-corporate-citizens.html [accessed November 2008].

[6] Carbon Disclosure Project. www.cdproject.net/reports.asp [accessed November 2008].

[7] Canada Green Building Council. www.cagbc.org/database/rte/LEED_Certified_Projects_in_Canada_Updated_081124.pdf [accessed November 2008].

[8] Invest BC. www.investbc.com/Documents/AssetMaps/SectorProfile_SusTech.pdf [accessed November 2008].

[9] VC Reporter. www.canadavc.com/info.aspx?page=stats [accessed November 2008].

[10] Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games (VANOC). www.vancouver2010.com/en/competition-schedules-and-venues/venues/-/32528/9I3h70/index.html [accessed November 2008].

ACTIONS

The Many Faces Of **Sustainability**

Carbon Neutral Workgroup
The Carbon Neutral Workgroup is a new program designed to help businesses take action against climate change. It was established by the partnership of the Pembina Institute, Ecotrust Canada and the David Suzuki Foundation. The Workgroup uses a series of workshops to provide technical skills and training to small- and medium-sized businesses on how to measure their carbon footprint with easy-to-use software; how to identify and implement opportunities to reduce their greenhouse gas emissions; and how to find avenues for offsetting emissions through carbon-neutral products and services. The program's collaborative structure, diversity of participants and targeted technical assistance makes for a lively exchange of ideas, strategies and successes: www.ecotrust.ca/services/enterprises/climate_smart.

Sustainability Purchasing Network (SPN)
Do you know where the products and services you buy are made or what their environmental impacts are? Sustainability purchasing seeks answers to these questions before the products and services are purchased. The SPN educates, connects and inspires organizations in developing and improving their sustainability purchasing efforts. Through learning events and networking sessions, the SPN has, since 2006, provided skills training and resources that have helped more than 370 individuals from 175 businesses, non-profit groups and government organizations with their purchasing decisions: www.buysmartbc.com.

VANOC Embraces LEED Standards[10]
The Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games (VANOC) has embraced sustainability and environmental conservation as one of the pillars of the 2010 Games. Nowhere is this better seen than in the planning, design and construction of the venues being used for events, athlete housing and office buildings in Vancouver, Richmond and the Resort Municipality of Whistler. The Richmond Olympic Oval (long track speed skating) is a LEED Silver project. LEED Gold projects include VANOC's head office, the Whistler Olympic Village and the Vancouver Olympic Village in South East False Creek. The latter is also a pilot site for the new LEED Neighborhood Design Rating System. It will include a LEED Platinum level community centre that will be one of the highest rated environmentally designed buildings in Canada.

BOB, INNER-CITY CONNECTOR

For five years Frank lived in Vancouver's Downtown Eastside, struggling to make ends meet on just over $500 a month, and finding his prospects bleak. As he put it, "I hibernated, became depressed and couldn't see how anyone would want to hire a burnt-out, mid-50s fellow with health concerns." Thankfully, there were a few friendly faces in his future. In 2007, Frank met the staff of BOB – Building Opportunities with Business – a non-profit organization that supports local business development and increases job opportunities for inner-city residents.

It proved a turning point. Frank signed up for customer service training through a program called BusinessLinks, funded by Bell Canada. He learned job skills and he met others in similar circumstances who offered support and encouragement. The training led to a store position with Rona where Frank found a good work team and a supportive human resources manager. With his re-entry into the workplace came a better quality of life, confidence and independence. BOB tailors its training programs and ongoing support to meet the needs of local employers and to help place residents in a range of occupations, including call centre work, commercial cleaning, banquet and event serving, landscaping, hotel housekeeping, food services and construction.

BOB also helps inner city businesses retain consultants, and brings multiple interests together to plan opportunities in tourism and hospitality, construction, creative industries and information/ communication technologies.

Recognizing that progressive businesses are key to revitalizing Vancouver's Downtown Eastside, BOB runs Vancouver's Social Purchasing Portal, where organizations of all types can demonstrate support by purchasing goods and services from social enterprises and businesses that hire hard-to-employ people. For information, visit www.buildingopportunities.org.

Climate Change

SUSTAINABILITY HIGHLIGHTS

Climate change is one of the world's most important sustainability challenges. Scientists who study climate change agree that greenhouse gas (GHG) emissions from human activities are increasing the natural greenhouse effect to such a degree that they are adversely changing the earth's climate in many different ways.

Beautiful Wedgemount Lake in Garibaldi Park is nestled below one of BC's receding glaciers. Glaciers are indicators of climate change, and their retreat is cause for concern, including loss of a freshwater supply. A team of scientists from universities in BC, Alberta and Washington State and from the federal government are now studying several glaciers and icefields in BC, including Castle Creek Glacier near McBride and Klinaklini and Tiedemann glaciers in the Coast Mountains. For more information, visit www.unbc.ca.

GHGs originating from human activities include carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). The burning of fossil fuels is the main source of these GHGs, but additional contributions come from land use practices such as agriculture, landfills and forestry. The buildup of GHGs in the atmosphere is contributing to rising average air and water temperatures, changes in wind and precipitation patterns, and increases in the frequency of severe weather events. In addition to lowering our output of GHG emissions, it is imperative that communities become more resilient to impending climate change and its impacts.

- Total GHG emissions in BC increased by 27.4% between 1990 and 2006, due mainly to energy consumption patterns and increases in natural gas production.

- Per capita GHG emissions in BC remained relatively stable between 1990 and 2006 (between 14.4 and 15.6 tonnes). In comparison, the Canadian average ranged between 22 and 23 tonnes per capita during the same period.

- Between 1990 and 2004, significant increases in GHG emissions occurred within the transportation (44%) and industrial (34%) sectors; however, between 2004 and 2006, these sectors reduced their emissions by 8% and 11%, respectively.

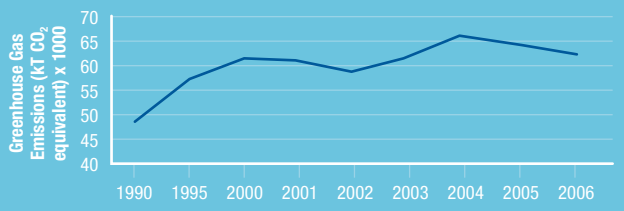
MIXED RESULTS / POOR	**Greenhouse Gas Emissions in BC** In 2004, both total (65,600 kilotonnes) and per capita (15.6 tonnes) GHG emissions in BC were at their highest levels reported since 1990; however, total emissions decreased by 5% between 2004 and 2006.
POOR / GETTING WORSE	**Climate Change Impacts in the Fraser Basin** Average freshwater and air temperatures have warmed over the past 50–100 years, and Fraser River flows are occurring earlier than in the past 85 years.
GETTING BETTER	**Climate Change Mitigation and Adaptation in the Fraser Basin** Communities and organizations are identifying and pursuing many opportunities for reducing their greenhouse gas emissions, and are planning to adapt to climate-related vulnerabilities, such as flooding, drought and interface fires.

ISSUES AND TRENDS

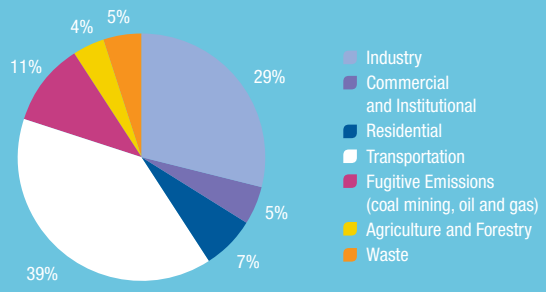
Greenhouse Gas Emissions in BC (1990–2006)[1]

Despite increases in total (27.4%) and per capita (4.6%) GHG emissions between 1990 and 2006, the BC economy has become more carbon-efficient, producing 11% fewer emissions per dollar of gross domestic product (GDP) between 1990 and 2004. Although there have been significant increases in GHG emissions since 1990, there has been a 5% reduction in total GHG emissions since 2004. There have been notable GHG reductions in several sectors, including energy use overall, transportation, industry, agriculture and waste management. In BC, the transportation sector is the most significant single emitter of GHGs, followed by industry. Following a 44% increase in emissions between 1990 and 2004, the transportation sector reduced its emissions by almost 8% between 2004 and 2006. Following a 34% increase between 1990 and 2004, the industrial sector reduced emissions by 11% between 2004 and 2006. In contrast, GHG emissions from residential energy use declined between 1990 and 2004 and then increased by 12.8% between 2004 and 2006. Fugitive emissions from coal mining and oil and gas production have increased steadily, almost doubling between 1990 and 2006.

Total Greenhouse Gas Emissions in BC (1990–2006)[1]



Proportion of Greenhouse Gas Emissions by Sector in BC (2006)[1]



Climate Change

Climate Change and Its Impacts

The following climatic changes have been observed in the Fraser Basin in the past 50–100 years:[2]

• Average air temperatures in the Fraser Basin rose by approximately 1ºC in the past century; average precipitation also increased.

• Summer water temperatures in the Fraser River have warmed over the past 50 years at a rate equivalent to 2.2ºC per century, and are increasingly in the upper threshold of what sockeye salmon can tolerate.

• Peak flows on the Fraser River and its tributaries are now occurring earlier in the year than 85 years ago. The Fraser is reaching half of its annual cumulative flow nine days earlier, on average, than a century ago.

Several other impacts on the Fraser Basin and BC are predicted, including continued warming of air temperatures; a rise in sea levels; increased frequency, magnitude and intensity of extreme events such as floods, drought, interface fires and pest outbreaks; increased occurrence and distribution of invasive plants; increased precipitation in the form of rain rather than snow, which may result in low flows and droughts during the summer in some watersheds; shifts in the range and abundance of species; and changes in ecosystem structure and function such as increased distribution of grasslands and grassland/forest transition areas.

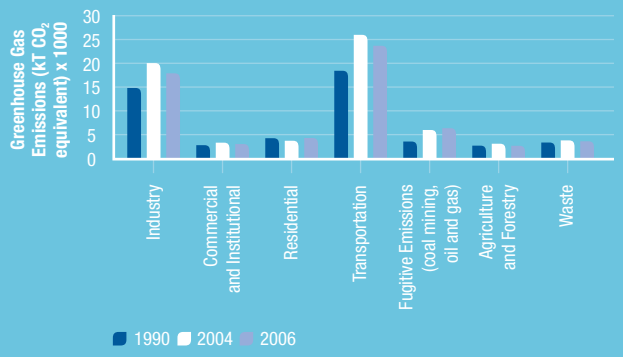
It is estimated that sea levels may rise by more than 50 cm in parts of the Fraser River delta. However, because of the many uncertainties in measuring historic changes and predicting future sea levels, the possible range could be much greater, possibly up to 120 cm for the Fraser River delta by 2100.[3]

Climate Model Projections for BC with Regional Average Temperature Increases Recorded to Date[4]

CLIMATIC ZONE	SEASON	TEMPERATURE INCREASE 1976–2005	MODEL PROJECTION FOR INCREASES TO 2055 OVER 1976 BASELINE[a]
Pacific	Winter	0.7°C warmer	2–4°C warmer
	Summer	1.6°C warmer	2–3°C warmer
South BC Mountains	Winter	1.6°C warmer	2–4°C warmer
	Summer	0.7°C warmer	2–3°C warmer
Northwestern Forest	Winter	2.8°C warmer	3–4°C warmer
	Summer	no significant trend	2–3°C warmer

There will be costs to reduce GHG emissions, in particular through a shift to clean energy sources and new technologies to improve energy efficiency and reduce GHG emissions. However, the costs of inaction may be greater still, given the impacts of climate change and the costs of adaptation. The independent Stern Review has estimated that not acting on climate change could lead to costs equivalent to 20% of global GDP; early action could limit costs to about 1% of GDP.[5]

Greenhouse Gas Emissions by Sector in BC (1990, 2004 and 2006)[1]



Notes

[a] Projected temperature increases are based on the Canadian Regional Climate Model 4, using emissions scenario A2 from the Intergovernmental Panel on Climate Change Special Report on Emission Scenarios (2000). Scenario A2 applies an approximate carbon dioxide equivalent concentration of 1250 parts per million.

[b] EPA refers to the United States Environmental Protection Agency.

References

[1] Environment Canada. 2008. National Inventory Report 1990–2006: Greenhouse Gas Sources and Sinks in Canada. www.ec.gc.ca/pdb/ghg/inventory_report/2006/som-sum_eng.cfm [accessed December 2008].

[2] BC Ministry of Environment. 2002. Indicators of Climate Change. www.env.gov.bc.ca/epd/climate/pdfs/indcc.pdf [accessed December 2008].

[3] Bornhold, B.D. 2008. Projected Sea Level Changes for British Columbia in the 21st Century. www.env.gov.bc.ca/epd/climate [accessed December 2008].

[4] BC Ministry of Environment. 2007. Environmental Trends in British Columbia: 2007. Climate Change. www.env.gov.bc.ca/soe/et07.

[5] BC Climate Action Team. 2008. Meeting British Columbia's Targets: A Report from the BC Climate Action Team. www.climateactionsecretariat.gov.bc.ca [accessed December 2008].

ACTIONS

The Many Faces Of **Sustainability**

E3 Fleet – for Energy, Environment, and Excellence

The Township of Langley was recently awarded a Silver Rating under the Fraser Basin Council's E3 Fleet program for excellence in greening its vehicle fleets, making it the first fleet in British Columbia to be recognized for sustainable fleet management. The Fraser Basin Council's E3 Fleet is Canada's only independent green rating system for fleets. The program offers a green rating guide, a points system for assessing fleets, a third-party fleet audit, and for fleets that qualify, a rating of Bronze, Silver, Gold or Platinum. The rating recognizes excellence in fleet management, including measures to achieve fuel efficiency and emissions reduction. Langley's key accomplishments in achieving a Silver Rating include reducing its greenhouse gas emissions by 14% between 2006 and 2007 through various commitments and practices, including replacing larger vehicles with Smart Cars and hybrids, fuelling some fleet vehicles with biodiesel, installing GPS tracking systems to increase route efficiency and training staff on green practices.

The Township of Langley receives a Silver Rating under the E3 Fleet program.

Rolling Out Big Rig enviroTrucks

The Fraser Basin Council and the BC Trucking Association, through funding from the BC Ministry of Environment, have helped several BC trucking fleets roll out and test new "enviroTrucks" – a demonstration project of FBC's Green Fleets BC program. The enviroTruck program is open to all types of fleets, including municipal and commercial fleets. It offers up to $10,000 per newer model Class 7 or 8 heavy-duty truck with a 2007 EPA[b] certified low-emission engine, a speed limiter to restrict truck speed to a maximum of 105 km/hr, aerodynamic add-ons for both truck and trailer, auxiliary power units to reduce idling, and tires that help maximize fuel efficiency. The additional features such as aerodynamic devices, fuel-efficient tires and anti-idling devices are expected to improve a truck's fuel efficiency by 10-20% and reduce its GHGs by up to 40 tonnes a year. Under the demonstration project to date, seven fleets are operating enviroTrucks – 88 trucks and 56 trailers. Stay current on opportunities for fleets at www.greenfleetsbc.com.

Communities Tackle Energy and Emissions

The Community Action on Energy and Emissions (CAEE) initiative, part of the Ministry of Energy, Mines and Petroleum Resources' Energy Efficient Buildings Strategy (www.energyplan.gov.bc.ca/efficiency), provides financial and research support to BC's local governments and First Nations to advance energy efficiency, energy conservation and emissions reductions measures through policy and planning tools. A program of the Fraser Basin Council, CAEE has welcomed the participation of 62 communities in British Columbia since 2005.

CITY OF PRINCE GEORGE

Prince George developed a draft green building plan that is integrated with the City's Energy and Greenhouse Gas Plan.

DISTRICT OF 100 MILE HOUSE

The District reviewed both its Official Community Plan and Subdivision Servicing Bylaw for energy efficiency policies and requirements. It also completed a greenhouse gas inventory, identified energy efficiency opportunities, established performance measures for buildings, and developed a green building policy and checklist.

CITY OF KAMLOOPS

Kamloops developed an integrated greenhouse gas, energy and air quality plan that includes recommendations for city facilities and operations, and for the broader community.

FRASER VALLEY REGIONAL DISTRICT (FVRD)

The FVRD is updating its Air Quality Management Plan to include greenhouse gas emissions and mitigation measures.

DISTRICT OF SQUAMISH

The District developed a Community Energy Plan with greenhouse gas targets. Implementing the plan, they developed policies and tools for a "Smart Growth on the Block" catalyst project, district energy, local electricity network and a hub to better integrate local and regional transportation systems.

Climate Change Resources

Climate Change Resources for BC Planners is a bibliography of adaptation resources developed with planners in mind. It includes climate change assessment and planning methodologies, and information about past and future climate conditions in BC: www.env.gov.bc.ca/epd/climate/reports.htm.

Citizens' Conservation Councils on Climate Action

In September 2008, the provincial government appointed seven regional Citizens' Conservation Councils on Climate Action to help build a network for grassroots climate action across British Columbia. Three of these are in the Fraser Basin, including Lower Mainland-Southwest, Thompson-Okanagan and Cariboo-Prince George. The purpose of the Councils is to advise government on how to encourage individuals, groups and communities in their regions to learn more about climate change, take climate actions and reduce greenhouse gas emissions. The Councils include citizens who represent youth, seniors, municipal government, local business, First Nations, community groups, and educational institutions. For more information, visit www.livesmartbc.ca/community/citizens.html.

Community Engagement

SUSTAINABILITY HIGHLIGHTS

Across BC people volunteer many hours with local schools, food banks, churches, local events, community organizations and political parties; donate money to charities and non-profit organizations; and directly help neighbours and others in need. This generosity of spirit is important for community well-being, particularly in tough economic times.

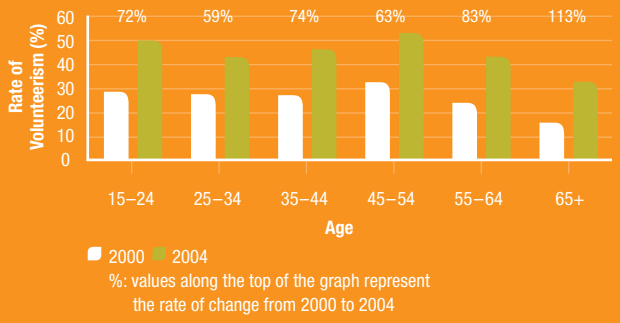
By taking the time to volunteer services, donate, vote, participate in community planning, or simply get to know our neighbours, we can enhance community life. Volunteer commitments support social cohesion, informed and accountable decision-making, stronger institutions and community assets, increased racial tolerance and lower crime rates. Our engagement in the community can also help us understand the interconnections between social, economic and environmental issues, and the importance of sustainability.

• In 2004, the rate of volunteerism in BC matched the Canadian average (45%). BC's rate of volunteerism ranked seventh among Canada's 13 provinces and territories; however, the average number of volunteer hours contributed by British Columbians (199 hours) ranked number one in Canada.

• In 2004, 78% of British Columbians directly helped others in their community, and 66% belonged to a group or organization.

• In 2004, the rate of charitable giving in BC was high (77%) but below the Canadian average (85%). BC's rate of charitable giving ranked seventh among Canada's 13 provinces and territories; however, the average value of donations in BC ($467) was greater than the Canadian average ($400) and ranked third among the 13 provinces and territories.

Rates of Volunteerism in BC by Age (2000 and 2004)[1]



%: values along the top of the graph represent the rate of change from 2000 to 2004

GOOD

Volunteerism
In 2004, the rate of volunteerism in BC matched the Canadian average in terms of the proportion of British Columbians that volunteered (45%), and was high in terms of the average number of hours volunteered (199).

GOOD

Charitable Giving
In 2004, rates of charitable giving in BC were strong but below the Canadian average in terms of the proportion of British Columbians that donated money (78%), and were high for the average value of donations ($467).

ISSUES AND TRENDS

Volunteerism in BC (2000 and 2004)[1,2]

Volunteering is a significant part of British Columbians' lives. In 2004, almost 1.6 million volunteers contributed 315 million hours to their communities, including sports and recreation, social services, education and research and religious organizations. Most volunteers across Canada (92%) agreed that making a contribution to their community is an important reason for volunteering. In addition to volunteering for a specific organization or group, 78% of British Columbians directly helped others through activities such as helping around home with gardening and maintenance, providing emotional support, or driving a neighbour to an appointment or the store.

Between 2000 and 2004, the rate of volunteering in BC increased significantly from 26% to 45% among the population aged 15 years and older. Increases were recorded in all age categories, and ranged from 59% to 113%. The largest increase was among those aged 65 years and older. Their rate of volunteerism more than doubled from 15% in 2000 to 32% in 2004. In 2004, those aged 45–54 years volunteered the most (52%), closely followed by those aged 15–24 years (50%).[1]

Despite these high rates of volunteerism, 54% of all charities and non-profit organizations in BC had difficulty recruiting volunteers. This was especially true for social service organizations (69% reported difficulty) and arts and culture organizations (67%).[3]

Community Engagement

Charitable Giving in BC (2004)[1]

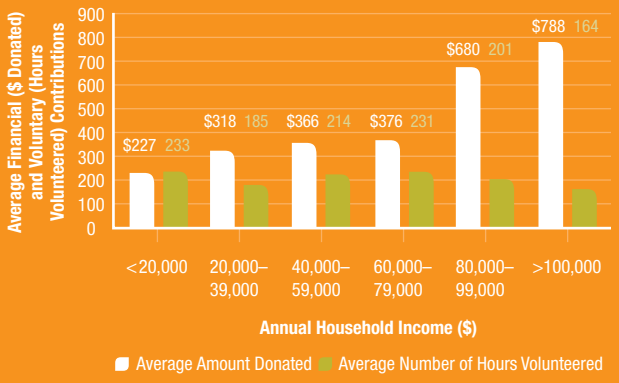
Charitable donations are affected by a variety of factors, including economic conditions, social and cultural values, and individual characteristics and beliefs. In general, the likelihood of donating and the amount given increases with age, education and household income. The top three reasons given by Canadians for donating are feeling compassion towards people in need, helping a cause that they believe in and wanting to make a contribution to their community. In addition to donating money, people donate clothing, toys, household goods and food to charitable organizations.

In 2004, 2.7 million British Columbians (77% of the total population) donated $1,257,800 to charities and non-profit organizations. Generally, there are slightly higher rates of charitable giving among higher household income categories: 90% of households with incomes greater than $80,000 made charitable donations compared to middle income categories ($40,000-$80,000), of which about 78% of households contributed. It is notable that 58% of households with low incomes (<$20,000) made charitable donations. On average, people with higher incomes donated the most money, whereas those with lower income volunteered more time. This was particularly true for people living in households that earned less than $20,000 per year. On average, they volunteered 69 more hours per year than people living in households that earned over $100,000.

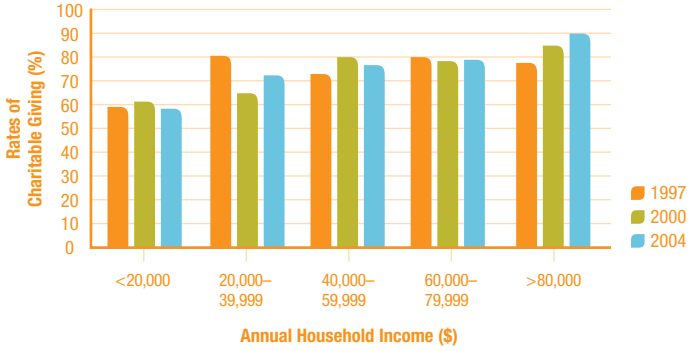
Public Confidence in the Charitable Sector[4,5]

Two recent studies provide additional insight on the importance of the voluntary, charitable and non-profit sectors, particularly in relation to trust and confidence in government. In the first study, Canadians ranked registered charities and charitable leaders very high in terms of trust – just below nurses and doctors. This placed charities and charitable leaders above business leaders and politicians. Of those polled, 75% said charities understand the needs of Canadians better than government does, and 66% said charities do a better job than government of meeting those needs.[4] In the other study, interest groups scored better than political parties (by a three to one margin) in terms of effectiveness at influencing public policy.[5] The public opinions recorded in these studies emphasize the importance of charitable and non-profit organizations to communities. The results also explain, in part, why citizens contribute their time and money to such organizations.

Average Annual Financial Donation and Hours Volunteered in BC by Annual Household Income (2004)[1]



Rates of Charitable Giving in BC by Household Income (1997, 2000 and 2004)[1]



References

[1] Statistics Canada. 2004. Caring Canadians, Involved Canadians: Highlights from the Canada Survey of Giving, Volunteering and Participating, 2004. Catalogue No. 71-542-XIE.

[2] Statistics Canada. The Daily, Monday, June 5, 2006. Canada Survey of Giving, Volunteering and Participating. www.statcan.ca/Daily/English/060605/d060605a.htm [accessed December 2008].

[3] Imagine Canada. 2006. The Nonprofit and Voluntary Sector in British Columbia – Regional Highlights of the National Survey of Nonprofit and Voluntary Organizations.

[4] Ipsos Reid Public Affairs. 2008. Talking About Charities 2008 – Canadians' Opinions on Charities and Issues Affecting Charities. Prepared for the Muttart Foundation. www.muttart.org/surveys.htm [accessed December 2008].

[5] Drainie, B. 2001. A Discussion Paper on the Voluntary Sector in Canada. Voluntary Sector Initiative. www.vsi-isbc.org/eng/joint_tables/awareness/pdf/drainie.pdf [accessed December 2008].

[6] David Suzuki Foundation. Gail Mainster, personal communication by email December 2008. www.davidsuzuki.org/NatureChallenge [accessed December 2008].

ACTIONS

The Many Faces Of **Sustainability**

Edible Garden Project

Adequate access to fresh fruit and vegetables is key to good health but can be beyond the reach of many people. The Edible Garden Project (EGP) operates on Metro Vancouver's North Shore – in the District of West Vancouver and the City and District of North Vancouver. EGP's purpose is to create a network of community organizations that collect locally grown food and distribute it to low-income families and individuals. The EGP network includes homeowners who have gardens and want to donate a portion of their harvest, people who have unused or under-used garden space and want to cultivate it for growing food, and volunteers who want to learn about, grow and share locally produced food. The EGP aims to educate the community and build skills to support ecologically based food gardening, healthy eating and food preservation. In 2007, thanks to partners, volunteers and local businesses, the EPG was able to:

- collect over 2,300 pounds of fresh local food from individual harvest donors,
- cultivate 60 m^2 of garden space, and
- offer 15 workshops to community members: www.ediblegardenproject.com.

Volunteerism in BC

Volunteer BC is a provincial association of volunteer centres, individuals and organizations that work together to strengthen the growth and development of volunteerism in BC. In 2008, there were more than 30 volunteer centres in communities throughout BC that help promote and support effective volunteering in many different sectors. Volunteer BC provides a variety of information, resources and tools for volunteers, organizations and volunteer centres. The Provincial Training Calendar is a popular resource for finding training opportunities in volunteerism and the voluntary sector. The association also provides the organizational home and administrative support for the Voluntary Organizations Consortium of British Columbia, which is a network of organizations that involve volunteers in health, education, social services, sport, recreation, arts, culture, multiculturalism, aboriginal, disabilities, children/youth, business, environment and other sectors. The Consortium's vision is "to be a leader in the promotion of a society that recognizes the essential role, value and diversity of volunteers in improving the quality of life in our province." Visit www.volunteerbc.bc.ca.

Nature Challenge

The David Suzuki Foundation established the Nature Challenge to inspire and engage people in caring for the natural environment by taking action at home, at work and in communities. The Challenge gives examples of the most effective ways to conserve nature and improve the quality of life everywhere on earth based on:

- the way we get around,
- the food we eat,
- the energy we use, and
- the public action we take.

By late 2008, 120,000 Canadians had registered on the Nature Challenge website, and 15,000 (12.5%) of those were living in BC.[6] See www.davidsuzuki.org/NatureChallenge.

The friendly face and helping hand of volunteer Annie Neroth greets runners during the Canadian Cancer Society Relay for Life in Coquitlam. Volunteer BC is a good place to begin exploring volunteer opportunities in your community.

Consumption & Waste

SUSTAINABILITY HIGHLIGHTS

Limiting consumption of natural resources to within sustainable levels is of utmost importance to the world. Similarly, it is vital to manage wastes in ways that do not exceed the capacity of the land, water and air to receive them. The size and location of the human population can significantly influence rates of consumption and waste generation.

Strategies for limiting the impacts of consumption and waste generation include using renewable resources and creating practices and technologies that improve energy efficiency, control pollution and conserve water and other resources. The simple act of buying local products can reduce fuel consumption and greenhouse gas (GHG) emissions that are associated with transporting goods from far away places. Government regulations, assistance programs and other financial incentives can all play important roles in encouraging the wise use of resources and smarter patterns of consumption.

• Between 1996 and 2006, the population of the Fraser Basin increased by 13.3%. By 2006, the total population was 2.73 million.[1]

• The proportion of British Columbians participating in environmental activities in 2006 was higher than the Canadian average.

• The total amount of solid waste disposed in the Fraser Basin increased by 18% between 1996 and 2006 (from 1.74 to 2.05 million tonnes).

• Between 2000 and 2006, average residential electricity consumption in the Fraser Basin increased by more than 4%.

• Total GHG emissions in BC increased by 27.4% between 1990 and 2006. Per capita GHG emissions in BC increased only 4.4% during this period, remaining relatively stable (ranging between 14.4 and 15.6 tonnes). This was well below the Canadian average of 22–23 tonnes per capita.

• Overall water consumption per capita in the Fraser Basin continued to increase between 2001 and 2004. In most cases, however, average daily flow per capita for both municipal water and wastewater systems was below the provincial average.

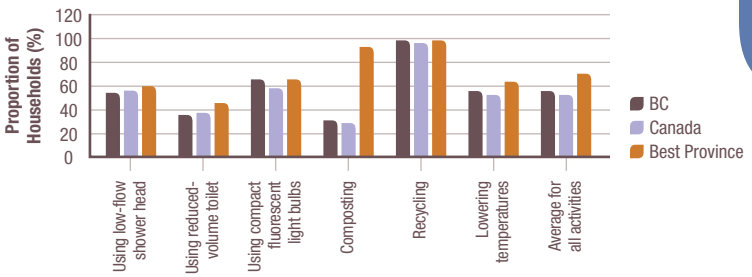
FAIR / MIXED RESULTS	**BC Households and the Environment** In 2006, participation of BC households in environmental activities was better than the Canadian average in four of six categories. In two of those categories – rates of recycling and use of compact fluorescent light bulbs – BC led the country.
POOR / GETTING WORSE	**Solid Waste Disposal** Total solid waste disposal increased in the Fraser Basin overall and in most regional districts in the Basin between 1996 and 2006.
POOR	**Canadian Consumer Choices** In 2008, the Consumer Greendex™ measured environmentally sustainable behaviour of consumers in 14 countries by ranking their choices in housing, transportation, food and consumer goods. Canadians ranked second to last in the survey.

ISSUES AND TRENDS

BC Households and the Environment (2006)[2]

In 2006, the percentage of British Columbia households participating in environmental activities that reduce consumption and waste exceeded the Canadian average in four of six categories: recycling, use of compact fluorescent light bulbs, composting and lowered thermostat settings. However, BC had lower participation rates in water conservation, which included the use of low-flow shower heads and reduced-volume toilets.

Household Participation in Environmental Activities in BC and Canada (2006)[2]



Solid Waste Disposal[3,a,b]

The total amount of solid waste disposed throughout the Fraser Basin increased by 18% between 1996 and 2006 (from 1.74 to 2.05 million tonnes). Only two of the eight regional districts in the Fraser Basin reduced the total amount of solid waste disposal between 1996 and 2006: Bulkley-Nechako (25% reduction) and Fraser-Fort George (12% reduction). Recorded total solid waste disposal doubled in the Thompson region between 1996 and 2006, with increases of 107% in the Thompson-Nicola Regional District (TNRD) and 80% in the Columbia Shuswap Regional District (CSRD).

Between 1996 and 2006, per capita solid waste disposal increased in four of the eight regional districts in the Fraser Basin. The Bulkley-Nechako and Fraser-Fort George (FFGRD) Regional Districts both recorded decreases in per capita solid waste disposal between 1996 and 2006 but more recently had increases between 2002 and 2006. Only the Squamish-Lillooet Regional District recorded decreases in per capita solid waste disposal both in 2002–2006 (7% reduction) and 1996–2006 (16% reduction). However, these improvements were outpaced by population growth, and there was a 12% increase in total solid waste disposal between 1996 and 2006.

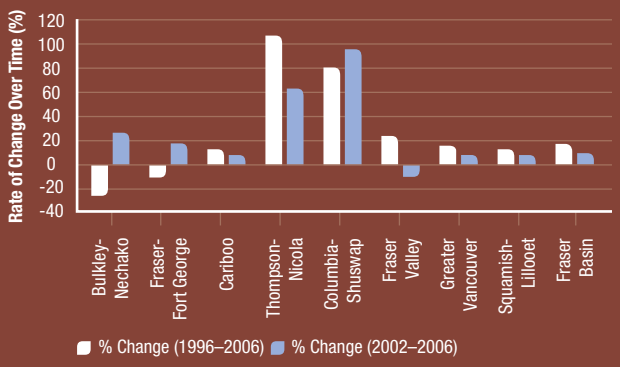
Caution is advised for analysis of trends over time and comparisons between regional districts because of different methods of estimating solid waste disposal (e.g. weigh scales versus population-based assumptions) and because of different community conditions (e.g. upturn in construction in the FFGRD; inclusion of construction and demolition waste in the TNRD in 2006; relocation of waste previously disposed at an old landfill site in the CSRD; and redirection of waste to landfills operated by First Nations in the Fraser Valley Regional District, but not reported).

Energy Consumption and Greenhouse Gas Emissions (1990–2006)[4,5,6]

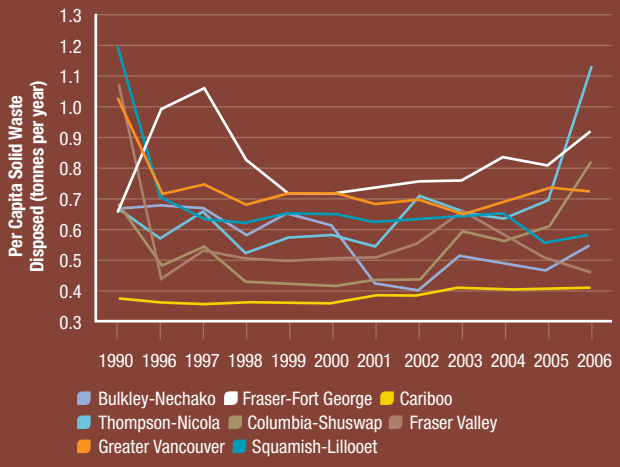
Between 1990 and 2006, total energy consumed in BC rose by 24% to 1,292 petajoules; however, energy intensity improved.[c] During this period, population and gross domestic product (GDP) ($1997) grew by 31% and 86%, respectively. The greater growth rates in population and GDP compared to energy consumption resulted in energy intensity declining by 5% per person and by 50% per unit of GDP.[4]

In the Fraser Basin, average annual electricity consumption per residential account increased from 9,482 kWh in 2000 to 9,909 kWh in 2006 (4.5%); however, there was a 1.5% decrease between 2004 and 2006. Residential consumption grew in all regions of the Fraser Basin between 2000 and 2006, but decreased between 2004 and 2006 in all regions except the Cariboo-Chilcotin.[5]

Change in Total Solid Waste Disposed in the Fraser Basin (1996–2006)[3,a,b]



Per Capita Solid Waste Disposed in the Fraser Basin (1990 and 1996–2006)[3,a,b]



Consumption & Waste

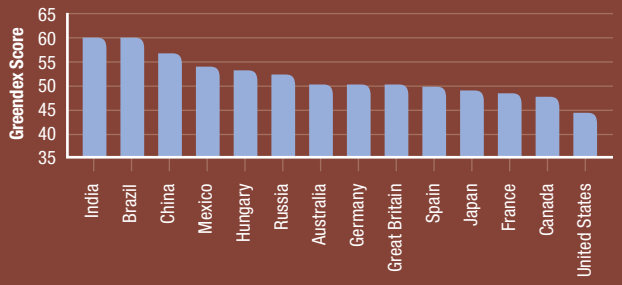
Despite increases in total (27.4%) and per capita (4.4%) GHG emissions between 1990 and 2006, the BC economy became more carbon-efficient, producing 11% fewer emissions per unit of GDP between 1990 and 2004. Although there were significant increases in total GHG emissions after 1990, there was a 5% reduction in total GHG emissions between 2004 and 2006.[6]

Municipal Water Consumption and Wastewater Treatment (2001–2004)[7]

In most Fraser Basin communities, domestic (i.e., residential) consumption accounts for more than half of municipal water use. In 2004, average daily domestic consumption ranged from 302 litres per capita in Fraser Valley municipalities to 670 litres per capita in Thompson region municipalities. On average, daily domestic consumption among Fraser Basin municipalities (483 litres per capita) was well below the provincial average of 649 litres per capita. However, this represented a 2% increase in consumption in the Fraser Basin since 2001 when per capita daily consumption was 474 litres.

In 2004, the 45 municipalities in the Fraser Basin provided, on average, 89% of their residents with wastewater treatment systems. Just over half of these municipalities (23) served 98–100% of their populations with sewage connections. Of those populations connected to municipal wastewater treatment systems, most (59.4%) received secondary levels of treatment. More than one-third (36.2%) received only primary treatment, and only five communities (4.3% of the Fraser Basin population) received tertiary treatment, the highest level.

Greendex Scores for Fourteen Countries (2008)[8]



Canadian Consumer Choices (2008)[8]

Based on scientific research and advice, the National Geographic Society and the polling firm, GlobeScan, developed the Consumer Greendex™, which is composed of four sub-indices: housing, transportation, food and consumption of goods. In 2008, the Greendex was used to measure consumer choices and citizen behaviour in relation to environmental sustainability. While the Greendex does not measure the overall environmental performance of a country in areas such as total emissions, government policy and other factors, it recognizes the importance of consumer choices as a key factor in environmental performance. A total of 14,000 consumers (1,000 in each of 14 countries, including Canada) were surveyed about their energy use and conservation, transportation choices, food sources and use of green products; their attitudes about the environment and sustainability; and their knowledge of environmental issues.

Canada ranked second to last (13th) out of the 14 countries surveyed, beating only the United States. This low ranking was due primarily to large home sizes and transportation behaviour that is less environmentally friendly. The following are highlights from the study:

- Of Canadians surveyed, 29% had nine or more rooms in their homes, which is among the largest house size of those countries surveyed.

- Half of Canadians drove alone daily, and 87% had one or more vehicles per household. Canadians also ranked among the lowest in use of public transportation: only 22% used it at least once per week.

- Canadians ranked better (fifth) for the food sub-index: 77% of Canadians surveyed ate locally grown foods, 94% ate fruits and vegetables, and below average numbers (52%) drank bottled water.

Notes

[a] Disposal includes landfill and incineration facilities.

[b] Data supplemented by Metro Vancouver and TNRD.

[c] For this report, energy intensity is the amount of energy used per person and per unit of real GDP.

References

[1] Statistics Canada. Semi-Custom Area Profiles (created from 1996, 2001 and 2006 census data).

[2] Statistics Canada. 2006. Households and the Environment Survey. Special Tabulation. Reported in EnviroStats. Winter 2008. Vol. 2, no. 4 (Catalogue no.16-002-X). www.statcan.gc.ca/pub/16-002-x/16-002-x2008004-eng.pdf [accessed December 2008].

[3] Recycling Council of BC. BC Municipal Solid Waste Tracking Reports (2006, 2003–2005 and previous tracking reports). www.env.gov.bc.ca/epd/epdpa/mpp/solid_waste_index.html [accessed December 2008].

[4] Nyboer, J. Review of Energy Consumption and Supply in British Columbia, 1990 to 2006. Canadian Industrial Energy End-use Data and Analysis Centre, Simon Fraser University. Updated by personal communication by email with the author March 2008..

[5] BC Hydro. Custom tabulation of electricity consumption data, 2000–2006.

[6] Environment Canada. 2008. National Inventory Report 1990–2006: Greenhouse Gas Sources and Sinks in Canada. www.ec.gc.ca/pdb/ghg/inventory_report/2006/som-sum_eng.cfm [accessed December 2008].

[7] Environment Canada. Municipal Water and Wastewater Survey 2004. www.ec.gc.ca/Water/en/manage/use/e_data.htm [accessed October 2008].

[8] National Geographic Society. 2008. Greendex™. Consumer Choice and the Environment – A Worldwide Tracking Survey. http://event.nationalgeographic.com/greendex/index.html [accessed December 2008].

ACTIONS

The Many Faces Of **Sustainability**

100-Mile Diet
There is a growing interest in locally produced food, as reflected in the popularity of *The 100-Mile Diet*, a book by Alisa Smith and James MacKinnon. Motivated by a desire to reduce their carbon footprint, this Vancouver couple decided in 2005 that, for one year, they would eat only foods produced within 100 miles of their home. Their story sparked interest in Canada and beyond, and especially in Metro Vancouver and the Fraser Valley where a variety of local foods are available year round. In the summer of 2008, a dozen families in Mission answered the couple's challenge and publicly pledged to eat at least 50% of their meals from local sources for 100 days. A TV documentary on the challenge is scheduled to air in 2009. And while a commitment to give up chocolate and coffee or try to source meals within a 100-mile radius might not appeal to most people, the simple act of adding more locally produced food to meals is a palatable option that is also beneficial for local farmers and the environment. To check out farmers' markets, community gardens, farm-gate sales, local food delivery services, organic products and specialty local products, visit www.eatbc.com, www.bcfreshvegetables.com and www.certifiedorganics.info. A provincial program for branding products with the "Food Miles" they have travelled to the grocer's bins is expected to be implemented soon.

LiveSmartBC
LiveSmartBC helps BC families, businesses and communities go green. Various rebates, incentives and tax exemptions, plus general program funding are available to help British Columbians save money while using less energy, improving environmental and social health, reducing resource use and diverting solid waste from landfills: www.livesmartbc.ca.

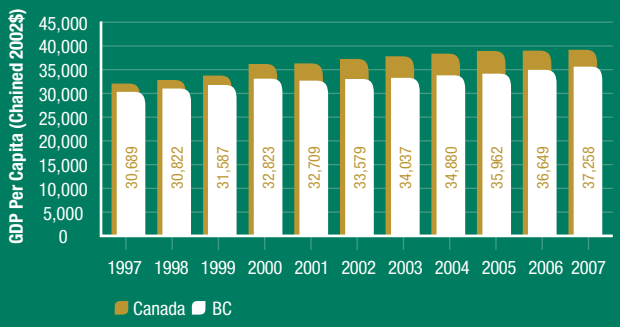
Ocean Wise
Ocean Wise is a conservation program of the Vancouver Aquarium to educate and empower consumers about sustainable seafood. Ocean Wise works directly with restaurants and food markets to ensure they and their customers can make environmentally friendly seafood choices based on the most current scientific information. Visit www.vanaqua.org/oceanwise.

Economy

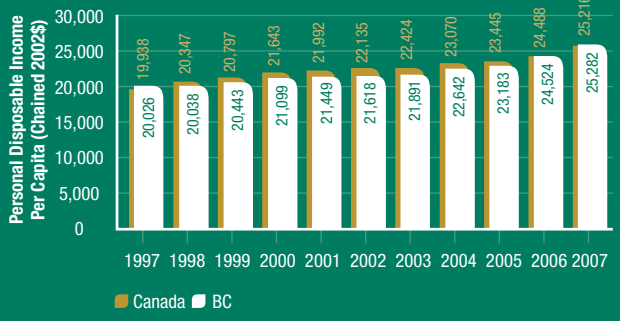
SUSTAINABILITY HIGHLIGHTS

A sustainable economy factors the whole range of social and environmental costs and benefits into economic development and business transactions. It uses natural resources but does not deplete them, and it balances the needs of individuals and society as a whole, as well as the needs of future generations.

GDP Per Capita in BC and Canada (1997–2007)[1]



Personal Disposable Income Per Capita in BC and Canada (1997–2007)[2]



Over the past few years, there has been an encouraging shift towards more sustainable business models. There is a growing expectation by consumers, shareholders and voters that industry and government consider and mitigate negative impacts on the environment and communities. These expectations are being reinforced through policy and regulations designed to spur behavioural shifts and reward innovation around products and services that have environmental and social as well as financial values. Information related to a more sustainable economy is found throughout this report.

• In 2007, per capita gross domestic product (GDP) in BC was $37,258 – up 1.7% since 2006 and 11% since 2002. BC's GDP was less than the Canadian average but recorded higher growth per annum than Canada's GDP between 2002 and 2007.

• In 2007, average disposable income in BC was $25,282; the Canadian average was $25,216.

• A significant number of people in the Fraser Basin spent unpaid time caring for children and seniors.

• The data presented in this report are current up to and including 2006–2007. Significant economic challenges emerged late in 2008. They are not reflected in the indicators, data and trend analysis in this report but will be explored in future reports produced by the Fraser Basin Council.

GETTING BETTER	**Strength of the Economy (per capita GDP)** Per capita GDP increased steadily year to year between 2002 and 2007.
FAIR / MIXED RESULTS	**Individual Disposable Income** Disposable income in BC increased by 26% between 1997 and 2007 and was similar to the Canadian average throughout this period.
FAIR / MIXED RESULTS	**Unpaid Work** In 2006, 36% of the population dedicated their time, without pay, on a weekly basis to care for children; 17.5% volunteered their time to provide assistance to seniors.

ISSUES AND TRENDS

Per Capita Gross Domestic Product (1997–2007)[1]

Per capita GDP is a measure of the economic value of particular types of economic activity per person within a country or region. In 2007, $37,258 worth of economic output was generated for each individual in British Columbia. This represented a 1.7% increase since 2006 and an 11% increase since 2002. The 2007 measure was below the Canadian average of $39,914. However, GDP grew at a faster pace in BC, increasing an average of 2.2% per year between 2002 and 2007 compared to 1.7% per year in Canada.

Disposable Income Per Capita (1997–2007)[2,3,a]

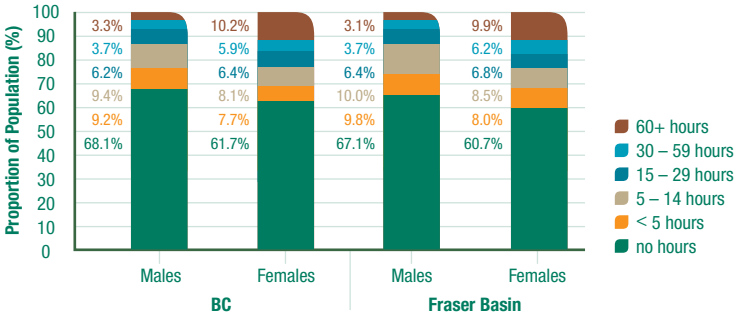
Disposable income is a function of income and rates of taxation and other government-related fees. Disposable income in BC has increased steadily for the past decade, growing by 3% between 2006 and 2007 and 26% since 1997. However, BC trailed the Canadian average throughout this period.

The fact that disposable incomes have grown at a similar pace as the economy is a good sign. However, since 1997, economic accounts indicate that British Columbians have been spending more than their personal disposable income on consumer goods and services. This means that much of the population has been accumulating debt and has very little in terms of personal savings to buffer economic downturns and unexpected expenses.

Unpaid Time Spent Providing Childcare or Assistance to Seniors (2006)[4]

Volunteer work and time committed to providing care without remuneration is not reflected in conventional economic accounts and figures. However, it plays an important role in the functioning of the economy and our society. There are many types of volunteer work. A particularly important one is providing care and assistance to others in the community, such as children and seniors. In 2006, 36.2% of residents in the Fraser Basin spent unpaid time on a weekly basis caring for children, and 17.5% volunteered their time in providing assistance to seniors. Females were more likely than males to spend time caring for children and seniors. Approximately 40% of women and 33% of men in the Fraser Basin cared for children without receiving payment. About 10% of women spent 60 or more hours weekly in this role. The proportion of the population that spent unpaid time caring for children was slightly higher in the Fraser Basin than in BC. Approximately 20% of women and 15% of men in the Fraser Basin cared for seniors without receiving payment. The proportion that provided unpaid assistance to seniors in the Fraser Basin was on par with the provincial average.

Population in BC and the Fraser Basin by Gender Spending Time on Unpaid Childcare (2006)[4]



ACTIONS
The Many Faces Of **Sustainability**

Buy BC*wild*

The Buy BC*wild* program builds public awareness of, and support and economic opportunities for, BC's unique forest products and services. It has produced a free consumer's guide with a directory of products from the wilds of BC. Buy BC*wild* also puts on an annual conference to facilitate the sharing of knowledge and networking among businesses in the forestry sector: www.buybcwild.com/about-buy-bcwild.

Innovative Clean Energy (ICE)

The goal of the ICE Fund is to accelerate the development of new energy technologies that have the potential to solve real, everyday energy and environmental issues and create significant socio-economic benefits for all British Columbians. In July 2008, the provincial government announced the first 15 successful applicants to receive support from the ICE Fund. Approved projects representing bio-energy, geothermal, solar and other alternative energy sources shared nearly $25 million. A second round of funding will focus on projects throughout rural BC that address specific provincial energy and environmental priorities and accelerate the commercialization of clean energy technologies: www.tted.gov.bc.ca/ICEFund/Pages/default.aspx.

THE ECONOMY AND SUSTAINABILITY

The indicator data included in the Economy section of the report are current to 2006 and 2007. Significant economic change has occurred, particularly since the latter part of 2008. People from all walks of life have been, and are being, affected by severe economic challenges, including a devaluation of stocks, mutual funds and pensions; declines in housing values; constrained access to credit; and business closures. Aspects of the economic downturn are recorded in the Business Council of BC's BC Economic Index, with very low growth in the first and third quarters of 2008 and declines in the second and fourth quarters (-0.5% and -0.7% respectively).[5] Declines in 2008 were particularly notable in the number of jobs, retail sales, international visitors and housing starts.

There is much uncertainty about the breadth and depth of the current economic downturn. Governments are being challenged to stimulate an economic recovery. Businesses are being challenged to become more efficient and innovative. At this time it is important to ask what would the economy look like if it were informed by the principles and practices of sustainability? It would include broad-based dialogue and collaboration to develop new economic strategies. It would invest in green infrastructure, innovation and other supports to better enable businesses to implement sustainability. It would support employees with skills development and retraining. The challenges we are facing today present an opportunity to transform the economy in a way that advances sustainability long into the future.

Notes

[a] Personal disposable income is the amount remaining after payment of personal direct taxes, including income taxes, contributions to social insurance plans (such as the Canada Pension Plan contributions and Employment Insurance premiums) and other fees.

References

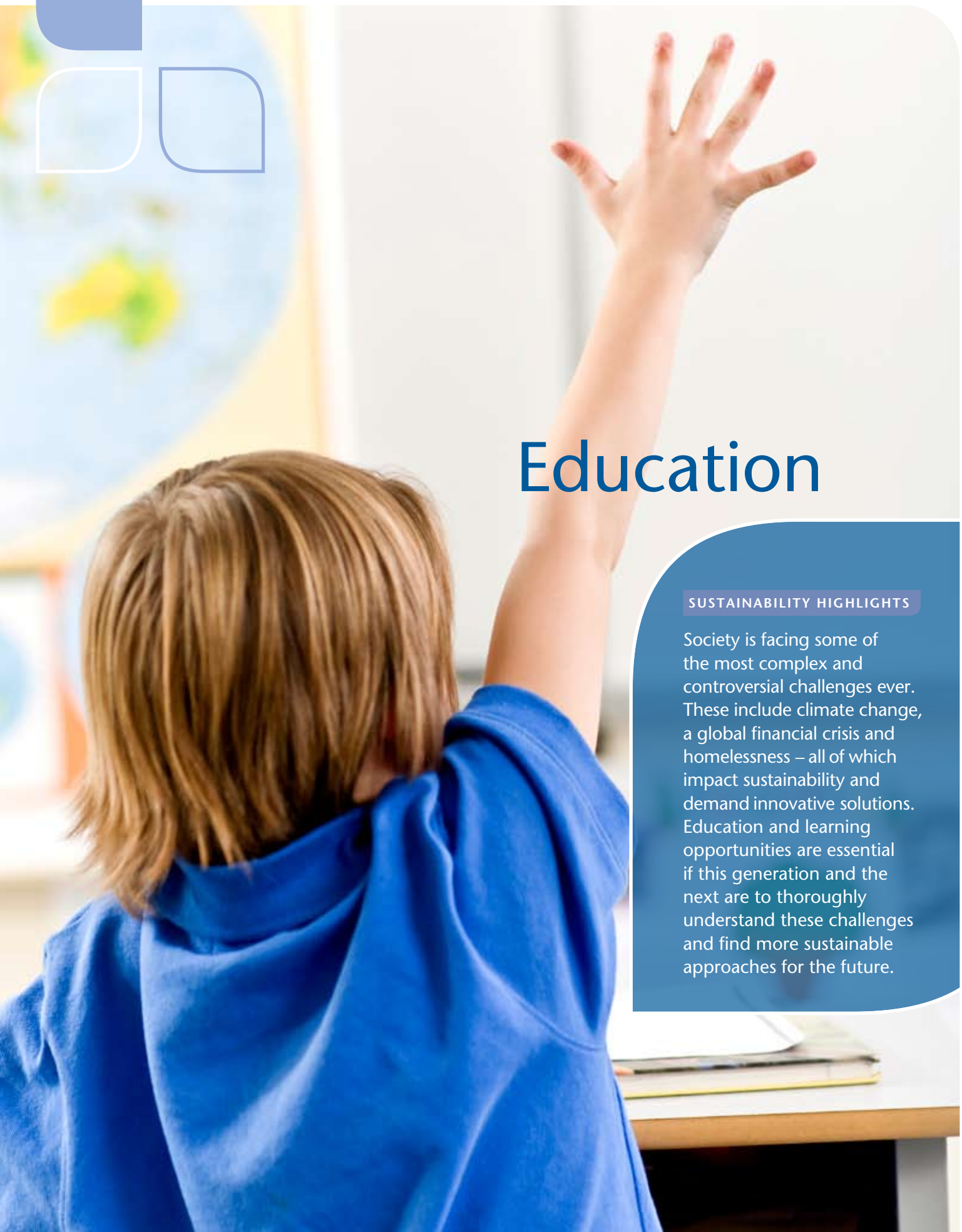
[1] BC Statistics. Prepared with population data from BC Statistics and deaths data from BC Vital Statistics. www.bcstats.gov.bc.ca/DATA/POP/vital.asp [accessed September 2008].

[2] Statistics Canada. Prepared by BC Stats using Statistics Canada economic accounts data for BC and Canada. www.bcstats.gov.bc.ca/data/bus_stat/bcea/tab1.asp [accessed January 2009].

[3] Statistics Canada. Review of Personal Disposable Income. www.statcan.gc.ca/pub/13-605-x/2003001/chrono/2003prov/4151911-eng.htm [accessed October 2008].

[4] Statistics Canada. Semi-Custom Area Profile (extracted from 2006 census data).

[5] Business Council of BC. 2009. BC Economic Index. Volume 7 Number 4. www.bcbc.com [accessed January 2009].



Education

SUSTAINABILITY HIGHLIGHTS

Society is facing some of the most complex and controversial challenges ever. These include climate change, a global financial crisis and homelessness – all of which impact sustainability and demand innovative solutions. Education and learning opportunities are essential if this generation and the next are to thoroughly understand these challenges and find more sustainable approaches for the future.

Education helps people acquire workplace skills, earn a living and retrain for new opportunities. It also helps youth and others gain the understanding, skills and training they need to contribute towards a more sustainable society. It is equally important to have opportunities for both formal and informal learning so that people of all ages can continue to expand their knowledge and enrich their skill sets over the course of their lives.

• Overall, levels of educational attainment in the Fraser Basin are higher than the provincial average. In 2006, six in 10 residents in the Fraser Basin had some form of post-secondary education or training.

• In 2006, only 16% of the Fraser Basin population over 25 years of age did not have a high school diploma. However, in the Cariboo-Chilcotin region, the percentage was 27%.

• There was wide variation in the six-year completion rates of high school students in the Fraser Basin in 2006/2007. In some school districts, more than 90% of students graduated within six years of entering high school; in others, it was less than 65%.

• There were also notable differences in the six-year completion rates between boys and girls and between Aboriginal and non-Aboriginal students throughout the Fraser Basin in 2006/2007.

• In 2008, the average Composite Learning Index score (a measure of life-long learning) for communities in the Fraser Basin was below the provincial average for all four aspects of learning: Learning to Know, Learning to Do, Learning to Live Together and Learning to Be. Scores for 2008 were also below those of 2007.

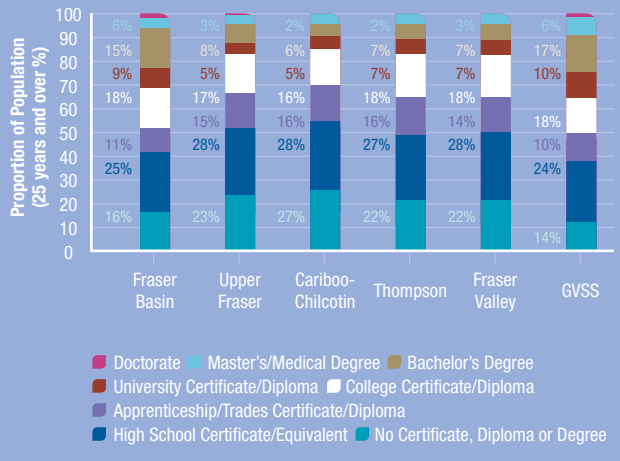
FAIR / MIXED RESULTS	**Educational Attainment** In 2006, overall levels of educational attainment in the Fraser Basin were above the provincial average, but in certain regions they were well below the average.
FAIR / MIXED RESULTS	**Graduation Rates** In 2006-2007, six-year completion rates varied throughout the Fraser Basin and differed between genders and Aboriginal and non-Aboriginal students.
GETTING WORSE	**Composite Learning Index (CLI)** CLI scores declined between 2007 and 2008 and were below the provincial average.

ISSUES AND TRENDS

Educational Attainment (2006)[1,a]

In 2006, 83.9% of residents in the Fraser Basin had at least a high school education, and 58.9% had some form of post-secondary training or education. This level of educational attainment was on par with the provincial average; however, the proportion of residents with a university education was higher in the Fraser Basin (30.6%) than in BC (27.6%). There were also notable regional differences in levels of educational attainment. For example, in the Cariboo-Chilcotin region, less than half the population (45.3%) had some of form of post-secondary education, compared to 61.5% in the Greater Vancouver-Sea to Sky region. In contrast, the proportion of the population that had apprenticeship and trades certifications was highest in the Cariboo-Chilcotin and Thompson regions.

Educational Attainment in the Fraser Basin by Region (2006)[1]



Education

Six-Year Graduation Rates (2006–2007)[2]

A high school certificate is a minimum requirement for most jobs in today's labour market. It also opens the door to other learning opportunities, such as university and college-level programs. In 2006–2007, 62–93% of students in the Fraser Basin graduated from high school in the expected six-year time period. Completion rates in nine of 24 districts in the Fraser Basin were above the provincial average of 80.4%.

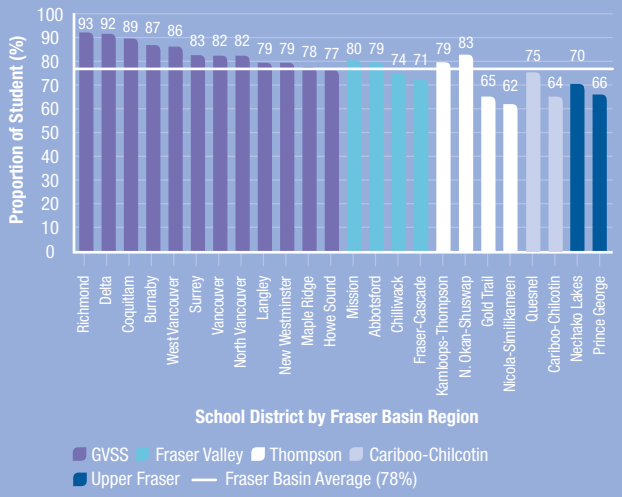
The six-year completion rates for boys were below those of girls in all but two school districts in the Fraser Basin. In some areas, the completion rates for boys were 13% below those of girls. There was also a significant difference in the completion rates for Aboriginal and non-Aboriginal students.

Composite Learning Index (2006–2008)[3,b]

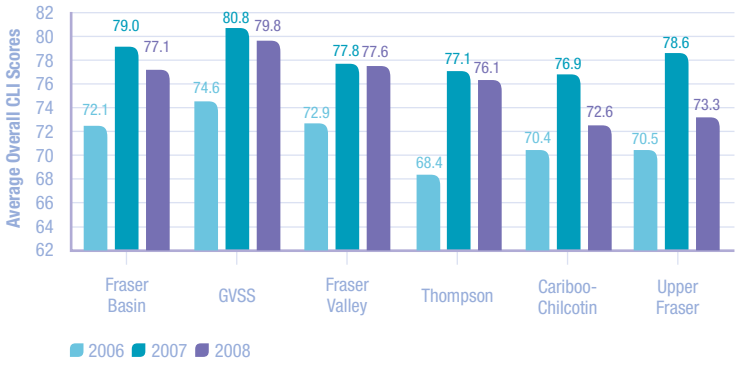
The Composite Learning Index (CLI) is a national index that evaluates society's progress in life-long learning. It is the first index of its kind in the world. The CLI is a valuable measurement tool that recognizes how learning throughout a person's life is critical to the success of that person and his or her community and country. The index is based on 24 learning-related indicators that reflect four different ways of learning at home, at work, in school and in society. The four pillars of the index are: Learning to Know, Learning to Do, Learning to Live Together, and Learning to Be. These learning indicators are combined to generate numeric scores for 4,700 cities and communities across Canada. A high CLI score means that a particular city or community possesses learning conditions that support social and economic success.

In 2008, the average CLI score for the Fraser Basin (77.1) was on par with the national average (77) but below the average for BC (80) in terms of the overall score and each of the four pillar scores. CLI scores in the Fraser Basin increased significantly between 2006 and 2007 but declined in 2008. The largest decrease was in the Upper Fraser region where the CLI score dropped by more than 5 points. The highest regional CLI score in 2008 was in the GVSS region (79.8).

Six-Year High School Completion Rates in the Fraser Basin by School District (2006–2007)[2]



Composite Learning Index Scores in the Fraser Basin by Region (2006–2008)[3]



Notes

[a] Population refers to persons 25 years and older.

[b] In 2006 – the first year the CLI was calculated – the average score for communities across the country was 73. Since then, community CLI scores have ranged from 42 to 98. While this range is intended to parallel the scale that is typically used in schools (from 1–100%), CLI scores are relative, and there is no value that represents a perfect score (i.e., 100 is not the maximum achievable score). Rather, each year's top score represents the best the country has to offer. More information about the Composite Learning Index and how it is calculated can be found on the Canadian Council on Learning website: www.ccl-cca.ca/CCL/Reports/CLI/?Language=EN.

References

[1] Statistics Canada. Semi-Custom Area Profile (extracted from 2006 census data).

[2] BC Ministry of Education. www.bced.gov.bc.ca/reports/pdfs/exams/comp_rate/prov.pdf [accessed October 2008].

[3] Canadian Council on Learning. Composite Learning Index. www.ccl-cca.ca/CCL/Reports/CLI/2008scores.htm?Language=EN [accessed October 2008].

ACTIONS

The Many Faces Of **Sustainability**

Aboriginal Education Enhancement Agreements
Statistics suggest that, in many cases, the school system is typically not providing a learning environment that meets the needs of Aboriginal students. In recognition of this, 19 of the 24 school districts in the Fraser Basin have established Aboriginal Education Enhancement Agreements (EAs), which are working agreements between a school district, local Aboriginal communities and the BC Ministry of Education. EAs are designed to enhance the educational achievement of Aboriginal students. They include a collaborative partnership between Aboriginal communities and school districts that involves shared decision-making and specific goal setting to meet the educational needs of Aboriginal students. EAs highlight the importance of academic performance, and more importantly, stress the integral nature of Aboriginal traditional culture and languages to Aboriginal student development and success. Fundamental to EAs is the requirement that school districts provide strong programs on the culture of local Aboriginal peoples: www.bced.gov.bc.ca/abed/agreements.

Healthy Schools
The Healthy Schools initiative is aimed at establishing healthy environments and promoting healthy lifestyles among children and youth. Part of this initiative involves integrating daily physical activity into the school curriculum. The guidelines for food and beverage sales in BC schools have also been revised to maximize students' access to healthier options; this includes completely eliminating the sale of unhealthy foods and beverages. Schools are also being encouraged to set up their own walking school bus programs and bike trains to provide fun opportunities for physical activity and to reduce the schools' carbon footprint: www.bced.gov.bc.ca/health.

Walking the Talk on Sustainability Education
The BC Network on Sustainability Education "Walking the Talk" is a social and learning network open to everyone interested in sustainability education. A multi-sectoral BC Working Group on Sustainability Education is also working closely with the BC Ministries of Education and Advanced Education and the National Education for Sustainable Development Expert Council. The focus is on three areas: non-formal education, formal K-12 education and higher education.

Taking Stock 2008: Assessing the Current State of Sustainability in British Columbia Universities and Colleges is the working group's first report; it details the policies, operations and academic research and teaching that support provincial and societal goals of sustainability. Visit www.walkingthetalk.bc.ca.

ALTERNATIVE SCHOOLS HELP YOUTH AT RISK

A study of alternative education programs in seven BC communities, including five in the Fraser Basin – Abbotsford, Kamloops, Prince George, Surrey and Vancouver – show that youth who may have suffered violence, homelessness and instability in their lives are finding success in British Columbia's alternative schools.

"The findings may surprise some people," says Annie Smith, Executive Director of the McCreary Centre Society in Vancouver and co-author of the report *Making the Grade: A Review of Alternative Education Programs in BC*. "Many of the youth are disadvantaged by the effects of poverty, such as hunger, unstable housing and the need to secure income, yet they still want to connect with school, continue their education, and work towards a career."

Making the Grade documents a survey of 339 students, aged 13-19, from 34 alternative education programs between December 2006 and June 2007, as well as interviews with teachers and parents, social workers, probation officers and others in the community.

Alternative schools are characterized by small class sizes, life skills instruction, an individualized approach to teaching and emphasis on developing healthy relationships with teachers, peers and the community. They may be operated by school districts outside or within a mainstream school, or at a youth or community centre. Many offer support that benefits marginalized youth considered to be at risk by such factors as abuse, sexual exploitation, substance use, bullying, discrimination, mental health problems or street involvement. Support includes counselling, cultural programs, daycare, shower and laundry facilities as well as food and employment programs.

Of the youth surveyed, 40% felt they were gaining skills and knowledge necessary to pursue post-secondary education; 68% expected to have a job within five years; only 4% expected to be on the street. They liked school more and skipped school less than in their previous experience.

"These students reported positive connections with their teachers and other adults within the alternative education system, and draw tremendously on support from their peers attending the same programs," says Smith.

Visit www.mcs.bc.ca for the full report. See also recent research on marginalized and street-involved youth, including the 2009 report *Moving Upstream*, which details the specific challenges faced by Aboriginal youth.

Energy

SUSTAINABILITY HIGHLIGHTS

Energy underpins British Columbia's economy and communities and our personal well-being. We use energy to power our vehicles; run appliances, equipment, and industrial plants; and heat and light our homes and businesses. BC is fortunate in having a large supply of renewable energy in the form of hydroelectricity and biomass energy.

While BC and the Fraser Basin have enjoyed clean, renewable energy in the form of hydroelectricity, and while other renewable energy sources are being actively pursued, there remains a heavy reliance on non-renewable oil and gas for most of the province's energy needs. In addition, most of BC's hydroelectricity comes from large storage facilities in the Columbia and Peace River watersheds where river valleys have been flooded and ecosystems have been lost. Strategies are required to manage the effects of energy development and consumption on airsheds and watersheds. British Columbians are also recognizing the benefits of using energy wisely, which includes saving money and protecting the environment.

• The greatest growth in energy consumption by sector in BC between 1990 and 2006 was in the transportation (29%), residential (22%) and commercial / institutional (21%) sectors.

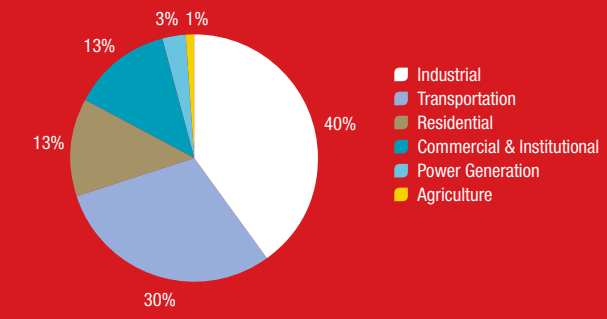
• Renewable energy is about 13% of the energy produced but more than 30% of the energy consumed in BC.

• Between 2000 and 2006, average residential electricity consumption increased by over 4% in the Fraser Basin. Growth in consumption was greatest in the Thompson and Fraser Valley regions (10% between 2000 and 2006).

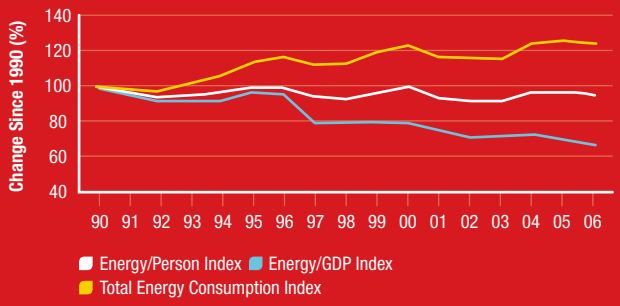
• In 2006, BC had 22% (1,468 MW) of Canada's total cogeneration capacity. Between 2002 and 2006, BC's installed cogeneration capacity rose by 22%, more than double the rate of increase for Canada as a whole.

FAIR / MIXED RESULTS	**Total Energy Consumption in BC** Although energy consumption in BC increased by 24% from 1990 to 2006, annual consumption has levelled off since 2000.
GETTING BETTER	**Energy Intensity in BC** Rates of energy consumption per person and per unit of real GDP declined between 1990 and 2006 (by 5% and 33% respectively).
FAIR / MIXED RESULTS	**Residential Electricity Consumption in the Fraser Basin** There was a 6% increase in average annual electricity consumption per residential account between 2000 and 2004; however, there was a 1.5% decrease between 2004 and 2006.

Energy Consumption in BC by Sector (2006)[1]



Energy Consumption and Intensity Trends in BC (1990–2006)[1]



ISSUES AND TRENDS

Energy Consumption in BC (1990–2006)[1]

Between 1990 and 2006, total energy consumed in BC rose by 24% to 1,292 petajoules; however, energy intensity improved.[a] During this period, population and gross domestic product (GDP) ($1997) grew by 31% and 86% respectively. The greater growth rates in population and GDP compared to energy consumption resulted in energy intensity declining by 5% per person and by 33% per unit of GDP. The greatest growth in energy consumption in BC was in these sectors: transportation (29%), residential (22%) and commercial / institutional (21%). Agriculture and industry energy consumption increases were much more modest: 14% and 6% respectively.

Energy Use by Source in BC (1990–2006)[1]

BC's major energy sources are natural gas, electricity and refined petroleum products, such as gasoline and diesel. Between 1990 and 2006, growth in energy use by source was lowest for natural gas (11%), followed by electricity (16%) and refined petroleum products (26%). Hydroelectricity continued to dominate electricity production, although the share of electricity production from natural gas-fired plants increased.

Energy

Almost all renewable energy produced in BC is in the form of hydroelectricity and biomass energy. Renewable energy provides about 13% of the energy produced but more than 30% of the energy consumed in BC.

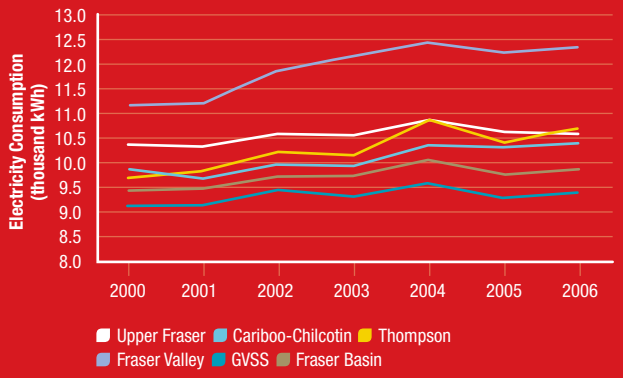
Residential Electricity Consumption in the Fraser Basin (2000–2006)[2]

In the Fraser Basin, average annual electricity consumption per residential account grew from 9,482 kWh in 2000 to 9,909 kWh in 2006. This was a 4.5% increase; however, there was a 1.5% decrease between 2004 and 2006. There were significant regional differences. These can be attributed to several factors, including regional differences in heating sources; housing type, age and size; and climate. In 2006, the average residential account in the Fraser Valley region consumed 12,378 kWh, 25% more than the Fraser Basin average. Residential consumption grew in all regions of the Basin since 2000; however, consumption decreased between 2004 and 2006 in all regions except the Cariboo-Chilcotin.

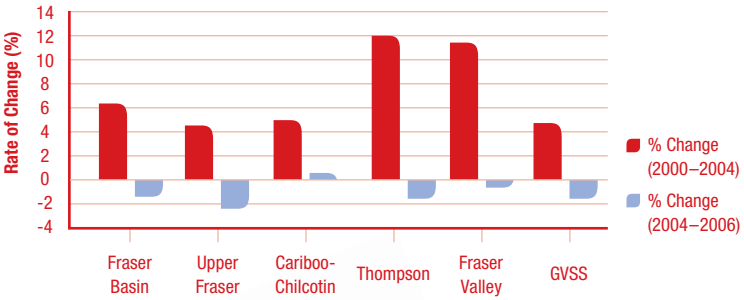
Energy Cogeneration (2002–2006)[1]

Cogeneration, also referred to as combined heat and power, is the simultaneous generation of electricity and useful heat from a single fuel. By making use of waste from one process in the production of another, substantial gains in energy efficiency can be realized. Cogeneration is one of many greenhouse gas reduction strategies and is effectively used in different processes, including wastewater treatment. In 2006, BC had 22% (1,468 MW) of Canada's total cogeneration capacity. Between 2002 and 2006, BC's installed cogeneration capacity rose by 22%, more than double the rate of increase for Canada as a whole. The forestry sector has almost 55% of BC's total cogeneration capacity, followed by the electricity generation sector at 42%.

Average Annual Electricity Consumption per Residential Account in the Fraser Basin (2000–2006)[2]



Change in Average Annual Electricity Consumption per Residential Account in the Fraser Basin (2000–2006)[2]



Notes

[a] For this report, energy intensity is the amount of energy used per person and per unit of real GDP.

References

[1] Nyboer, J. Review of Energy Consumption and Supply in British Columbia, 1990 to 2006. Canadian Industrial Energy End-use Data and Analysis Centre, Simon Fraser University. March 2008. Updated by personal communication with the author.

[2] BC Hydro. Custom Tabulation of Electricity Consumption Data, 2000–2006.

ACTIONS

The Many Faces Of **Sustainability**

The Williams Lake Generation Station

The Williams Lake Generation Station is the largest biomass power plant in North America, with a production capacity of 66 MW. The plant uses wood residue from local sawmills. This helps to reduce particulate emissions by over 90% by diverting waste wood from, and enabling the closure of, beehive burners. The plant generates electricity for sale to BC Hydro, improves air quality and enhances the competitiveness of local sawmills.

Community Action on Energy and Emissions (CAEE)

In 2008, 62 local governments and First Nations across BC were participating in the CAEE program, double the number of participating communities in 2006. Through a partnership with the Fraser Basin Council, the program supports energy efficiency and community planning projects. Here are a few examples from the Fraser Basin (visit www.caee.ca for more information):

- The Coldwater Indian Band completed energy audits of civic buildings and designed its new administration complex building according to green building standards.

- The Seabird Island Band is preparing a community sustainability action plan and has completed research on renewable energy options.

- The City of New Westminster developed a strategy to improve the efficiency of municipal buildings and undertook five retrofit projects under the guidance of a newly formed Energy Management Committee.

BC Hydro – Towards Bioenergy and Energy Savings

BC's 2007 Energy Plan requires all new electricity generation projects to have zero greenhouse gas emissions. It also requires zero net greenhouse gas emissions from existing thermal power plants by 2016.

In 2008 BC Hydro issued a call for proposals on generating electricity from bioenergy. Phase one drew 22 expressions of interest. Three of the four accepted projects are at existing pulp mills in Kamloops, Prince George and Castlegar; the fourth is at a small waste-to-energy plant in Prince George. A second phase is expected to be announced in early 2009. It should lead to several stand-alone green energy projects, particularly in rural areas and in areas such as the Chilcotin that currently rely on diesel-fired generators.

In addition to supporting cleaner energy projects, BC Hydro promotes energy conservation. The well-known Power Smart program has achieved 2,844 GWh of cumulative energy savings. This is comparable to the energy output of the 478 MW Bridge River Plant near Lillooet, BC Hydro's seventh largest hydro-generating station and its largest in the Fraser Basin.

BC Hydro's new two-step residential rate structure is expected to result in a further 300 GWh of annual electricity savings by 2010 – enough to power 30,000 homes. Hydro has also introduced an industrial stepped rate that has helped many industries meet part of their electricity needs by investing in energy efficiency or on-site cogeneration using biomass or waste heat.

Community Energy and Emissions Inventories (CEEIs)

CEEIs are being developed for each BC regional district and municipality. These reports will estimate energy consumed and GHG emissions from transportation, buildings and solid waste. They are anticipated to be available in February 2009, and will be accessible through the Climate Action Toolkit (www.toolkit.bc.ca/ceei).

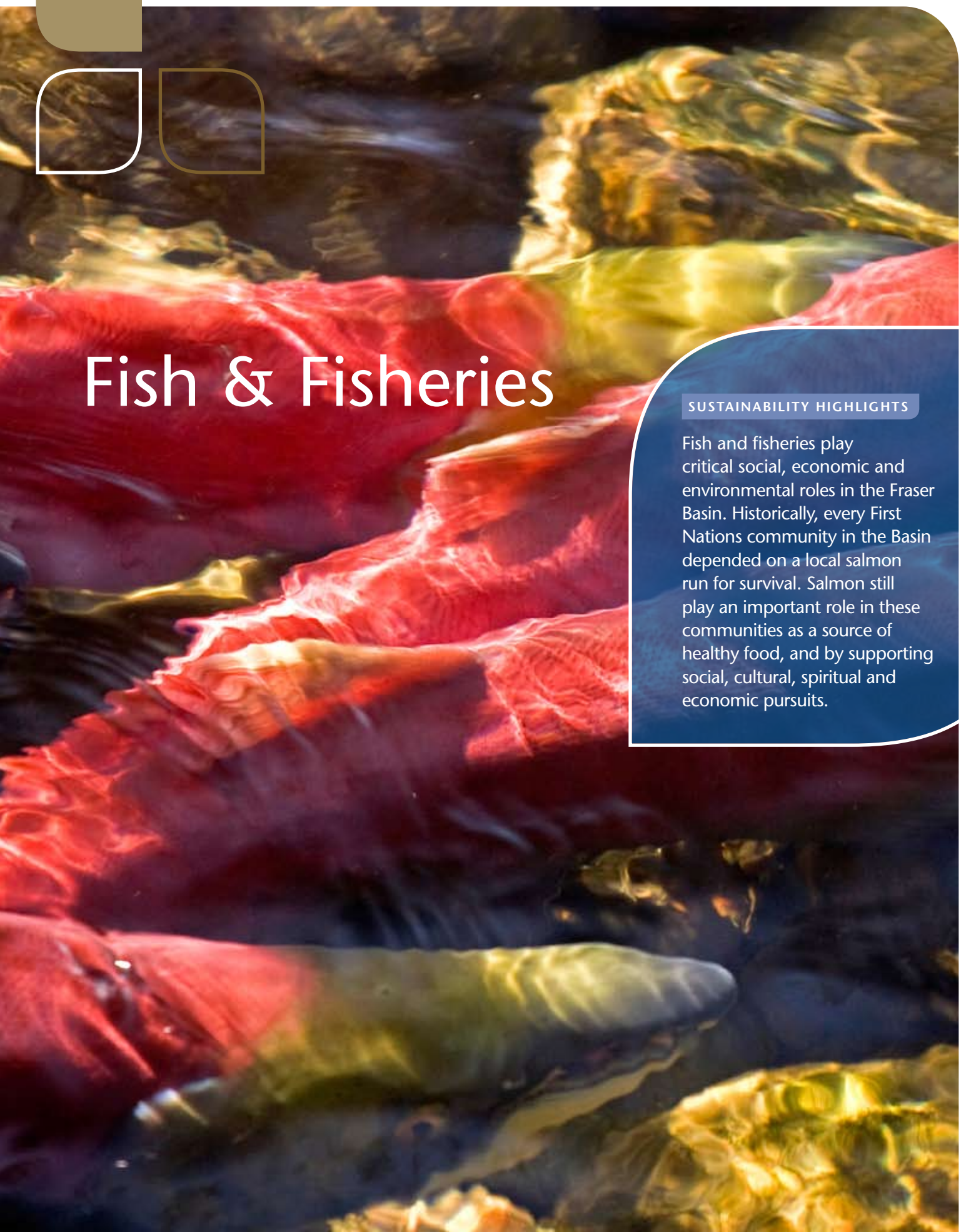
R&B Trucking: The Little Engine That Could

Rare might be the trucker who proudly says he has an engine smaller than most, but that's the case with Paul Cunnington of Victoria-based R&B Trucking. With an incentive from Green Fleets BC, a program of the Fraser Basin Council and BC Ministry of Environment, this company has shown leadership by acquiring a specially modified 2008 Freightliner, the first Class 5 vehicle of its kind in western Canada. This big truck has been equipped with a hybrid-electric engine that is about the size of a diesel motor in a pickup truck, but promises far greater fuel efficiency and fewer greenhouse gas emissions. It's a small start to something big, and Cunnington says he is eager to track and communicate results to other fleet operators.

Hybrid and Electric Mid-Size Trucks Come to BC

The trucking industry is about to see some important innovations in mid-sized trucks – commonly used as delivery vehicles in urban and suburban areas. Following on the demonstration project at R&B Trucking (above), FBC's Green Fleets BC program is helping to organize a new Hybrid/Electric Vehicle Buyers Group to pilot medium-duty hybrid trucks in both public and private fleets. Participating fleets can receive funding towards hybrid powertrains. The first trucks are rolling out in 2009 and are expected to achieve a 25-40% drop in fuel consumption in urban driving.

Paul Cunnington of R&B Trucking is helping to show that mid-sized, medium-duty commercial trucks can go hybrid.



Fish & Fisheries

SUSTAINABILITY HIGHLIGHTS

Fish and fisheries play critical social, economic and environmental roles in the Fraser Basin. Historically, every First Nations community in the Basin depended on a local salmon run for survival. Salmon still play an important role in these communities as a source of healthy food, and by supporting social, cultural, spiritual and economic pursuits.

Sustainable recreational and commercial fisheries help develop local economies, and provide opportunities for people to learn about nature and become environmental stewards. Salmon and freshwater fishes are key components of aquatic ecosystems. Fish depend on abundant clean, cool water, and therefore are key indicators of the health of our rivers, lakes, streams and oceans.

• Fraser River salmon and salmon fisheries are in a state of considerable change, and urgent action is needed.

• Sockeye returns in 2007 and 2008 were the lowest observed in 30 years.

• The lowest ever recorded coho escapement occurred in 2006, with a slight improvement in 2007.

• Spring chinook (Upper Fraser) runs are in decline while summer chinook (Upper Fraser) runs are increasing. Fall chinook (Lower Fraser) runs have declined in recent years.

POOR / GETTING WORSE	**Sockeye, Coho and Chinook Salmon** Sockeye, coho and chinook salmon returns are in varying states of decline, with significant cause for concern in recent years. The one exception is summer chinook (Upper Fraser) runs, which are increasing.
POOR / GETTING WORSE	**Steelhead** Thompson River populations have fallen to critically low levels, resulting in closures of the inland catch and release fishery in both 2004 and 2008.
MIXED RESULTS / POOR	**Fraser River White Sturgeon** The number and growth rate of Lower Fraser white sturgeon have declined since 2003. The Nechako River population remains critically endangered. Upper Fraser and Middle Fraser River populations are low but apparently stable.

ISSUES AND TRENDS

Status of Salmon Escapements

While the Fraser River remains one of the most productive Pacific salmon rivers in the world, overall trends are not positive, and climate change is likely to make things worse. Many factors have contributed to the decline of salmon stocks, including mixed-stock fishing, poor ocean survival, habitat deterioration (including water quality and quantity), and in some cases, inadequate information to support decision-making.

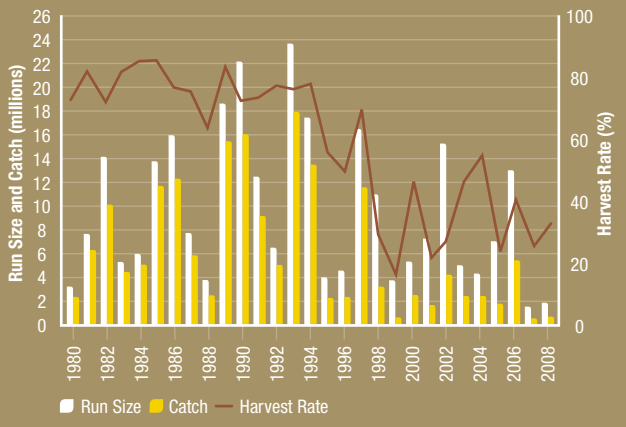
Sockeye Salmon (1980–2008)[1]

Total annual returns of sockeye salmon in 2007 and 2008 were the lowest observed in the past 30 years. Declines were worse than the expected cyclic lows,[a] but escapements for some of the major summer-run stocks in 2005 and late-run stocks in 2006 were good, so there is some potential for better returns in 2009 and 2010. Harvest rates were reduced substantially in the late 1990s due to concerns for late-run sockeye stocks, which were experiencing elevated pre-spawn mortality. Annual sockeye management continues to be strongly influenced by measures to address pre-spawn mortality, high river temperatures and efforts to protect depleted stocks (e.g., Cultus and Sakinaw sockeye, interior coho, steelhead and some chinook stocks). The average harvest rate for the 2001–2008 period (34%) was less than half of the average for the 1980–1994 period (77%).

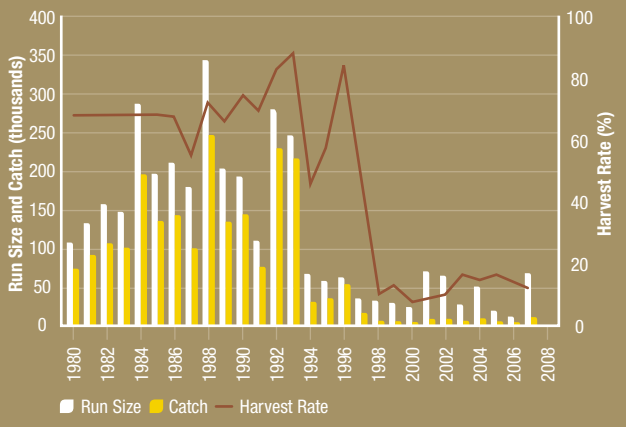
Coho Salmon (1980–2007)[2]

Severe conservation concerns remain for interior Fraser coho. Harvest rates were reduced substantially in the late 1990s in response to observed declines in marine survival and the sharp drop in run size from 1993 to 1994. But while harvest rates have consistently been less than 16% since

Fraser Sockeye Salmon (1980–2008)[1]



Interior Fraser Coho (1980–2007)[2]



Fish & Fisheries

1998, returns of interior Fraser coho have not rebounded. They reached record low levels in 2006. Returns in 2007 improved but were still only 30% of the average for the 1980–1993 period.

Chinook Salmon (1986–2008)[3,4,5]

Harvest rates for spring (Upper Fraser) stocks tend to be higher than for other Fraser chinook stocks and returns have been declining since their recent peak in 2003. All in-river fisheries from early April to mid-June were restricted in 2008 to reduce harvest pressure for the five spring run-timing stocks with the highest harvest rates. Returns of summer-run stocks have increased substantially since 1995, likely as a result of reduced harvest rates introduced in the late 1990s to protect late-run sockeye and interior coho stocks. However, fall-run stocks returning to the lower Fraser have declined substantially since their recent peak in 2003. This stock group, with spawners primarily returning to the Harrison and Chilliwack Rivers, has historically comprised the largest component of total chinook returns to the Fraser Basin.

Fraser River White Sturgeon (1995–2008)[6,7]

White sturgeon are the largest freshwater fish in North America, reaching more than six m and 600 kg in size and living for over 150 years. There are four "stock groups" of white sturgeon in the Fraser Basin: Nechako, Upper Fraser, Middle Fraser, and Lower Fraser. All have been designated by scientists as endangered, but in 2006 only the Nechako and Upper Fraser stocks were "listed" by the federal *Species at Risk Act*. White sturgeon spawn only in freshwater and are very dependent on the health of critical in-river habitats. They are a prized species for recreational anglers, particularly in the Lower and Middle Fraser. The number and growth rate of Lower Fraser white sturgeon have been in decline since 2003,[6] a trend some suggest may be associated with impacts on critical spawning and rearing habitats, including decreased food supply due to critically low levels of eulachon (the runs of this small anadromous[b] smelt collapsed in 1993 and remain at very low levels).

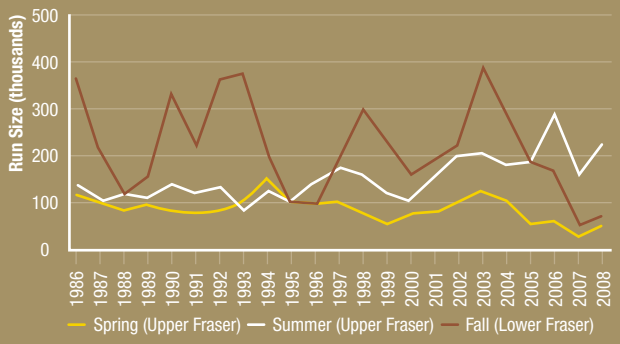
Fraser River Steelhead and Inland Recreational Fisheries[8]

Most of the Fraser River steelhead populations remain classified as "Extreme Conservation Concern".[c] Current population numbers throughout southern BC are well below historic levels, and returns to the Thompson River in 2008 are estimated at less than 1,400 fish. Most Thompson stocks have fallen to critically low levels, resulting in complete closures of the inland catch and release fishery in both 2004 and 2008. These and other inland fisheries are well known internationally as prized sports fishing destinations, and generate significant economic benefits to local communities. Other commercial and recreational fisheries have similarly faced restrictions due to steelhead conservation concerns.

Invasive Species[9]

Spiny ray fish (bass, perch and pumpkin seed) have been introduced into many freshwater systems in interior BC. Bass are found in the Quesnel River watershed, and perch have been discovered in several lakes that drain into the Adams and South Thompson Rivers. These introductions have the potential to dramatically impact BC's freshwater food webs by depleting important food sources used by native fish species, and exacerbating impacts from other threats.

Fraser River Chinook (1986–2008)[3,4]



Parker pauses to "think salmon" with Amy Greenwood of the Fraser Basin Council during a community celebration in Mission. Think Salmon is an outreach initiative of the Fraser Salmon and Watersheds Program (FSWP), co-managed by the Council and the Pacific Salmon Foundation, with funding from the Province of BC, Government of Canada and non-profit and private sector partners. For a look at FSWP projects on watershed planning and governance, habitat restoration and stewardship, sustainable integrated fisheries management and education and engagement, visit www.fswp.ca and thinksalmon.com.

Notes

[a] Sockeye mature and return to spawn at age four, and "sub-dominant" and "dominant" cycle lines occur in relation to 2005 and 2006 respectively.

[b] Anadromous – Fish that reside primarily in the ocean but spawn in freshwater.

[c] Extreme Conservation Concern – Steelhead stocks are believed to be at 15% or less of habitat capacity and are likely subject to extinction.

References

[1] Pacific Salmon Commission. 2009. Fraser River Sockeye Abundance, Catch and Harvest Rates: 1980-2007 and Preliminary Estimate for 2008. Mike Lapointe, personal communication.

[2] Fisheries and Oceans Canada. 2009. Fraser River Coho Run Size, Catch and Harvest Rates Estimates: 1980-2007. Mike Chamberlain, personal communication.

[3] English, K.K., R. E. Bailey, and D. Robichaud. 2008. Assessment of Chinook Returns to the Fraser River Watershed Using Run Reconstruction Techniques: 1982-2007. Draft report prepared by LGL Limited for Fisheries and Oceans Canada.

[4] Fisheries and Oceans Canada. 2009. Assessment of Chinook Returns to the Fraser River Watershed Using Run Reconstruction Techniques: Preliminary Estimate for 2008. Mike Chamberlain, personal communication.

[5] Fisheries and Oceans Canada. 2008. www-comm.pac.dfo-mpo.gc.ca/publications/speciesbook/Salmon/chinook.fraser.html [accessed January 2009].

[6] LGL Ltd. and Fraser River Sturgeon Conservation Society. 2008 Lower Fraser River White Sturgeon assessments. Troy Nelson, personal communication.

[7] Fisheries and Oceans Canada. 2007. Fraser River Eulachon Population Assessment and Harvest Recommendations for 2007. www.dfo-mpo.gc.ca/csas/Csas/status/2006/SAR-AS2006_039_E.pdf [accessed January 2009].

[8] Ahrens, R. 2004. The Status of Steelhead Trout in BC. Report prepared by University of BC for the Pacific Resource Conservation Council.

[9] BC Ministry of Environment, Environmental Stewardship Division. www.gov.bc.ca/env [accessed January 2009].

[10] Metro Vancouver. February 4, 2008 Media Release. Joint Program Plans to Return Sockeye Salmon to Coquitlam Reservoir.

[11] LGL Ltd, Seastar Biotech Inc. and Fisheries and Oceans Canada. 2006. Coquitlam Kokanee Re-Anadromy/Hatchery-Captive Broodstock Review.

ACTIONS

The Many Faces Of **Sustainability**

Green Bylaws Toolkit
The Toolkit is a practical guide for anyone in local government interested in securing healthy ecosystems in their communities. The Toolkit includes an integrated set of bylaw provisions to protect sensitive areas such as fish habitat and maintain green infrastructure. This includes sample provisions for regional growth strategies, official community plans, development permit areas, zoning, tax exemptions, environmental assessments and stormwater management. The University of Victoria Faculty of Law and Deborah Curran & Company developed the Toolkit for the Province, Environment Canada and several non-profits partners. Download a copy from www.greenbylaws.ca.

Go Fish BC
Ready to connect with nature – hook, line and sinker? Fees from angler licences are now directed to the Freshwater Fisheries Society of BC. They are used to manage freshwater fisheries and support educational programs about protecting and enhancing fish habitat. The Society hosts Learn to Fish lessons that are sure to lure youth and their families into the fun of recreational sport fishing. Sessions are held across BC, including in Abbotsford, Kamloops and Greater Vancouver. Visit: www.gofishbc.com.

The Nechako White Sturgeon Recovery Initiative (NWSRI)
The NWSRI team received a Premier's Silver Award in recognition of its collaborative success in promoting stewardship and recovery of the critically imperiled Nechako River white sturgeon, whose numbers have dropped from 5,000 to under 500 in the past 50 years. Loss of habitat on the Nechako River appears to be a key reason why very few juveniles are reaching adulthood; therefore, habitat remediation to recreate suitable spawning and rearing grounds is a key priority along with conservation aquaculture to bolster the numbers of juveniles. In the fall of 2008, the recovery team was rewarded for its efforts with the capture and release of a two-year old sturgeon it had originally released in 2006. For more information, visit: www.nechakowhitesturgeon.org and www.cstc.bc.ca/cstc.

For the Nechako white sturgeon, a gentle giant that traces its ancestry back to the age of the dinosaurs, there may still be hope for the future.

WATERSHED MOMENTS: RETURN OF THE SOCKEYE TO THE COQUITLAM RIVER

Although once plentiful, sockeye salmon have not graced the waters of the Coquitlam River for more than 100 years – until just recently, that is. Against the odds, several sockeye returned to the river in 2007 and 2008. It was thrilling, especially for the people of Kwikwetlem First Nation, long-time champions of the salmon and whose very name means "red fish up the river."

The demise of the sockeye run traces back to dam construction on the river in 1905 and 1914, which blocked the sockeye's access to spawning and rearing grounds in Coquitlam Lake. In 2003, a multi-party salmon restoration committee, hosted by BC Hydro, began exploring the feasibility of reintroducing sockeye to the river.[10] Reintroductions began in 2005 when kokanee smolts were released from the dam spillway. DNA tests showed that kokanee, landlocked salmon resident in Coquitlam Lake, are recent descendants of sockeye and the best candidates for release.[11] From that initial release, two spawners returned in 2007. In 2008, 10 more sockeye were captured, trucked up past the dam and placed in the lake. Return of the salmon brought hope. "With the sockeye back, it's restoring our name," Kwikwetlem band councillor George Chaffee said. "This is something great – it is hard to find the words."

Sockeye have returned to the Coquitlam River in each of the past two years thanks to the efforts of many, including the Kwikwetlem First Nation, BC Hydro and Metro Vancouver.

SUSTAINABILITY HIGHLIGHTS

Forests cover 75% (17 million hectares) of the Fraser Basin and include a mix of age classes and dominant tree species. These forests provide multiple goods and services, such as building materials, employment, recreation, generation and maintenance of clean air and water, regulation of stream flows, carbon sequestration to offset greenhouse gas emissions and diverse wildlife habitat.

Forests & Forestry

Forest sustainability is very important because of the many goods and services offered by forests and because the economies of many regions in the Fraser Basin depend heavily on the forestry sector. In some communities, the forestry sector provides more than 44% of local income. Sustainable forest management (SFM) practices can contribute to long-term forest health and community stability. SFM is supported, in part, by special initiatives and legislation, such as the Protected Areas Strategy, Land and Resource Management Planning, the Forestry Revitalization Plan and the *Forest and Range Practices Act*.

• Field surveys and modelling of the mountain pine beetle (MPB) epidemic predict that its destructive effects will start to rapidly decline in 2015.

• Some communities in the Fraser Basin have a high economic vulnerability to the mountain pine beetle epidemic, although a number of communities are building capacity to adapt to it, which is helping reduce this vulnerability.

POOR	**Mountain Pine Beetle Outbreak** The area affected by the MPB epidemic has grown rapidly since 2000; in 2007 the epidemic affected more than 8.8 million ha in the Fraser Basin.
MIXED RESULTS / POOR	**Community Vulnerability to the Mountain Pine Beetle** In 2005, vulnerability was higher for communities in the Upper Fraser and Cariboo-Chilcotin than for those in the Thompson region.
FAIR / MIXED RESULTS	**Forest Restocking in BC** In the 1980s the area of satisfactorily restocked forest was less than the area disturbed. From the early 1990s to 2005, it was more than the area disturbed; from 2005 to 2008 it was again less than the area disturbed.

ISSUES AND TRENDS

Mountain Pine Beetle in BC (1981–2008)[1,2]

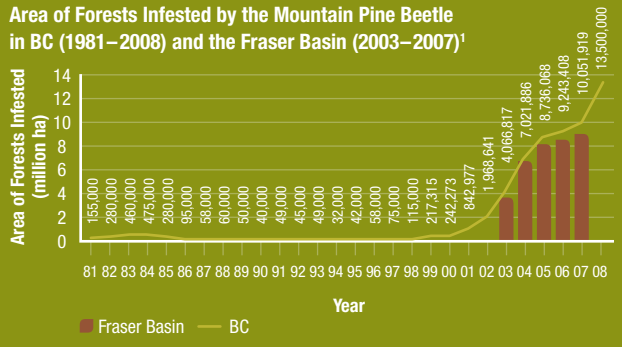
From 1981 to 2008, forested lands in BC were affected by the mountain pine beetle infestation, and all severity classes of both red and grey attack[a] were recorded: trace, light, moderate, severe and very severe. The total area affected in 2008 (13,500,000 ha) was estimated based on preliminary results from aerial surveys conducted during summer of that year.[1] From 1998 to 2006, an estimated 46% of the merchantable pine volume (MPV) on BC's timber harvesting land base was killed. It is currently estimated that the provincial peak in annual kill for this outbreak occurred during the summer of 2004, but the destructive trend will continue through to 2015 (76% MPV killed), and then will largely be over by 2019.[2]

From 2003 to 2007, 88–95% of the forested area infested annually in BC occurred in the Fraser Basin. The Cariboo-Chilcotin (49–61%) and Upper Fraser (37–44%) regions experienced the largest impact; the Thompson (1–9%) and Fraser Valley/Greater Vancouver-Sea to Sky (GVSS) (< 1%) regions experienced the least impact.

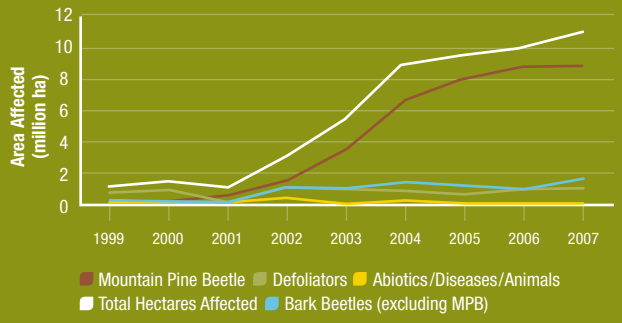
Forest Health (1999–2007)[1]

Bark beetles and defoliators, disease, animals and abiotic (i.e., non-living) factors, such as fire, windthrow and drought, have shaped the Fraser Basin's forests for thousands of years. These factors contribute to tree mortality and create highly variable natural disturbance patterns across different forest landscapes and time periods. How these factors contribute to overall forest health is complex. Measuring the effects of these factors on the abundance and distribution of live trees present at any given time influences forest management and other human activities on the landscape. From either an environmental or human-centred perspective, the current declining trend of "forest health" will have lasting effects on the

Area of Forests Infested by the Mountain Pine Beetle in BC (1981–2008) and the Fraser Basin (2003–2007)[1]



Factors Affecting Forest Health in the Fraser Basin (1999–2007)[1]



Forests & Forestry

ecosystem and human economies for decades to come. Climate change, forest management policies and international markets are additional factors that further influence forest ecosystems and human relationships with them.

Community Vulnerability and Forest-Based Employment[3,4,5]

Many Fraser Basin communities depend on forest-based economies; however, a number of those communities are particularly vulnerable to the current and future impacts of the MPB infestation. Community vulnerability to the MPB epidemic is influenced by both biophysical factors (i.e., forest susceptibility to current and future MPB populations and impacts) and community circumstances. The capacity of a community to adapt to the epidemic is influenced by political, economic, social and environmental factors, including climate change, natural hazard management and risk perception. Cheslatta, Burns Lake and Quesnel were assessed as being among the most vulnerable to the impacts of the MPB infestation, although all three communities have adaptive capacities in place, which may be strengthened to reduce their vulnerability. Of the eight communities in the Fraser Basin that were surveyed, Salmon Arm in the Thompson region was the least vulnerable to the MPB outbreak.[3]

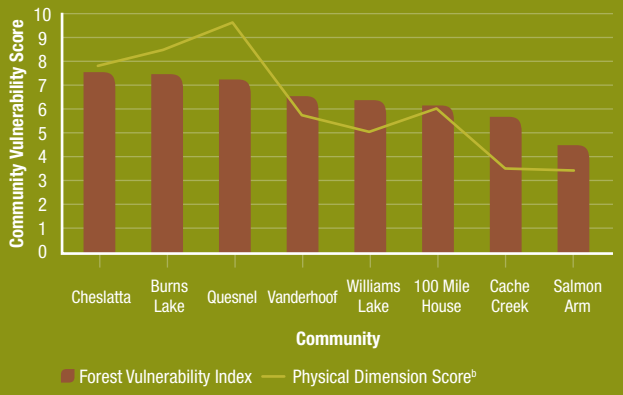
In BC, direct employment in forest-based industries, including cattle ranching and nature-based tourism, averaged around 120,000 jobs from 1970 to 2004. Most jobs in the industry were consistently associated with the wood manufacturing sector.[4] From 2001 to 2006, 5,095 jobs were lost in the wood manufacturing and pulp and paper processing sectors. However, during that period, there was an increase of 4,515 jobs in landscaping and ground maintenance.[5]

Forest Restocking (1980–2008)[6]

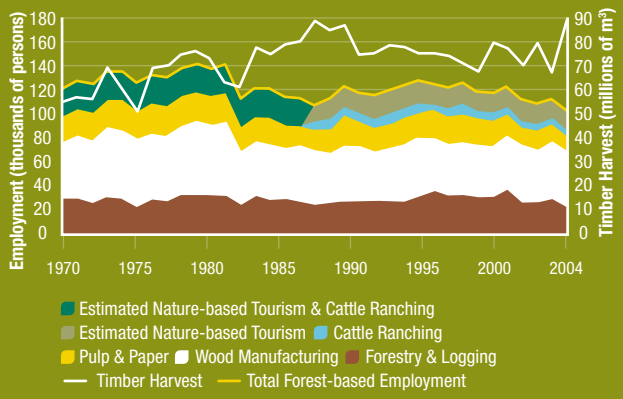
During the 1980s, the amount of forest disturbed by harvesting, pests, or fire was greater than the area restocked by both replanting and natural generation. During the 1990s, the area restocked exceeded the area disturbed due to significant government support for replanting programs. From the mid-1990s to the mid-2000s, the amount of both disturbed and restocked areas declined; however, from 2005 to 2008, the amount of area disturbed exceeded the amount of satisfactorily restocked area. This may be due to the increase in allowable annual cut, which was used to help control the spread of MPB and to salvage commercially valuable wood, or it may be a reflection of reduced survey intensity of restocked areas.

Area of Forest Disturbed and Restocked in BC (1980–2008)[6]

Community Vulnerability to Mountain Pine Beetle (2001 and 2005)[3]



Forest-Based Employment in BC (1970–2004)[4]



Notes

[a] Red attack refers to beetle-killed trees that have retained their needles (usually one to two years after beetle attack), and grey attack refers to beetle-killed trees that have dropped their needles.

[b] Physical Dimension Score refers to factors such as forest susceptibility to MPB impacts.

References

[1] BC Ministry of Forests and Range, Forest Practices Branch. 2008. Forest Health – Aerial Overview Survey. www.for.gov.bc.ca/hfp/health/overview/overview.htm [accessed December 2008].

[2] Walton, A., et al. 2008. Provincial-Level Projection of the Current Mountain Pine Beetle Outbreak: Update of the Infestation Projection Based on the 2007 Provincial Aerial Overview of Forest Health and Revisions to the "Model" (BCMPB.v5). BC Ministry of Forests and Range, Victoria.

[3] MacKendrick, N., and J. Parkins. 2005. Socio-economic Dimensions of Community Vulnerability to Mountain Pine Beetle: Final Report to the Foothills Model Forest. Social Science Research Group, Natural Resources Canada, Canadian Forest Service.

[4] BC Ministry of Forests and Range. 2006. The State of British Columbia's Forests 2006. www.for.gov.bc.ca/hfp/sof/2006 [accessed December 2008].

[5] BC Business. 2008. Numerology: Can't See the Forests for the… Highly Manicured Lawns. BC Business. 36:11, 25.

[6] BC Ministry of Forests and Range, Forest Practices Branch. 2008. Annual Reports of Silvacultural Investments and Accomplishments. www.for.gov.bc.ca/hfp/silviculture/statistics/statistics.htm [accessed December 2008].

[7] BC Government. 2007. Mountain Pine Beetle: Sustaining Communities for the Future. Victoria.

ACTIONS

The Many Faces Of **Sustainability**

Research Forests

Research forests are managed either wholly or partly by academic institutions and provide research opportunities, employment, education, demonstration of integrated resource management and revenue generation. The four research forests in BC – John Prince (Fort St. James), Aleza Lake (Prince George), Alex Fraser (Williams Lake) and Malcolm Knapp (Maple Ridge) – total 37,000 ha of diverse ecosystems within three regions of the Fraser Basin. The John Prince Research Forest is a unique model of forestry co-management in Canada, which is based on a partnership between the University of Northern BC and the Tl'azt'en First Nation.

In July 2008, the Province of BC, in consultation with five First Nations, proposed establishing a new 12,000 ha research forest for the College of New Caledonia. In the fall of 2009 the College's Resource Technology Program will use the forest to train students for employment in a changing forest environment and industry. Jobs are expected to remain plentiful in the area of land management, which will involve other industries and forest harvest companies. To learn more about BC's research forests, go to: www.rpd.forestry.ubc.ca.

BC's Mountain Pine Beetle Action Plan[7]

BC's Mountain Pine Beetle Action Plan guides provincial responses to the MPB epidemic and helps coordinate all levels of government including First Nations, communities, industries and stakeholders who are working to mitigate its impacts. Economic diversification is being pursued in the mineral exploration, bioenergy and agriculture sectors as one approach to mitigate economic impacts on the forest sector. Actions initiated to sustain the forest sector include:

- temporarily increasing allowable annual cuts in affected areas,
- focusing salvage harvesting on forests composed of at least 70% pine,
- requiring companies operating in beetle attack areas to replant what they harvest,
- reforesting areas affected by the infestation that have not been logged,
- developing new uses for beetle-affected wood, and
- developing new markets for BC wood products.

Collaboration in Eco-Forestry

The Resort Municipality of Whistler, Squamish Nation and Lil'wat Nation are working together to develop an eco-forestry operation in 55,000 ha of forest land surrounding the internationally renowned mountain resort and Host Mountain Resort in time for the 2010 Olympic and Paralympic Winter Games. The proposed community forest will be among the first forestry operations on the BC coast to employ a new, ecosystem-based management approach. The project presents a unique opportunity to locally manage forest resources and meet the growing demand for eco-forestry products from conscientious consumers. It will also demonstrate the opportunity for economic development through collaboration between Aboriginal and non-Aboriginal communities. The 2010 Games will provide an opportunity to showcase to the world this project and the highest standards of eco-forestry.

Agro-forestry

Agro-forestry is a land use system that involves the deliberate retention, introduction or mixing of trees or other plants into crop and animal production as a means of enhancing both profitability and sustainability. Novel demonstration projects are underway, such as growing ornamental shrubs and ferns between crop rows, introducing poplars near livestock barns to help absorb nutrients and aid manure management and incorporating suitable ornamentals near creek riparian zones to reduce nutrient loading, stabilize soils and provide a harvestable product. Visit www.woodlot.bc.ca for information on these projects and the partners involved.

Health

SUSTAINABILITY HIGHLIGHTS

Human health is implicitly connected to our natural environment, our lifestyles and behaviours and the genes we inherit. Eating habits, physical activity, exposure to toxins such as tobacco, alcohol and toxic chemicals, and the use of seatbelts and bike helmets to minimize the risk of injuries all influence our health.

Stable ecosystems, clean air and water, safe, nutritious foods and preventative and responsive health services are vital to human health.

• Over the past 15 years, life expectancy has increased by one to three and a half years in different regions of the Fraser Basin.

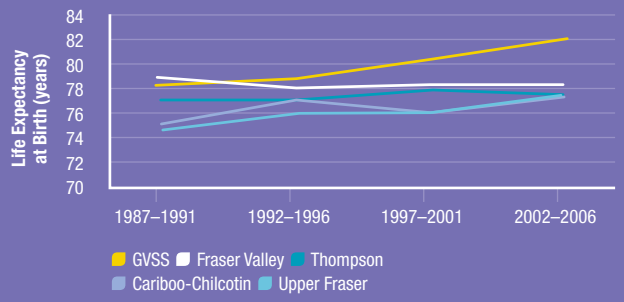
• The proportion of babies born that weigh less than 2,500 grams – and therefore who are at higher risk of future health complications – increased between 1996 and 2006.

• Cancer and lung disease continue to be the leading causes of death in the Fraser Basin; however, rates of the seven leading causes of death are declining, with the exception of diabetes.

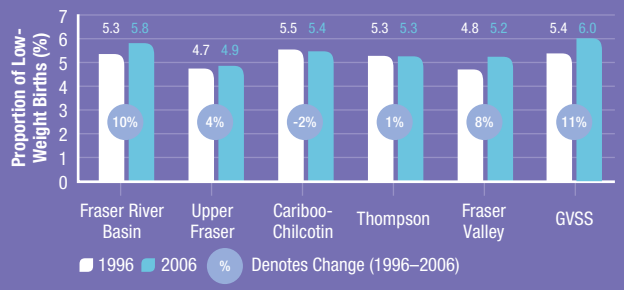
• Health care expenditures continue to rise in BC. In 2007, health care system costs were $4,714 per person – 72% more than in 1997.

GETTING BETTER	**Life Expectancy** Average life expectancy across the Fraser Basin continued to rise over the 2002–2006 period.
GETTING WORSE	**Low-Weight Births** The proportion of low-weight newborns increased between 1996 and 2006.
GETTING BETTER	**Leading Causes of Death** Rates of the seven leading causes of death in the Fraser Basin decreased between 2001 and 2006, with the exception of diabetes.

Life Expectancy in the Fraser Basin by Region (1987–1991 to 2002–2006)[1]



Change in the Proportion of Low-Weight Births in the Fraser Basin and by Region (1996–2006)[2]



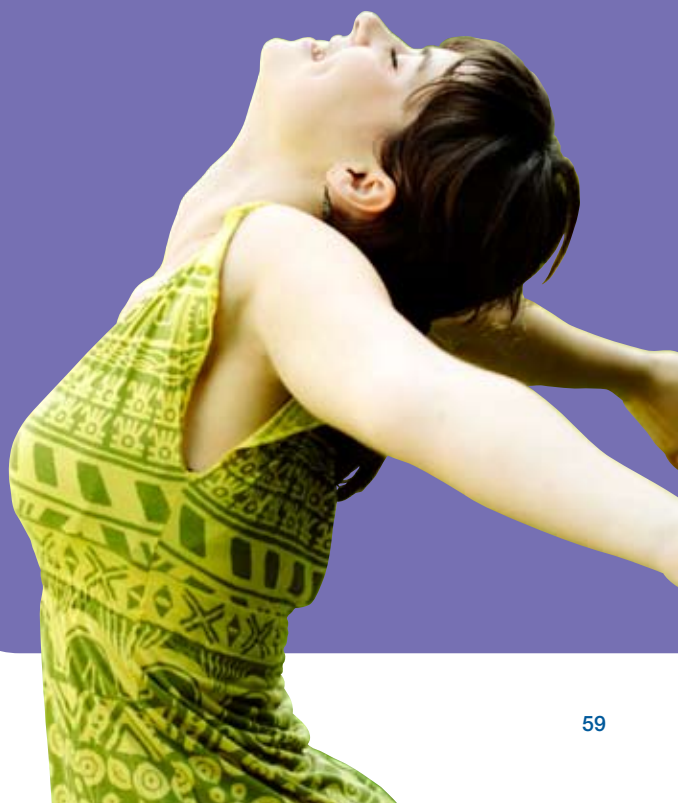
ISSUES AND TRENDS

Life Expectancy (1987–2006)[1]

Throughout the Fraser Basin, life expectancy continues to increase, although not as significantly in the Thompson, Cariboo-Chilcotin and Upper Fraser regions. In the 2002–2006 period, as in past years, people living in the Greater Vancouver-Sea to Sky (GVSS) region had the longest life expectancy. Their average age was 81.8 years, up three and a half years from 78.3 in the 1987–1991 period. Residents in the Fraser Valley could be expected to live an average of 79.2 years in 2002–2006, up from 78.5 in 1987–1991. In general, people living in the interior regions of the Fraser Basin could be expected to live an average of 78–78.2 years in 2002–2006. This represents an increase of three years in both the Cariboo-Chilcotin and Upper Fraser regions since 1987–1991; however, life expectancy in the Thompson region increased by less than a year during the same period.

Low-Weight Births (1996–2006)[2]

Low birth weight is a key determinant of infant survival, health and development. Babies weighing less than 2,500 grams at birth are at a greater risk of having a disease or a disability such as cerebral palsy, visual problems, learning disabilities or respiratory problems. In 2006, 5.8% of babies born in the Fraser Basin were considered to be in this low-weight category. This is a 10% increase from 1996 when the proportion of low-weight babies was 5.3%. This trend occurred in BC overall and in all regions of the Fraser Basin except the Cariboo-Chilcotin where the proportion of low-weight babies declined by 2% since 1996. The Upper Fraser region had the lowest percentage of low-weight babies. The highest proportion, and the largest increase, was in the Greater Vancouver-Sea to Sky region. This may relate, at least partly, to the fact that this region is also the provincial centre for acute prenatal and infant care.



Health

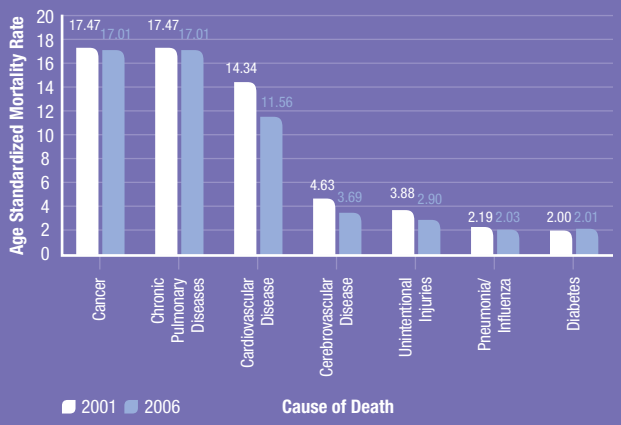
Leading Causes of Death (2001–2006)[3]

Cancer and chronic pulmonary (lung) disease continue to be the two leading causes of death in the Fraser Basin, followed by cardiovascular (heart disease) and cerebrovascular (strokes) diseases as measured by Age Standardized Mortality Rates (ASMR). These are death rates that have been adjusted by age and gender and standardized to a "standard" population to enable comparisons between genders, different time periods or different geographic locations. The ASMR indicates the theoretical number of deaths that would occur per 10,000 people if the population had the same age structure as the standard population. Between 2001 and 2006, the ASMR for the seven leading causes of death in the region decreased, with the exception of diabetes, which increased slightly. The GVSS region had the lowest rates for the seven leading causes of death in the Fraser Basin. The Upper Fraser region had notably higher ASMR for cancer (21.5), followed by the Cariboo-Chilcotin region (18.9). The ASMR for cancer in the Fraser Basin was 17.

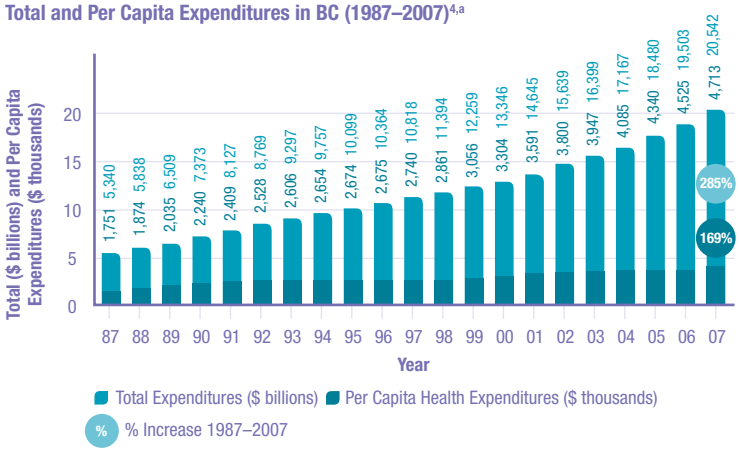
Health System Expenditures (1987–2007)[4]

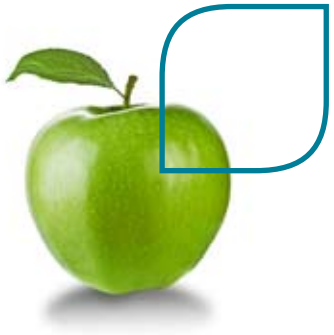
The health professionals, institutions and other resources that make up our health system play an important role in providing residents of the Fraser Basin and BC with critical medical care and support in diagnosing, managing, preventing and healing illnesses, injuries and diseases. Over the past twenty years, health care system expenditures in British Columbia have almost tripled, and per capita expenditures have increased by 169%. In 2007, BC spent $4,714 per person on health care system costs, up from $2,740 in 1997 and $1,751 in 1987. Overall health expenditures in BC in 2007 were forecast to be over $20 billion.[a]

Average Age Standardized Mortality Rate for Leading Causes of Death in the Fraser Basin (2001–2006)[3]



Total and Per Capita Expenditures in BC (1987–2007)[4,a]





Notes

[a] Data for 2006 and 2007 represent forecasts and has not been verified by the data source.

References

[1] Prepared by BC Statistics with deaths data from BC Vital Statistics and population data from BC Statistics. www.bcstats.gov.bc.ca/DATA/POP/vital.asp [accessed September 2008].

[2] BC Vital Statistics. Special Request. 2008.

[3] BC Vital Statistics. Special Request. 2008.

[4] Canadian Institute for Health Information. National Health Expenditure Database. 2007. http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=spend_e [accessed October 2008].

[5] Tobin, P. 2008. Changing the way we think about feeding our kids: an evaluation of the Farm to School Salad Bar Project, Dragon Lake Elementary, Quesnel, BC. Northern Health.

ACTIONS

The Many Faces Of **Sustainability**

Health Advice via HealthLink

When it comes to health care information, ease of access is important. As of November 2008, a new health care line (Dial 811) offers BC residents medical advice and assistance in navigating the health care system. The service is available full-time, in over 130 languages. HealthLink connects people with a registered nurse, pharmacist or dietitian and is of particular help to people living in remote areas far from a health facility or who are having difficulties with mobility: www.healthlinkbc.ca.

New Cancer Centres

In August 2008, Abbotsford became home to Western Canada's first cancer centre to be fully integrated within a hospital. The Abbotsford Regional Hospital and Cancer Centre is a 300-bed facility that will provide health services to more than 150,000 people in the greater Abbotsford area and up to 330,000 in the Fraser Valley region. It will also provide specialized services such as neonatal intensive care and adolescent psychiatric care. Prince George will also soon have a new cancer centre. Part of a northern cancer control strategy, the centre will provide residents of the Upper Fraser region and northern BC with better access to cancer treatment and diagnostic services. Construction will begin in 2009, with a completion goal of 2012.

Community Kitchens

Community kitchens are a true social hub where people can learn cooking skills, share recipes and save money by pooling their purchasing power and making nutritious meals cooperatively. New types of community kitchens are emerging. A recent example is Food Skills for Families, a program of the Canadian Diabetes Association. This new cooking and nutritional skill-building program is offered at no cost by trained facilitators in community agencies, schools and other locations. The emphasis is on healthy food choices and meeting the needs of Aboriginal, South Asian, new immigrant and low-income families: see www.bchealthyliving.ca. To find a nearby community kitchen (or to find out how to organize one), visit Fresh Choice Kitchens, The Community Kitchen Program of the Greater Vancouver Food Bank Society at www.communitykitchens.ca.

The Fresh Choice Kitchens program in Vancouver.

FARM TO SCHOOL SALAD BAR: DIG IN!

In just a few short months, the Farm to School Salad Bar at Dragon Lake Elementary School in Quesnel accomplished what few parents might dare hope for – kids who are eating more fruits and vegetables, even at home, and more willing to try new foods.

The Farm to School Salad Bar began as a pilot project in May 2007 with a small seed grant from Northern Health. The aim was to bring local farm-fresh foods into schools to improve student nutrition and support the local food economy. Under the leadership of Denis Lessard, Principal at Dragon Lake Elementary School, and Michelle Lessard, School District 28 Meal Coordinator, the program took root. The husband and wife team inspired parents, teachers, farmers, students, local media, politicians and many others to lend a hand.The result? A survey showed that, thanks to the salad bar, kids were more adventurous in tasting never-before-tried foods, and over half said they ate "more" or "a lot more" fruits and vegetables than before the start of the project.[5] Students also learned about food, nutrition and health and the importance of local food systems. For older kids, there was a further option to complete FoodSafe training and test their skills. A valuable lesson learned by organizers during the pilot was to build partnerships with local farmers early so that farmers can plan and plant local produce destined for the salad bar.

The salad bar success at Dragon Lake Elementary School led to a new provincial initiative spearheaded by the Public Health Association of BC. In 2008,15 new schools, including those in Williams Lake and Kamloops, introduced programs involving 24 farms and over 3,000 students. For more information, visit the new Farm to School website: www.phabc.org/farmtoschool.

Housing

SUSTAINABILITY HIGHLIGHTS

Access to adequate and affordable housing is a basic need for all people and plays an important role in determining quality of life. Although housing is a key aspect of everyday life, for many of us, it is often taken for granted.

Housing is part of the broader issue of land use planning – and the type, pattern and style of housing can affect the livability of a community in positive or negative ways. A key element of a sustainable, healthy community is an adequate supply of affordable homes that are designed to suit a range of household types and housing needs.

• In 2006, there were more than 1 million households in the Fraser Basin (1,064,295). Approximately two-thirds of these were owner-occupied households and one-third were rental households.[1]

• In 2005, 15% of residents in the Vancouver Census Metropolitan Area (CMA), which is equivalent to the Metro Vancouver Regional District, were living in core housing need[a] compared to 14.6% in BC urban centres overall and 13.5% in Canadian urban centres.[2]

• In 2005, 43% of renters and 25% of homeowners in the Fraser Basin spent more than 30% of their household income on housing costs.

• In 2007, the Metro Vancouver region had the least affordable housing of all Fraser Basin regions, with home ownership requiring an average of 73.8% of household income compared to 68.5% in BC on average and 31.7% in northern BC.

• The number of homeless people in Metro Vancouver increased by 137% between 2002 and 2008. In the Fraser Valley region, the number increased by 13% between 2004 and 2008.

POOR / GETTING WORSE

Housing Affordability
In 2006, BC had the least affordable housing market among all provinces in Canada and, in 2005, had the second highest (worst) proportion of urban residents living in core housing need.

POOR / GETTING WORSE

Rental Housing
Urban centres in all regions of the Fraser Basin recorded declining vacancy rates and increasing rental costs between 2001 and 2007.

POOR / GETTING WORSE

Homelessness
In 2008, the rate of homelessness had increased in Metro Vancouver and the Fraser Valley since previous counts throughout the 2000s.

ISSUES AND TRENDS

Housing Affordability (2005–2008)

BC has the least affordable housing market among all provinces in Canada,[3] and in 2005, had the second highest (worst) incidence of people in urban centres living in core housing need (14.6%). In 2006, 43% of renters and 25% of homeowners in the Fraser Basin spent more than 30% of their household income on housing costs. The proportion of income spent on housing is a key component of core housing need.[1,2]

In 2007, the Metro Vancouver region had the least affordable housing, with home ownership requiring an average of 73.8% of household income compared to 68.5% in BC on average and 31.7% in northern BC.[4] In September 2008, the average price for all types of housing in BC was $412,149 – a decrease of 7% since September 2007.[5] The average purchase price for housing in northern BC in September 2008 was $207,613; Metro Vancouver had the highest house prices, averaging $535,598.

Rental Housing (2001–2007)[1,6]

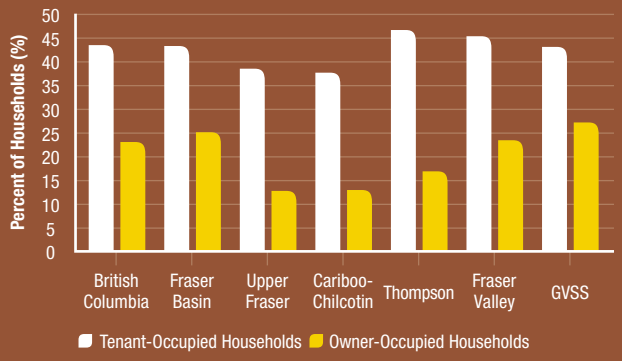
In 2006, more than 340,000 (about 32%) of Fraser Basin households were in rental accommodation. As more people migrate to urban centres, the demand for rental accommodation increases and vacancy rates decrease, which often leads to an increase in rental costs. For example, the average monthly rental costs in Metro Vancouver and Williams Lake increased 18% and 17% respectively between 2001 and 2007, while rental vacancies declined to less than 2% in Williams Lake and 1% in Metro Vancouver. Prince George also showed a noticeable decline.

Between 2001 and 2007, the cost of renting a two-bedroom apartment increased 22% in Kamloops (15% in the Thompson region), 18% in Metro Vancouver (17% in the Greater Vancouver-Sea to Sky or GVSS region), 17% in Williams Lake (19% in the Cariboo-Chilcotin region), 13% in Prince George (11% in the Upper Fraser region) and 5% in Abbotsford (7% in the Fraser Valley region).[6] Renters in the Thompson and Fraser Valley regions are more likely to spend more than 30% of their household income on rental accommodation than renters in other regions.

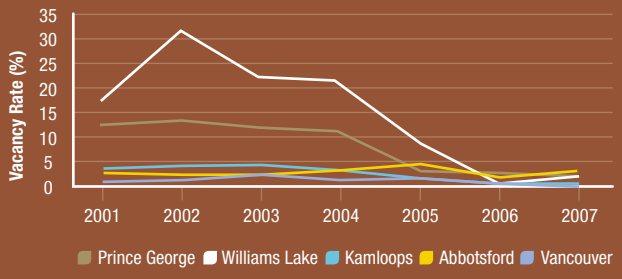
Homelessness (2002–2008)[b]

Homelessness continues to be a significant challenge affecting an increasing number of people in the Fraser Basin, especially in urban centres in the GVSS, Fraser Valley and Thompson regions. Homelessness is a complex issue because it is associated with economic circumstances, severe drug addictions and mental health problems.[7] During a 24-hour period in March 2008, 2,660 homeless people were counted in Metro Vancouver. This represents a 22% increase in the total number of homeless people[c] since 2005 when 2,174 homeless people were counted. It is also a 137% increase since 2002 when 1,121 homeless were counted. Most homeless people in Metro Vancouver (59%) lived on the street rather than in shelters.[8] In 2005, the cost of homelessness in the City of Vancouver was estimated at more than $51 million.[9] A 24-hour homeless count conducted in the Fraser Valley region in March 2008 identified 465 homeless individuals, representing a 13% increase since 2004. Most of the Fraser Valley's homeless population (50%) was located in the Abbotsford area.[10] In November 2005, 127 homeless people were counted in Kamloops.[11]

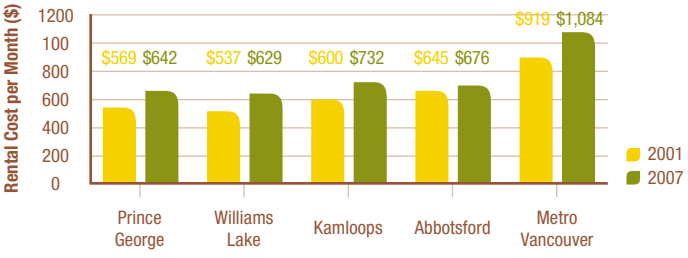
Percent of Renters and Owner-Occupiers Spending 30% or More of Household Income on Housing Cost (2006)[1]



Rental Vacancy Rates for Two-Bedroom Apartments in Fraser Basin Urban Centres (2001–2007)[6]



Cost per Month to Rent a Two-Bedroom Apartment in Fraser Basin Urban Centres (2001 and 2007)[6]

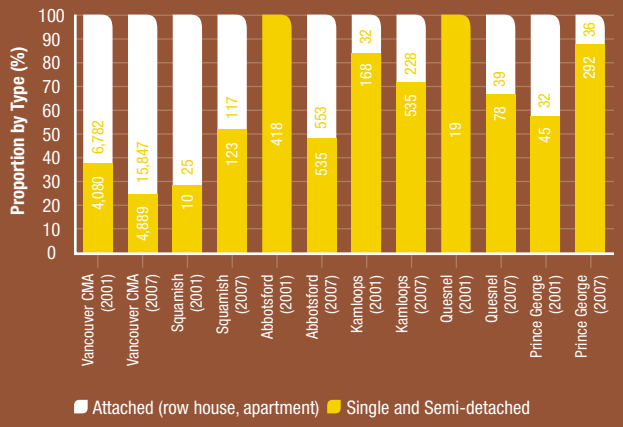


Housing

Some Definitions of Homelessness

- **SHELTERED HOMELESS –** people living temporarily in emergency shelters, safe houses or transition houses[10]
- **STREET / UNSHELTERED HOMELESS –** people living or sleeping in places not intended for human shelter (e.g., parks, alleys, doorways, parkades, beaches, vehicles, under bridges)[10]
- **HIDDEN HOMELESS –** people temporarily staying with family or friends, also known as sofa surfing[10]
- **AT RISK OF HOMELESSNESS –** people living in housing that is inadequate or unsuitable for their needs, and who spend at least 50% of their household income on shelter[7]

Housing Starts by Type for Fraser Basin Communities (2001; 2007)[13]



Housing Design and Residential Development

The way houses are designed and built can significantly reduce the impact housing development has on both people and the environment. Sustainable building practices can contribute to improved human health through better indoor air quality; reduce water and energy consumption; save money through enhanced efficiency; and reduce waste created in the building process. The new Built Green BC™ program recognizes and certifies sustainable building in BC. In 2008, 1,571 homes in the Fraser Basin were registered under the Built Green BC certification system. Most of these are within the Metro Vancouver region (1,405); the remainder are in the Fraser Valley (144) and Thompson regions (22).[12]

Generally, residential developments that are designed for multiple families have a lower environmental impact than single-family dwellings. While there was a significant increase in the total number of homes built in 2007 compared to 2001, there was also a significant increase in the number of multi-family housing developments (such as apartments and row houses) built in communities across the Fraser Basin during this time. In both 2001 and 2007, the GVSS region (specifically Metro Vancouver and Squamish) continued to have the highest proportion of multi-family dwellings compared to other regions in the Fraser Basin.[13]

Although the numbers show an increase in multi-family developments, a 2008 report on the progress made in addressing Smart Growth principles indicated that there had actually been a decline in compact community development in Metro Vancouver from 2001 to 2006 compared to the previous census period of 1996 to 2001.[14]

Notes

[a] People who live in core housing need are defined as living in a dwelling that is not adequate (i.e., requires major repairs), not suitable (i.e., overcrowded) and/or not affordable (i.e., costs more than 50% of before-tax household income).[2]

[b] 24-hour homeless counts tend to provide underestimates as they undercount those people who are homeless for short periods of time and those who are not found at the time the count is conducted. They also exclude those who are at-risk of homelessness.[8]

[c] Total homeless includes both street homeless and sheltered homeless.[8]

References

[1] Statistics Canada. Semi-Custom Area Profile (extracted from 2006 census data).

[2] Canada Mortgage and Housing Corporation. Recent Trends in Housing Affordability and Core Housing Need. 2008 Canadian Housing Observer.

[3] Royal Bank of Canada. 2008. Housing Affordability is Forecast to Improve in 2008. Housing Affordability Report.

[4] Conroy, R. 2008. Housing Affordability Study, Northern BC. BC Northern Real Estate Board.

[5] British Columbia Real Estate Association. 2008. Home Prices Down; Affordability Improves. www.bcrea.bc.ca/news_room/2008-09.pdf [accessed December 2008].

[6] Canadian Mortgage and Housing Corporation. Rental Market Reports, 2000–2007 and unpublished data. Daryoush Aslebiza, Market Research Assistant, personal communication by email. June 2008.

[7] Patterson, M., J.M. Somers, K. McIntosh, A. Shiell and C.J. Frankish. 2008. Housing and Support for Adults with Severe Addictions and/or Mental Illness in British Columbia. Centre for Applied Research in Mental Health and Addiction, Faculty of Health Sciences, Simon Fraser University.

[8] Results of the 2008 Metro Vancouver Homeless Count Executive Summary. www.metrovancouver.org/planning/homelessness/Pages/Resources.aspx [accessed October 2008].

[9] Greater Vancouver Regional Steering Committee on Homelessness. 2005. 3 Ways to Home.

[10] Selected Findings of the 2008 Upper Fraser Valley Homelessness Survey and Preliminary Summary, April 2008. Suzanne Cameron, City of Chilliwack, personal communication by email June 2008.

[11] True Consulting Group. Kamloops Housing Count 2005.

[12] Built Green™. 2008. Unpublished municipality data. Jennifer Shaw, BC Program Director, personal communication by email July 2008.

[13] Canadian Mortgage and Housing Corporation. Starts and Completions Survey, 2001 and 2007.

[14] Williams-Derry, C. 2008. Slowing Down – Greater Vancouver's Smart-Growth Leadership Slips. Sightline Institute report. www.sightline.org/publications/reports/slowing-down [accessed September 2008].

ACTIONS

The Many Faces Of **Sustainability**

Homelessness Emergency Action Team (HEAT)
On December 9, 2008, the City of Vancouver created HEAT, an initiative to identify and coordinate immediate actions the City can undertake to help people get off the street and into a safe environment within three months. Examples include identifying locations for immediate shelters, fast-tracking developments and coordinating different sectors. Chaired by Mayor Gregor Robertson, HEAT includes representatives from the City and housing stakeholders. More than 4,000 people – 280 a night – found shelter in HEAT emergency facilities during the first two weeks of operation in December 2008. By January 13, 2009, Vancouver had opened four new emergency shelters: http://vancouver.ca.

Community Partners Addressing Homelessness in Prince George
The Community Partners Addressing Homelessness (CPAH) is a collaboration of service providers, agencies, non-profit organizations and representatives from municipal, provincial and federal governments that was established in 2001 to develop local solutions to homelessness in Prince George. CPAH has developed a Community Plan, and in May 2008 conducted a count and survey to examine the issues and situation of homelessness. Of the 375 people surveyed, 259 identified themselves as homeless. Thirty percent of those surveyed cited the cost of housing as the main reason for their homelessness; 22% indicated alcohol or substance abuse was the primary reason.

Homelessness Partnering Strategy
In 2007, the federal government provided $16 million to the Metro Vancouver region to be used over a two-year period for a Homelessness Partnering Strategy. Key priorities of the program are youth and Aboriginal services, supportive housing, mental health and addictions, emergency services and facilities, outreach, homelessness prevention and improvements to existing service delivery: www.metrovancouver.org/planning/homelessness/.

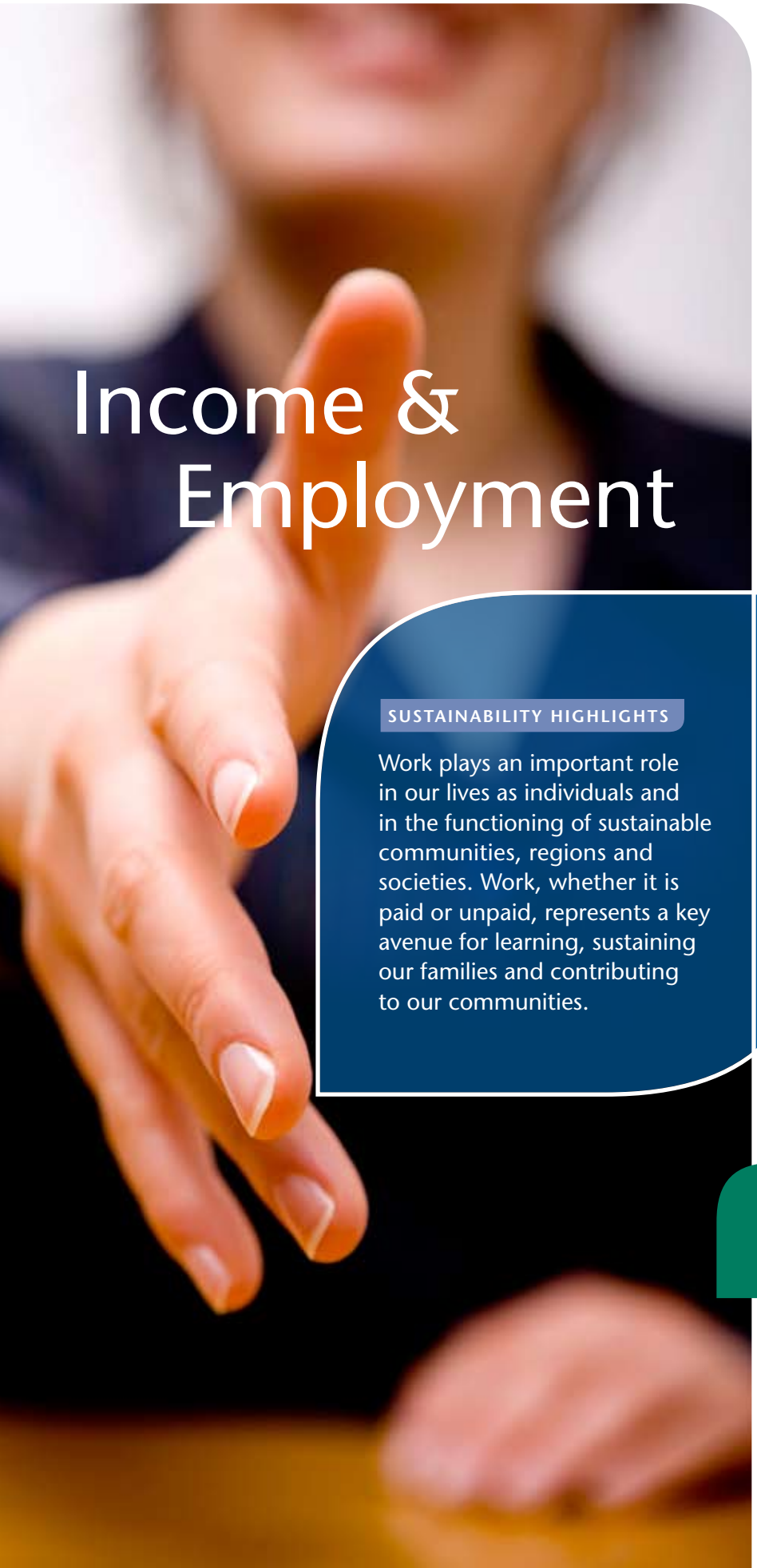
Greater Vancouver Regional Steering Committee on Homelessness (RSCH)
This committee was formed in 2000 and includes more than 40 members representing service providers, community-based organizations, business and all levels of government. The RSCH developed and oversees the implementation of the Regional Homelessness Plan for Greater Vancouver – 3 Ways to Home – which includes three components of a comprehensive solution to homelessness: affordable housing, support services, and adequate income: www.metrovancouver.org/planning/homelessness/Pages/default.aspx.

HABITAT FOR HUMANITY

Habitat for Humanity (HFH) seeks to eliminate poverty housing and homelessness from the world by inviting people to build houses together with families in need. HFH has built more than 300,000 houses in 3,000 communities around the world as a means of providing safe, decent and affordable shelter. Using volunteer labour and donations of money and materials, HFH builds and rehabilitates houses with the help of the partner families. Habitat houses are sold to partner families at no profit and are financed with affordable, zero-interest loans. The homeowners' monthly mortgage payments are used to build more Habitat houses. There are Habitat for Humanity affiliates in cities in four of the five Fraser Basin regions: Prince George, Kamloops, Abbotsford and Vancouver.

Habitat ReStores (short for Recycle Stores) help people and the environment by collecting donated new and used building materials, equipment, appliances and furniture, and reselling them to the public at bargain prices. Profits pay for operating costs and help build local Habitat for Humanity homes for low-income, eligible families. By collecting these materials, a ReStore also helps in encouraging recycling, reducing waste going to landfills and protecting the environment. In the Fraser Basin, ReStores are located in Prince George, Kamloops, Abbotsford, Burnaby and Vancouver: www.habitat.org.

HFH Build in Prince George.



Income & Employment

SUSTAINABILITY HIGHLIGHTS

Work plays an important role in our lives as individuals and in the functioning of sustainable communities, regions and societies. Work, whether it is paid or unpaid, represents a key avenue for learning, sustaining our families and contributing to our communities.

Most residents in the Fraser Basin depend on their business or employment as a primary source of income. Having a diversity of employment and volunteer opportunities, with skilled individuals to fill those positions, are two essential components of a strong and resilient economy. It is equally important that individuals and families have sufficient income to meet their needs, participate in society and feel secure.

- Employment rates in the Fraser Basin have increased, as they have in BC overall. The highest rates of employment in the Fraser Basin are in the Upper Fraser region.[1]

- Average household incomes in the Fraser Basin were above the provincial average in 2005; however, income levels have declined since 2000.[1]

- In general, there is a large and growing gap between incomes of the wealthiest and poorest families in the Fraser Basin and in BC.

- Rates of child poverty in BC are the highest in Canada.

MIXED RESULTS / POOR	**Average Household Income** Average household income in the Fraser Basin was higher than the BC average in 2005 but was lower than in 2000.
MIXED RESULTS / POOR	**Incidence of Low Income** In 2005, the proportion of low-income families (11.7%) had decreased since the proportion in 1995 (17.3%) and 2000 (15.7%); however, the number of children living in poverty had increased.
GETTING BETTER	**Employment Rate** The employment rate in the Fraser Basin in 2006 (62.8%) was almost 2% higher than in 2001.

ISSUES AND TRENDS

Employment Rates (2001 and 2006)[1,a]

In 2006, the employment rate in the Fraser Basin was 62.8%, which was above the provincial average of 61.6% and almost 2% higher than the 2001 rate of 61%. The Upper Fraser region had the highest employment rate in the Fraser Basin: 65.4%. In contrast, rates in the Cariboo-Chilcotin region (59%) and Thompson region (59.2%) were below the BC average.

Unemployment Rates (2006)[2,a]

In 2006, unemployment rates in the Cariboo-Chilcotin region (9.9%) and the Thompson region (7.2%) were higher than the BC average (6%) and the Fraser Basin average (5.9%). Although the Upper Fraser region had the highest employment rate in the Fraser Basin, its unemployment rate (8.2%) was also higher than the BC average.

Employment by Sector (2001 and 2006)[3,a]

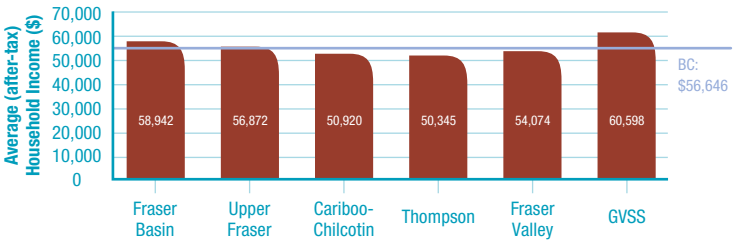
Employment in the Fraser Basin continues to be concentrated in construction/manufacturing (15.7%) and wholesale/retail trade (15.6%). There have been only minimal changes in the distribution of labour by sector since 2001, with minor increases in the proportion employed in construction/manufacturing; professional, scientific and technical services; and oil and gas extraction. There have also been minor decreases in the proportion employed in the transportation/warehousing, public administration and information/cultural industries. There were, however, more notable changes at the regional level, particularly in the construction/manufacturing sector where the proportion of employed people grew by over 2% in both the Thompson and Fraser Valley regions.

Average (After-Tax) Household Income (2000 and 2005)[4,5]

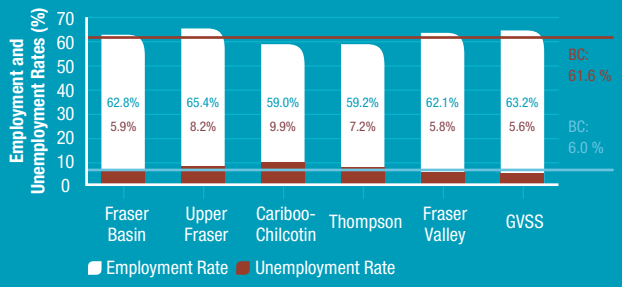
The average household income (after tax) in the Fraser Basin in 2005 was $58,942. This was 4% higher than the provincial average but was below the average for the Fraser Basin in 2000, which was $60,752.

Similar to 2000, there was considerable variation in average household incomes across the Fraser Basin regions in 2005, with a gap of more than $10,000 between the highest average income ($60,598) in the Greater Vancouver-Sea to Sky region and the lowest ($50,345) in the Thompson region. The disparity between wealthier and lower income families is significant. In 2004, BC Statistics reported that the market income[b] gap in British Columbia was 6%, meaning that the annual average income earned by the 20% of families with the lowest incomes ($8,800) was only 6% of what the 20% of wealthiest families in the province were making on average ($147,700). In 2004, this was the biggest (i.e., worst) income gap of all provinces in Canada.

Average (after-tax) Household Income in the Fraser Basin (2005)[4]



Employment and Unemployment Rates in the Fraser Basin (2006)[2]



Employment by Sector in the Fraser Basin (2001 and 2006)[3]

Income & Employment

After-Tax Household Income Levels (2005)[6]

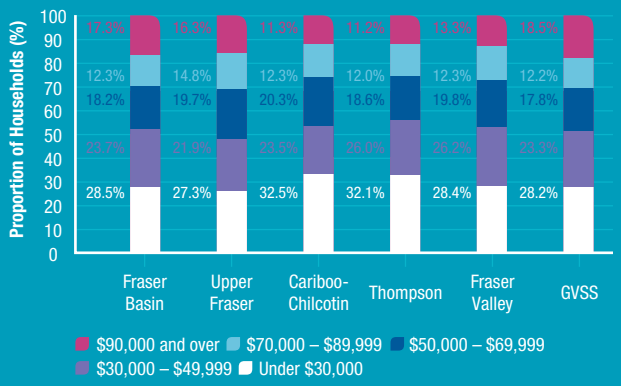
In 2005, more than a quarter of the households in the Fraser Basin had average incomes of less than $30,000. In the Cariboo-Chilcotin and Thompson regions, this proportion was closer to one third. Another 23.7% of households in the Fraser Basin had incomes between $30,000 and $50,000; approximately 30% had incomes of $70,000 or more.

Incidence of Low Income (1995–2005)[7]

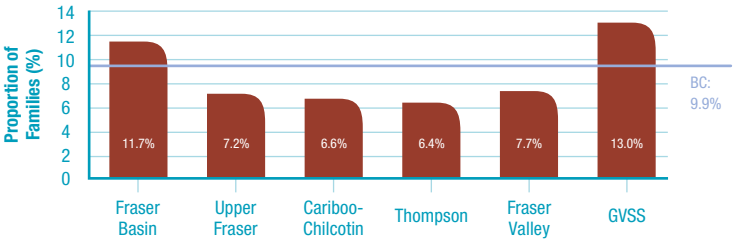
More than one in 10 families (11.7%) in the Fraser Basin had a low income in 2005, based on low-income cut-off.[c] Although this was higher than the 2005 provincial average (9.9%), it represented a continuing drop in the proportion of low-income families in the Fraser Basin from 1995 (17.3%) and 2000 (15.7%). The GVSS region had the highest proportion (13%) of low-income families in the Fraser Basin in 2005 as well as in 2000 and 1995. Although the Thompson region had the lowest average income of all the regions in the Fraser Basin in 2005, it also had the lowest incidence of low-income families.

Disposable income is important for families to meet their needs such as food and shelter. A 2007 study by the Dietitians of Canada found that basic healthy foods cost an average BC family 17% of disposable income. A family on income assistance, by comparison, would spend 42% of their income for the same food basket (and 100% of income to cover both food and shelter.) This means no money left over for clothing, transportation, child care or other costs. The evidence suggests that poor families often sacrifice the quality and quantity of their food by consuming more energy-dense, nutrient-poor foods, which contributes to the rising incidence of obesity.[8]

After-Tax Household Income Levels in the Fraser Basin (2005)[6]



Proportion of Low-Income Families in the Fraser Basin (2005)[7]



Notes

[a] Employment and unemployment rates are for the population aged 15 years and older.

[b] Market income includes earnings, investment income, retirement pensions and other incidental market income. It excludes all government transfers.

[c] Low income cut-offs (LICOs) are income thresholds, determined by analyzing family expenditure data, below which families will devote a larger share of income to the necessities of food, shelter and clothing than the average family would. To reflect differences in the costs of necessities among different community and family sizes, LICOs are defined for five categories of community size and seven categories of family size. www.statcan.gc.ca/pub/75f0002m/75f0002m2006004-eng.pdf.

References

[1] Statistics Canada. Semi-Custom Area Profiles (extracted from 2001 and 2006 census data).

[2] Statistics Canada. Semi-Custom Area Profiles (extracted from 2006 census data).

[3] Statistics Canada. Semi-Custom Area Profiles (extracted from 2001 and 2006 census data).

[4] Statistics Canada. Semi-Custom Area Profiles (extracted from 2006 census data).

[5] BC Statistics. Earnings and Employment Trends, June 2006. www.bcstats.gov.bc.ca/pubs/eet/eet0606.pdf [accessed November 2008].

[6] Statistics Canada. Semi-Custom Area Profiles (extracted from 2006 census data.)

[7] Statistics Canada. Semi-Custom Area Profiles (extracted from 1996, 2001 and 2006 census data).

[8] Dietitians of Canada. The Cost of Eating in BC. 2007.

ACTIONS

The Many Faces Of **Sustainability**

The CORE Training Program

The CORE Training Program is an initiative administered by Building Opportunities with Business on behalf of the City of Vancouver and Millennium Developments. The program offers residents of Vancouver's inner city an opportunity to receive hands-on training in the construction industry and a number of industry certifications. With these skills and qualifications, graduates are able to take advantage of employment opportunities in the construction industry, such as the building of the Vancouver Olympic Village: www.buildingopportunities.org/hrservices/training.asp.

First Call

BC Child and Youth Advocacy Coalition is a cross-sectoral, non-partisan coalition of more than 80 provincial and regional organizations. Its goal is to ensure that children and youth in BC have the opportunities and resources they need to achieve their full potential. BC continues to have the highest rate of child poverty in Canada. Data from 2006 showed that the incomes of female single-parent families and two-parent families with children living in poverty were more than $11,000 below the poverty line. First Call provides public education, community mobilization and public policy advocacy to raise awareness about these issues and improve the health and well-being of children and youth in the province: www.firstcallbc.org.

Disability Supports for Employment Fund

A new Disability Supports for Employment Fund provides support for organizations throughout BC who are working to increase employment opportunities in their communities for persons with disabilities. Visit www.vancouverfoundation.bc.ca/grants/documents/disabilitysupportsforemployment.pdf.

KAMLOOPS FOOD BANK

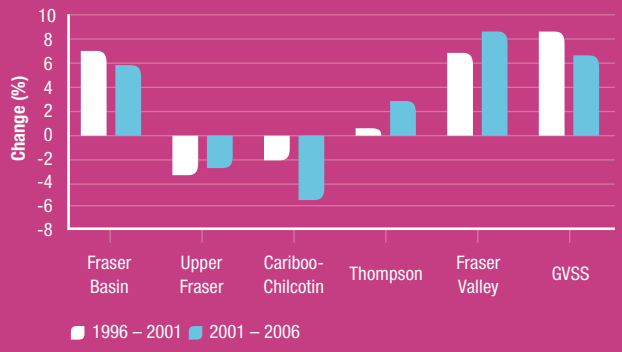
A growing number of residents in communities across Canada are turning to emergency food services. The Kamloops Food Bank goes beyond providing individuals with a warm meal. By working together with the Community Nutritionist, the Interior Health Authority and the Kamloops Food Policy Council, the Food Bank has developed programs and services that build community support for food security and ensure residents have access to affordable, local and nutritious food. Partnerships with the local Salvation Army, church groups and community agencies have helped create community kitchens and gardens. A horticultural training centre for marginalized groups has also been established. Together, these programs and services have helped reduce the number of people who rely on the food bank: www.kamloopsfoodbank.org.

Population & Demographics

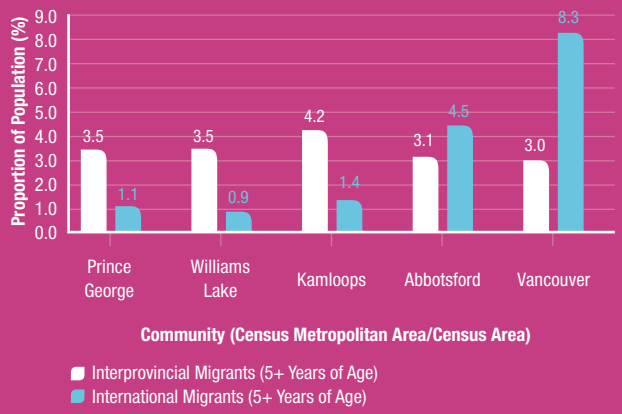
SUSTAINABILITY HIGHLIGHTS

The size of a population can significantly affect sustainability through rates of resource consumption and waste generation, and the land base needed to house and feed people.

Population Change in Fraser Basin Regions (1996–2001 and 2001–2006)[1]



Population of Interprovincial and International Migrants in Fraser Basin Communities (2001–2006)[3]



Rates of population change can significantly impact communities and regions, particularly in areas of high growth or high out-migration. It can be especially challenging for all orders of government and the non-profit sector to respond to, and mitigate, the impacts of rapid population change. This includes providing an appropriate mix of public services, such as healthcare, schools, housing, childcare, energy, transportation, water and wastewater systems and solid waste management. There may also be unique challenges associated with changing age demographics or ethnic and immigrant composition, such as changing demands on the healthcare system and immigrant services, and the availability of a skilled labour force.

• More than two-thirds (67%) of all British Columbians reside in the Fraser Basin.[1]

• Most (87.4%) of the Fraser Basin population is located in the Greater Vancouver-Sea to Sky (GVSS) and Fraser Valley regions. These regions, along with the Thompson region, have experienced population growth since 1996; however, the Upper Fraser and Cariboo-Chilcotin regions have experienced population declines.[1]

• Of 177,800 people who moved to BC from outside of Canada during the 2001 to 2006 period, over 80% settled in the Metro Vancouver Regional District.[2]

FAIR / MIXED RESULTS

Population
Between 1996 and 2006, the Fraser Basin population increased steadily (13.3%); however, population declines were observed in the Upper Fraser (-6%) and Cariboo-Chilcotin (-7.4%) regions during this period.

ISSUES AND TRENDS

Total Population and Change (1996–2006)[1]

The 2006 census counted 2.73 million residents in the Fraser Basin. Between 2001 and 2006, the population increased by more than 150,000 (5.9%). This is slightly less than the 7.0% increase recorded during the previous census period (1996–2001). Between 1996 and 2006, the population of the Fraser Basin increased by 320,000 (13.3%), with an increase of 16% in the Fraser Valley and 15.8% in the GVSS region.

Although the Fraser Basin population increased overall between 2001 and 2006, there was a decrease in population in the Cariboo-Chilcotin and Upper Fraser regions (-5.5% and -2.6%, respectively). The population in these regions also experienced declines during the previous census period. Since 2001, the Fraser Valley region has had the highest rate of population growth (8.6%) in the Fraser Basin, followed by the GVSS region (6.7%). However, because the GVSS accounts for the largest proportion of Fraser Basin residents, the total increase of more than 133,000 people between 2001 and 2006 was by far the largest of any Fraser Basin region.

The regional distribution of the Fraser Basin population remained similar between 1996 and 2006. On average, most of the Fraser Basin's population (77.3%) resided in the GVSS region, followed by the Fraser Valley (9.2%), Thompson (6.7%), Upper Fraser (4.4%) and Cariboo-Chilcotin (2.5%) regions. Minor variations occurred between census years.

Migration and Diversity (2001–2006)

During the 2001–2006 census period, about 16% or 177,800 of the 1.1 million new immigrants to Canada settled in British Columbia.[1] As a result, BC had the second highest proportion of foreign-born residents in Canada.

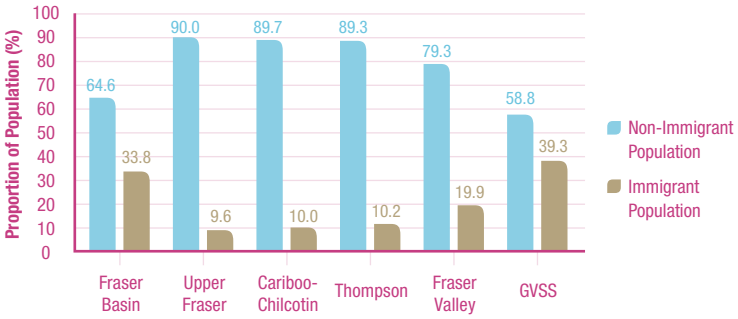
In 2006, international migrants accounted for 27.5% of BC's population (a close second after Ontario: 28.3%), up from 26.1% in 2001 and 22.3% in 1991.[2] More than 80% of people who moved to BC from outside of Canada during the 2001–2006 period settled in the Vancouver Census Metropolitan Area, which is equivalent to the Metro Vancouver Regional District. Immigrants in this region represent more than 8% of the total BC population 5 years of age and older.[3] In addition to international migrants, 164,710 people moved to BC from other provinces in Canada during the 2001–2006 census period. Most came from Alberta (38.1%) and Ontario (34.0%).[3]

In the Fraser Basin, interprovincial migration accounted for a greater proportion of the population change than international migration in Prince George, Williams Lake and Kamloops. Both Abbotsford and Vancouver Census Metropolitan Areas had a greater proportion of international migrants than interprovincial migrants.[3]

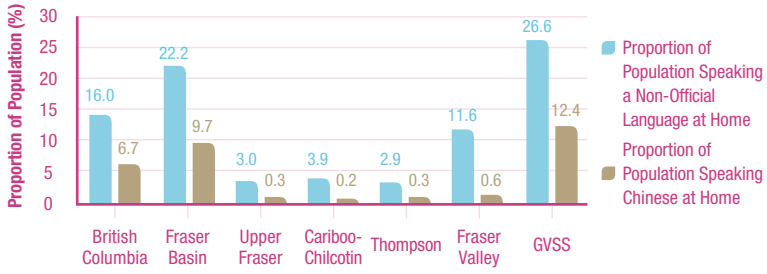
Language Diversity[1]

The Fraser Basin has a higher proportion than BC as a whole of people who speak a language other than an official language of Canada (English or French) at home. This includes indigenous languages and foreign languages. In 2006, almost 80 different languages were spoken in Fraser Basin homes, ranging from the indigenous Gitksan and Nisga'a languages to Farsi and Punjabi. Language diversity is greatest in the GVSS region where more than a quarter of the population speaks a non-official language at home. Chinese[a] was the most common non-official language spoken in GVSS households (12.4%).

Immigrant & Non-Immigrant Population in Fraser Basin Regions (2006)[1]



Proportion of Population in BC, Fraser Basin and Fraser Basin Regions Speaking a Non-Official Language Most Often at Home (2006)[1]



Statistics Canada Definitions: [43] **Non-immigrants** are persons who are Canadian citizens by birth. Although most Canadian citizens by birth were born in Canada, a small number were born outside Canada to Canadian parents.

[44] **Immigrants** are persons who are, or have ever been, landed immigrants in Canada. A landed immigrant is a person who has been granted the right to live in Canada permanently by immigration authorities. Some immigrants have resided in Canada for a number of years, while others are recent arrivals. Most immigrants are born outside Canada, but a small number were born in Canada. Data include immigrants who landed in Canada prior to Census Day, May 16, 2006.

Note

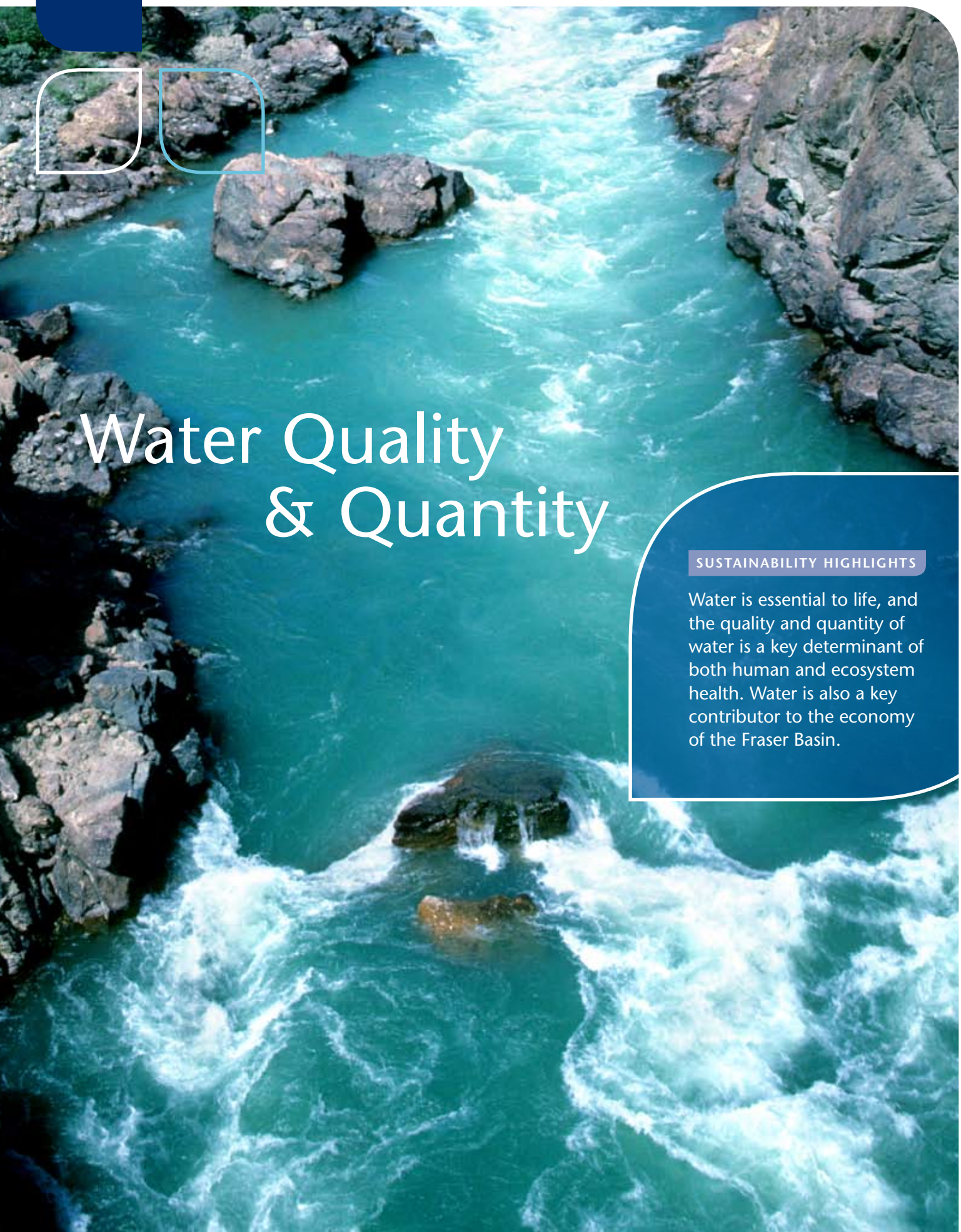
[a] Chinese language data in this report includes the following census categories: Mandarin, Cantonese and Chinese N.O.S. (not otherwise specified).

References

[1] Statistics Canada. Semi-Custom Area Profiles (created from 1996, 2001 and 2006 census data).

[2] Statistics Canada. Immigration in Canada: A Portrait of the Foreign-born Population, 2006 Census: Findings. Catalogue no. 97-557-XIE.

[3] BC Statistics. Mobility and Migration: Census 2006. Migration Highlights, Third Quarter 2007. www.bcstats.gov.bc.ca/pubs/pr_mig.asp [accessed December 2008].



Water Quality & Quantity

SUSTAINABILITY HIGHLIGHTS

Water is essential to life, and the quality and quantity of water is a key determinant of both human and ecosystem health. Water is also a key contributor to the economy of the Fraser Basin.

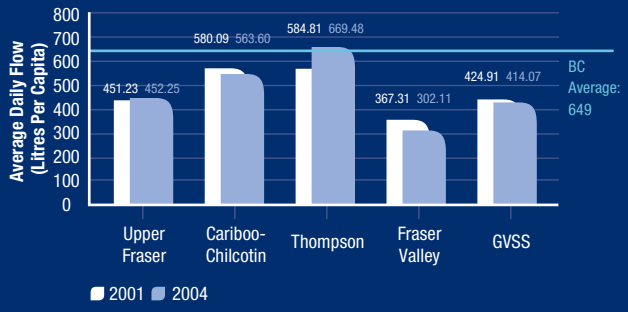
Water is critical to sustaining ecosystems and all life and activity in communities, including agriculture, industry and other businesses. Waterways connect communities, provide a means of transportation and allow for discharge of wastewaters. For many people, the Fraser River and its many lakes and tributaries also hold important cultural and historical significance.

Whether we live in regions of the Fraser Basin that have dry climates or regions that seem to have relatively abundant water resources, we cannot take for granted the long-term, year-round availability of sufficient supplies of clean water. The protection of surface water and groundwater resources is a growing concern for many communities throughout the Basin. Ensuring the future quality and quantity of this resource amidst growing populations and the impacts of climate change is critical to long-term sustainability. The management of liquid waste has an effect on the environment and the livability of communities. Without proper management and treatment of the many pollutants generated by human activities, the environment will suffer and human health will be put at risk.

• While some communities have managed to reduce their water consumption, overall water consumption per capita in the Fraser Basin continues to increase. In most cases, however, average per capita daily flows for both municipal water and wastewater systems are below provincial averages.[1]

• Water Quality Index (WQI) rankings at five of eight sites in the Fraser Basin were the same in 2004–2006 as in 2001–2003. Rankings improved at two sites and declined at one.[2]

Average Daily Flow Per Capita for Residential Water Use in the Fraser Basin (2001 and 2004)[1]



MIXED RESULTS / POOR	**Municipal Domestic Water Consumption** Domestic (i.e., residential) water consumption per capita increased in the Fraser Basin overall, but declined in three of the five regions between 2001 and 2004.
FAIR / MIXED RESULTS	**Municipal Wastewater Treatment** Together, municipalities in the Fraser Basin provided wastewater treatment services to 85% of the population in 2004: 36.2% with primary treatment, 59.4% with secondary treatment and only 4.3% with tertiary treatment.
GOOD / MIXED RESULTS	**Water Quality Index** Four Fraser Basin sites were given Good or Excellent Water Quality Index rankings, while four sites were Fair or Marginal for the period between 2004 and 2006.

ISSUES AND TRENDS

The Municipal Water and Wastewater Survey (MWWS) is a Canada-wide (excluding federal lands) survey of community drinking water and/or wastewater utilities serving at least 100 residents or 50 total connections. This report presents MWMS data from 45 municipalities and 2.6 million residents in the Fraser Basin.

Municipal Domestic Water Consumption (2001 and 2004)[1,a]

Domestic (i.e., residential) consumption accounts for a significant proportion of municipal water use (more than half in most Fraser Basin communities). On average, daily domestic consumption among Fraser Basin municipalities (483 litres per capita) was well below the provincial average of 649 litres per capita. However, this represented a 2% increase in consumption in the Fraser Basin since 2001 when per capita daily consumption was 474 litres. At the regional level, per capita domestic consumption declined between 2001 and 2004 in three of five regions: Cariboo-Chilcotin, Fraser Valley and Greater Vancouver-Sea to Sky (GVSS). In 2004, average daily domestic consumption ranged from 302 litres per capita for Fraser Valley municipalities to 670 litres per capita for Thompson region municipalities.

Water Quality & Quantity

Municipal Wastewater Treatment (2004)[1,a]

In 2004, on average, the 45 municipalities in the Fraser Basin provided 89% of their residents with wastewater treatment systems. Just over half of these municipalities (23) served 98–100% of their populations with sewage connections, and only two small rural communities served less than 40%, with one community serving only 33% of its population. Rates of connections to wastewater treatment systems were highest in the Upper Fraser, Cariboo-Chilcotin and GVSS regions, where 90% or more of their municipal populations were connected. Rates were lower in the Thompson region (86%) and lowest in the Fraser Valley region (77%), where many rural residents had their own septic systems.

Of those populations connected to municipal wastewater treatment systems, most (59.4%) received secondary levels of treatment. More than one-third (36.2%) received only primary treatment, and only five communities (4.3% of the Fraser Basin population) received tertiary (i.e., highest) levels of treatment: Prince George, Williams Lake, Enderby, Salmon Arm and Whistler.

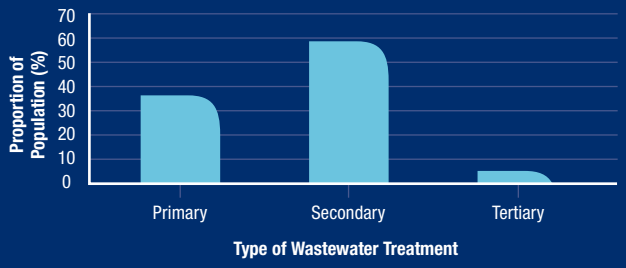
Flows from municipal wastewater treatment systems also varied significantly among the different regions of the Fraser Basin. Average flows were lowest in the Thompson region (430 litres per capita) and highest in the Upper Fraser (816 litres per capita). These values include wastewater from all sources connected to municipal treatment systems, including commercial and industrial.

Water Quality Index (2001–2003 and 2004–2006)[2,b,c]

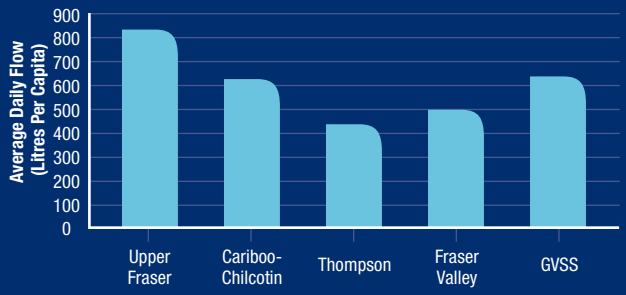
The BC Water Quality Index scores represent water quality in relation to the attainment of water quality objectives (i.e., safe limits set by the BC Ministry of Environment in areas of human activity as a means of protecting the most sensitive uses of a body of water). This report includes WQI data and scores for eight water bodies in the Fraser Basin. In 2004-2006, three were ranked as "Good," meaning that "conditions rarely depart from natural or desirable levels and that all uses are protected, with only minor threats or impairment." Two were ranked as "Fair," meaning that "conditions sometimes depart from natural or desirable levels and that most uses are protected, but a few uses are threatened or impaired." The Salmon River at Salmon Arm and Sumas River at the International Boundary were ranked "Marginal" indicating that "several uses are threatened or impaired, more than one use may be temporarily interrupted and conditions often depart from natural or desirable levels." At the other extreme, the Fraser River at Red Pass was ranked as "Excellent," meaning that conditions between 2004 and 2006 were very close to natural or pristine levels.

In the 2004–2006 period, five of the water bodies in the Fraser Basin had similar ratings as in the period from 2001 to 2003. The Fraser River at Red Pass improved from "Good" to "Excellent". The site on the Salmon River at Salmon Arm improved from "Poor" to "Marginal"; however, the Sumas River site declined from "Fair" to "Marginal." Three sites declined in their numeric WQI scores, while two remained stable and three improved.

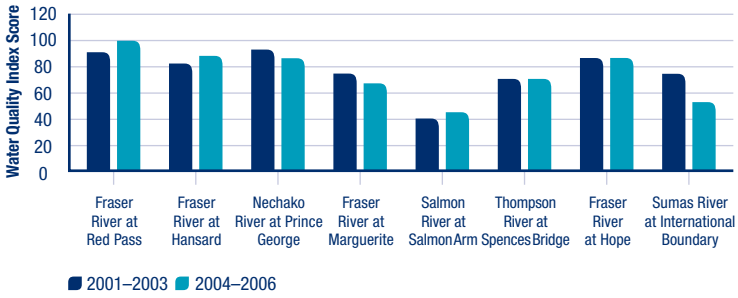
Proportion of Municipal Populations Served by Type of Wastewater Treatment Systems in the Fraser Basin (2004)[1]



Average Daily Flow of Municipal Wastewater Per Capita (2004)[1]



Water Quality Index Scores in the Fraser Basin (2001–2003 and 2004–2006)[2,c]



Notes

[a] The MWWS includes a large sample of municipalities with fewer than 1,000 residents, and all those with populations of over 1,000 residents. The survey is conducted by Environment Canada. More information about it can be found at www.ec.gc.ca/water/mwws/en/backgr.cfm.

[b] More information about the WQI and water quality objectives can be found at www.env.gov.bc.ca.

[c] Data for the Fraser River at Hansard were unavailable for the period 2004–2006. Therefore, the three-year average for the period 2003–2005 is included in the graph.

References

[1] Environment Canada. Municipal Water and Wastewater Survey 2004. www.ec.gc.ca/Water/en/manage/use/e_data.htm [accessed October 2008].

[2] Environment Canada. Water Quality Monitoring Program. www.waterquality.ec.gc.ca [accessed January 2009].

[3] Environment Canada. 2007 Municipal Water Use Report. www.ec.gc.ca/WATER/en/info/pubs/sss/e_mun2004.htm [accessed November 2008].

ACTIONS

The Many Faces Of **Sustainability**

Water Governance and Living Water Smart

Four regional water governance workshops took place in Langley, Prince George, Nanimo and Kelowna in 2008. The workshops were hosted by the BC Ministry of Environment, in partnership with Georgia Basin-Vancouver Island Living Rivers, Fisheries and Oceans Canada and the Fraser Basin Council. At the workshops, representatives of governments, the private sector and stewardship groups explored current water governance challenges and opportunities in BC. Workshop reports are available at: www.fraserbasin.bc.ca/programs/water_governance.html.

Dialogue on water governance will continue with implementation of Living Water Smart: British Columbia's Water Plan (www.livingwatersmart.ca). The plan is government's vision and commitment "to ensure our water stays healthy and secure." Some specific initiatives and targets that will require action by government and all British Columbians include the following:

- By 2012, land and water managers will know what makes a stream healthy, and will be able to help factor in new approaches to stream health and the full range of stream benefits.
- By 2012, government will regulate groundwater use in priority areas and large groundwater withdrawals.
- By 2020, water use in BC will be 33% more efficient.
- Government will cooperate with Canada to ensure the quality of drinking water in all Aboriginal communities will meet the same provincial standards applied across BC by 2015.
- By 2012, all students in BC will have completed at least one stream-health assessment.

Water Meters

In 2004, the proportion of BC residences with water meters was 29.8%, well below the national average (63.3%).[3]

WATER WISE IN THE CARIBOO-CHILCOTIN

In 2005, the City of Williams Lake developed a water management and conservation plan aimed at reducing water consumption by 6% by 2015 and 22% by 2025. A key component of the plan is to raise awareness about water conservation and watershed health.

The Cariboo Chilcotin Conservation Society (CCCS) works in partnership with the City of Williams Lake on an educational outreach program called Water Wise – offering practical ways people can lower water consumption and maintain healthy watersheds.

CCCS teaches Water Wise modules in elementary and high school classrooms and at the Gavin Lake Forest Education Centre. Students take field trips to test water quality and tour local water treatment facilities. Through the program, students learn about local ecosystems and how the health of a watershed and the health of species are connected.

A teacher's guide is available on the CCCS website, and program materials can be adapted for children's groups, high schools, colleges and universities. Visit www.ccconserv.org.

Water Wise also helps gardeners with lawn care tips and holds annual xeriscape workshops, demonstrating how to maintain a low-water outdoor garden, set up rain gardens and use rain barrels. The broader community is reached through Water Wise radio ads, newspaper articles, presentations, educational materials and displays and site consultations.

Kids discover water-saving actions at the Water Wise site in the Gavin Lake Forest Education Centre.

Regional Highlights

Residents, governments, businesses and community organizations in the Fraser Basin have all expressed a strong interest in regional data. This summary was designed with this in mind. It creates profiles for the five regions in the Fraser Basin, each highlighting several key indicators that reflect some of the regional characteristics, differences and influencing factors across the Fraser Basin.

The regional profiles are not intended to be an exhaustive list of indicators for the regions; in some cases, data were not available to support a complete regional analysis. This summary focuses instead on some of the more interesting trends and flags how well each region is doing in relation to particular topics. Because the regional profiles are limited in scope, they should not be used as a basis to assess the overall state of sustainability of a specific region or to compare the state of sustainability between regions. Additional regional data are included throughout the rest of this report.

Note on data: Statistics Canada prepared a custom tabulation of census data from 1996, 2001 and 2006 according to the boundaries of the Fraser Basin and the five regions (see Map 1). For more details on specific indicators, such as information sources and definitions, see each topic in this report.

UPPER FRASER REGION

The Upper Fraser region is the largest of the Fraser Basin's five regions, encompassing 78,164 km^2. In 2006, the regional population numbered about 108,255 or 4% of the Basin's population; however, the regional population declined by about 2.6% between 2001 and 2006. The Upper Fraser region has the lowest proportion of immigrants of any region in the Fraser Basin: only 9.6% of the population identified themselves as immigrants in the 2006 census. Prince George is the regional centre and largest city, with about 71,000 residents. Other communities include Burns Lake, Fort St. James, McBride, Valemount and Vanderhoof, which range in size from about 500 to 5,000 residents. The forest industry is one of the main economic drivers in the region and is important to all of its communities. Agriculture, transportation and tourism also play an important role in the regional economy.

Air Quality

Prince George had the highest (worst) concentrations of Particulate Matter$_{2.5}$ ($PM_{2.5}$) from 2001 to 2007 and the highest (worst) annual average Air Quality Health Index rating from 2000 to 2006 among monitored locations in the Fraser Basin, but recorded improvements in Ground Level Ozone (GLO) and $PM_{2.5}$ concentrations from 2004 to 2007.

Biodiversity

In 2008, the Upper Fraser region had the largest land area designated as Protected Areas (1.15 million ha or 14.4% of the region) compared to other Fraser Basin regions.

Health

In 2006, the region recorded the lowest proportion (4.9%) of low-weight babies in the Fraser Basin but had the highest Age Standardized Mortality Rate for cancer (21.5).

Housing

In 2006, the region had more affordable housing than other regions in the Fraser Basin and the lowest proportion (12.5%) of owner-households spending more than 30% of their income on housing costs.

Forests & Forestry

In 2005, three of four communities in the Fraser Basin identified as being most vulnerable to the mountain pine beetle infestation were in the Upper Fraser region (Cheslatta, Burns Lake and Vanderhoof).

Water Quality & Quantity

In 2004, per capita flows from municipal wastewater treatment systems were highest in the Upper Fraser region (816 litres per capita). In 2004, about 83% of municipal populations in the region were connected to municipal wastewater treatment systems. Most of these (89%) were served by the tertiary treatment system in Prince George (representing 74% of the municipal populations of the region).

During the 2004–2006 period, river Water Quality Index ratings were Excellent for one site and Good for two sites in the region. These were the best ratings of eight sites in the Fraser Basin.

Solid Waste Disposal

Of the eight Fraser Basin regional districts, the Bulkley-Nechako and Fraser-Fort George Regional Districts recorded the largest decreases in total solid waste going to landfills between 1996 and 2006: 25% and 12%, respectively. However, both regional districts have recorded increases since 2002.

CARIBOO-CHILCOTIN REGION

The Cariboo-Chilcotin region is located in the BC Central Interior. The Cariboo area includes the interior plateau east of the Fraser River; the Chilcotin lies west of the Fraser. The Cariboo-Chilcotin is the second largest region in the Fraser Basin, occupying almost 70,000 km^2. About 60,545 people, or 2.2% of the Basin's population, lived in the region in 2006. This represented a decline of 5.5% since 2001. The region had the second highest rate of growth in the Aboriginal population (53%) in the Fraser Basin between 1996 and 2006. Williams Lake, Quesnel and 100 Mile House are the three largest communities in the Cariboo-Chilcotin region. Barkerville and Wells are known worldwide as gold rush heritage sites and offer an attractive tourist destination along the historic Gold Rush trail. The region's economy is based mainly on the forest industry; however, agriculture, mining and tourism also play an important economic role.

Agriculture & Food

Average farm income increased 18% from 2001 to 2006. However, annual operating costs of farms in the region have continued to exceed gross farm receipts since 1996.

Biodiversity

Based on data from 2004, the region encompassed 32% of the Fraser Basin's grassland ecosystems. In 2008, the region had the third largest land area (but lowest proportion of land) designated as Protected Areas (718,826 ha or 10.4% of the region).

Education

In 2006, less than half of the region's adult population (45.3%) had some of form of post-secondary education, and 27% did not have a high school diploma. The proportion of the population that had apprenticeship and trades certifications was higher in the Cariboo-Chilcotin than in other regions of the Fraser Basin.

Health

In 2006, the region had the second highest proportion (5.4%) of low-weight births in the Fraser Basin, although that represented a decline of 2% since 1996. Deaths due to diabetes increased by more than 90% between 1996 and 2006.

Housing

In 2006, the region had the lowest proportion (37.9%) of tenant-occupied households spending more than 30% of income on housing costs. Average monthly rental costs in Williams Lake increased 17% between 2001 and 2007, and rental vacancies declined to less than 2%.

Income & Employment

In 2006, the employment rate (59%) in the region was 4 percentage points lower than the Fraser Basin overall, while the unemployment rate (9.9%) was 4 percentage points higher than the Basin. In 2005, the region had the highest proportion of households earning less than $30,000 (32.5%), which was 4 percentage points more than the Fraser Basin average.

Forests & Forestry

In 2007, the Cariboo-Chilcotin had the largest area of forest infested by the mountain pine beetle (48% of the total area affected in the Fraser Basin).

Water Quality & Quantity

Between 2001 and 2004, per capita domestic consumption in the region declined about 3% to 564 litres per capita, which was well below the BC average (649 litres per capita). In 2004, 90% of the municipal populations in the region were connected to municipal wastewater treatment systems; 49% were served by tertiary treatment systems and 41% were served by secondary treatment.

The Fraser Basin Council has prepared two in-depth regional reports: one for the Thompson region – ***How is our Region Doing?*** – in June 2005; the other for the Upper Fraser region – ***Upper Fraser Sustainability Snapshot 2008: A Picture of Our Region*** – in November 2008. See www.fraserbasin.bc.ca/publications/indicators.html for these and other indicator reports. The Council will also release a combined regional report for the Fraser Valley and Greater Vancouver–Sea to Sky regions in 2009.

THOMPSON REGION

The Thompson region includes about 56,000 km^2 of diverse landscapes that range from deep forests with whitewater rivers to semi-arid, desert-like terrain and rolling grasslands. In 2006, the region had a population of 174,585 or 6.4% of the total population of the Fraser Basin. This represented a 2.8% increase since 2001. Kamloops – the largest city in the region – has a diverse local economy based on forest industries, highway and rail services, mining, agriculture, regional trade, financial services, education and training, manufacturing and recreation. Tourism, transportation, technology, and financial and professional services play an increasing role in the region's economy.

Agriculture & Food

Although average farm incomes in the region increased between 2001 and 2006 (176%), farm income levels remained below levels recorded in the 1990s.

Biodiversity

In 2004, the region encompassed most (68%) of the Fraser Basin's grassland ecosystems, and in 2008, had the second largest land area designated as Protected Areas (938,738 ha or 14.7% of the region).

Housing

In 2006, the region had the highest proportion (45.9%) of tenant-occupied households spending more than 30% of income on housing costs. Between 2001 and 2007, the cost of renting a two-bedroom apartment increased 22% in Kamloops (15% in the Thompson region).

Income & Employment

In 2006, employment rates in the region (59.2%) were below the BC average (61.6%) and the Fraser Basin average (62.8%). In 2005, the region had the lowest average household income ($50,345), which was more than $8,500 lower than the Fraser Basin average; however, it also had the lowest incidence of low-income families (6.4%).

Energy

Average annual electricity consumption per residential account increased 10% in the region between 2000 and 2006, representing the second highest increase among Fraser Basin regions.

Water Quality & Quantity

In 2004, the region had the highest average daily flow per capita for residential water use (669.5 litres). This was higher than the BC average (649 litres) and an increase of 84.6 litres since 2001. The proportion of the municipal populations in the region connected to municipal wastewater treatment systems could not be accurately assessed for this report because the results for the City of Kamloops (two-thirds of the municipal population in the region) were unreported in 2004.

The Salmon River at Salmon Arm has regularly recorded the lowest Water Quality Index score (44 in the 2004–2006 period) of eight Fraser Basin sites; however, river water quality has improved from "Poor" to "Marginal" since the 2001–2003 period.

Solid Waste Disposal

The Thompson-Nicola and Columbia Shuswap Regional Districts recorded the highest increases in total solid waste disposed in landfills between 1996 and 2006 (107% and 80%, respectively).

FRASER VALLEY REGION

The Fraser Valley region encompasses almost 13,000 km^2. The broad, fertile floodplain in the valley contains some of the most productive farmland in Canada. In 2006, about 253,845 people, or 9.3% of the Fraser Basin's population, lived in this region. This represented an increase of 8.6% between 2001 and 2006. The region also had the highest rate of growth in the Aboriginal population (60%) in the Fraser Basin between 1996 and 2006. The regional economy is based largely on agriculture and forestry, but tourism, fishing, transportation, manufacturing and service industries are also major employers. The Fraser Valley connects the interior regions of the Fraser Basin, BC and Canada to the Pacific coast; consequently, it acts as a key corridor for air, rail, road and river transportation, as well as communications, natural gas and electricity utilities.

Air Quality

In 2007 and previous years, monitoring sites in the Fraser Valley consistently recorded the lowest (i.e., best) $PM_{2.5}$ concentrations but the highest (i.e., worst) GLO concentrations of eight monitoring sites in the Fraser Basin.

Agriculture & Food

In 2006, the Fraser Valley region had the highest average farm income ($53,643) and the largest increase in income since 1996 of any region in the Fraser Basin. It also has the largest number of farms (55 farms) producing certified organic products. However, there has been a net loss of more than 4,800 ha from the ALR since it was established in 1973, and almost 30% of these exclusions were prime agricultural land.

Biodiversity

In 2008, the region had the greatest proportion of land designated as Protected Areas (21.5%) of any region in the Fraser Basin. However, there

are significant pressures on remaining natural habitat due to population growth and urban development.

Health
In the 2002–2006 period, people in the region had the second longest life expectancy of all Fraser Basin regions (79.2 years), which was an increase of 0.7 years since the 1987–1991 period. The proportion of low-weight babies born in the region increased by 8% (to 5.2 per 100 births) between 1996 and 2006, but this was below the average increase of 10% for the Fraser Basin (5.8 per 100 births).

Housing
The number of homeless people in the Fraser Valley region increased by 13% between 2004 and 2008.

Energy
In 2006, the average annual electricity consumption per residential account in the Fraser Valley region was 12,378 kWh. This was the highest in the Fraser Basin (25% more than the Fraser Basin average) and represented the largest increase since 2000 (10.7%).

Water Quality & Quantity
In 2004, the region recorded the lowest rate of residential water consumption per capita (302 litres) in the Fraser Basin, which was a decrease of almost 18% since 2001. In 2004, 67% of the municipal populations in the region were reported to be connected to municipal wastewater treatment systems that provided secondary treatment (results for the District of Mission – about 14% of the municipal population in the region – were unreported).

GREATER VANCOUVER – SEA TO SKY REGION

The Greater Vancouver-Sea to Sky (GVSS) region encompasses the smallest area (about 12,000 km^2) but has the largest population of the Fraser Basin's five regions. More than 2.1 million people, or 78.1% of the Basin's total population, lived in the region in 2006. This represented an increase of 6.7% since 2001. In 2006, the region had the largest Aboriginal population in the Fraser Basin (42,650 persons or 43% of all Fraser Basin Aboriginals). The GVSS region is the most ethnically diverse region in the Fraser Basin, with immigrants accounting for 39.3% of its population in 2006. In addition to the Greater Vancouver area, the northern part of the GVSS region includes the Sea to Sky corridor and the communities of Britannia Beach, Squamish, Whistler and Pemberton. The GVSS region is also the most urbanized region of the Fraser Basin, and although the regional economy is diversified, overall economic performance is strongly influenced by the health of natural resource sectors in other parts of the Basin.

Air Quality
In 2007, monitoring sites in the GVSS region recorded the second lowest concentration of $PM_{2.5}$ of eight monitoring sites in the Fraser Basin. GLO concentrations in the region have been stable or improving since 2005.

Agriculture & Food
In 2006, the region had the second highest average farm income ($29,082) in the Fraser Basin. There has been a net loss of 7,360 ha (9.4%) of ALR land in the region since 1973; 39% of these exclusions were classified as prime agricultural land.

Biodiversity
In 2008, the region had the second highest proportion of land designated as Protected Areas (19.3%) among Fraser Basin regions. There are significant pressures on biodiversity and natural habitat due to population growth and urban development.

Education
In 2006, 61.5% of the population in the region had some form of post-secondary education, which was the highest of all Fraser Basin regions.

The GVSS region also had the highest Composite Learning Index (CLI) score in 2008 (79.8), which was higher than the Canadian average (77) but below the provincial average (88).

Health
During the 2002–2006 period, people living in the region had the longest life expectancy in the Fraser Basin (81.8 years), which was an increase of 3.5 years since the 1987–1991 period. This region also has the lowest rates for all seven leading causes of death in the Fraser Basin. In 2006, the region had the highest proportion of low-weight births (6%) in the Fraser Basin and the largest increase (11%) in these births since 1996. This may relate, in part, to the fact that the region is home to the provincial centre for acute prenatal and infant care.

Housing
In 2007, Metro Vancouver had the least affordable housing in the Fraser Basin, with home ownership requiring an average of 73.8% of household income compared to an average of 68.5% for BC. The GVSS region also had the largest proportion (27.1%) of owner-occupied households spending more than 30% of their household income on housing costs. Average monthly rental costs in Metro Vancouver increased 18% between 2001 and 2007, while rental vacancies declined to less than 1%. The number of homeless people in Metro Vancouver increased by 137% between 2002 and 2008.

Income & Employment
In 2005, the region had the highest average household income ($60,598), although this was a decrease of 3.8% since 2000. In addition, the region has had the highest proportion of low-income families (13% in 2005) in the Fraser Basin since 1995. In 2006, the employment rate in the GVSS was 62.8% (the second highest in the Basin), and the unemployment rate was 5.6% (the lowest in the Basin).

Solid Waste Disposal
Metro Vancouver recorded an increase of 15% in total solid waste disposal between 1996 and 2006. The Squamish-Lillooet Regional District recorded a significant decrease (16%) in per capita solid waste disposed in landfills between 1996 and 2006; however, a 12% increase in total solid waste disposal was also recorded during this period.

Water Quality & Quantity
In 2004, 91% of the municipal populations in the region were connected to municipal wastewater treatment systems: 53% were served by secondary treatment systems, 37% were served by primary treatment and less than 1% were served by tertiary treatment.

Summary of Sustainability Highlights

Sustainability Snapshot 4 sets out an in-depth analysis of 18 different sustainability topics, describes the status of four or five distinct indicators for each topic, and offers examples of initiatives advancing sustainability throughout the Fraser Basin. Upon completion of the data analysis, 50 "headline indicators" were identified to compile an overall summary. This process was similarly undertaken for the Sustainability Snapshot 3 report, which was published in November 2006.

The following highlights focus on two to three[a] headline indicators for each topic and a description of the status of those indicators. This is intended as a helpful synthesis, not an exhaustive summary of all of the indicators or data in this report. The status of each of the indicators is characterized using one of the following descriptions, which can be considered on a spectrum from best to worst.

GOOD / GETTING BETTER – The current state is good and/or the trend is improving when comparing the present to the past. The data must be good or improving for the Fraser Basin as a whole, a majority of the Basin regions, or for British Columbia (if data are unavailable for the Basin).

FAIR / MIXED RESULTS – The current state is fair and/or the trend is stable with minimal variation over time. Mixed results refer either to variations within the sub-regions of the Fraser Basin or to variations between sub-indicators (some are getting better and some are getting worse; for example total versus per capita). More than half of the sub-regions or sub-indicators are fair, good or improving.

MIXED RESULTS / POOR – The current state is poor and/or the trend is stable or getting slightly worse over time. Mixed results refer either to variations within the sub-regions of the Fraser Basin, or to variations between sub-indicators (some are getting better and some are getting worse). More than half of the sub-regions or sub-indicators are poor, or deteriorating.

POOR / GETTING WORSE – The current state is poor and/or the trend is deteriorating when comparing the present to the past. The data must be poor or deteriorating for the Fraser Basin as a whole, for a majority of the regions or for British Columbia (if data are unavailable for the Basin).

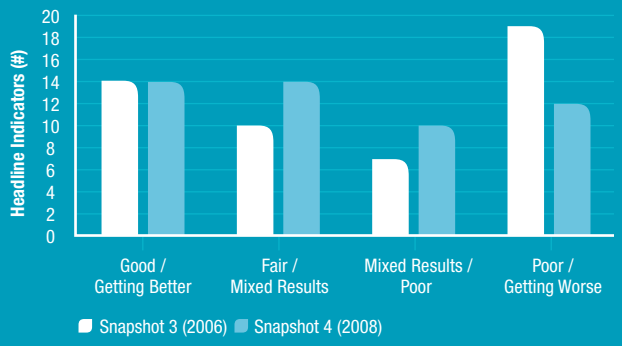
The following analysis compares the status of headline indicators in the Sustainability Snapshot 3 (2006) and Sustainability Snapshot 4 (2008) reports. For purposes of measuring change over time, the following numeric values were assigned to the rating scale for the headline indicators.[b]

Status	GOOD / GETTING BETTER	FAIR / MIXED RESULTS	MIXED RESULTS / POOR	POOR / GETTING WORSE
Value	4	3	2	1

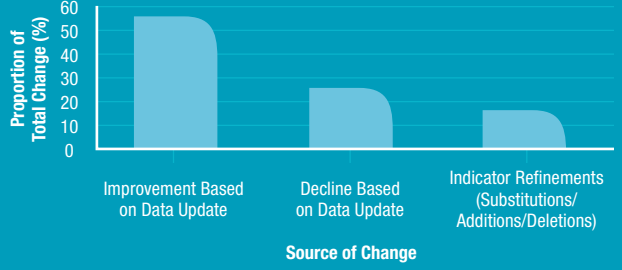
As the status of the indicators moves up or down the rating scale, the numeric value also changes. Using this scale, modest but notable improvements have been identified in the overall status of the headline indicators between the Snapshot 3 and 4 reports, including the following:

- There was an overall increase of 9% in the total numeric value of the headline indicators, based on a change from 119 to 130 on a scale up to 200;
- This represented an increase from 60% to 65% of the maximum possible score of 200;
- The same number (14) of indicators were assigned the status "Good / Getting Better" in both 2006 and 2008;
- There was an increase in the number (4) of indicators that were assigned the status "Fair / Mixed Results";

Change in Headline Indicator Status Between Snapshot 3 (November 2006) and Snapshot 4 (February 2009)



Sources of Change Between Snapshot 3 (November 2006) and Snapshot 4 (February 2008)



Notes

[a] Fifteen of the 18 topics list three indicators each; two topics list two indicators each; and one topic lists one indicator.

[b] This scale is intended to describe relative, not absolute, degrees of sustainability (e.g., a rating of Good / Getting Better may not imply absolute sustainability in all cases).

• There was an increase in the number (3) of indicators that were assigned the status "Mixed Results / Poor"; and

• There was a decrease in the number (7) of indicators that were assigned the status "Poor / Getting Worse."

Many of the headline indicators have been updated with data from consistent sources; however, other headline indicators have been refined with substitutions, additions or deletions for the following reasons:

• Availability or unavailability of data updates since previous Snapshot reports were prepared;

• Emergence of new data for indicators of interest;

• Interest in broadening the scope of previous indicator measures; and

• Challenges related to data access, verification or quality.

Because the Fraser Basin Council aims to continually improve on the suite of indicators used within the series of Snapshot reports, and because of the above-noted reasons for refining the indicators over time, it is important to assess the sources of change in the status of headline indicators between the two most recent Snapshot reports. The following are the results of this analysis:

• 83% of the overall change in status was based on updating indicator data for consistent or very similar indicator measures.

• Of these updates, more than half (57%) of the total change included measurable improvements in indicator trends, while one quarter (26%) included measurable declines.

• About 17% of the overall change in the status of headline indicators resulted from refinements in the suite of headline indicator, including substitutions, additions or deletions, which were implemented because of the reasons noted above such as data improvements, quality and availability.

Aboriginal & Non-Aboriginal Relations

MIXED RESULTS / POOR
Aboriginal Health and Well-Being – Between 2000 and 2004, there were signs of improvement; however, significant differences in many key health statistics still existed between Aboriginals and non-Aboriginals in BC.

MIXED RESULTS / POOR
Children in Care – The total number and proportion of Aboriginal children in care in BC continued to increase between 2000 and 2008.

FAIR / MIXED RESULTS
Progress in the BC Treaty Commission Process – Since 2002, some progress has been made by some First Nations participating in the BC Treaty Commission process.

Agriculture & Food

MIXED RESULTS / POOR
Average Farm Income – In 2006, average farm income was very low in interior regions and higher in the Fraser Valley and GVSS regions.

FAIR / MIXED RESULTS
Agricultural Land Reserve – There was a net increase in ALR in the Fraser Basin, a net loss in 4 of 5 regions, and a net loss in prime agricultural land between 1973 and 2005.

GETTING BETTER
Agriculture and the Environment – Between 2006 and 2008, there were increasing numbers of completed Environmental Farm Plans in all regions as well as a high use of organic farming practices.

Air Quality

GETTING BETTER
Particulate Matter$_{2.5}$ – Levels have either improved or remained low and stable since 2004.

GETTING BETTER
Ground Level Ozone – Levels have either improved or remained low and stable since 2004.

GOOD
Air Quality Health Index – Ratings were consistently good (Low Health Risk) between 2000 and 2006.

Biodiversity

POOR

Ecosystems at Risk – Six of eight BC ecosystems assessed as being "at risk" in 2008 were in the Fraser Basin.

FAIR / MIXED RESULTS

Protected Areas – In 2008, the Fraser Basin overall and four of five regions had 14% or more of the land base designated as Protected Areas; however, Protected Areas were not representative of all types of ecosystems in the Fraser Basin.

MIXED RESULTS / POOR

Woodland Caribou – Of 12 caribou herds in the Fraser Basin in 2008, six were declining in population, four were stable, one was increasing and one was of unknown status.

Business & Sustainability

FAIR / MIXED RESULTS

Corporate Social Responsibility – In 2007 and 2008, several companies based in the Fraser Basin and BC continued to be recognized by Stratos Inc. and Corporate Knights as CSR leaders in Canada.

GETTING BETTER

Carbon Disclosure – Between 2005 and 2008, the number of Canadian companies participating in the Carbon Disclosure Project increased from zero to 106.

Climate Change

MIXED RESULTS / POOR

Greenhouse Gas Emissions in BC – In 2004, both total (65,600 kilotonnes) and per capita (15.6 tonnes) GHG emissions in BC were at their highest levels reported since 1990; however, total emissions decreased by 5% between 2004 and 2006.

POOR / GETTING WORSE

Climate Change Impacts in the Fraser Basin – Average freshwater and air temperatures have warmed over the past 50–100 years, and Fraser River flows are occurring earlier than in the past 85 years.

GETTING BETTER

Climate Change Mitigation and Adaptation in the Fraser Basin – Communities and organizations are identifying and pursuing many opportunities for reducing their greenhouse gas emissions, and are planning to adapt to climate-related vulnerabilities, such as flooding, drought and interface fires.

Community Engagement

GOOD

Volunteerism – In 2004, the rate of volunteerism in BC matched the Canadian average in terms of the proportion of British Columbians that volunteered (45%) and was high in terms of the average number of hours volunteered (199).

GOOD

Charitable Giving – In 2004, rates of charitable giving in BC were strong but below the Canadian average in terms of the proportion of British Columbians that donated money (78%), and were high for the average value of donations ($467).

Consumption & Waste

FAIR / MIXED RESULTS

BC Households and the Environment – In 2006, participation of BC households in environmental activities was better than the Canadian average in four of six categories. In two of those categories—rates of recycling and use of compact fluorescent light bulbs—BC led the country.

POOR / GETTING WORSE

Solid Waste Disposal – Total solid waste disposal increased in the Fraser Basin overall and in most regional districts in the Basin between 1996 and 2006.

POOR

Canadian Consumer Choices – In 2008, the Consumer Greendex™ measured environmentally sustainable behaviour of consumers in 14 countries by ranking their choices in housing, transportation, food and consumer goods. Canadians ranked second to last in the survey.

Economy

GETTING BETTER

Strength of the Economy (per capita GDP) – Per capita GDP increased steadily year to year between 2002 and 2007.

FAIR / MIXED RESULTS

Individual Disposable Income – Disposable income in BC increased by 26% between 1997 and 2007 and was similar to the Canadian average throughout this period.

FAIR / MIXED RESULTS

Unpaid Work – In 2006, 36% of the population dedicated their time, without pay, on a weekly basis to care for children; 17.5% volunteered their time to provide assistance to seniors.

Education

FAIR / MIXED RESULTS

Educational Attainment – In 2006, overall levels of educational attainment in the Fraser Basin were above the provincial average, but in certain regions they were well below the average.

FAIR / MIXED RESULTS

Graduation Rates – In 2006/2007, six-year completion rates varied throughout the Fraser Basin and differed between genders and Aboriginal and non-Aboriginal students.

GETTING WORSE

Composite Learning Index (CLI) – CLI scores declined between 2007 and 2008 and were below the provincial average.

Energy

FAIR / MIXED RESULTS

Total Energy Consumption in BC – Although energy consumption in BC increased by 24% from 1990 to 2006, annual consumption has levelled off since 2000.

GETTING BETTER

Energy Intensity in BC – Rates of energy consumption per person and per unit of real GDP declined between 1990 and 2006 (by 5% and 33% respectively).

FAIR / MIXED RESULTS

Residential Electricity Consumption in the Fraser Basin – There was a 6% increase in average annual electricity consumption per residential account between 2000 and 2004; however, there was a 1.5% decrease between 2004 and 2006.

Fish & Fisheries

POOR / GETTING WORSE

Sockeye, Coho and Chinook Salmon – Sockeye, coho and chinook salmon returns are in varying states of decline with significant cause for concern in recent years. The one exception is summer chinook (Upper Fraser) runs, which are increasing.

POOR / GETTING WORSE

Steelhead – Thompson River populations have fallen to critically low levels, resulting in closures of the inland catch and release fishery in both 2004 and 2008.

MIXED RESULTS / POOR

Fraser River White Sturgeon – The number and growth rate of Lower Fraser white sturgeon

have declined since 2003. The Nechako River population remains critically endangered. Upper Fraser and Middle Fraser River populations are low but apparently stable.

Forests & Forestry

POOR
Mountain Pine Beetle Outbreak – The area affected by the MPB epidemic has grown rapidly since 2000; in 2007 the epidemic affected more than 8.8 million ha in the Fraser Basin.

MIXED RESULTS / POOR
Community Vulnerability to the Mountain Pine Beetle – In 2005, vulnerability was higher for communities in the Upper Fraser and Cariboo-Chilcotin than for those in the Thompson region.

FAIR / MIXED RESULTS
Forest Restocking in BC – In the 1980s the area of satisfactorily restocked forest was less than the area disturbed. From the early 1990s to 2005 it was more than the area disturbed; from 2005 to 2008 it was again less than the area disturbed.

Health

GETTING BETTER
Life Expectancy – Average life expectancy across the Fraser Basin continued to rise over the 2002–2006 period.

GETTING WORSE
Low-Weight Births – The proportion of low-weight newborns increased between 1996 and 2006.

GETTING BETTER
Leading Causes of Death – Rates of the seven leading causes of death in the Fraser Basin decreased between 2001 and 2006, with the exception of diabetes.

Housing

POOR / GETTING WORSE
Housing Affordability – In 2006, BC had the least affordable housing market among all provinces in Canada, and in 2005, had the second highest (worst) proportion of urban residents living in core housing need.

POOR / GETTING WORSE
Rental Housing – Urban centres in all regions of the Fraser Basin recorded declining vacancy rates and increasing rental costs between 2001 and 2007.

POOR / GETTING WORSE
Homelessness – In 2008, the rate of homelessness had increased in Metro Vancouver and the Fraser Valley since previous counts throughout the 2000s.

Income & Employment

GETTING BETTER
Employment Rate – The employment rate in the Fraser Basin in 2006 (62.8%) was almost 2% higher than in 2001.

MIXED RESULTS / POOR
Average Household Income – Average household income in the Fraser Basin was higher than the BC average in 2005 but was lower than in 2000.

MIXED RESULTS / POOR
Incidence of Low Income – In 2005, the proportion of low-income families (11.7%) had decreased since the proportion in 1995 (17.3%) and 2000 (15.7%); however, the number of children living in poverty had increased.

Population

FAIR / MIXED RESULTS
Population – Between 1996 and 2006, the Fraser Basin population increased steadily (13.3%); however, population declines were observed in the Upper Fraser (-6%) and Cariboo-Chilcotin (-7.4%) regions during this period.

Water Quality & Quantity

MIXED RESULTS / POOR
Municipal Domestic Water Consumption – Domestic (i.e., residential) water consumption per capita increased in the Fraser Basin overall but declined in three of five regions between 2001 and 2004.

FAIR / MIXED RESULTS
Municipal Wastewater Treatment – Together, municipalities in the Fraser Basin provided wastewater treatment services to 85% of the population in 2004: 36.2% with primary treatment, 59.4% with secondary treatment, and only 4.3% with tertiary treatment.

GOOD / MIXED RESULTS
Water Quality Index – Four Fraser Basin sites were given Good or Excellent Water Quality Index rankings, while four sites were Fair or Marginal for the period between 2004 and 2006.

Steps for Sustainability

FOR PRIVATE AND PUBLIC ORGANIZATIONS

Aboriginal & Non-Aboriginal Relations – Build New Relations

• Organizations, governments and businesses can help local Aboriginal and non-Aboriginal communities and organizations work together by accessing information provided by the First Nations Summit (www.fns.bc.ca), Union of BC Indian Chiefs (www.ubcic.bc.ca), BC Assembly of First Nations (www.bcafn.ca), Métis Nation British Columbia (www.mpcbc.bc.ca), Union of BC Municipalities (www.civicnet.bc.ca), BC Ministry of Aboriginal Relations and Reconciliation (www.gov.bc.ca/arr) and Indian and Northern Affairs Canada (www.ainc-inac.gc.ca).

• Consider formal and informal agreements, such as protocols and Memorandums of Understanding, to improve communication, information sharing, joint planning, co-management, shared decision-making and shared services between Aboriginal and non-Aboriginal entities.

• Explore opportunities for Aboriginal and non-Aboriginal business owners and communities to work together on business ventures.

Agriculture & Food – Sustain BC Food Production

• Buy local food when organizing your meetings and events.

• Local governments and the Agricultural Land Commission can continue to protect prime agricultural land from subdivision and development: www.alc.gov.bc.ca.

• Farm operators can implement Environmental Farm Plans and manage their land in a way that supports ecosystem health. The BC Agriculture Council can help you learn more about this initiative: www.bcac.bc.ca.

Air Quality – Breathe Easier

• Governments can track air pollution trends by maintaining and expanding air quality monitoring and reporting initiatives such as the National Air Pollution Surveillance Network, the National Pollutant Release Inventory and the Air Quality Health Index: www.airhealthbc.ca.

• Governments and businesses can support innovation and development of clean technology to minimize air pollution.

• All communities can develop Airshed Management Plans to improve air pollution.

Biodiversity, Fish & Fisheries – Be a Steward

• Farm operators and ranchers can manage their land in a way that supports and enhances biodiversity. A guide on planning for biodiversity, produced by the BC Agriculture Council, is available at www.bcac.bc.ca.

• Public and private organizations can partner with groups that focus on enhancing biodiversity and wildlife habitat on private and public land, such as the Nature Conservancy of Canada (www.natureconservancy.ca), the Land Conservancy of Canada (www.conservancy.bc.ca) and Ducks Unlimited (www.ducks.ca).

• Private businesses, such as nature tourism operators, can ensure they implement best practices to minimize their impact on biodiversity, habitat and wildlife. Visit the BC Wilderness Tourism Association to learn more: www.wilderness-tourism.bc.ca.

Business & Sustainability – Buy Smart

• Buy supplies and materials that are extracted/harvested, manufactured and capable of being disposed of in an environmentally sustainable way. See the Sustainability Purchasing Network: www.buysmartbc.com.

• Provide work-life balance opportunities for employees, including flex-time and job-sharing.

• Implement David Suzuki's Nature Challenge at Work: download a free guide from www.davidsuzuki.org.

Climate Change & Energy – Be Power Smart & Climate Neutral. Plus, Green Your Fleet

• Reduce energy consumption by using more efficient fleet management practices and technologies. See www.greenfleetsbc.com. Participate in the E3 Fleet Rating System: www.e3fleet.com.

• Use alternative fuels that reduce greenhouse gas (GHG) emissions and other air pollutants, or consider other green technologies for fleet vehicles.

• Join Idle Free BC and reduce unnecessary engine idling in your community or vehicle fleet. You could save up to 10% on fuel costs: www.idlefreebc.ca.

• Save money and energy by reducing your electricity consumption. Take advantage of BC Hydro's Power Smart program for businesses: www.bchydro.com.

• Communities can undertake climate change vulnerability assessments and develop adaptation strategies.

• Employers and governments can provide incentives, facilities and infrastructure to encourage people to walk, cycle, carpool, or take public transit instead of driving alone to work. Employees can also be encouraged to participate in sustainable transportation events such as Bike to Work Week (www.biketowork.ca) or the Commuter Challenge (www.commuterchallenge.ca).

• Visit www.bcclimateexchange.ca for other ideas on improving energy efficiency and reducing GHG emissions.

Community Engagement – Volunteer or Donate

• Offer your employees opportunities to volunteer for a worthy cause and help others in the community. Connect with your local volunteer centre through Volunteer BC: www.volunteerbc.ca.

• Make corporate donations or match employee donations to community development projects and help those less fortunate.

• Support your employees' participation in community fundraising and awareness events such as the Terry Fox Run (www.terryfoxrun.org) or the Weekend to End Breast Cancer (www.endcancer.ca).

Consumption & Waste – Use Resources Wisely

• Reduce, reuse and recycle wherever possible. See Recycling Council of BC (www.rcbc.bc.ca) and BC Industrial Materials Exchange (www.bcimex.ca).

• Properly dispose of special wastes. See Product Care (www.productcare.org) to learn about accepted products, disposal depots and other information.

• Conduct a waste assessment in your organization to reduce waste and save money. Waste assessments help determine the weight, volume and types of waste materials being generated and identify options for reducing, reusing, or recycling.

• Communities can participate in Waste Reduction Week (third week of October): www.wrwcanada.com.

• Businesses and industries can ensure production processes use resources efficiently (for example, water, wood, paper and energy).

Economy, Income & Employment – Support People and Communities

• Help develop partnerships between communities, governments and businesses to diversify local and regional economies.

• Support initiatives such as job sharing, cooperative enterprises, peer lending groups and entrepreneurship training.

• Governments and community organizations can implement policies and programs for reducing poverty and providing affordable housing, childcare and other social services to people on reduced incomes.

• Educate yourself and your organization about poverty issues in your community by connecting with social planning committees and local agencies that work with those in need.

• Explore opportunities for and the feasibility of paying employees a living wage and providing benefits to help them meet their costs of living. A number of organizations, such as the Canadian Centre for Policy Alternatives, have calculated a living wage for some communities: www.policyalternatives.ca.

• Governments can ensure that their policies and taxes do not disproportionately burden low-income households.

Education – Hands Up for Lifelong Learning

• The BC Network for Sustainability Education is a multi-sectoral, collaborative network where participants can engage in sustainability education and share an online meeting space: www.walkingthetalk.bc.ca.

• Help employees pursue lifelong learning by giving them time and opportunities for professional development.

• Offer training opportunities such as internships for youth, recent graduates, new immigrants, persons with disabilities and unemployed people in the community to help them develop necessary work experience and build capacity to participate in the workforce.

Forests & Forestry – Support Sustainable Forestry

• Forest companies can incorporate local interests and issues into their forest planning and management by working with community advisory committees.

• Governments, research institutions, forest companies and community groups can continue to manage the mountain pine beetle epidemic and its impacts on the environment and local communities.

• Forest companies and certification bodies can continue to implement rigorous monitoring, evaluation and reporting procedures for forest planning and management.

Health – Paths to Better Living

• Communities can join the BC Healthy Communities initiative: www.bchealthycommunities.ca.

• Schools can join Action Schools! BC to help children make good choices about physical activity and healthy eating: www.actionschoolsbc.ca.

Housing – Raising the Roof

• Local governments can develop land use plans and development policies to create a diverse mix of housing options, and can provide developers with incentives for incorporating affordable housing units into new developments.

• Federal and provincial governments can help communities develop affordable housing options.

• Developers can build green housing designs (www.builtgreencanada.ca).

Population – Plan Smart

• The new Smart Planning for Communities program (www.fraserbasin.bc.ca/programs/smart_planning.html) is helping local and First Nations governments strengthen the social, economic and environmental fabric of their communities by incorporating sustainability principles and practices into their planning processes.

• Communities and developers can learn how to implement smart growth principles and practices from Smart Growth BC: www.smartgrowth.bc.ca. The Smart Growth on the Ground initiative helps communities prepare sustainable neighbourhood plans, including land use, transportation, urban design and building design plans.

Water Quality & Quantity – Live Water Smart

• Governments can promote conservation programs for residential, commercial, industrial and agricultural water use with educational materials, incentives and rebates for water-saving devices, and water meters.

• Visit Water Bucket BC (www.waterbucket.ca) to learn about sustainable ways to use and manage water resources.

• Farmers can learn about efficient irrigation practices from the Irrigation Industry Association of British Columbia: www.irrigationbc.com. An irrigation schedule calculator is available to help farmers optimize their water use based on local and seasonal conditions. Also visit www.farmwest.com to tap into helpful data from a network of climate stations across BC.

• Local governments can develop Liquid Waste Management Plans to protect water quality.

• Businesses and public organizations can implement water conservation practices and technologies.

Steps for Sustainability

FOR INDIVIDUALS

Aboriginal & Non-Aboriginal Relations – Build New Relations

• Learn more about and engage with Aboriginal and non-Aboriginal people in or near your community.

• Attend local events, such as National Aboriginal Day and community celebrations.

• Deepen cultural understanding by learning another language. Try online resources designed to strengthen First Nations language skills, such as www.firstvoices.ca, which offers vocabulary-building games for the young and young in spirit.

Agriculture & Food – Sustain BC Food Production

• Buy local. Get to know your local farmers and support them by purchasing their products through farmers' markets, farm gate sales and community-shared agriculture. See www.bcfarmersmarket.org and www.getlocalbc.org to learn more about locally produced food.

• Do you live in an area with a year-round variety of local foods? Give the 100-mile diet a try.

• Grow your own vegetables in an urban garden or join a local farming co-op: www.cityfarmer.org. Visit Farm Folk, City Folk for more information on farm co-ops in your area: www.ffcf.bc.ca.

• Learn about invasive plants and avoid planting aggressive or known invasive species. Grow appropriate non-invasive alternatives, such as species native to your area, and dispose of garden waste appropriately at your local landfill or compost if composting will not promote the spread of invasive species. Visit the Invasive Plant Council of BC at www.invasiveplantcouncilbc.ca.

Air Quality – Breathe Easier

• Check out the Air Quality Health Index (www.airhealthbc.ca) to learn about air quality in your community and the risks posed by air pollutants. The index is updated several times daily and can assist anyone, especially people sensitive to air pollution, in making decisions on whether to limit exposure or activity during periods when the health risk is higher.

• Use clean energy sources and improve home energy efficiency, especially when it comes to home heating. Use high-efficiency furnaces and certified wood stoves.

• Learn about indoor air pollutants and how to minimize their impact. Visit Health Canada at www.hc-sc.gc.ca, Environment Canada at www.ec.gc.ca and the BC Lung Association at www.bc.lung.ca.

Biodiversity, Fish & Fisheries – Be a Steward

• Support local stewardship groups that help fish, wildlife and habitat. Visit the BC Stewardship Centre at www.stewardshipcentre.bc.ca, the Pacific Streamkeepers Federation at www.pskf.ca, the BC Wildlife Federation at www.bcwf.bc.ca, or other local stewardship groups to learn more about volunteer opportunities.

• Landowners and managers can help protect streamside and shoreline areas. Visit Think Salmon (www.thinksalmon.com) to learn what you can do to safeguard these sensitive ecosystems.

• Support sustainability in the fishing sector by making informed choices about seafood purchases. See Canada's Seafood Guide at www.seachoice.org or Ocean Wise at www.vanaqua.org/oceanwise.

• Report illegal fishing, wildlife poaching and polluting to the 24-hour hotline 1-877-952-RAPP (7277) or www.env.gov.bc.ca/cos/rapp/form.htm.

Business & Sustainability – Buy Locally and Buy Smart

• Support local businesses, buy locally produced goods and services, and support businesses that use sustainable practices.

• Visit the Better Business Bureau (http://mainlandbc.bbb.org), the BC Chamber of Commerce (www.bcchamber.org) or your local Chamber of Commerce for more information about BC businesses.

Climate Change & Energy – Be Power Smart and Climate Neutral

• Save money and energy by reducing your electricity consumption; take advantage of BC Hydro's energy saving tips, product information, and home upgrade incentives and rebates: www.bchydro.com.

• Take advantage of provincial and federal EcoEnergy Retrofit rebates, incentives and PST exemptions by improving your home's energy efficiency. An energy-efficient home will help you save money, increase comfort, and reduce your environmental footprint.

• Improve fuel efficiency and reduce air pollution by reducing engine idling. See www.idlefreebc.ca.

• Walk, cycle, carpool or take public transit instead of driving alone, especially to work and on short trips around your neighbourhood.

• Visit www.bcclimateexchange.ca for other ideas on improving energy efficiency and reducing GHG emissions.

Community Engagement – Volunteer or Donate

• Volunteer your time to a worthy cause and help others in your community. See Volunteer BC (www.volunteerbc.ca) for information about local volunteer centres.

• Donate money, food, clothes or household items to help those in need.

• Lend a helping hand to your neighbours.

Consumption & Waste – Reduce, Reuse and Recycle

• Take advantage of rebates, incentives and tax exemptions that make it easier and more affordable to make green choices. See LiveSmart BC: www.livesmartbc.ca.

• Buy products that use minimal packaging.

• Compost your yard waste and food scraps.

• Find out where you can safely recycle electronics and safely dispose of hazardous goods.

• Check with the Recycling Council of BC (www.rcbc.bc.ca) and your Regional District or the Return-It program (Encorp Pacific Canada – www.encorp.ca/cfm/index.cfm) for local opportunities to manage your waste.

Economy, Income & Employment – Support People and Communities

• Educate yourself about poverty issues in your community by connecting with local social planning committees and agencies that work with people who are on low incomes.

Education – Hands Up for Lifelong Learning

• Take advantage of the array of classes, programs and skills workshops offered by school districts, community centres and public libraries.

• Participate in non-formal community learning events, such as the ongoing Imagine BC: Dialogues on the Future of British Columbia (www.sfu.ca/dialog//imaginebc) or the annual 30 Days of Sustainability event: www.30daysofsustainability.com.

• Join your local public library for access to thousands of books, journals, magazines and audio recordings on a wide range of sustainability issues. See www.bclibrary.ca/home.

Forests & Forestry – Support Sustainable Forestry

• Support BC forest workers and companies by buying local forest products. See BuyBC*wild* at http://buybcwild.com.

• Buy certified wood and paper products. See the Canadian Sustainable Forestry Certification Coalition: www.certificationcanada.org.

• Participate in community advisory committees to help forest companies incorporate local interests and issues into their forest planning and management.

Health – Paths to Better Living

• Take the healthy living pledge and enhance your health by getting at least 30 minutes of physical activity per day—walk the dog, ride your bike or go snowshoeing with friends or family. See www.actnowbc.ca.

• Learn more about healthy eating habits. In BC, 30% of cancer and diabetes cases and 20% of cardiovascular diseases are due to poor nutrition, and $800 million per year is spent on illnesses related to poor nutrition.

Housing – Raising the Roof

• Buy homes that are Built Green.™ Visit www.builtgreencanada.ca.

• Participate in Homelessness Awareness Week activities and events, and help community leaders and decision-makers appropriately address homelessness.

Population – Neighbours Helping Neighbours

• Help make your community a safer and friendlier place by getting to know your neighbours and learning about the ethnic and cultural diversity in your neighbourhood.

Water Quality & Quantity – Live Water Smart

• Reduce household water consumption by installing water-saving appliances and fixtures, such as low-flow shower heads and toilets.

• Do not pollute water by disposing of garbage, motor oil, paint, or pesticides in storm drains or near water bodies.

• Maintain septic systems at least once every three years.

• Minimize the use of chemical pesticides and fertilizers on lawns and gardens.

• Visit www.livingwatersmart.ca for other ideas on preserving and protecting water.

Fraser Basin Council Offices

FBC BASIN-WIDE OFFICE & GREATER VANCOUVER SEA TO SKY (GVSS) REGIONAL OFFICE

1st Floor, 470 Granville Street
Vancouver, BC V6C 1V5

David Marshall, *Executive Director*
T (604) 488-5350
F (604) 488-5351
info@fraserbasin.bc.ca

Marion Town, *Regional Manager*
T (604) 488-5365
mtown@fraserbasin.bc.ca

FRASER VALLEY REGIONAL OFFICE

PO Box 3006
Mission, BC V2V 4J3

Marion Robinson, *Regional Manager*
T (604) 826-1661
F (604) 826-6848
mrobinson@fraserbasin.bc.ca

THOMPSON REGIONAL OFFICE

#200 –1383 McGill Road
Kamloops, BC V2C 6K7

Phil Hallinan, *Regional Manager*
T (250) 314-9660
F (250) 828-2597
phallinan@fraserbasin.bc.ca

CARIBOO-CHILCOTIN REGIONAL OFFICE

104 –197 Second Avenue North
Williams Lake, BC V2G 1Z5

Mike Simpson, *Regional Manager*
T (250) 392-1400
F (250) 305-1004
msimpson@fraserbasin.bc.ca

UPPER FRASER REGIONAL OFFICE

207–155 George Street
Prince George, BC V2L 1P8

Jillian Merrick, *Associate Regional Manager*
T (250) 612-0252
F (250) 564-6514
jmerrick@fraserbasin.bc.ca

Photo Credits

Charles Jago (page 1), courtesy of University of Northern BC; FBC board (page 4) by Denise Palmer, FBC; Green Fleets BC launch (page 5) by Denise Palmer, FBC; House post ceremony (page 8) by Gerhard von Rosen, Gaiapix; Canim Lake Band horticultural program (page 11), courtesy of BC Ministry of Agriculture and Lands; Girl meets butterfly (page 14), courtesy of BC Association of Farmers' Markets; Community weed pull (page 15), courtesy of Northwest Invasive Plant Council; Tour of Silver Hills Ranch (page 15), by Fraser Basin Council; Border Air Quality map (page 18), courtesy of Martin Mullan, Environment Canada; Idle-Free Ambassador (page 19), courtesy of BC Ministry of Environment; Woodland caribou (page 21), courtesy of Elena Jones; BC grasslands (page 22), courtesy of Richard Doucette, Grasslands Conservation Council of BC; Frolek grasslands (page 23), courtesy of the Nature Conservancy of Canada; E3 Fleet presentation (page 31), by Mitz Naga for FBC; Relay for Life (page 35), courtesy of Canadian Cancer Society – Greater Vancouver Region; R&B Trucking (page 49), by Kristopher Grunert, for FBC; Think Salmon (page 52), by Denise Palmer, FBC; Nechako sturgeon (page 53), courtesy of Nechako White Sturgeon Recovery Initiative; Community kitchen (page 61), courtesy of Fresh Choice Kitchens, the community kitchen program of the Greater Vancouver Food Bank Society; Farm to School Salad Bar (page 61), courtesy of Public Health Association of BC; Habitat for Humanity (page 65), courtesy of Kevin Gagel; Water Wise tour (page 75), courtesy of Cariboo Chilcotin Conservation Society.

Fraser Basin Council Directors

Dr. Charles Jago
Chair, Fraser Basin Council
President, University of Northern BC
Prince George

Deborah Abbott
Executive Director
Nlaka'pamux Nation Tribal Council,
Nlaka'pamux language group, Lytton

David Barratt
Harbour Master
Harbours & Ports, Mission

Ervin Charleyboy
Chief
Alexis Creek First Nation,
Ts'ilhqot'in language group, Williams Lake

Rose Charlie (De-lix-hwia)
Grand Chief, OBC, LL.D. (Hon)
Halq'eméylem language group, Chehalis

Michael Clague
Past President
Canadian Council on Social Development,
Vancouver

Linda Coady
Vice President
Sustainability, VANOC – 2010 Olympic &
Paralympic Winter Games, Vancouver

Sheilagh Foster
Artist
McBride

Dan George
President
Four Directions Management Services, Carrier
language group, Prince George

Leah George-Wilson
Chief
Tsleil-Waututh Nation, Hun'qumyi'num'
language group, North Vancouver

Duncan Jeffries
Instructor
Computer Information Systems,
University College of the Fraser Valley,
Abbotsford

Gary John
Former Chief
Stl'atl'imx, S'á imcets language group, Shalath

Paul Kluckner
Regional Director General
Environment Canada, Vancouver

Doug Konkin
Deputy Minister
Ministry of Environment, Victoria

John Massier
Director
Cariboo Regional District, Quesnel

Ken Melamed
Director
Squamish-Lillooet Regional District, Whistler

Marie Mervyn
Retired Rancher
Alkali Lake

Debora Munoz
Director
Regional District of Fraser-Fort George,
Prince George

Michael O'Brien
Vice President
Vancouver International Airport Authority,
Vancouver

Alan Osborne
Executive Director
Intergovernmental Relations and Planning
Division, Ministry of Community Development,
Victoria

Kristy Alphonse-Palmantier
Representative, Shuswap Nation
Secwepemc language group, Williams Lake

Bob Patterson
Manager
Government & Environmental Affairs,
Taseko Mines, 150 Mile House

Bob Peart
President
The Nexus Learning Group, Sidney

Jerry Petersen
Director
Regional District of Bulkley-Nechako, Vanderhoof

Patricia Ross
Chair
Fraser Valley Regional District, Abbotsford

Doug Routledge
Vice President
Council of Forest Industries, Prince George

Gerry Salembier
Assistant Deputy Minister
Western Economic Diversification Canada,
Vancouver

George Saddleman
Representative
Okanagan Nation Alliance,
Okanagan language group, Merritt

Bob Smillie
Retired Physician
Kamloops

Paul Sprout
Regional Director General
Fisheries and Oceans Canada, Vancouver

Rene Talbot
Director
Columbia Shuswap Regional District, Falkland

John Taylor
Director
Thompson-Nicola Regional District, Kamloops

Bev van Ruyven
Executive Vice-President
Customer Care and Conservation, BC Hydro,
Vancouver

David Van Seters
President
Small Potatoes Urban Delivery, Vancouver

Richard Walton
Director
Metro Vancouver Regional District,
North Vancouver

Thanks to Our Sponsors

Platinum Sponsors

BRITISH COLUMBIA

Ministry of Aboriginal Relations and Reconciliation
Ministry of Community Development
Ministry of Energy, Mines and Petroleum Resources
Ministry of Environment
Ministry of Public Safety and Solicitor General

BC hydro FOR GENERATIONS

Rio Tinto Alcan

THE VANCOUVER SUN
SERIOUSLY WESTCOAST

Gold Sponsors

TRANSLINK

YVR VANCOUVER AIRPORT AUTHORITY

Silver Sponsors

BCIT SCHOOL OF CONSTRUCTION AND THE ENVIRONMENT

Environment Canada / Environnement Canada

Terasen Gas

UBC

Vancity

Bronze Sponsors

bc AHC BC Academic Health Council
working together to prepare tomorrow's healthcare workforce

BC Transmission CORPORATION
Building Connections

Hemlock

junxion

mfa Municipal Finance Authority of British Columbia

PACIFIC SALMON FOUNDATION

SNC·LAVALIN

Spectra Energy

THRIFTY FOODS

Report Sponsor

Air Quality Get to know it!
Air Quality Health Index British Columbia

Other Supporters

CSRD

metro vancouver

SHAW

Maps of the Fraser River Basin

Map 1 presents an Overview of the Fraser River Basin. The Fraser River is central to this map; other tributary rivers and lakes are also included. The map profiles major communities, Indian Reserves, regional districts, major transportation corridors and the five regions of the Fraser Basin Council: Upper Fraser, Cariboo-Chilcotin, Thompson, Fraser Valley and Greater Vancouver-Sea to Sky.

On the reverse side, **Map 2** presents Land Use in the Fraser River Basin. The Fraser River is profiled on the map, along with the names and boundaries of each major tributary watershed. The map illustrates land uses such as the Agricultural Land Reserve, Protected Areas, forest harvesting and grasslands. Regional urban centres and major highways are also profiled on this map.

Fraser Basin Council

Social well-being supported by a vibrant economy and sustained by a healthy environment

The Fraser Basin Council (FBC) is a not-for-profit organization dedicated to advancing sustainability in the Fraser Basin and across BC.

Basin-Wide Office
1st Floor, 470 Granville St.
Vancouver, BC V6C 1V5
T 604 488-5350
F 604 488-5351
info@fraserbasin.bc.ca
www.fraserbasin.bc.ca

This report is printed in Canada on Grays Harbor 100 Offset (text) and Mohawk Options PC (cover), which are 100% post-consumer, process chlorine free recycled papers.