

Future Forest Products and Fibre Use
Backgrounder:

Non-Timber Forest Resources

Information Compendium



Prepared for:
Omineca Beetle Action Coalition

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Table of Contents

	Page Number
About this Project	iii
Acknowledgements	iv
Project Availability	v
Contact Information	v
1. Introduction	1
2. Agroforestry	3
2.1 Alley Cropping	6
2.2 Integrated Riparian Management and Timber Belting	8
2.3 Forest Farming	10
2.4 Silvopasture	12
3. Energy Production	14
3.1 Biomass Energy	16
4. Birch Products	19
5. Botanical Products	22
5.1 Beauty Products	24
5.2 Herbal Health Products	26
6. Crafts and Wild Flowers	29
7. Eco-services	31
7.1 Carbon Sequestration	33
7.2 Eco-tourism	36
8. Traditional Ecological Knowledge	39
9. Wild Greenery and Christmas Trees	41
10. Honey and Honey Products	43

Table of Contents

	Page Number
11. Wild Edibles	46
11.1 Wild Fruits and Berries	46
11.2 Wild Vegetables and Seasonings	48
11.3 Wild Mushrooms	50
12. Sustainable Landscaping	53
13. General Links for Non-Timber Forest Resources	55
14. References	58

About this Project

The Mountain Pine Beetle infestation has had, and will continue to have, an impact on the timber supply and forest sector in northern British Columbia. The forest industry is the largest employer and economic catalyst in the Omineca Beetle Action Coalition (OBAC) area. Thus a reaction to, and innovation of, the current forest economy is necessary, complete with a diverse set of products and utilisation of resources.

In the OBAC's *Future Forest and Fibre Use Strategy* (Enfor Consultants Ltd. 2008), a number of forests products already in production in the area are identified. These include:

- lumber;
- panels (veneer, plywood, particle board);
- posts and poles;
- finger-jointed lumber;
- chips;
- log homes;
- pulp and paper;
- pellets from sawmill residue; and
- power cogeneration plants.

A number of prospective options for future forest and fibre use are also identified and available for future reference, including:

- bio-energy;
- fuel pellets; and
- high value products (such as wood composite board for prefabricated construction).

This guide, however, seeks to identify alternative options to future forest and fibre use, particularly in the non-timber forest products sector. The aim is to build upon and supplement larger scale operational possibilities and industries, as outlined in OBAC's *Future Forest and Fibre Use Strategy* (Enfor Consultants Ltd. 2008).

As a guide, this work seeks to provide insight to, and definition of, lesser known forest products and resources, by using existing literature and informational links for future reference.

Non-timber forest products are practical for small-scale operations, are compatible with conservation, can be ecologically sound, and can compliment mainstream forest harvest industries. Niche market products and small-scale forestry operations could play a larger role in the future of northern British Columbia's forestry economy, with many small operations cumulatively capturing a larger part of the market.

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Prince George
January 2009

Project Availability

Copies of this report are accessible through the Omineca Beetle Action Coalition and the Community Development Institute website (<http://www.unbc.ca/cdi>).

Contact Information

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1. Introduction

Forests have long provided a range of services and diverse products that contribute to the livelihood of economies, communities, and industries. The spectrum of non-timber uses of forest resources has come to be known as ‘non-timber forest products’. These include botanical and mycological resources, and exclude conventional timber products (such as lumber, pulp, shakes, or firewood). Some definitions have come to include forest animals (Center for Non-Timber Resources, Royal Roads University http://cntr.royalroads.ca/about_ntfp_sector/definition_overview), although they are not generally considered part of non-timber forest products.

The Ministry of Forests and Range, in their overview of non-timber forest products (<http://www.for.gov.bc.ca/hre/ntfp/>) describes the industry as a rapidly growing sector that contributes to the economic diversification of the province. In 1997, the Ministry of Forests and Range estimates valued the sector at \$600 million per year, with over 30,000 British Columbia residents earning income from this sector.

Carla Burton (2006) lists 21 commercial locally grown products currently for sale in the area (including food, herbs, crafts, and decorative products). Also noted, are 31 commercial and locally available products which are for sale in Prince George stores, but are imported from other areas. This implies that there is a significant opportunity for growth and innovation in the non-timber forest resources sector of the Omineca Beetle Action Coalition’s (OBAC) region.

Most non-timber forest products are harvested from relatively isolated public Crown lands. There are also independent small-scale harvesters who may or may not claim their earnings. As a result, regulation and data collection of non-timber forest products has proved to be difficult. Of concern to harvesters, recreation users, First Nations, and others are forest access and land use opportunities. In the Center for Non-Timber Resources at Royal Roads University’s *A Regional Profile of Non-Timber Forest Products Being Harvested from the Cariboo-Chilcotin, British Columbia Area* (Powell 2005), First Nations in the Cariboo-Chilcotin area expressed concerns around four themes, including:

- impacts of other resource uses and activities on traditional foods and medicines;
- commercialization of traditional foods and medicines, and the intellectual rights to First Nations traditional knowledge;
- harvest levels and techniques of non-timber forest resources; and
- a lack of information and support for First Nations governments to manage and develop sustainable non-timber forest product based businesses.

The harvesting, commercialization, and benefits derived from non-timber forest resources cross many aspects of forestry, policy, economics, community, ecological management, history, culture, and politics. Many studies have looked into the future of non-timber forestry, as it is likely to be a key component in the future of forestry and agriculture.

Northern British Columbia and the OBAC region could differentiate themselves from other lumber producing areas through increased diversification of the forest sector, particularly in terms of non-timber forest products. This guide will provide a brief outline of available non-timber forest products and opportunities associated with each type of product, and how to implement the system or enter the market. Also included are links of interest, information on opportunities for capital funding [where applicable], best practise techniques, and industry articles analysing the non-timber forest products sector. Please note that since these links take readers to external websites, managed by other parties, we cannot vouch for their quality, accuracy, or reliability.

2. Agroforestry

What is agroforestry?

Agroforestry is a land management approach combined with agriculture industries, and is defined by the production systems employed (SYLVIS Environmental 2003). It is the practice of growing trees in combination with perennial and annual food crops or livestock (BC Woodlot Association <http://www.woodlot.bc.ca/agroforestry/whatis.htm>). The BC Woodlot Association has extensive information on agroforestry practises specific to British Columbia's climate and ecology. Their publications, most notably the document *A Guide to Agroforestry in BC* (Small Woodlands Program of BC 2001) and an informational website, have served as a basis for this section. There are four main types of agroforestry typically identified, including:

- alley cropping;
- integrated riparian management and timber belts;
- forest farming; and
- silvopasture.

Benefits of agroforestry:

Agroforestry practises have many benefits associated with their implementation, such as productivity benefits, economic benefits, and environmental benefits. The Small Woodlands Program of BC notes numerous benefits, including:

Productivity benefits:

- combinations of trees and shrubs with agriculture can improve the use of available soil, resources, and light; and
- when used in addition to nutrient cycling, there are further ecological and soil productivity gains.

Economic benefit:

- short-term cash flow and extra income while awaiting long-term crops;
- diversification of crops and labour, reducing dependence on single commodities;
- more income and community jobs per hectare of land; and
- diversification and strengthening of agricultural and forest production.

Environmental benefits:

- trees and shrubs that provide biodiversity, wildlife habitat, green space; and
- tree and shrub buffers that can intercept groundwater and surface water; reduce the impacts of flooding, wind, and erosion; and decrease odours.

How do you integrate agroforestry practises?

Add a complimentary, additional forest or agricultural crop component to current land management systems for environmental and economic benefits.

Agroforestry Links

Agriculture and Agri-Food Canada

This site provides information and research on agricultural practises (including agroforestry) and new technologies in Canada.

http://www.agr.gc.ca/index_e.php

Agroforestry Net Inc.

This non-profit organization is dedicated to providing educational resources about agroforestry, trees, and sustainable stewardship of land and water. Their site contains links to free online journals and publications.

<http://agroforestry.net/>

The Overstory (agroforestry ejournal)

This free online journal has concise information on trees and their roles in agriculture, natural ecosystems, and human culture and economy.

<http://agroforestry.net/overstory/index.html>

Agroforestry Research Trust

This is a charitable organisation in England that has information on agroforestry plant species and photos of implemented systems.

<http://www.agroforestry.co.uk/index.html>

Association for Temperate Agroforestry

This association's site has agroforestry policy briefs, professional development and education, links to agroforestry institutions in North America, online journals, and publications available for order.

<http://www.aftaweb.org/index.php>

BC Agriculture Council

This site has information and links on agriculture in BC that are useful for different forms of agroforestry implementation.

<http://www.bcac.bc.ca/Default.asp>

BC Woodlot Association

These sites provide documents pertaining to system overviews and funding information for agroforestry, including a listing of successful agroforestry projects and how-to guides.

http://www.woodlot.bc.ca/agroforestry/pdf/app_guide_08.pdf

http://www.woodlot.bc.ca/agroforestry/whatis.htm#emerge*

<http://www.woodlot.bc.ca/swp/Downloads/files/AgroforestryGuide.pdf>

Climate Change Connection

This Manitoba based site has information on climate change, and this link correlates climate change with sustainable agriculture and agroforestry.

<http://www.climatechangeconnection.org/Solutions/Agroforestry.htm>

Food and Agricultural Organization of the United Nations

This site provides definitions, uses, and benefits of agriculture throughout the world; and is useful for its online publications pertaining to agroforestry.

<http://www.fao.org/>

Investment Agriculture Foundation of British Columbia

This site provides information on financial support funding (federal and provincial) for innovative projects, including the *Agroforestry Industry Development Initiative*.

http://www.iafbc.ca/funding_available/programs/agroforestry/Agroforestry.htm

Agroforestry Industry Development Initiative

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Ministry of Agriculture and Lands

These sites provide detailed definitions of system and economic gains associated with agroforestry, as well as links, contacts, statistics, and funding opportunities.

<http://www.agf.gov.bc.ca/agroforestry/overview.htm>

<http://www.agf.gov.bc.ca/agroforestry/contacts.htm>

<http://www.al.gov.bc.ca/agroforestry/factsheets.htm>

<http://www.agf.gov.bc.ca/stats/index.htm>

Missouri Center for Agroforestry

The Missouri Center for Agroforestry has research and implementation information on agroforestry, including best practises and statistical data.

<http://www.centerforagroforestry.org/>

The University of British Columbia Faculty of Land and Food Systems

This group facilitates integrated research and education that addresses global issues surrounding health and sustainable land food systems, including agroforestry.

<http://www.landfood.ubc.ca/>

http://www.landfood.ubc.ca/ubcfarm/documents/Symposium_2a.pdf

The USDA Nation Department of Agroforestry

This US site has many online documents, journals, and publications surrounding the agroforestry sector and its practises in the US.

<http://www.unl.edu/nac/index.htm>

2.1 Alley Cropping

What is alley cropping?

Alley cropping systems, also known as ‘sun systems’, are managed intercropping systems that grow harvestable crops between trees and require full sun exposure (Small Woodlands Program of BC 2001). Various berries, forages, vegetables, or grains are usually planted between rows of trees or shrubs, which are spaced strategically to allow sun between the rows. Crops that can be produced in full sun exposure include:

- horticultural plants, such as tomatoes, peas, potatoes, or carrots;
- forages and grains;
- tree fruit crops, such as plums and nuts;
- Christmas trees;
- shrubs, such as berries; and
- trees for lumber, high value hardwoods, and wood fibre (Small Woodlands Program of BC 2001).

An alley cropping agroforest system is best developed when the desired plants for enhancement require sun, or when the current tree density does not produce enough shade for other crops. As the sun system grows and the trees expand, they can either be pruned to maintain the alley cropping method, or can eventually become larger and develop into a ‘shade system’.

Benefits of alley cropping:

The diversity of crops can have a favourable effect on soil chemical composition, microbiological activities, and yield. The integration of larger more densely rooted trees and shrubs also protects against soil erosion and has been shown to have a minimizing effect on weeds (Kang and Gutteridge 1993).

Many of the intercropping systems developed in eastern Canada and the US grow high-value trees (e.g. black walnut, cherry, birch, or beech) with other crops on agricultural fields. These systems are managed intensively and produce crops for profit during the years needed for the crops to mature (Small Woodlands Program of BC 2001).

How do you integrate alley cropping practises?

By adding horticultural crops to actively managed woodlots, or by adding well spaced tree crops to traditional agricultural practises, additional value can be extracted from existing farms. The multiple crop system must be actively managed and maintained. The design should be established by an experienced or accredited agriculturalist. Systems often utilise fast growing trees such as poplar or birch at first in order to establish quickly and derive benefits. Slower growing species can be planted concurrently for future harvest benefits.

Alley Cropping Links

BC Woodlot Association

This site provides definition and overviews of alley cropping implementation and benefits. It includes a review of an alley cropping system implemented in the Peace Region.

www.woodlot.bc.ca/agroforestry/pdf/Doig-River-FN-Alleycropping.pdf

Investment Agriculture Foundation of British Columbia

This site provides information on financial support and funding (federal and provincial) for innovative projects, including the *Agroforestry Industry Development Initiative*; it could be useful for funding alley cropping initiatives.

http://www.iafbc.ca/funding_available/programs/agroforestry/Agroforestry.htm

Ministry of Agriculture and Lands

This site provides an overview of alley cropping techniques and benefits.

<http://www.woodlot.bc.ca/agroforestry/pdf/Doig-River-FN-Alleycropping.pdf>

Missouri Center for Agroforestry

The Missouri Center for Food Organisation has research and implementation information on alley cropping, including best practises and economic benefits.

<http://www.centerforagroforestry.org/>

The Food and Agriculture Organization of the United Nations

This site provides information on alley cropping techniques and feasibility across a variety of landscapes.

<http://www.fao.org/ag/Agp/agpc/doc/Publicat/Gutt-shel/x5556e0q.htm>

The USDA Nation Department of Agroforestry

This US site has online journals and publications on alley cropping opportunities, research and technology transfers, and sustainability.

<http://www.unl.edu/nac/alleycropping.htm>

2.2 Integrated Riparian Management and Timber Belting

What are integrated riparian management and timber belting?

Integrated riparian management is the practice of actively managing forests and shrubs in areas bordering lakes, streams, rivers, wetlands, farms, and agricultural lands. Integrated riparian management systems are used to enhance and protect aquatic and riparian resources, as well as to generate income from timber and non-timber forest products. Shelterbelts, timber belts, windbreaks, fence line plantings, and hedgerows work in a similar manner. They are designed for both shelter and the opportunity for woody plant harvest, as well as non-timber forest production (Small Woodlands Program of BC 2001). Trees and shrubs have long been used for protection, to reduce soil and water erosion, and are often integrated with other managed agroforestry techniques.

Benefits of integrated riparian management and timber belting:

Timber belts and integrated riparian management systems can employ a wide variety of tree and shrub species with specific plantings tailored to suit the growing conditions and production opportunities (Small Woodlands Program of BC 2001). Riparian and shelterbelt agroforestry plantings also produce forest products in addition to their conservation value and environmental benefits. These practices may also be employed to utilise a number of other environmental services, including:

- odour, dust, and noise reduction;
- waste water and manure management;
- green space and visual aesthetics;
- enhancement or maintenance of wildlife habitat; and
- crops from harvestable, multi-use shelter plants.

How do you pursue integrated riparian management and timber belting practises?

Integrated riparian management and timber belts generally provide a complementary agroforestry service to existing farms. A mismanaged riparian buffer system can result in the potential loss of economic opportunities or degraded areas (Brigham n.d.), so consultation with planning professionals or practitioners should be explored. Small-scale implementation of tree and shrub boundaries utilising natural or existing plants can easily supplement commercial or private purposes as long as they are actively managed for desired results.

Many cities across Canada, such as St. Catherine's Ontario (<http://www.brocku.ca/envi/greenpln.htm>), have been involved with the Greenbelt Movement and urban buffer systems. These systems allow the utilisation of natural plants for boundary and pollution absorption purposes.

Integrated Riparian Management and Timber Belting Links

BC Woodlot Association

These sites provide definition and overviews of integrated riparian management systems and timber belts.

<http://www.woodlot.bc.ca/agroforestry/links.htm>

<http://www.woodlot.bc.ca/swp/Downloads/files/AgroforestryGuide.pdf>

British Columbia Integrated Land Management Bureau

This site provides a guide for appropriate integrated riparian management systems in BC.

<http://ilmbwww.gov.bc.ca/>

BC Ministry of Agriculture and Lands

These sites provide an overview of integrated riparian management techniques and benefits.

<http://www.al.gov.bc.ca/agroforestry/factsheets.htm>

<http://www.gov.bc.ca/al/>

<http://www.agf.gov.bc.ca/agroforestry/overview.htm>

<http://www.agf.gov.bc.ca/stats/index.htm>

BC Ministry of Forests and Range

Riparian Management Area Guidebook, December 1995.

This document provides information on implementing integrated riparian management, including specific guidelines for different area types of landscapes (i.e. lakes, streams, river, and floodplains).

<http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/riparian/rip-toc.htm>

City of St. Catharine's

The Green Plan

Compiled by: Green Plan Advisory Committee Green Plan Implementation Committee, City of St. Catharine's, June 19, 1995.

This plan provides information on integrated riparian management implementation and techniques in an urban area. It could be used as a guide for other communities or large farming operations looking to add riparian management techniques and buffers systems.

<http://www.brocku.ca/envi/greenpln.htm>

Eastern Canada Soil and Water Conservation Centre Web site

This site provides publications on integrated riparian management and stewardship practises. The organisation is based in New Brunswick.

<http://www.ccse-swcc.nb.ca/events.cfm?idev=4&title=11&lg=en>

The Greenbelt Movement

This site provides information about the protection and security of natural resources through integrated riparian management systems and greenbelt management for communities, individuals, and public lands.

<http://greenbeltmovement.org/index.php>

2.3 Forest Farming

What is forest farming?

Forest farming is the “integrated cultivation of actively managed timber and non-timber forest products within shaded forest understory” (Small Woodlands Program of BC 2001). Forest farming does not refer to the harvesting of wild non-timber forest products, but rather purposefully introduced commercial crops into woodland areas.

A distinction is often made between a 'shade agroforest' and 'forest farming'. A shade agroforest tends to refer to less intensive, more extensive, and lower yielding production, while 'forest farming' refers to more intensive and cultivated understory crop production (Small Woodlands Program of BC 2001). Both can be classified as a 'shade system'.

Due to the nature of forest farming, shade systems are well suited to shade-tolerant crops, and potentially even the management and cultivation of traditionally 'wild' crops under a closed tree canopy. It is usually established in existing woodlands. According to the BC Woodlot Associations' *A Guide to Agroforestry in BC* (Small Woodlands Program of BC 2001), the vast forests of northern BC are well suited to forest farming and provide the necessary space for larger scale, seasonal crops. Successful forest farming operations in BC produce:

- mushrooms;
- maple and birch syrup;
- native plants used for landscaping and floral greenery;
- medicinal and pharmaceutical products (e.g. ginseng, goldenseal, and St. John's Wort);
- vegetable and fruit products (e.g. wild berries); and
- craft products (e.g. cones, twigs, and moss).

Benefits of forest farming:

Shade provision, reduction of water loss from evaporation, retention of soil moisture, and the non-destructive, lower maintenance nature of forest farming make it ideal for existing farms and woodlots. The forage food can also act as living mulch for trees and more intensive crops (Alley *et al.* 1998). Forest farming is suited to be placed in existing farms in BC or in underutilized forest patches immediately.

How do you integrate forest farming practises?

Forest farms are either created using existing forests and planning horticultural activities around the landscape, or by planting a sun system in order to develop a sufficient canopy for harvestable shade tolerant crops (Small Woodlands Program of BC 2001). The addition of forest farming techniques to existing agricultural operations is generally straight forward, but it does require basic agricultural knowledge and access to woodland.

Forest Farming Links

BC Ministry of Agriculture and Lands

These sites provide an overview of forest farming techniques and benefits.

<http://www.al.gov.bc.ca/agroforestry/factsheets.htm>

<http://www.agf.gov.bc.ca/agroforestry/overview.htm>

<http://www.agf.gov.bc.ca/stats/index.htm>

BC Ministry of Forests and Range

This site has information on forest farming products.

<http://www.for.gov.bc.ca>

BC Woodlot Association

This site provides definitions and overviews of forest farming implementation and benefits.

<http://www.woodlot.bc.ca/swp/Downloads/files/AgroforestryGuide.pdf>

Center for Non-Timber Resource

The organisation is currently completing their *Forest Farming Resources* project, which will soon provide a guide for producers, product knowledge, and resources.

<http://cntr.royalroads.ca/node/121>

Investment Agriculture Foundation of British Columbia

This site provides information on financial support and funding (federal and provincial) for innovative projects, including the *Agroforestry Industry Development Initiative*. It could be useful for starting forest farming operations.

http://www.iafbc.ca/funding_available/programs/agroforestry/Agroforestry.htm

Missouri Center for Agroforestry

The Missouri Center for Agroforestry has research and implementation information on forest farming, including best practises, system techniques, and economic benefits.

<http://www.centerforagroforestry.org/>

South Central New York Agricultural Team, Cornell

This group has information about how to initiative forest farming, as well as best practises and links to other American [agroforestry] related sites.

<http://scnyat.cce.cornell.edu/forestfarming/index.htm>

Books and Other Publications

Alley, J., H. Garrett, R. McGraw, J. Dwyer, and C. Blanche. 1998. Forage Legumes as Living Mulches for Trees in Agroforestry Practices: Preliminary Results. *Agroforestry Systems Journal* (44) 2-3: 281-291.

<http://www.springer.com/life+sci/forestry/journal/10457>

2.4 Silvopasture

What is silvopasture?

Silvopasture combines livestock grazing with tree crop management in either a natural forest or pasture setting. Cattle, sheep and goats have all been incorporated into silvopasture systems in BC. Silvopasture systems may be located within a private farm or woodlot, or be special collaborative arrangements between forest licensees and livestock producers on Crown land (such as using sheep as a vegetation management tool) (Small Woodlands Program of BC 2001). Crops and products that silvopasture systems yield include:

- meat and dairy goods;
- forage and hay;
- soft and hardwood lumber products; and
- nuts, fruits, and berries.

Benefits of silvopasture:

‘Livestock in the forest’

The integration of animals into the system can increase the production and growth of cone trees, while providing protection for livestock. Livestock grazing on groundcover reduces competition for moisture between the trees and other vegetation, so tree yields often increase. The combination is environmentally sound and generates revenue, particularly if the silvopasture consists of high-value or special purpose trees (Small Woodlands Program of BC 2001).

‘Trees in the pasture’

Adding tree farming into existing grazing operations is called a tree pasture system. These can be successful for two reasons. First, agricultural soils are usually deeper and more fertile than forest soils and produce more crop options for pasture trees. Second, the right choice of tree crop allows for the development of a livestock operation while maintaining an investment in [specialty] timber (Small Woodlands Program of BC 2001).

How do you integrate silvopasture practises?

Kootenay Tree Farms Ltd., in partnership with BC Hydro, the BC Ministry of Forests and Range, and local ranchers, began integrating low intensity grazing onto their lots. This pairing benefited both industries. To create silvopasture operations, liaising with forested land owners or existing farmers and finding an appropriate business match is the most viable option. Using unaltered woodland for cattle grazing is common in the OBAC region, although integrating this method with the production of high-value trees or other crops is less common.

Silvopasture Links

Agroforestry Net Inc.

The Overstory (agroforestry ejournal)

Klopfenstein, N., W. Rietveld, R. Carman, T. Clason, S. Sharrow, G. Garrett, and B. Anderson. Silvopasture: An Agroforestry Practice. *The Overstory* (36).

This free online issue provides information on the establishment of silvopasture, and planning considerations for successful operations.

<http://www.agroforestry.net/overstory/overstory36.html>

BC Farm and Ranch Safety and Health Agency

This site has information on ranching practises and guidelines. It is useful for new silvopasture proprietors.

<http://www.bcac.bc.ca/links.htm>

BC Ministry of Agriculture and Lands

These sites provide detailed definitions of system and economic gains associated with silvopasture, as well as links information about contacts, statistics and funding opportunities.

<http://www.agf.gov.bc.ca/agroforestry/overview.htm>

<http://www.al.gov.bc.ca/agroforestry/factsheets.htm>

http://www.al.gov.bc.ca/Agriculture_Plan/2_challenges.html

BC Woodlot Association

These sites provide definitions, system overviews, and funding information for silvopasture, including information about successful silvopasture projects (Kootenay Tree Farms Ltd.).

<http://www.woodlot.bc.ca/swp/Downloads/files/AgroforestryGuide.pdf>

<http://www.woodlot.bc.ca/agroforestry/app-proj.htm>

Investment Agriculture Foundation of British Columbia

This site provides information on financial support and funding (federal and provincial) for innovative projects, including the *Agroforestry Industry Development Initiative*.

http://www.iafbc.ca/funding_available/programs/agroforestry/Agroforestry.htm

Missouri Center for Agroforestry

The Missouri Center for Agroforestry has information about best practises, as well as economic and statistical data on silvopasture.

<http://www.centerforagroforestry.org/practices/sp.asp>

Provincial Agricultural Land Commission (BC)

This Crown Corporation provides information on land use restrictions, legislation, and approved farming and grazing projects.

<http://www.landcommission.gov.bc.ca>

3. Energy Production

What is energy production?

In terms of non-timber forest products, energy production can refer to any extractable unit of energy. Forests have a number of harvestable energies. The Omineca Beetle Action Coalition's *Alternative Energy Strategy* (2008) outlines non-timber, forest-based power producing technologies that could be employed in the OBAC region. These include:

- run-of-river (micro hydro) electricity (from forest streams and rivers);
- geothermal energy (under forest lands);
- wind power (energy harvested from ridge tops and open plains);
- solar photovoltaic and solar thermal energy (from atop forest areas); and
- biomass energies.

These technologies can be implemented on a large or small-scale, can be tied into existing or independent grids, and can be self-sufficient or reduce consumption of conventional energy methods.

Benefits of energy production:

Energy production can be used by small and large-scale producers, businesses, and homes. There are a number of benefits associated with non-timber energy production. These include:

- low emissions and pollution [if any];
- the utilization of sustainable renewable resources;
- the potential for long-term cost savings (particularly if fossil fuel prices increase).

How do you become involved in energy production?

Becoming an independent power producer, on or off of the BC Hydro grid lines, requires substantial investment. The required investment varies depending on the size and type of operation. Anastasia Ledwon, a Telkwa resident, has a full scale off the grid system including solar panels, a wind tower, a backup generator, 12 golf cart batteries, and an inverter. The system cost an estimated \$30,000, and at the time was less expensive than bringing in hydro grid lines (Ledwon 2004). Graig Pearen, a Prince George area resident, has wind energy capturing capabilities that supplement his BC Hydro use (<http://www.pearen.ca>). Alternative energy websites are excellent resources for technology and investment ideas.

Energy Production Links

BC Hydro

These sites have information for independent power producers including methods of small-scale production, information for using the grid, and proposal applications.

<http://www.bchydro.com/info/ipp/ipp956.html>

http://www.bchydro.com/rx_files/environment/environment1837.pdf

BC Sustainable Energy Association

This site has information on energy production in BC, including financial development planning, and a sustainable energy directory.

<http://www.bcsea.org/>

Cloud Works Energy Inc.

This Vancouver based company's site provides information on their current run-of-river electricity projects.

<http://www.cloudworksenergy.com/index.php>

Home Power Magazine

This magazine, available in print or for free online, has solar, wind, and hydro design information and success stories from around North America.

<http://www.homepower.com/home/>

Independent Power Producers of BC

This body serves as an industry voice for independent power producers. Their site has links to technology, news stories, and information about independent power producing.

<http://www.ippbc.com/>

The New Zealand Institute of Forestry

Conference 2006

Brian Cox. Revenue From Forest Derived Energy. April 22, 2008.

The document has information about non-timber energy product options and feasibility.

<http://www.nzif.co.nz/articles/conf2006/Cox%20power%20point%2012%20Apr%2006.pdf>

One Sky – Canadian Institute of Sustainable Living

This organization, based in Smithers, B.C., has information on power production, including an interview with Anastasia Ledwon.

www.onesky.ca

http://www.onesky.ca/files/uploads/One_Sky_Wind_Solar_case_study.pdf

Pearen Ventures

This semi-commercial site, maintained by Graig Pearen, Chair of the BC Sustainable Energy Association Central Interior chapter, has information on his solar and wind power system. He is a Prince George area resident.

<http://www.pearen.ca/>

3.1 Biomass Energy

What is biomass energy?

Biomass energy refers to the energy available in non-fossil, live or recently living organic material. Biomass energy can be harvested from plants, animals, insects, and waste; and can be developed into a variety of gaseous, liquid, and solid products (Natural Resources Canada 2003). Due to the size of the available wood fibre basket, the feasibility of utilising biomass from Mountain Pine Beetle kill salvaged wood and waste fibre sources in the OBAC area has been under investigation. Biomass technologies and product developments have been incorporated in the Ministry of Energy, Mines, and Petroleum Resources *BC Bioenergy Strategy* (2008) and the OBAC's *Alternative Energy Strategy* (2008). While there are many potential bioenergy products which could be derived from beetle kill wood and wood waste from increased harvest, some of the more common products and uses include:

- biofuels, including biodiesel;
- cogeneration plants;
- ethanol;
- methanol (conceptual);
- pellets (exported to Europe) and cellulosic briquettes (popular in Brazil); and
- synthetic natural gas.

Benefits of biomass energy:

The bioenergies market is growing worldwide, so there is tremendous opportunity for biomass development, investment, and expansion. According to BC Hydro (2007), over 6.1 million dry tonnes of wood residue are generated annually in the mainland region of British Columbia. Of this residue, 74% of the total is consumed in pulp mill boilers, cogeneration plants (plants which produce both electricity and heat by controlled burning of wood residue), power plants, and other facilities. By using the additional wood residue, an additional 200 MW of power would be made available (BC Hydro 2007).

There can be environmental benefits from biomass use; the most noted being less reliance on petroleum products. While there are benefits to using waste wood, logging results in the loss of other valuable services, including other non-timber forest products, environmental services (such as carbon sequestration), and wildlife habitat. Completely removing all woody debris from an existing cut block can cause further problems.

How do you become involved in biomass energy production?

Biomass energy extraction tends to be large-scale and intensive, and a thorough, professional analysis should be conducted prior to any investment or fibre harvesting. OBAC's *Future Forest and Fibre Use Strategy* (2008) and the Bioenergy Conference website (<http://www.bioenergyconference.org>) contain information on biomass industries and should be consulted for information on opportunities in the OBAC area.

Biomass Links

BC Hydro

BC Hydro provides documents on bioenergies, including energy output levels, benefits, and challenges.

<http://www.bchydro.com/2007bioenergy>

<http://www.bchydro.com/environment/greenpower/greenpower1735.html>

BC Ministry of Energy, Mines and Petroleum Resources

This site contains information on the Innovative Clean Energy (ICE) Fund, which supports the development of clean power and energy efficiency technologies. There are also links to the BC Bioenergy Strategy and BC Energy Plan.

<http://www.gov.bc.ca/empr/>

BC Bioenergy Strategy: Growing Our Natural Energy Advantage (2007)

This strategy directly supports the commitments made in the *BC Energy Plan* (2007), and includes feasibility and direction for the biomass industry.

<http://www.energyplan.gov.bc.ca/bioenergy>

BC Energy Plan: Vision for Clear Leadership (2007)

This plan looks at the needs and opportunities of energy in British Columbia, including support for the development of new energy technologies, such as biomass energies.

<http://www.energyplan.gov.bc.ca/>

BC Ministry of Forest and Range

These sites provide information on biomass harvesting, forestry analysis and inventories, harvest cost analysis by forest district, and potential tenure arrangements.

<http://www.for.gov.bc.ca/bcts/>

<http://www.for.gov.bc.ca/hts/bioenergy>

BC Sustainable Energy Association

This site has information on the feasibility of biofuels and links to additional sites.

<http://www.bcsea.org/sustainableenergy/biodiesel.asp>

Biobasics Biportal.

This site provides scientific information on bioenergy benefits, challenges, and limitations to their development in Canada.

<http://biobasics.gc.ca/english/view.asp?x=556>

Bioenergy Conference and Exhibition

This conference will be held in Prince George in 2010, and has information about business and investment project in bioenergies.

<http://www.bioenergyconference.org/proceedings.php>

Community Energy Association

This organization provides communities with information about energy funding programs, conversion opportunities, and project implementation.

<http://www.communityenergy.bc.ca/>

<http://www.communityenergy.bc.ca/search/node/guide+to+funding>

Natural Resources Canada

Natural Resources Canada contains data on resource material, products, extraction, uses, and retail opportunities for biomass.

http://www.canren.gc.ca/resou_asse/index.asp?CaId=53&PgId=57

The National Biodiesel Board (NBB)

This site provides information on current projects, news, and companies working with biodiesel in the United States.

<http://www.biodiesel.org/>

The Omineca Beetle Action Coalition

The Omineca Beetle Action Coalition has conducted studies on the biomass sector, including feasibility studies in Prince George and surrounding area. Both the *Alternative Energy Strategy* (2008) and the *Future Forest and Fibre Use Strategy* (2008) are available from their website.

<http://www.ominacacoalition.ca>

Books and Other Publications

Haygreen, J. G. and Bowyer, J.L. 1996. *Forest Products and Wood Science*. Ames Iowa: Iowa State University Press, p 413-450.

4. Birch Products

What are birch products?

Birch (aka white birch or paper birch) timber and bark can be shaped with warm water to create a variety of goods. Traditional uses for birch include: baskets, cradles, canoes, wrapping and storing food, roofing pit houses, moose calls, toboggans, wood eating utensils and dishes, sap, medicine for colds, buckets, treatment for skin problems of various rashes, skin sores, and burns, and a cure for dysentery (Burton 2006). Commercial uses of birch include:

- pulp;
- veneer logs;
- paneling;
- tongue depressors;
- cheese boxes;
- firewood and biomass feedstock; and
- furniture (Moore 2006).

Commercial food and medicinal products can also be made from parts of the birch tree. Some listed in the *Buy BCwild: 2007/08 BC Directory of Buyers and Sellers of Non-Timber Forest Products* (Centre for Non-Timber Resources 2007a) include:

- birch sap drinks (e.g. birch beer or birch syrup);
- value-added products (e.g. toffee, toppings, marinades, vinegar, and sauce);
- oils from bark for cosmetics, salves, and medicinal preparations;
- disposable wooden cutlery;
- chemicals (e.g. Xylitol) that are used as sweeteners; and
- Birch Catkins that is used for medicinal purposes and as a survival edible.

Benefits of birch products:

Birch is a fast growing hardwood. According to the City of Quesnel, the yearly net economic potential of each tree is estimated to be up to \$189. Producers in the Quesnel area sell their syrup products from \$13.50 / 250 ml. to \$25.00 / 250 ml. Birch requires 80 to 120 litres of sap for every litre of syrup (2 to 3 times more sap than maple) and has specialty niche market status, deriving a reasonable market value for its products (Centre for Non-Timber Resources 2007a).

How do you become involved in the commercial birch industry?

There are many value-added opportunities for new and existing commercial birch products. The Community Futures Development Corporation (CFDC) of the Northern Cariboo sites 55 business owners who use birch in their end product (Center for Non-Timber Resources 2006b). Their website should be consulted as an industry point of reference.

Birch Links

Aspenware

This site provides information on the Aspenware Corporation, a Vernon-based producer of birch and aspen disposable cutlery products.

<http://aspenware.ca>

Agriculture and Agri-food Canada

This site provides information on funding programs and business services for food producers, including birch food products.

http://www.agr.gc.ca/index_e.php

BC Forestry Innovation Investment

This link provides information on birch and other tree characteristics. BC Forestry Innovation Investment provides funding to numerous projects and developments.

www.bcforestinformation.com/wood-products/tree-species/White-Birch.aspx

The Center for Non-Timber Resources, Royal Roads University

2007. Buy BCwild: 2007/08 BC Directory of Buyers and Sellers of Non-Timber Forest Products.

This is a free directory of sellers of wild non-timber products. It is a source of marketable birch products and an advertising resource.

<http://www.buybcwild.com>

2006. Market and Product Development for Birch Timber and Non-Timber Products: Current Status and Potential in British Columbia.

This is an in-depth study on birch product market potential in British Columbia.

<http://cntr.royalroads.ca/files-cntr/Market%20and%20Product%20Development%20for%20Birch%20Timber.pdf>

Powell, G. 2005. Regional Profile of Non-Timber Forest Products Being Harvested from the Cariboo-Chilcotin, British Columbia Area.

This document includes information on successful birch products in the Cariboo-Chilcotin Region.

<http://cntr.royalroads.ca/files-cntr/Cariboo-Chilcotin%20NTFP%20Regional%20Profile.pdf>

City of Quesnel

This site provides retail product information on the commercial birch market in the Quesnel area.

<http://www.quesnelinfo.com/birch.asp>

Forbes Wild Foods

This commercial site provides descriptions of wild food products (including birch syrup). It is a good example of a commercial non-timber forest company.

<http://www.wildfoods.ca/products-syrups-birchsyrup.html>

Forestnet

This site provides links to forestry journal articles, including articles discussing birch production and specialty birch wood products from BC.

<http://www.forestnet.com/>

Ministry of Forests and Range

Tree Book

This document contains information for identifying the features of 40 species of trees in BC. It includes information about the uses [commercial and non-commercial] of each species.

<http://www.for.gov.bc.ca/hfd/library/documents/treebook/index.htm>

<http://www.for.gov.bc.ca/hfd/library/documents/treebook/paperbirch.htm>

Seed and Species Planning

This site looks at the economic benefits from breeding tree seeds, including aspen, poplar, and birch.

<http://www.for.gov.bc.ca/hti/speciesplan/>

US Department of Agriculture

Plant Guide, Paper Birch

This site provides information on birch tree uses, characteristics, and economic benefits.

http://plants.usda.gov/plantguide/doc/pg_bepa.doc

5. Botanical Products

What are botanical products?

Botanical products are plants or plant extracts used for therapeutic or cosmetic purposes. Harvesting regulations of botanical products, pursuant to the *Forest Act*, fall under the authority of the Lieutenant-Governor-in-Council, the Minister of Forests, or a regional or district manager (David Douglas Botanical Garden Society www.ddbotgarden.bc.ca).

A variety of products can be based on, or have additives of, natural botanical origin. Burton (2006) compiled the following chart of botanical ingredients for sale in a Prince George health store. These products, which are available for harvest in the OBAC region, are imported, and therefore suggest a gap between harvesters and retailers.

- bilberries;
- birch leaf;
- blueberry leaf;
- cranesbill;
- coltsfoot leaves;
- elder flower;
- elderberries;
- goldenrod;
- horsetail;
- hawthorn berries;
- juniper berries;
- nettle leaf;
- rosemary;
- raspberry leaf;
- rose hips;
- speedwell;
- strawberry leaves;
- uva-ursi;
- valerian root;
- white willow bark;
- wormwood;
- yarrow;
- alfalfa leaf;
- burdock root;
- dandelion root;
- eyebright;
- mullein;
- plantain leaf;
- red clover; and
- St. John's wort.

Benefits of botanical products:

Botanical products are beneficial because they utilise existing forest resources, generally on small levels. The botanical harvesting and sales sector is characterized by many small or home-based businesses. With the exception of certain products (such as wild rose or chamomile), annual harvest levels tend to be minimal between 1-10 kg (Powell 2005).

How do you become involved in the botanical product industry?

There are opportunities to develop this sector into a broad, diverse set of businesses that utilize naturally occurring botanical resources for income and revenue generation. The most commercial botanical product sectors include botanical beauty products and herbal health products. These topics will be explored in further detail in sections 5.1 and 5.2.

Botanical Product Links

Canadian Botanical Association

This site has information on plant identification and uses.

<http://www.cba-abc.ca/cbahome.htm>

Canadian Botanical Conservation Network

This site has news stories and data on botanical conservation projects.

<http://www.rbg.ca/cbcn/en/>

Center for Non-Timber Resources, Royal Roads University

2007. *Buy BCwild: 2007/08 BC Directory of Buyers and Sellers of Non-Timber Forest Products.*

This free non-timber forest product directory of sellers includes botanical goods.

<http://www.buybcwild.com>

Burton, C. 2006. *A Regional Profile of Commercial Harvesting of Non-Timber Forest Products in the Prince George, British Columbia Area.*

This document contains a profile of commercial botanical operations in the Omineca area.

Powell, G. 2005. *Regional Profile of Non-Timber Forest Products Being Harvested from the Cariboo-Chilcotin, British Columbia Area.*

This document contains information on botanical products and harvesting in the Cariboo-Chilcotin area.

<http://cntr.royalroads.ca/files-cntr/Cariboo-Chilcotin%20NTP%20Regional%20Profile.pdf>

EFlora BC

This site provides a guide to BC's botanical diversity and is useful in species identification.

<http://www.eflora.bc.ca/>

University of British Columbia Botanical Garden and Center for Plant Research

This site provides education and outreach services, research documents, and conservation efforts pertaining to BC plants.

www.ubcbotanicalgarden.org

Ministry of Forest and Range

This site provides botanical plant locations and species information in BC.

<http://www.for.gov.bc.ca/hfp/publications/00002/>

North American Native Plant Society (formerly the Canadian Wildflower Society)

This site contains listings of wild, flowering plants and a botanical index.

<http://www.nanps.org/>

5.1 Beauty Products

What are botanical beauty products?

Botanical extracts and wild flowering plants can be used as a basis or additives for beauty and grooming products. As consumer interest in ecologically friendly products and processing increases, more attention has been paid to natural beauty products. Current commercial botanical beauty products produced in BC include:

- salves, sunscreen, and lotions;
- massage oils;
- facial scrubs;
- essential oils for perfume;
- moisturizers;
- lip balms;
- mosquito repellent;
- after bite stick; and
- wild nettle, raspberry, yarrow, rose, and oatmeal soaps (Centre for Non-Timber Resources 2007a).

In a recent report commissioned for the Royal Roads Center for Non-Timber Resources' *A Regional Profile of Commercial Harvesting of Non-Timber Forest Products in the Prince George, British Columbia Area* (Burton 2006), common and widely available plants used in botanical beauty product production include: rose leaves and rose petals (*Rosa*), chickweed (*Stellaria media*), and clover (*Trifolium*).

Benefits of botanical beauty products:

Wild botanical plants are an existing forest resource. The natural beauty and grooming industry is growing, and internet sales allow greater access to buyers of naturally sourced products. Harvesting of rarer plant varieties and the use of traditional weed or pest plants means a long-term supply for future use in value-added products.

How do you become involved in the botanical beauty product industry?

The *Buy BCwild: 2007/08 BC Directory of Buyers and Sellers of Non-Timber Forest Products* directory lists existing commercial non-timber beauty products. By researching daily use products and consumer preferences, and by taking advantage of the availability of naturally growing substances in BC, small-scale seasonal harvesting and sales can become a successful venture.

Botanical Beauty Product Links

BC Herb Growers Association

This site contains a 'growers and members' directory which includes botanical beauty product producers.

<http://www.bcherbgrowers.com>

Canadian Botanical Association

This site has information on plant identification and uses.

<http://www.cba-abc.ca/cbahome.htm>

Center for Non-Timber Resources, Royal Roads

2007. *Buy BCwild: 2007/08 BC Directory of Buyers and Sellers of Non-Timber Forest Products.*

This free non-timber forest product directory of sellers includes botanical goods.

<http://www.buybcwild.com>

Burton, C. 2006. A Regional Profile of Commercial Harvesting of Non-Timber Forest Products in the Prince George, British Columbia Area.

This document discusses botanical beauty products sold in the Omineca region.

Powell, G. 2005. Regional Profile of Non-Timber Forest Products Being Harvested from the Cariboo-Chilcotin, British Columbia Area.

This document contains a listing of botanical beauty product retail operations in the Cariboo-Chilcotin region.

<http://cntr.royalroads.ca/files-cntr/Cariboo-Chilcotin%20NTPF%20Regional%20Profile.pdf>

David Douglas Botanical Garden Society

This society has information on botanical species in the Prince George area.

www.ddbotgarden.bc.ca PO Box 1305 Prince George, BC V2L 4V3

EFlora BC

This site provides an electronic guide to British Columbia's botanical diversity.

<http://www.eflora.bc.ca/>

Ministry of Forest and Range

This site provides information on non-timber forest resources in BC, including botanical plant location and species information.

<http://www.for.gov.bc.ca/hfp/publications/00002/>

The Northern Forest Diversification Centre

This site has listings and descriptions of wild food products including natural beauty products.

<http://www.nfdc.ca/naturalbodycare.htm>

5.2 Herbal Health Products

What are herbal health products?

Herbal health products are derived from natural sources. The herbal health market has expanded as concerns about long-term health and attention to traditional medicines have increased. Naturally based pharmaceuticals and treatments can be alternatives to, or compliments of, western medicines. Herbal health products can be derived from roots, stems, flowers, or plant leaves, and are frequently sold in liquid extracts, capsules, tablets, or teas (Canadian Herbalist Association of BC <http://www.chaofbc.ca/whatisherbalism.php>). Examples of herbal plants with medicinal values are:

- hawthorn flower, leaf, and berry (heart tonic, popular in China);
- arnica (pain reliever, natural herbal health products);
- cottonwood bud (pain relieving, anti-inflammatory, and skin healing properties);
- St. Johns wort (treatment for depression);
- elderberry, horsetail, nettle (tinctures) (BC Herb Growers Association <http://www.bcherbgrowers.com/herbs/index.php/listings?catid=1>);
- chickweed (emollient, burn and skin soothing);
- devil's club (antifungal, antiviral);
- choke cherry (cough suppressant, heart and worm medication);
- dandelion (digestive aid, liver stimulant, detoxifier);
- birch catkins (tuberculosis remedy, skin soothers, may suppress tumours);
- arrowleaf balsamroot (expectorant, immunosuppressant, topic anaesthetic); and
- yarrow (skin swelling, cuts, fevers, and bleeding wounds) (Tilford 1997).

Benefits of herbal health products:

Herbal health products are readily available non-timber forest resources and many have long histories of use. Aboriginal traditional knowledge, Chinese medicine, and other homeopathic treatments are examples of long standing herbal health knowledge.

A tourist market exists for instruction and guided tours of botanical health products in the OBAC region. Jean Christison, an herbalist from Smithers, gives tours and trips on the gathering, identification, and preparation of herbal medicines (Centre for Non-Timber Resources 2007a).

How do you become involved in the herbal health product industry?

The harvesting of herbal health products requires knowledge not only of the plant to be harvested and its medicinal value, but also of the topographical features of the area and similar looking plants. Those interested are advised to seek well known plants, consult a professional herbalist, or take a course of study before proceeding with any commercial business plans or administration of herbal health botanical products. This assists in the avoidance of poisoning, health risks, or conflict with other medications.

Herbal Health Links

BC Herb Growers Association

This site has information on herb cultivation and commercial use.

http://www.bcherbgrowers.com/about_BCHGA/

Canadian Herbalist Association of BC

This site provides insight into the availability of herbal health products across B.C.

<http://www.chaofbc.ca/>

Centre for Non-Timber Resources, Royal Roads University

2007. *Buy BCwild: 2007/08 BC Directory of Buyers and Sellers of Non-Timber Forest Products.*

This is a free directory of sellers of wild non-timber products. It is a guide to the marketability of health products, and an advertising resource.

<http://www.buybcwild.com>

Howe, A. 2006. Development of Good Wildcrafting Practices and Wildcrafter Certification for Medicinal Plants.

This guide provides information on best practises, harvesting techniques, and safety.

<http://cntr.royalroads.ca/node/62>

EFlora BC

This site provides an electronic guide to B.C.'s botanical diversity, including herbal health plants.

<http://www.eflora.bc.ca/>

Health Canada

Link of Natural Health Products Monographs

This site provides a listing of commercial and non-commercial natural health products.

This information can be used as a tool to identify marketable products.

http://www.hc-sc.gc.ca/dhp-mps/prodnatur/applications/licen-prod/monograph/mono_list-eng.php

National Research Council of Canada

This site provides information on herbal health products, including scientific research and medicinal uses.

http://cisti-icist.nrc-cnrc.gc.ca/media/press/medicinal_e.html

Public Health Agency of Canada

This site has basic information on herbal health and is useful as a general reference on herbal health products and news.

www.phac-aspc.gc.ca

Weeds BC

This site provides information on the identification and management of weeds. Since many herbal health products are pest plants, this can be a useful tool to identify plant sources.

<http://www.weedsbc.ca>

Western Canadian Functional Food and Natural Health Product Network

This site has information for business development, education, and broadening the functional food market (healing foods). It also contains a natural resource directory.

<http://www.wcfn.ca/>

Wild Rose College of Natural Healing

This Alberta-based site has information on holistic healing and herb use.

www.wrc.net

Books and Other Publications

Tilford, Gregory. 1997. *Edible and Medicinal Plants of the West*. Missoula, Mont. Mountain Press.

6. Crafts and Wild Flowers

What are crafts and wild flowers?

Crafts and wild flowers are [non-cultivated] products that are either processed into crafts or packaged for retail sale. Commercial craft and wild flower use tends to be small-scale and for aesthetic purposes (Powell 2005).

An important aspect of wild craft materials is timber, usually from fallen trees or small shrubs. Some wood-based craft products for sale in the OBAC region identified by Burton (2006) include:

- small boxes;
- picture frames;
- tool handles; and
- trinkets.

Wild flowers, which are only seasonably available can be harvested and used for:

- decorative arrangements;
- bouquets for weddings;
- potpourri; and
- seed sales and distribution.

Benefits of crafts and wild flowers:

Craft materials and wild flowers are generally area specific, so the plants and flowers of one region may be of novelty value to another distant place. This can also be true for natural craft and flower products desired by urban areas. Niche market products can be of considerable novelty value. For instance seed paper (dried seeds flattened to create paper) used in product packaging can be dissolved in water after use, and will return to its original seed form (Botanical Paperworks <http://www.botanicalpaperworks.com>).

How do you become involved in the crafts and wild flowers industry?

Successful entrance into the niche-based craft and wild flower market is more reliant on securing a broad and sustainable customer base than finding the common material necessary for production or sale. Due to the ease and availability of many craft materials and wild flowers, those seeking these resources often harvest for themselves. Harvesting is generally unregulated and rarely monitored. Local flower stores, farmers' markets, and tourist shops may be useful links to develop a customer base for harvested craft and wild flower products.

Crafts and Wild Flowers Links

BC Association of Farmers' Markets

This group provides information on farmers' market schedules and itinerary, which could be useful for the sale of products.

<http://www.bcfarmersmarket.org/>

Botanical Paperworks

This commercial site has new product information (seed paper) and ideas for commercialization of wild flowers and related craft products.

<http://www.botanicalpaperworks.com/>

Center for Non-Timber Resources, Royal Roads

2007. *Buy BCwild: 2007/08 BC Directory of Buyers and Sellers of Non-Timber Forest Products.*

This is a free directory of sellers of wild non-timber forest products. It is both a source of marketable craft and wild flower products and is an advertising venue.

<http://www.buybcwild.com>

Burton, C. 2006. A Regional Profile of Commercial Harvesting of Non-Timber Forest Products in the Prince George, British Columbia Area.

This document has an inventory of craft and flower products sold in the Omineca region.

Powell, G. 2005. Regional Profile of Non-Timber Forest Products Being Harvested from the Cariboo-Chilcotin, British Columbia Area.

This document contains an inventory of craft products harvested and sold in the Cariboo-Chilcotin region.

<http://cntr.royalroads.ca/files-cntr/Cariboo-Chilcotin%20NTFP%20Regional%20Profile.pdf>

Crafts Association of British Columbia

This site features craft products and information on non-profit organisations that promote craft services and art programs. These include galleries and an online advertising venue.

www.cabc.net

David Douglas Botanical Garden Society

This society has information about harvesting and collection locations for flowers and plant species in the Prince George area.

www.ddbotgarden.bc.ca

EFlora BC

This site provides an electronic guide to wild flower and other plant species across BC.

<http://www.eflora.bc.ca/>

Flowers Canada

This site has information on commercial Canadian florists and a retail outlet locator.

<http://www.flowerscanada.ca/>

7. Eco-services

What are eco-services?

Eco-services are services that the forests provide without harvesting, cultivation, or extraction. They allow for necessary natural processes and revitalization to occur. Costanza *et al.* (1997) highlights examples of eco-services, including:

- gas regulation (in particular a balance between carbon and oxygen);
- climate regulation (temperature and precipitation);
- soil formation and erosion control;
- waste treatment;
- recreation and tourism;
- cultural practises;
- biodiversity (genetic resource for medicine, pesticide, and other remedies); and
- habitat (refuge for local and migratory animals and birds).

Benefits of eco-services:

Eco-services often act as a public good, as they provide a service that can be enjoyed by everyone. Ecological services are difficult to charge for or assign a monetary value to because of this trait. The value placed on these services varies, as does the premium individuals are willing to pay (Costanza *et al.* 1997). Some of the direct and indirect benefits from ecological services include:

- improved individual health and potentially less money spent on health care;
- sustainability of consumptive goods for individuals and businesses;
- long-term availability of natural resources (such as water, plants, and animals).

How do you become involved in the eco-services industry?

Since the large-scale implementation of ecological conservation efforts is dependant on a large number of individuals, usually with government or monetary incentive, many ecological services are not suitable for commercialisation. Some services, however, are easy to value and could be sold for profit.

Tolls at parks, carbon credits, and payment from urban centers to rural resource holders are some examples of value systems for eco-services. For instance, in 1997, Costa Rica pioneered an approach that paid landowners for the ecological services they produced (Bishop *et al.* 2002). Such a system has not been attempted in a Canadian context. Carbon credits however, are already in wide use in the UK. Those more suited to commercialisation in Canada include carbon sequestration and eco-tourism. These will be explored in further detail in sections 7.1 and 7.2.

Eco-services Links

Canadian Biodiversity Information Facility

This site has information on biodiversity and a data bank of species found across Canada.
http://www.cbif.gc.ca/home_e.php

Climate Change Connection

This site provides information on the positive and negative impacts that ecosystems have on human and community health.

<http://www.climatechangeconnection.org/Impacts/Health.htm>

Forest Action Network

This site contains a number of publications on conservation specific to northern BC, including a conservation toolkit.

www.fanweb.org/resources/reports/GBR_toolkit.pdf

Intergovernmental Panel on Climate Change

This organisation looks at the effects of human activity on climate change. It provides access to numerous scientific and government documents pertaining to ecological processes and services.

<http://www.ipcc.ch/>

Natural Resources Canada

This article provides insight into the total value of the forest, including goods, biological, and cultural values.

<http://foretscanada.mcan.gc.ca/articletopic/179>

Nature's Services

This site provides specific information on ecological services, watershed management in some cities, and valuation processes used in determining the value of eco-services.

<http://www.rand.org/scitech/stpi/ourfuture/NaturesServices/index.html>

UNBC Wet Belt

This site has information on the ecological benefits of the inland rainforest located east of Prince George.

<http://wetbelt.unbc.ca/docs/AFT-Prescribed-Learning-Outcomes.pdf>

Books and Other Publications

Costanza, R., R. D'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, S. Naeem, K. Limburg, J. Paruelo, R.V. O'Neill, R. Raskin, P. Sutton and M. van den Belt. 1997. The value of the world's ecosystem services and natural capital. *Nature* 387: 253–260.

Pagiola, S., N. Landell-Mills, and J. Bishop. 2002. Making Market-based Mechanisms Work for Forests and People. In *Selling Forest Environmental Services: Market-based Mechanisms for Conservation and Development*, edited by S. Pagiola, J. Bishop, and N. Landell-Mills, 37-58. London: Earthscan.

7.1 Carbon Sequestration

What is carbon sequestration?

Carbon absorption is a natural service provided by forests and intact natural ecosystems (e.g. wetland, bogs, etc.). This absorption is commonly referred to as sequestration, with the object holding the carbon known as a 'carbon sink'. The Organization for Economic Co-operation and Development (OECD) defines carbon sequestration (or carbon sinks) as “a biochemical process by which atmospheric carbon is absorbed by living organisms, including trees, soil micro-organisms, and crops, and involving the storage of carbon in soils, with the potential to reduce atmospheric carbon dioxide levels” (OECD <http://stats.oecd.org/glossary/detail.asp?ID=286>).

Carbon sequestration is often linked to the mitigation of climate change and the movement to reduce personal and industrial carbon emissions.

Benefits of carbon sequestration:

The need to reduce carbon or 'off-set' emissions has led to the development of a carbon trading system. In North America, there are voluntary cap-and-trade systems: the Chicago Climate Exchange and the [new] Montreal Climate Exchange. These exchanges create a mechanism which facilitates the exchange of environmental protection for monetary value.

Compensation for carbon sequestration services provides a unique opportunity for countries, such as Canada, with vast quantities of natural resources, to benefit fiscally from their conservation efforts. Trees for example, remove carbon dioxide from the atmosphere naturally during their growth and reproductive processes (Natural Resources Canada <http://cfs.nrcan.gc.ca/news/473>).

How do you become involved in the carbon sequestration market?

The Montreal Climate Exchange (created in partnership with the Chicago Exchange) is relatively new, so the actual potential for land owners to benefits from the exchange is still unknown. Trading and opportunity for monetary gain is available however, for those savvy enough to trade in the derivative-based Montreal climate market.

Since deforestation from logging, agriculture, and development is believed to be responsible for up to 20% of global carbon emissions (Johnson 2008), economic opportunities for 'green' logging, agroforestry, and conservation could become more widespread. Review of the Kyoto protocol (which sets the standards for carbon trading), as well as contact with industrial conglomerates that may need to purchase off-sets, should be established in order to determine the possibilities for carbon sequestration operations.

Carbon Sequestration Links

Agriculture and Agri-Food Canada

This site examines how agroforestry practises and carbon sequestration are mutually beneficial.

<http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1186580878442&lang=e>

BC Ministry of Forests and Range

Research Branch

This site provides publications, including the following on carbon credit systems. Spittlehouse, D.L. 2002. Carbon Credits. *Canadian Silviculture*, Fall issue: 10-13.

<http://www.for.gov.bc.ca/hre/pubs/pubs/1211.htm>

Canadian Foundation for Climate and Atmospheric Science

This site provides information on carbon science, including monitoring programs and ongoing research.

http://www.cfcas.org/index_e.html

Clean Air Cool Planet

Trexler Climate and Energy Services. 2006. *A Consumers Guide to Retail Offset Providers*.

This guide provides information on carbon offsetting mechanisms and processes.

<http://www.cleanair-coolplanet.org/ConsumersGuidetoCarbonOffsets.pdf>

Climate Change Connection

This Manitoba based site has information about climate change, including information on current carbon 'offset' practises.

<http://www.climatechangeconnection.org/default.htm>

David Suzuki Foundation

This site provides information on carbon offsets and the processes involved in carbon credit trading.

http://www.davidsuzuki.org/Climate_Change/What_You_Can_Do/carbon_offsets.asp

http://www.davidsuzuki.org/Climate_Change/What_You_Can_Do/carbon_neutral.asp

Intergovernmental Panel and Climate Change

This site contains information about policy implications and international concerns of 'human-induced' carbon-related climate change.

<http://www.ipcc.ch/>

Natural Resources Canada

These sites contain information pertaining to Canada's forests. This includes a debate of the "sink or source" nature of Mountain Pine Beetle attacked forests.

<http://cfs.nrcan.gc.ca/subsite/afforestation>

<http://cfs.nrcan.gc.ca/news/544>

<http://cfs.nrcan.gc.ca/news/473>

Our Climate

This site contains information on carbon trading systems, tax incentives, a how-to guide for methods of carbon reduction and sequestration in transportation and agriculture.

<http://www.ourclimate.net/sequestration.htm>

United States Department of Energy

Office of Science

This site provides insight into carbon sequestration science and research in the U.S.

<http://cdiac2.esd.ornl.gov/>

Vermont Family Forest

This conservation organization's site has information on community run forests for community benefit, including climate change and carbon absorption.

<http://www.familyforests.org/research/biomass-project.shtml>

Books and Other Publications

Fredeen, A.L. 2006. How is forest management influencing carbon storage in sub-boreal forests? Natural Resources and Environmental Studies Institute, Research Extension Note #06.01. University of Northern British Columbia, Prince George, British Columbia, Canada.

<http://web.unbc.ca/~fredeena/Fredeen%20REN%202006.pdf>

Kulshreshtha, S.N., Lac, S., Johnston, M., and Kinar, C. 2000. *Carbon Sequestration in Protected Areas of Canada: An Economic Valuation*. Department of Agriculture at the University of Saskatchewan. Saskatoon Sask.

7.2 Eco-tourism

What is eco-tourism?

Eco-tourism is based on natural experience, and includes elements of community-based tourism, as well as sustainable travel and activities. According to the *International Ecotourism Society* (www.ecotourism.org) eco-tourism should include the following of characteristics:

- minimized impact;
- building environmental and cultural awareness;
- providing positive experiences for visitors and hosts;
- direct financial benefits for conservation;
- financial benefits and empowerment for local people; and
- raising sensitivity to the host countries' political, environmental, and social climate.

Benefits of eco-tourism:

Fiscal benefits associated with eco-tourism tend to be allocated to the local community, which can be a part of local economic development or community improvement. According to the *International Ecotourism Society* (www.ecotourism.org) in 2004, eco-tourism was growing globally at 3 times the rate of the general tourism industry.

How do you become involved in the eco-tourism industry?

Since eco-tourism is a large industry, there are a number of opportunities for new businesses. Some examples of eco-tourism operations include:

- [rain]forest hiking;
- kayaking and canoeing;
- bear, bird, and other wildlife watching;
- ocean and mountain tours;
- mushroom safaris; and
- wilderness lodging.

Eco-tourism is subject to market and resource fluctuations. Existing lodges, hotels, and other accommodation businesses can add an eco-tourist element to their operation by changing to environmentally sensitive practises, or collaborating with guiding, travel, and holiday operations that promote conservation / low impact travel.

Eco-tourism Links

BC Agri-tourism Alliance:

This site provides a listing of farms and agritourism sites, which can be incorporated into eco-tourism packages or become niche tourism markets themselves.

<http://www.agritourismbc.org/northernbc.htm>

BC Wilderness Tourism Association

This organization acts as a wilderness tourism advocacy and education group. Their site has information on tourism opportunities, recreation, and government/ policy documents.

<http://www.wilderness-tourism.bc.ca/>

British Columbia Travel Guide

This site has an eco-tourism directory available to provide market insight as well as tourist site profiles.

<http://www.gobc.ca>

Elderhostel

This site provides ecotours targeted at retirees, including trips to the Churchill Manitoba area research stations, estuaries and community.

<http://www.elderhostel.org/>

Forest House

This small resort specializes in eco-tourism, including packages with wild edible identification and alternative energy utilisation. It is an example of a successful eco-tourism business.

<http://www.foresthouse.ca/>

The International Ecotourism Society (TIES)

This site has information on tourist packages and responsible travel, with links to regional and national eco-tourism organizations.

http://www.eco-tourism.org/webmodules/webarticlesnet/templates/eco_template.aspx?a=12&z=25

Tourism BC

This site provides a listing of successful eco-tourism businesses, including zipline tours in Whistler BC and 'eco-walks' in Parksville BC.

<http://www.hellobc.com/en-CA/default.htm>

United Nations Environment Programme (UNEP)

These sites provides definitions of eco-tourism, as well as a listing of benefits and challenges associated in this industry.

<http://www.unep.org>

<http://www.unep.org/ourplanet/imgversn/101/otte.html>

The Ontario Eco-tourism Society (TOES)

This Ontario site is the first province wide eco-tourism organisation. The site provides information on best practices and eco-tourism businesses, and includes an online forum.

<http://www.toes.ca/>

8. Traditional Ecological Knowledge

What is traditional ecological knowledge?

Traditional Ecological Knowledge (TEK) is a way of understanding how one relates to and uses physical aspects of the land. TEK is generally associated with First Nations populations in a historical context; however, any society may have TEK. In order to protect and preserve the value of TEK a classification is needed. UNESCO has established the following traits:

- “Locally bound, indigenous to a specific area;
- Non-formal knowledge;
- Orally transmitted, and generally not documented;
- Dynamic and adaptive;
- Holistic in nature; and
- Closely related to survival and subsistence for many people worldwide” (<http://www.unesco.org/most/bpindi.htm>).

First Nations TEK is generally passed along in a different way than western learning. It is often done in a multidimensional way through hands on learning; lessons through error and stories; and an interweaving of botany, identification, practises, and spirituality.

Benefits of traditional ecological knowledge:

Traditional ecological knowledge is extremely useful and relevant to current resource industries and communities and can be applied in a number of ways. According to Canada’s *International Development Research Centre* (<http://www.idrc.ca>), traditional knowledge can be beneficial for:

- new biological and ecological insights;
- resource management;
- protected areas and for conservation education;
- development planning; and
- environmental assessment.

How do you access and apply traditional ecological knowledge?

Traditional knowledge is increasingly being used as a tool for development in both top down and grassroots approaches (UNESCO). Environmental scientists, climatologists, and policy developers often utilise First Nation’s traditional expertise. The procurement of this knowledge can be of issue, often taken without permission or used in a manner other than originally intended. First Nations’ losses can come in the form of lost market opportunity, exploitation, or land degradation.

Traditional Ecological Knowledge Links

Canadian Arctic Resources Committee

Northern Resources Journal

This online journal covers a number arctic topics, including the expertise and extensiveness of traditional ecological knowledge, its utility, and its practicality.

http://www.carc.org/northern_perspectives.php

Centre for Non-Timber Resources, Royal Roads University

Howe, A. 2005. *Native Plants and First Nations: How can we create research that is equitable, sustainable, and beneficial to all?*

This document contains conclusions made regarding research best practises and First Nation's knowledge classification systems. It contains a listing of workshop participants.

<http://cntr.royalroads.ca/node/93>

Environment Canada

State of the Environment InfoBase

This infobase provides an overview of Inuit TEK.

<http://www.ec.gc.ca/soer-ree/english/SOER/1996report/Doc/1-6-9-5-6-1.cfm>

First Nations Non-Timber Forest Products

This site provides insight into First Nation's traditional ecological knowledge regarding the use of non-timber forest products.

<http://web2.uvcs.uvic.ca/courses/ntfp/history/unit02.htm>

Natural Resources Canada, TEK Program

This site has a small database which includes stories related to TEK and highlights the methods in which it is shared.

http://www.pfc.cfs.nrcan.gc.ca/programs/tek/index_e.html

Tl'azt'en Nation and the University of Northern BC

Community University Research Alliance

This community-university research partnership's between the Tl'azt'en First Nations and UNBC site includes information on the John Prince Research Forest, Tl'azt'en Ecological Knowledge, and research projects.

<http://cura.unbc.ca/>

United Nations Educational, Scientific and Cultural Organisation (UNESCO)

This site provides definitions of T.E.K. and a best practise guide regarding the collection and classification of such knowledge.

<http://www.unesco.org/most/bpindi.htm>

Books and Other Publications

Bev Kynoch. 2003. *The Brightwater Environmental and Science Project: Respecting Traditional Ecological Knowledge; The Soul of a Tribal People*. Saskatoon: University of Saskatchewan Printing Services.

9. Wild Greenery and Christmas Trees

What are wild greenery and Christmas trees?

Wild greenery and Christmas trees are abundant non-timber forest products available across BC. Wild greenery refers to any non-flowering product used for decorative purposes or commercial sale. Such products are usually wild plants, although some may be specifically grown via agroforestry. In the OBAC region, local florists and wild greenery users tend to import their greenery due to quality and consistency issues from local harvesters (Burton 2006). Examples of wild greenery products include:

- salal (used around roses);
- green mosses;
- ferns;
- cattails; and
- tree branches for wreathes, boughs, and garlands (Burton 2006).

Christmas trees, or trees used for seasonal festive purposes, can be harvested for personal use by obtaining a Christmas tree permit from the Ministry of Forests and Range's regional managers. Commercial Christmas tree operations are usually harvested from private lands or tree farms, with about 20% harvested from Crown lands (<http://www.agf.gov.bc.ca/aboutind/products/plant/xmastree.htm>). A variety of Christmas trees are farmed in BC including:

- fir (e.g. douglas, grand, noble, and concolor);
- pine (e.g. scotch and white pine); and
- spruce (<http://www.agf.gov.bc.ca/aboutind/products/plant/xmastree.htm>).

Benefits of wild greenery and Christmas trees:

Wild greens are a lucrative crop in BC, with Royal Roads (2006b) estimates ranging from \$27 to \$65 million per year from 1995-2004. The Centre for Non-Timber Resources (2007a) notes that salal alone can generate from \$35 to \$50 million per year in BC. Christmas trees and greenery are widely available in the Omineca region. Their long harvesting season makes them desirable crops.

How do you become involved in the wild greenery and Christmas trees industry?

The wild greenery market in the OBAC region is underdeveloped, with local buyers purchasing elsewhere due to concerns about the quality and consistency of supply. Since it is an unregulated industry, market entrance involves securing buyers products and providing product consistency. Christmas trees, which are heavily regulated, require access to private land, Crown harvesting licenses, power line right-of-way trees, or the development of a tree farm. Christmas tree farms, however, qualify for agroforestry funding through the *Agroforestry Industry Development Initiative* and can be marketable on a larger scale to non fir-tree producing countries, such as Mexico.

Wild Greenery and Christmas Tree Links

BC Woodlot Association

This site has information about a successful Christmas tree project in the Kootney area.
<http://www.woodlot.bc.ca/agroforestry/app-proj.htm>

BC Christmas Tree Council

This site has information about the Southwest, Kootney, and Vancouver Island Christmas Tree Associations. Information is provided for tree care and includes a 'buy-sell' directory.

<http://www.bcchristmastrees.com/>

BC Ministry of Agriculture and Lands

BC farm Products, Christmas Trees

This site provides information on the Christmas tree industry in BC, including marketability, harvest processes, and a contact directory.

<http://www.agf.gov.bc.ca/aboutind/products/plant/xmastree.htm>

BC Ministry of Forests and Range

Christmas Tree Regulation

This site provides information on regulations and permits for the acquisition of personal use Christmas trees.

<http://www.for.gov.bc.ca/tasb/legsregs/forest/faregs/ctreereg/ctreg.htm#section1>

Center for Non-Timber Resources, Royal Roads University

2007. Buy BCwild: 2007/08 BC Directory of Buyers and Sellers of Non-Timber Forest Products.

This is a free directory of sellers of wild non-timber products. It is a source for marketable greenery products and advertising.

<http://www.buybcwild.com>

2007. Adding Value to Floral Greens: A Handbook for Entrepreneurs.

This guide provides insight into the greenery market, including best practises.

<http://cntr.royalroads.ca/files-cntr/Adding%20Value%20to%20Floral%20Greens%20Handbook%2019-04-06.pdf>

Burton, C. 2006. A Regional Profile of Commercial Harvesting of Non-Timber Forest Products in the Prince George, British Columbia Area.

This document contains information on floral greenery in the Omineca region, including reported problems with locally harvested products.

Powell, G. 2005. Regional Profile of Non-Timber Forest Products Being Harvested from the Cariboo-Chilcotin, British Columbia Area.

This document contains retail and harvesting information about the greenery industry in the nearby Cariboo-Chilcotin region.

<http://cntr.royalroads.ca/files-cntr/Cariboo-Chilcotin%20NTFP%20Regional%20Profile.pdf>

10. Honey and Honey Products

What are honey and honey products?

Honey is a well developed commercial industry. While honey is usually cultivated through actively managed hives and beekeeping, it is a natural forest resource, and thus can be considered a non-timber forest product. Honey production is well suited to both small-scale and large-scale commercial operations. Honey can be consumed alone as a sweetener, in combination with other wild edibles, or as an additive in products. Some commercial honey products include:

- mead (honey wine);
- honey and mead jellies;
- bee pollen and royal jelly (health product use);
- soaps, personal grooming, and cosmetic products;
- bee hive tourism;
- bee venom;
- smoke wood flavourers; and
- pollination services.

Benefits of honey and honey products:

Honey is successfully cultivated across northern BC. According to the Canadian Honey Council (www.honeycouncil.ca) hives that are wintered indoors [similar to some Quebec operations] can experience lower mortality rates and greater honey bee survival. The value-added nature of many honey products and services, combined with advances in beekeeping methods and consumer demand for ‘healthier’ natural foods (BC Ministry of Forest and Range 1995), contributes to the lucrative aspect of this industry in the OBAC region. Honey and honey products have a long history of successful sales in BC worth an estimated \$160 million per year in bee services, and \$8 million in product sales (Ministry of Agriculture and Lands 2003).

How do you become involved in the commercial honey and honey products industry?

Due to the well developed nature of the honey and beekeeping industry, as well as the intensiveness of honey production, market entrance can be more capital intensive and regulatory than other non-timber forest products. Wild honey collection (from wild nests) requires the knowledge of an experienced expert. Commercial hives require specialised equipment and queen bees. It would be advisable to contact the Ministry of Agriculture and Lands for registration and regulation information, as well as one or more of the regional beekeeping and honey associations for information on business development, funding, and best practises.

Honey and Honey Product Links

BC Association of Farmers' Markets

This group provides locations and dates of farmers' markets. These are useful venues for the sale of honey products.

<http://www.bcfarmersmarket.org/>

BC Food Processors Association

This site includes a directory of food processor associations, suppliers, and industry regulation. It is a useful source of food industry opportunities.

http://www.bcfpa.ca/directories/directories_intro.htm

BC Honey Producers Association

This organisation promotes beekeeping operations in British Columbia. The site provides links for funding, pollinating services, bylaws, conferences, and member services.

<http://www.bcbeekeepers.com/index.html>

BC Ministry of Agriculture and Lands

This site has documents for bee keeping registration, as well as information on legislation and practises. This is a useful site for commercial honey producers.

<http://www.al.gov.bc.ca/apiculture/>

BC Small-scale Food Processor Association

This association provides an online specialty food directory and business development tools.

<http://www.ssfpa.net/>

Canadian Honey Council

This site provides information on honey industry markets and prices, beekeeping, as well as standards and practises.

<http://www.honeycouncil.ca>

Center for Non-Timber Resources, Royal Roads University

2007. *Buy BCwild: 2007/08 BC Directory of Buyers and Sellers of Non-Timber Forest Products.*

This directory of sellers of wild non-timber products has a listing of marketable honey products.

<http://www.buybcwild.com>

Honeybee Center

This site has information on honey bee activities, beekeeping tools, and equipment.

<http://www.honeybeecentre.com/>

Investment Agriculture Foundation of BC

This organisation administers funding through the *Agri-Food Futures Fund* (a joint venture between the Province of BC and the Government of Canada) for numerous initiatives, including the *Beekeeping Industry Development Initiative*.

http://www.iafbc.ca/funding_available/programs/beekeeping/beekeeping.htm

Institute of North Ireland Beekeepers

This site has information regarding the treatment of the Varroa mite, which has devastated honey bee stocks across North America.

<http://www.inibeekeepers.com/oxalic.html>

11.1 Wild Fruits and Berries

What are wild fruits and berries?

Wild fruits and berries are an abundant forest resource. The Ministry of Forests and Range estimates that thirty-five species of berry and wild fruit are used in BC (Ministry of Forests and Range 1994). Burton (2006) notes seven species that are commercially harvested in the Omineca region. These include:

- wild strawberries;
- saskatoon berries;
- raspberries;
- blueberries;
- huckleberries;
- high-bush cranberries; and
- oregon grape.

Additional wild fruits and berries that are harvested on a smaller scale include: crab-apples, wild rose hips, elderberries, and soap berries.

Benefits of wild fruits and berries:

Wild fruits and berries can be consumed raw (with the exception of elderberries) (Centre For non-Timber Resources 2007a) or processed into baked goods and preserve products, making them a potential year round commercial product. These products include:

- jams and jellies;
- wines and vinegars;
- pies, cakes, and fillers;
- whole frozen fruits;
- syrups and salad dressings; and
- canned or jarred whole fruits.

How do you become involved in the wild fruits and berries industry?

Numerous studies reviewed by the Ministry of Forests and Range (1994) have shown that there is potential for economic development within the wild foods market. The challenge for wild fruits and berries proprietors is accessing information regarding product supply and inventory, such as harvesting locations and product marketability (Ministry of Forests and Range 1994). Interested parties should consult local farmers' markets, craft and bakes sales, seller guides and associations, the Ministry of Agriculture and Lands, and the Ministry of Forests and Range for funding opportunities and market profiles before investing time or resources. The Ministry of Health should also be contacted for 'food safe' processing and sales regulations.

Wild Fruits and Berries Links

BC Food Processors Association

This site includes a directory for food processor associations, suppliers and industry regulations. It is useful as a guide to successful wild fruit industry opportunities.

http://www.bcfpa.ca/directories/directories_intro.htm

BC Small-scale Food Processor Association

This association provides an online specialty food directory, information regarding food safety, and links to funding programs for new entrepreneurs.

<http://www.ssfpa.net/>

Center for Non-Timber Resources, Royal Roads University

Burton, C. 2006. A Regional Profile of Commercial Harvesting of Non-Timber Forest Products in the Prince George, British Columbia Area.

This document has information on wild fruits and berries in the OBAC region.

Investment Agriculture Foundation of BC

This organisation administers funding through the *Agri-Food Futures Fund* for numerous initiatives, including processed foods, health foods, and functional (wild) foods.

http://www.iafbc.ca/funding_available/programs.htm

Manitoba Agriculture, Food and Rural Initiatives

This provincial site has detailed information on the production and management of wild Manitoba fruits and berries.

<http://www.gov.mb.ca/agriculture/crops/fruit/>

Ministry of Agriculture and Lands

This link provides statistical data on *cultivated* berry sales in BC. It can be useful for links, contacts, and marketability of popular berries.

<http://www.agf.gov.bc.ca/berries/>

Ministry of Forests and Range

These online publications provide background information on the wild fruit and berry industry sales, harvesting, and prevalence in BC.

<http://www.for.gov.bc.ca/hfd/library/frfa/1994/chap6.htm>

<http://www.for.gov.bc.ca/hfp/publications/00002/chapt4.htm#wbf>

<http://www.for.gov.bc.ca/hfp/publications/00002/table10.htm>

11. 2 Wild Vegetables and Seasonings

What are wild vegetables and seasonings?

Wild vegetables and seasonings provide value as edible vegetables, herbal seasonings, flavourings, and culinary stimuli for personal and commercial consumption (Ministry of Forests and Range 1994). Many are considered speciality items due to their rarity. Some commercial wild forest vegetables and herbs include:

- tree tips (jellies);
- cattails (fresh or canned heads, root stems, and flour);
- fiddle heads (fresh, frozen, or canned);
- daisy capers (Forbes Wild Foods www.wildfoods.ca/products-vegetables.html);
- dandelions (fresh as a salad green, dried root, and leaves for herbal use);
- salmonberry (shoots);
- teas (made from a variety of leaves and shrubs, including Labrador Tea), and
- fireweed (cooked, raw in salad, and as an additive in honey) (Tilford 1997).

In addition to commercial sales, a number of wild non-flowering edibles exist in BC and are utilised for personal consumption. These include:

- chickweed (salad green);
- stinging nettle (cooked like spinach);
- mountain potato (bulb);
- rhubarb (stalks only);
- thistle; and
- nodding onion (Powell 2005).

Benefits of wild vegetables and seasonings:

Some plants, as noted by the BC Ministry of Forests and Range (1994), can be beneficial additives or substitute products (such as biscuit-root, camas root, and cattail roots, which work as a wheat substitutes). Other products may have specialty ‘niche’ market status (such as salmonberry shoots that are popular in the Vancouver and Eastern Canadian market). The uniqueness of wild vegetables and seasonings increases their economic value.

How do you become involved in the wild vegetables and seasonings industry?

It is important to thoroughly research plants for harvest, as vast differences in plant edibility and safety can only be distinguished by slight variations in flora appearance. Poisoning is possible. Studying regional books on edible plants species and speciality food distributors is the most effective method to identify and develop marketable products. The Ministry of Health should also be contacted for ‘food safe’ processing and sales regulations.

Wild Vegetable and Seasoning Links

BC Food Processors Association

This site includes a directory for food processor associations, suppliers and industry regulations. It is useful for identifying wild vegetable and seasoning opportunities.

http://www.bcfpa.ca/directories/directories_intro.htm

BC Small-scale Food Processor Association

This association provides an online specialty food directory, information regarding food safety, and links to funding programs for new businesses.

<http://www.ssfpa.net/>

Center for Non-Timber Resources, Royal Roads University

Powell, G. 2005. Regional Profile of Non-Timber Forest Products Being Harvested from the Cariboo-Chilcotin, British Columbia Area.

This document contains a listing of traditional First Nations uses of plants.

<http://cntr.royalroads.ca/files-cntr/Cariboo-Chilcotin%20NTFP%20Regional%20Profile.pdf>

Investment Agriculture Foundation of BC

This organisation administers funding through the *Agri-Food Futures Fund* for numerous initiatives, including processed foods, health foods, and functional (wild) foods.

http://www.iafbc.ca/funding_available/programs.htm

Manitoba Agriculture, Food and Rural Initiatives

This provincial site has detailed information on production and management of Manitoba wild crop potentials.

<http://www.gov.mb.ca/agriculture/>

Ministry of Forests and Range

This online publication provides harvesting and retail information for the wild vegetable and herb industry in BC.

<http://www.for.gov.bc.ca/hfd/library/frfa/1994/chap5.htm>

Saskatchewan Herb and Spice Association

This organization is the management body for the Nation Herb and Spice Coalition. The site provides information on potential herb and spice products, best practices for harvesting techniques, and links to other natural food sites.

<http://www.saskherbspice.org/>

The Northern Forest Diversification Centre

This site has listings and descriptions of wild vegetable and seasoning products, including teas.

<http://www.nfdc.ca/wildharvestedteas.htm>

11. 3 Wild Mushrooms

What are wild mushrooms?

Wild mushroom harvesting involves trained mushroom pickers who seasonally identify and harvest edible fungi, usually from public or Crown forests. In terms of commercial activities, pine, morel and chanterelles mushrooms have the highest value and are widely harvested. Many of wild mushrooms are exported. For example, morels are popular in France and Italy, and chanterelles are popular in Germany. Pine mushrooms (which are similar to the Japanese matsutake mushroom) are popular in Japan (Powell 2005). Other mushrooms identified for commercial harvest in northern BC include:

- brain mushrooms (*Gyromitra Esculenta*);
- giant western puffballs (*Calvatia Booniana*)
- boletes (*Boletus edulis*);
- oyster mushrooms (*Pleurotus Ostereatus*);
- honey mushrooms (*Armillaria Ostoyae*);
- slippery jacks (*Suillus Tomentosus*);
- shaggy manes (*Coprinus Comatus*); and
- birch boletes (*Leccinum spp*) (Powell 2005).

Wild mushrooms produce an immediate commercial product, but there are also opportunities for value-added mushroom products. These include:

- wild mushroom spreads and pâtés;
- dressings and marinades;
- soups and [morel] bisques; and
- meat alternative products due to their meaty texture (Centre for Non-Timber Resources 2007a).

Benefits of wild mushrooms:

Wild mushrooms are a lucrative industry. The Center for Non-Timber Resources at Royal Roads University (2006a) estimates that from 1995 to 2004, wild mushrooms sales ranged between \$10 and \$42 million per year.

How do you become involved in the wild mushroom industry?

Wild mushroom harvesting requires knowledge of mushroom species in order to avoid poisoning, as well as location sites and sustainable harvesting techniques. Local or seasonal pickers should be consulted. Pine mushrooms, which are generally associated with older pine, douglas-fir, or hemlock, may be difficult to locate due to the Mountain Pine Beetle's attack on older stands. Morels, however, are harvestable in the mid-spring and are often abundant in previous fire sites (Powell 2005).

Wild Mushroom Links

BC Biodiversity

This site has information on the location, identification, and harvesting techniques for mushrooms in BC.

<http://bcbiodiversity.homestead.com/mushrooms.html>

BC Ministry of Forests and Range

Protection Branch, Fire Locations

This site is useful for morel harvesters planning for the following year as it provides fire locations and sizes.

<http://www.bcwildfire.ca/History/firelocations.htm>

BC Ministry of Forests and Range

Berch, S. and Cocksedge, W. 2003. *Commercially Important Wild Mushrooms and Fungi of British Columbia: What the Buyers Are Buying*. Technical Report. 006. BC Ministry of Forests and Range, Research Branch. Victoria, B.C.

This document is an analysis of the wild mushroom market in BC, including mushroom typology and location.

<http://www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr006.htm>

Edible Wild Mushrooms in BC

This online publication includes a step-by-step approach to harvesting mushrooms in BC. It provides information on fungi growth, species location, harvest techniques, and best practices.

<http://www.for.gov.bc.ca/hfp/publications/00028/harvest.htm>

BC Mushrooms

This site, hosted by Forrex, provides information on the mushroom harvesting industry in BC, including mushroom ecology and best practices.

<http://bcmushrooms.forrex.org/ntfp/>

Center for Non-Timber Resources, Royal Roads University

2006. Economic Values for Non-Timber Forest Products in British Columbia.

This document contains information about the wild mushroom market in British Columbia.

http://www.for.gov.bc.ca/hfd/library/FIA/2006/FSP_Y061065d.pdf

Powell, G. 2005. Regional Profile of Non-Timber Forest Products Being Harvested from the Cariboo-Chilcotin, British Columbia Area.

This document contains information on spring and fall mushrooms harvested, as well as listings of mushroom species bought and sold in the Cariboo-Chilcotin Region.

<http://cntr.royalroads.ca/files-cntr/Cariboo-Chilcotin%20NTFP%20Regional%20Profile.pdf>: p. 24-25.

The Great Morel

This site contains species descriptions, best practises for harvesting techniques, safety advice for harvesters, morel recipes, and morel photographs for identification purposes.

<http://thegreatmorel.com/>

U.S. NTFP Species Database

Additional Information for Fungi Harvested For Food or Flavoring

This site is a branch of the U.S. Non-Timber Forest Products species data base, and has listings of mushroom species, taxonomy, and distribution.

<http://www.ifcae.org/ntfp/databases/products/ediblefungiinfo>

12. Sustainable Landscaping

What is sustainable landscaping?

Sustainable landscaping is the practise of using local plant species for cultured landscapes (such as yard and community spaces) along with less consumptive methods of maintenance, pest elimination, and care. The revitalised practise of using local plants and sustainable techniques stems from environmental concerns about pesticides and fertilisers. These practises consume natural resources and can pollute surrounding ecosystems.

Benefits of sustainable landscaping:

Sustainable landscaping practises have numerous financial, ecological, and aesthetic benefits. These include:

- reduced air, noise, and water pollution;
- less erosion and washout;
- increased biodiversity;
- less maintenance and consumption of natural resources;
- low cost;
- aesthetic appeal; and
- a sense of place affiliated with regional plant species (Welker and Green <http://www.epa.gov/greenacres/smithsonian.pdf>)

The implementation of sustainable landscaping requires a source of live plants, seeds, and technical information. This creates an opportunity for rural areas to market locally harvested plants to urban areas where access to open woodland and biodiversity may be more limited. Some commercial sustainable landscaping products include:

- plants used in restoration projects or nature-scaping;
- green roof and living wall plants;
- ground cover plants, and wild flower seeds; and
- sustainable landscape planning.

How do you become involved in sustainable landscaping practises and industry?

UNBC, the City of Prince George and other partners entered into the *Northern Sustainable Landscaping Initiative*. This is a five year research program that explores landscaping options which can withstand road salt and cold winter temperatures, and does not require extensive watering or pesticides (UNBC 2007). Reviewing the City of Prince George project reports will be useful for determining which sustainable landscaping plants and techniques are best suited to a northern climate. The collection and addition of local wild or low maintenance plants in a turf test-patch is a simple introduction to sustainable landscaping practises.

Sustainable Landscaping Links

British Columbia Landscape & Nursery Association

This site has information for landscape professionals on integrated pest management systems for sustainable pest reduction.

<http://www.bclna.com/index.htm>

The City of Prince George

The City is involved in the *Northern Sustainable Landscape Initiative*, a co-operative research project between UNBC and Prince George. This report has information on sustainable landscaping methods.

Michelle Nakano. *Sustainable Landscape: Principles & Practices*. Prince George, BC 2008.

http://www.city.pg.bc.ca/rec_culture/pginbloom/2008/SustainableLandscapePresentation.pdf

Colorado State Extension Horticulture

This site has information on gardening and horticulture and includes documents on landscaping techniques and practices, including this one on sustainable landscaping. Bousset, J., Badertscher, K., and Roll, M. Sustainable Landscaping.

<http://www.ext.colostate.edu/Pubs/Garden/07243.html>

United States Environmental Protection Agency

This agency has information on environmental sustainability methods, including sustainable landscaping practices.

<http://www.epa.gov/greenacres/>
<http://www.epa.gov/greenacres/smithsonian.pdf>

University of Minnesota

Sustainable Urban Landscape Information Series

This online series contains diagrams, charts, and directions for implementing sustainable landscaping systems.

<http://www.sustland.umn.edu/>

University of Northern British Columbia

Northern Sustainable Landscaping Initiative

Project coordinators Dr. Annie Booth and Dr. Eric K. Rapaport from UNBC assisted in preparing this document on the initiative.

Booth, A., E. Rapaport, and I. Parker. 2005. Northern Sustainable Landscaping Initiative.

http://www.realestatefoundation.com/community/sustlandscapeinit_pg.pdf

The Urban Farmer

This commercial sustainable landscaping company is based in Edmonton. They are an example of a successful sustainable landscaping service business.

<http://www.theurbanfarmer.ca/>

13. General Links for Non-Timber Forest Resources

BC Ministry of Forests and Range

Biogeoclimatic Zones of British Columbia

This site provides a map of the 14 different biogeoclimatic zones in BC, useful for identifying species locations.

<http://www.for.gov.bc.ca/hfd/library/documents/treebook/biogeno/biogeno.htm>

Non-timber forest products

This section provides an overview of the non-timber forest product industry in BC.

<http://www.for.gov.bc.ca/hre/ntfp/>

Regions and Districts

This section provides links to forest region websites across B.C.

<http://www.for.gov.bc.ca/mof/regdis.htm>

Center for Non-Timber Resources, Royal Roads University

Community Tool Kit for Non-Timber Resources

This document contains information for communities interested in building a resilient non-timber forestry industry.

<http://cntr.royalroads.ca/book/export/html/22>

Cocksedge, W. 2007. Non-Timber Forest Product Profile for the Prince George Forest District.

This document is a review of non-timber forest product literature (in the Prince George forest district) and contains an appendix of publications related to the topic.

www.for.gov.bc.ca/hfd/library/FIA/2007/LBIP_2538070.pdf

Forest Policy Research

This site provides links to news stories regarding forestry policy, ecological tourism and conservation efforts in world regions.

<http://forestpolicyresearch.org/2008/07/05/367-bc-canada/>

Forrex

Natural Resource Information Network

This data base searches a number of different ministries, publishers and websites for natural resource and forestry documents.

<http://nrin.forrex.org/>

Government of British Columbia

Infobasket

This is a resource for searching ministry documents, including non-timber forest products, bioproducts, economic reports, and resource management tools.

<http://infobasket.gov.bc.ca/portal/server.pt?>

Institute for Culture and Ecology

Non-Timber Forest Products in the United States website

This site provides identification and location of non-timber forest products. It includes a bibliographical database and a species database (currently unavailable, but under repair). It is a portion of the larger American based institute for culture and ecology.

<http://www.ifcae.org/>

<http://www.ifcae.org/ntfp/pubs/index.html>

Natural Resources Canada

Main site

This site contains publications, government employee directories, news releases, and information on legislation and access pertaining to Canadian forest resources.

www.nrc-cnrc.gc.ca

Non-timber Forest Product Network of Canada

This site contains a non-timber forest product specific directory, partner listing, and media releases in Canada.

<http://www.ntfpnetwork.ca/>

Canadian Forest Service

This site contains information on Canada's forests including conservation, harvestable products, land use issues, and governance structure.

<http://cfs.nrcan.gc.ca/?lang=en>

Non-Timber Forest Products

This American directory of non-timber forest product publication, fact sheets, links, and workshop information is a collaborated effort by: the Center for Forest Products Marketing and Management; the Virginia Polytechnic Institute and State University; and the Southern Research Station, USDA Forest Service.

http://www.sfp.forprod.vt.edu/special_fp.htm

The Overstory

This online agroforestry journal is a resource for scholarly articles on non-timber resources and agroforestry.

<http://www.agroforestry.net/overstory/index.html>

Small Business BC

This resource for small businesses provides information for business development and niche markets products.

<http://www.sb.gov.bc.ca/>

Western Economic Diversification Canada

This site provides financial support for economic diversification projects, which could include development of non-timber forest product businesses.

<http://www.wd.gc.ca/>

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