

Hard Times or Good Times?

A Call to Action for Agricultural Producers



Community Futures Thompson Country



Government of Canada / Gouvernement du Canada

Canada

The Government of Canada has contributed funding to this initiative

Challenges and Opportunities

for Small and Medium Scale Agricultural Producers

in the Thompson Valley, Nicola Valley, Upper Fraser Canyon and South Cariboo

MAJOR FLUCTUATIONS in the cost of doing business



In July, 2000 Community Futures Development Corporation of Thompson Country (CFTC) received a series of commissioned agricultural studies that reviewed opportunities for growth in small and medium-scale agriculture in the Thompson and Nicola valleys, the Upper Fraser Canyon and the South Cariboo. The authors generated a picture of the region's current agricultural activities, land base and climate and suggested a range of opportunities for future growth.

By September, 2009 long-term increases in the cost of vehicle fuels and fluctuations in the cost of natural gas and propane across North America have added to the uncertainties for agricultural producers. This situation is further complicated by the deep world-wide recession which began in 2008.

FUEL COSTS – the bad news

Although industry-watchers on both sides of the Canada/US border had been warning for a decade that a continent-wide fuel and energy crisis was on the way, these warnings were largely ignored. The predictable local results are great increases in home heating costs over the last decade, with similar increases in the cost of gasoline, diesel fuel and propane. This fuel-cost spiral has long-term implications for the people of the Thompson Valley, Nicola Valley, the Upper Fraser Canyon and the South Cariboo – both individually and as citizens of an economic region. Rising fuel and energy prices mean that the cost of forest products production, the region's most important manufacturing activity, has escalated steeply over the past 10 years. At the same time, the rise in the Canadian dollar hurts overseas sales.

ELECTRICITY – the bad news

Electricity prices – which might have acted as an offset for

rising fossil fuel costs – are also under pressure. Electricity powers everything from irrigation pumps and mining crushers to sawmill and pulpmill motors. British Columbia's huge hydroelectric production has significant value as an export commodity, which means domestic prices stand to be affected by export market demand. This threatens the agriculture, mining and forest products sectors with additional cost increases. In the same way, the rapid upturn in diesel fuel prices means noticeable increases in the cost of imported food.

What does all of this mean in terms of regional agricultural opportunities?

ENERGY COSTS – the good news

The Interior of British Columbia has not been a self-sufficient food producer since the coming of the railways in the 1880s. The creation of an improved highway network in the 1950s and '60s meant that it was cheaper to import produce from California and Mexico than to produce it locally. In the Kamloops area, a productive vegetable sector that used the railways to ship its products to market disappeared and its land base was recycled for housing.

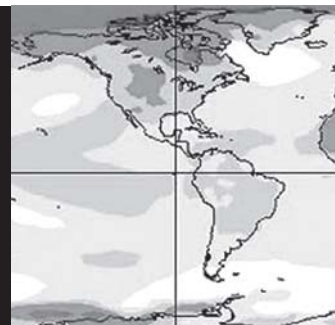
Fresh Opportunities

Anyone who buys food today is aware of the rapid increases in the cost of groceries due to all of the factors mentioned above. The situation may be grim for regional consumers and manufacturers, but it also provides some opportunities for small-scale niche producers and value-added manufacturers.

When it becomes very expensive to truck in produce, it becomes feasible to resurrect at least some of the fruit and vegetable production that used to exist locally, for consumption by the local market. Many barriers still affect the expansion of local small and medium-scale agriculture, but the fuel crisis provides a window of opportunity for some innovative producers with a sound business plan and an understanding of commercial realities.

INTO THE UNKNOWN

Climate & Other Variables



2 Hard Times or Good Times? A Call for Action

Challenges and Opportunities for Small and Medium-Scale Agricultural Producers in the Thompson Valley, Nicola Valley, Upper Fraser Canyon and South Cariboo

Community Futures Development Corporation of Thompson Country (CFTC), #101 – 286 St. Paul Street, Kamloops, BC, V2C 6G4 • Tel: 1-877-335-2950; 250-828-8772 • www.communityfutures.net

SHAKY GROUND

Today what might be euphemistically referred to as “succession planning” is another problem inextricably linked to the future of agriculture in the BC Interior.

Not only is it more expensive to operate existing farms and ranches because of the energy cost spiral – it is also very difficult to find people who actually want to go farming in today’s world. Many of the children of today’s farmers and ranchers are unwilling to take over their parents’ operations and it is often very difficult for newcomers to assemble the necessary capital to acquire a going concern. Perhaps it is time for government to re-examine the whole business of agricultural land reserves in the light of the realities of current and future agriculture. To complicate things still further, the weather is changing.

CLIMATE – in context

Historically, producers often underestimated the cyclical nature of the Southern Interior climate and have made significant investments in developing sites that lack the appropriate climate to be productive over time.

A useful example is the British-owned agricultural development at Walhachin on the Thompson River. This site was developed prior to the First World War as a fruit-farming venture. It failed because it proved impossible to irrigate the lands satisfactorily – given the available technology – and especially because, except for a small portion of the site, the area proved too cold to support reliably most of the fruit crops the settlers intended to grow. The general lack of agricultural experience of the development’s principals was another contributing factor.

CLIMATE – changes & opportunities

Over the past 30 years, world climate scientists have debated the issue of whether or not the global climate is warming. The consensus today is that global warming is indeed occurring.

Good News–Bad News

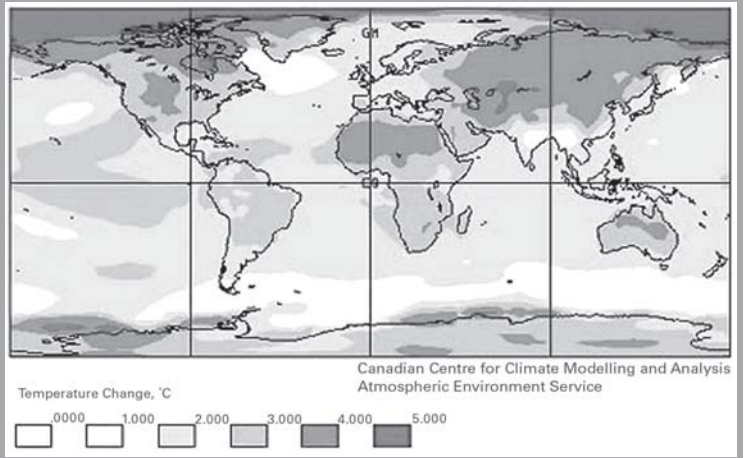
Some versions of the Canadian Global Coupled General Circulation Model developed by Environment Canada show that a mean average temperature increase in the BC Interior may be as high as 3° Celsius by 2060.

This represents significant warming and if it occurs as modelled, could have a major impact on the kinds of crops that will grow successfully in the region. It may mean that with warmer winters and longer, wetter springs, agricultural opportunities will change. It may also have an impact on the types of forest trees that will thrive within the region and thus have an impact on this area’s current industrial base.

Current Climate–Current Crops

The Thompson and Nicola Valleys, the Upper Fraser Canyon and the South Cariboo experience a wide range of

Canadian Global Coupled General Circulation Model



Annual Mean Temperature Change: 2040-2060 minus 1970-1990

climate conditions. The range of crops that can be grown successfully under current climatic conditions in the region are shown in Appendix 2 of *Resource Opportunity Analysis (Back to the Land – Agricultural Opportunities, July 2000)*, one of three basic reports commissioned by CFTC and funded by Human Resources Development Canada. Appendix 2 also refers readers to more detailed data that can be used as part of the research required to assess the suitability of any site to produce a particular crop.

MARKETS – the bad news

It is obvious that as a region the Thompson and Nicola valleys, the Upper Fraser Canyon and the South Cariboo are in a period of major change. Traditional agricultural practices and traditional agricultural products may not be viable in an era of high energy prices, skyrocketing transportation costs, global warming and worldwide economic uncertainty.

MARKETS – the good news

On the other hand, by thinking locally and within the borders of British Columbia, local producers may be able to find customers who will pay a fair price for their products. We know with some precision the kinds of crops that will grow in the various zones of the region. It is less obvious which crops will be profitable in the future. The following excerpts from *Back to the Land – Agricultural Opportunities* (Crane Management Consultants Ltd. of Vancouver; July, 2000) provide some ideas.

It will be necessary for producers to be very careful and to work with all of the sources of information available from government agencies in order to make wise choices from the information contained in the study.

Results of a survey of local producers and their customers (source *Back to the Land: Marketing*; July, 2000) follow on the next page.

This table shows the response to the 'Geographical Location of Customers and Sales' question by producers surveyed for the *Back to the Land* project.

"Customers of small-scale agri-food producers in the Study Area largely reside in the Study Area.

"Almost all respondents sell locally and slightly more than half sell in the region, too. Few sell outside of the province."

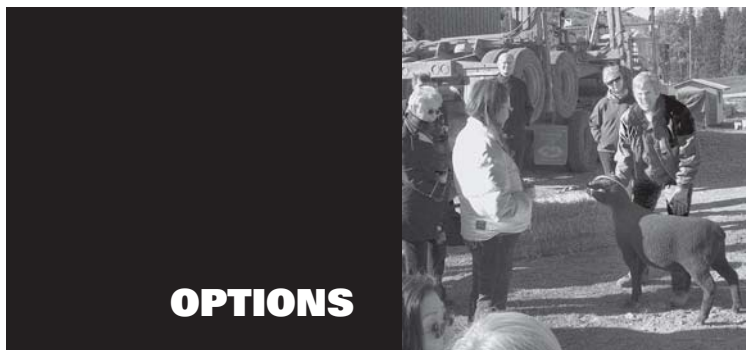
Source: Page 7

Back to the Land – Agricultural Opportunities: Marketing; July 2000

Primary Report Authors: Crane Management Consultants Ltd., Vancouver, BC and Calissi Consulting Inc., Kelowna, BC

LOCATION OF SALES Study Area Small Scale Producers

Percentage of Sales	Location of sales					
	Local	Regional	BC	Canada	USA	Foreign
1-10%	15%	18%	18%	15%	2%	2%
11-25%	10	20	12	2	0	2
26-50%	12	15	5	0	0	2
51-75%	15	2	5	0	0	0
76-100%	48	5	0	0	0	5
Some	100	60	40	17	2	12



There is no doubt that fuel prices, climate change and the price of the dollar will damage the BC Interior economy. Forecasting the long-term consequences is much more difficult.

Minimizing the damage to local small and medium-scale agricultural producers caused by the current upward spiral in fuel costs and expected climate changes will require innovative approaches.

Regions such as Thompson Valley, Nicola Valley, Upper Fraser Canyon and South Cariboo have a number of options in a period of change.

• Economic Diversification

Communities can attempt, once again, to diversify the economy of their local area.

Government support for small-scale, community-based economic development activities would be an attractive, workable alternative to the large-scale economic diversification programs of the past.

• Niche Products for Local Markets

Rising fuel prices may provide opportunities to a limited number of farsighted entrepreneurs. An individual who does the market research, has a sensible business plan and markets a niche product that meets local needs may profit from the current uncertainties.

Create enough small-scale activity like this, and it begins to make a difference.

• Grower Co-operatives & Shared Infrastructure

Co-operatives worked in the 1930s; they do not seem to flourish in good times. This could be the right time to dust off the concept of grower co-operatives and shared community infrastructure such as cold storage facilities.

• Consumer Co-operatives

A consumer-controlled food cooperative operated for a number of years in the early 1970s in the greater Kamloops area. The concept of consumer-managed co-operatives supplied by small-scale local agricultural producers is worth exploring.

• Small Plantings of Low Maintenance Crops

• Small Scale, Value Added Manufacturing

What should be considered is the exact opposite of the ginseng craze of the 1990s. Land and capital costs today are too great for most people to become involved in capital-intensive, large-scale agriculture. Ginseng appeared to be a panacea for local landowners, but market fluctuations make prospects far less attractive today.

What might be tried, instead, are numbers of small-scale operations growing a range of carefully selected crops – ones that don't need a great deal of expensive irrigation or depend too much on equipment that runs on fossil fuels. If this new production was linked to small, value-added manufacturing or packaging operations, the regional economic benefit could be multiplied two or three times. Already there is a small-scale salsa producer in Kamloops. Perhaps there is room for a few people growing things like hardy kiwi fruit or peppers and others producing preserves and fruit leathers from local berry crops.



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Back to the Land: Resource Opportunity Analysis

Report Management and Editing: *Crane Management Consultants Ltd., Vancouver, BC*

Primary Report Authors: *Herb Luttmending, P.Ag., Kelowna, BC; John Vielvoje, P.Ag., Kelowna, BC; GIS Mapping: Sa Su Services, Victoria, BC*

The Study Area

The Study Area generally includes the Regional District of Thompson-Nicola as well as a small portion of Squamish-Lillooet Regional District in the Lillooet area and the southernmost portion of the Cariboo Regional District. More specifically the study is confined to valley and plateau areas where the favourable climate provides the most opportunities for the production of a wide range of agricultural commodities.

The Study Area includes:

- Fraser River valley from the vicinity of Pavilion downstream to Lytton;
- Thompson River valley from Clearwater southward to Kamloops and onward to Lytton including the tributary Bonaparte and Nicola River valleys and Deadman Creek valley;
- South Thompson River valley eastward from Kamloops to Chase;
- that part of the Salmon River valley in the vicinity of Westwood; and
- the lower plateau areas in the vicinity of Merritt and south of Kamloops.

Report 1: Part 1

Executive Summary

This report lays out the agricultural production capabilities of the Thompson-Nicola Regional District and parts of the Squamish-Lillooet and Cariboo Regional Districts and matches them with the resource requirements of a large number of commodities.

It is report no. 1 of a five report series, that included the production of nine GIS maps. Community Futures Development Corporation of Thompson Country (CFTC) sponsored the "Back to the Land" project and a steering committee of stakeholders guided the consultants' work. Human Resources Development Canada provided project funding.

The lands under consideration in this study are generally all within the Provincial Agricultural Land Reserve (ALR) and have been rated according to the Canada Land Inventory (CLI) Soil Capability for Agriculture. The focus was placed on Class 1 to Class 3 lands located within the ALR, since these offer the most opportunities for diverse agricultural production. An assumption is that irrigation is available for these lands – the Study Area's hot, dry climate dictates that irrigation is generally required for successful agricultural cropping.

The Agriculture Land Reserve and Soil Capability for Agriculture map data was extracted from digital data provided by the BC Ministry of Agriculture, Food and Fisheries and is presented on nine GIS maps (not included in this report), which use provincial TRIM 1: 100 000 map bases.

The Study Area was subdivided into 10 sections within which soil and climate characteristics are generally similar. These characteristics are described in Climate Capability for Agriculture maps (1:100,000 scale) and several soil surveys which cover the Study Area.

In total, the 10 sections together contain about 145,350 ha of Land Capability for Agriculture Class 1 to 3 (improved) lands. Other parts of the project area are also potentially arable but are severely to moderately limited in crop range by adverse climate (e.g. short frost free period), stoniness and rockiness, adverse topography and, in small areas, poor soil drainage. Some of these areas currently produce forage for the ranching industry.

Cropping Possibilities on Class 1-3 Lands within the ALR – Irrigation Required

Field Vegetables

Potatoes, carrots, turnips, onions, garlic, parsnips, beans, lentils, peas, pumpkin, various melons, cabbage, broccoli, tomatoes, peppers, sweet corn, garlic, melons, lettuce, celery, leeks, spinach, Swiss chard, radish, celery, carrots, cauliflower, pickling cucumbers, beets and pumpkins

Vegetable production of speciality products such as baby vegetables for the ready to use markets (e.g. baby carrots, corn, beets, cherry and roma tomatoes, leeks, squash, spinach eggplants), exotic greens (curly cress, pink cress, dandelion greens, various types of lettuce such as escarole, frizée, red/green oak leaf, red/green romaine, red/green leaf) may provide added opportunities, as well.

Greenhouse vegetables

Tomatoes, peppers, and cucumbers

Greenhouse floriculture

Roses, geraniums, chrysanthemums, poinsettia, freesia, gerberas, azaleas, and other indoor and outdoor garden plants

Berries, Fruits and Nuts

Blackberries, blueberries, saskatoons, currants, gooseberries, chokecherries, strawberries, raspberries, grapes, hardy kiwi fruit, hardy tree fruit varieties, and hazelnuts

Field Crops

Buckwheat, cicer milkvetch, fenugreek, fodder kale, canola, grass pea, industrial hemp, grass and shrub seeds, peppermint, spearmint, spelt, sweet white lupines, triticale, winter hardy orchard grass

Others

Mushrooms, nursery crops, dried flowers, honey, herbs and spices, ginseng, medicinal plants, stevia and Christmas trees.

Report 1: Part 3

Study Area Agriculture

Crops other than forage

The acreage under cultivation for growing vegetables remained static over the 1986-1996 period, as did the acreage under cultivation for growing berries and grapes. Tree fruit production increased slightly over the 1986-1996 period but remained a very small portion of total provincial production. Potato acreage doubled to approximately 200 acres but is also a very small portion of total BC production. There were no commercial mushroom growing operations in the area.

Bucking the national trend, the number of small farms in the Study Area, whether measured by acreage (less than 10 acres) or annual gross receipts (\$50,000 or less), increased 29% and 15%, respectively. The proportion of larger agricultural operations is larger because of the importance of cow-calf raising in the Study Area's agriculture.

The following table presents data from the 1986, 1991, and 1996 censuses for a few agricultural indicators for the Study Area.

Study Area Census of Agriculture Statistics*

	1996	1991	1986
No. farms reporting	1,150	1,008	905
Total area farmed	1,005,246	1,006,967	936,373
Total area in crops	74,260	75,666	97,200
Pasture:			
–Tame	45,652	45,666	53,973
– Natural	714,760	639,858	772,309
Summer fallow	1,879	2,199	4,949
All other land	168,695	243,580	7,942
Irrigation:			
– number of farms	704	556	632
– area irrigated	66,885	50,331	66,277
Farm size:			
– less than 10 acres	151	117	104
– 10 to 69 acres	364	309	234
– 70 to 129 acres	125	107	101
– more than 129 acres	510	475	466
Gross farm receipts	\$87,675,580	\$53,492,044	n/a
Receipts under \$50,000	904 farms	788 farms	n/a
Major crops produced:			
– Field crops	72,971 acres	52,373 acres	93,349 acres
– Fruit trees & nuts	212 acres	178 acres	167 acres
– Berries and grapes	26 acres	26 acres	n/a
– Vegetables	331 acres	314 acres	328 acres
– Potatoes	207 acres	111 acres	90 acres
– Nursery products	33 acres	n/a	n/a
– Sod (turf)	n/a	n/a	149 acres
– Christmas trees	498 acres	n/a	n/a
Greenhouse products	225,909 sq. ft.	284,409 sq. ft.	168,712 sq. ft.
– flowers	111,177 sq. ft.	n/a	n/a
– vegetables	81,972 sq. ft.	n/a	n/a
– other products	n/a	n/a	n/a
Mushroom houses	0	0	0

* The most recently available Agricultural Census statistics are from 1996. The data for the Thompson-Nicola Regional District was combined with data for the Squamish-Lillooet Regional District to create Study Area statistics. BCMAF develops annual production and value statistics for agriculture on a provincial basis only.

Processing Industry

A disadvantage of the specialty crops processing industry is the characteristic veil of secrecy that limits collaboration and exchange of information between participants. Like the primary production of ginseng, processing of medicinal herb crops requires substantial technical knowledge. The BC processing industry for ginseng and other herbaceous crops is in its infancy stage. There is a recently started industry association, Vernon-based BC Herb Growers Association. The Science Council of BC and BC Ministry of Agriculture, Food and Fisheries have taken an interest in furthering this industry's development and sponsored studies to examine development issues.*

Historically, an interesting factor was the production of superior quality potatoes in the Ashcroft area, a region well suited to the production of processing potatoes. It has competitive strengths over the Fraser Valley since potatoes grown in the Ashcroft area do not possess a high water content, making them more desirable for processing. The rental price of vegetable land in the area is about \$300 (CAN) per acre, which is substantially less than potato land in Washington's Columbia Basin where potato land rents for \$500-1,000 (US) per acre.

Currently there are no potato processors (e.g. processing into potato chips or flakes) in the area and one would need to be established before growers would have a financial incentive to put widespread plantings in

* BCMAFF has compiled a directory of sources of information for the BC herb sector (phone Food Industry Branch, 604-666-5259 to obtain a copy).

the ground. There was a very small potato processor in Kamloops about a decade ago. Clearly, it is a "chicken and the egg" case and illustrative of a common conundrum in agricultural development: primary production may be possible but nearby processing is lacking.

The crop could be grown in rotation with other crops, such as alfalfa and ginseng, and may offer the potential for ginseng growers to plant an alternative crop on irrigated ginseng land as a rotation, and also as a hedge for fluctuations in ginseng prices.



Small-scale agricultural producers, Kamloops Farmers Market

Report 1: Part 4

Resource Capability

Agricultural production opportunities in any area are dependant on soil characteristics and climatic conditions. As well, a stable marketing and economic infrastructure is required as are farm operators with the appropriate management skills and knowledge.

This report addresses the first two items identified above, that is, the availability and location of land with soils and climates suitable for a variety of agricultural production.

The lands under consideration in this study are generally all within the Provincial Agricultural Land Reserve (ALR) and have been rated according to the Canada Land Inventory (CLI) Soil Capability for Agriculture.

The focus was placed on Class 1 to Class 3 lands located within the ALR, since these offer the most opportunities for diverse agricultural production.

An assumption is that irrigation is available for these lands – the Study Area's hot, dry climate dictates that irrigation is generally required for successful agricultural cropping.

The Study Area was subdivided into 10 sections within which soil and climate characteristics are generally similar. Descriptions follow.

The previously described sections of the project area contain the majority of those lands which provide the most agricultural cropping options from both a climatic and soils perspective. In total, the ten sections together contain about 145,350 ha of Land Capability for Agriculture Class 1 to 3 (improved) lands.

Other parts of the project area are also potentially arable but are severely to moderately limited in crop range by adverse climate (e.g. short frost free period), stoniness and rockiness, adverse topography and, in small areas, poor soil drainage. Most of these areas lie at substantially higher elevations than those described and commonly occur in relatively remote locations. Some of these areas currently produce forage for the ranching industry. *[Continues next page]*

4.2.1 – Section 1

Fraser River Valley

Fraser River Valley from Pavilion to Lytton and Thompson River Valley south from Spences Bridge including the lower reaches of the Nicola River Valley

Climatically, a wide range of annual and perennial agricultural crops can be produced, including heat loving crops such as tomatoes and melons. Winter hardy tree fruits are also possible. Ground crops such as potatoes and carrots can also be produced where the surface sandy layer is of sufficient thickness so that the underlying gravelly and stony conditions do not interfere with mechanical harvesting. Winds causing desiccation are common and windbreaks are beneficial for many crops.

There are about 8,650 ha of dominantly Land Capability for Agriculture Class 1 to 3 (improved) lands scattered through this section of the project area. The predominant 'improvement' is the availability of irrigation although stone removal is also needed in some locations.

Lytton - Lillooet - Pavilion - Spences Bridge - Clapperton

Growing Degree Days: 2000 - 2400

Frost Free period (days): 160 - 180

Capability Classification: 1bE at lower elevations

4.3.1 – Section 2

Thompson River Valley

Thompson River Valley from Kamloops Lake to Spences Bridge

A wide range of crops, including those that thrive in hot conditions can be produced. Winter hardy tree fruits are also possible. Ground based crops such as potatoes, carrots, and ginseng can also be produced where the surface sandy layers are of sufficient thickness so that the underlying gravels and stones do not interfere with mechanical harvesting. Desiccating winds are common, therefore windbreaks are beneficial for many crops.

This section of the project area contains about 10,560 ha of Land Capability for Agriculture Class 1 to 3 (improved) lands. Irrigation is the main improvement required to achieve these capability levels.

Savona - Spences Bridge

Growing Degree Days: 1900 - 2100

Frost Free period (days): 140 - 150

Capability Classification:

1bE at higher elevations to 1aF near the Thompson river

4.4.1 – Section 3

Upper Benches

Upper Benches in the Vicinity of Cache Creek and Ashcroft Including Semlin and Bonaparte River Valleys

A wide range of both annual and perennial crops, including some that thrive in hot conditions can be produced. Production of some hardy tree fruits is also possible in selected areas. Windbreaks to moderate desiccating winds are beneficial for most crops.

About 6,820 ha of Land Capability for Agriculture Class 1 to 3 (improved) lands occur in this section of the project area. The dominant 'improvement' is the availability of irrigation.

Carquile - Cache Creek - Semlin Valley - Bonaparte River Valley

Growing Degree Days: 1500 - 1800

Frost Free period (days): 120 - 150

Capability Classification: Generally 1aF with 1F in low lying areas

Loon Lake

Growing Degree Days: 1420

Frost Free period (days): 99

Capability Classification: 3GF



4.5.1 – Section 4

Deadman River Valley

Deadman River Valley and Upper Benches near its Confluence with Thompson River (including Walhachin)

Production of a range of annual and perennial crops is possible, including some winter hardy tree fruits near Walhachin. Crops very susceptible to temporary wet conditions may not be suitable on the low lying areas along Deadman Creek. Adequate irrigation is required for satisfactory production of all crops, particularly on the terraces near the Thompson Valley. In this area as well, production of ground crops such as potatoes and carrots may be limited by stony soil conditions which impede mechanical harvesting. Desiccating winds in exposed areas may require windbreaks for susceptible crops.

This section of the project area contains approximately 7,760 ha of Land Capability for Agriculture Class 1 to 3 (improved) lands. The dominant 'improvement' is the availability of irrigation although improvements by stone removal is also needed in some areas. As well, improved watertable control and flood protection in some areas near Deadman Creek are also required.

Deadman River Valley - Walhachin

Growing Degree Days: 1300 - 1800

Frost Free period (days): 90 - 150

Capability Classification:

1F along Deadman River to 1aFG near Thompson River

4.6.1 – Section 5

South Thompson River Valley

South Thompson River Valley from Chase westward to Kamloops Lake, including areas near Kamloops Lake and on the lower reaches of Thompson River

Climate and soil conditions both provide the opportunity for the production of a wide range of agricultural crops. Production of winter hardy tree fruits is possible, especially in sloping areas above the valley floor. A substantial part of this section of the Study Area is occupied by the City of Kamloops and associated urbanization.

Section 5 contains about 29,070 ha of Land Capability for Agriculture Class 1 to 3 (improved) lands with much as relatively large, contiguous areas. The major improvement required is the availability of irrigation.

Kamloops Lake-Chase

Growing Degree Days: 1500 - 2100

Frost Free period (days): 120 - 140

Capability Classification:

Generally 1b with 1aF near valley bottom

4.7.1 – Section 6**North Thompson River Valley to Little Fort**

North Thompson River Valley from Kamloops north to Little Fort

This portion of the Study Area is well suited for the production of most annual crops although temporary high watertables and potential flooding may either limit or preclude production of some crops during the freshet season. Hardy tree fruits and other perennial crops can be produced on most higher lying areas - stony conditions here may preclude in-ground crops such as potatoes, carrots and ginseng. Adequate irrigation is required although at the northern extremes it becomes somewhat less critical due to higher growing season precipitation.

There is about 13,000 ha of Land Capability for Agriculture Class 1 to 3 (improved) lands in Section 6 of the project area. As in previous areas, irrigation is the dominant 'improvement' required, although dyking and watertable control is beneficial in limited areas as well.

Kamloops - Little Fort

Growing Degree Days: 1300 - 1800

Frost Free period (days): 90 - 150

Capability Classification:

1F along valley bottom to 1aF in better sites.

4.8.1 – Section 7**North Thompson River Valley to Clearwater**

North Thompson River Valley northward from Little Fort to Clearwater

Most cool season annual crops can be produced where poor soil drainage is not a limitation. Although growing season precipitation increases from south to north, supplemental irrigation is required on all the sandy and gravelly soils for good crop production.

Extended cold winter temperatures are highly probable, therefore perennial crops susceptible to these conditions are not suited. Dyking along parts of the North Thompson River is required to limit springtime flooding.

Section 7 contains about 2,740 ha of Land Capability for Agriculture Class 1 to 3 (improved) lands. Irrigation is the dominant 'improvement' required to achieve the improved ratings although substantial areas require dyking and watertable control as well.

Little Fort- Clearwater

Growing Degree Days: 1300 - 1500

Frost Free period (days): 80 - 1120

Capability Classification:

1F in most areas with 2F intermixed

4.9.1 – Section 8**Lower Elevations of the Interior Plateau**

Lower Elevations of the Interior Plateau, including the general vicinities of Knutsford, Barnhartvale, Stump Lake, Nicola Lake and Douglas Lake

Most short season crops, and especially those that thrive in cool conditions, can be produced as can be most cereals and forages.

Extended cold winter periods preclude perennial crops that are sensitive to these conditions, including most tree fruits.

Natural precipitation may sometimes provide sufficient moisture

during the early part of the growing season but supplemental irrigation is required after that to maintain good crop production.

Section 8, a large area, contains about 55,340 ha of Land Capability for Agriculture Class 1 to 3 (improved) scattered among areas of lower capability. Irrigation is the main improvement required to achieve the improved ratings although stone removal is also required in some areas.

Nicola Lk. - Douglas Lk. - Stump Lk. - Trapp Lk. - Barnhartvale -**Knutsford**

Growing Degree Days: 1300 - 1500

Frost Free period (days): 90 - 120

Capability Classification: Generally 1F to 1FG.

4.10.1 – Section 9**Nicola Valley**

Nicola Valley southward from Nicola Lake, including the Merritt Area and Lower Coldwater River Area

Climate and soil conditions are generally well suited for a wide range of both annual and perennial crops, including some hardy tree fruits in protected locations above the valley bottom. Crops such as tomatoes and melons may be limited by inefficient heat units. Restrictions to ground crop development (e.g. potatoes) is likely in the areas where soil textures are clayey and dense, and compact subsurface conditions exist. Those crops that are highly susceptible to temporary high water tables may not be well suited to the lowest lying parts of the Nicola and Coldwater River floodplains. The southern part of the Coldwater Valley is best suited for cool season crops because of diminished frost free periods and growing degree days.

There are about 8,430 ha of Land Capability for Agriculture Class 1 to 3 (improved) lands in this section of the project area. Irrigation is the main improvement required to achieve the improved ratings; stone removal is also required in limited areas, as is watertable control.

Nicola Lake - Merritt

Growing Degree Days: 1500 - 1700

Frost Free period (days): 110 - 120

Capability Classification: 1F - 1aF

Merritt - Coldwater River Valley

Growing Degree Days: 1300 - 1500

Frost Free period (days): 100 - 120

Capability Classification: 1aF - 2F

4.11.1 – Section 10**Salmon River Valley**

Salmon River Valley in the vicinity of Westwold

Soil conditions are generally suitable for a wide variety of crops. The relatively short frost free period and low growing degree days, however, limits cropping to cool season crops that mature rapidly and can withstand minor amounts of frost. Tree fruits are not generally suited nor are heat loving crops such as tomatoes, peppers and melons.

Section 10 contains about 2,990 ha of Land Capability for Agriculture Class 1 to 3 (improved) lands. The availability of irrigation is the main improvement required to achieve the improved ratings.

Westwold area

Growing Degree Days: 1300 - 1500

Frost Free period (days): 80 - 100

Capability Classification: 1FG - 1F

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Report 1: Part 5 – Agricultural Production Possibilities

5.1 Field Crops

A word of caution is in order for field crops and how they relate to small farm producers. Although certain parts of the Study Area have acceptable soil and climatic conditions for growing various field crops, and yields would certainly be acceptable, the profit margins per acre on most field crops are thin and the economics of producing most field crops directs their production to more extensive operations than those considered in this study. An important consideration in growing field crops is topography, where extensive amounts of flat or slightly rolling land is highly desirable. It is a matter that any producer in the Study Area should carefully examine before proceeding with a field crop. Farming these crops not only requires large acreages, but also requires expensive machinery, whose costs need to be spread out over many acres. [For field crop details, see Report 1, Part 5.1, page 20.]

BC Berry, Grape, Kiwi, Nut and Tree Fruit Production and Values (1998)

Commodity	Ranking by Commodity	Total Sales in 1998	Total Sales in 1998
	5 yr. average sales (1993-97)	Quantity '000 lb.	Value \$ '000
Blackberries	9	123	159
Blueberries	3	34,164	23,154
Cranberries	2	50,500	28,395
Currants, Black	10	100	82
Currants, Red	12	43	47
Grapes	4	21,669	15,586
Hazelnuts	7	1,156	766
Kiwifruit	8	555	328
Loganberries	13	10	19
Raspberries	5	28,522	12,358
Strawberries	6	8,840	8,740
Other Berries	n/a	502	404
Tree Fruits	1	476,004	54,716
Total BC		622,188	144,754

5.2 Fruits and Nuts

Fruit and nut crops are the sixth most valuable agricultural commodity in British Columbia.

Statistics Canada (1996) reports that the Study Area contains approximately 248 acres of commercial tree fruits and nut bushes and 36 acres of various berries and grapes. Predominant tree fruits reported are apples (150 acres) followed by apricots (14 acres), sweet cherries (13 acres) and sour cherries (15 acres). **Appendix 3** [see page 12 of this discussion paper] is a table showing the commercially grown crops in the Study Area and some of their acreages for 1986, 1991, and 1996.

Berry crops are predominately strawberries (16 acres), raspberries (9 acres) grapes (3 acres) and other berries. General crop requirements for all fruit crops include well to moderately well drained soils, adequate fertility and irrigation.

Most fruit crops can be produced on soils with pHs between 5.5 and 8, but blueberries require a soil with a pH that is lower than 7.0. Sites protected from severe winter cold and winds are most suitable for fruit and nut crops.

Winter hardiness of all fruit crops is of concern in the Study Area

although Sections 1, 2, 3, 4, and 5 and a portion of Section 9 would appear to be the best suited. Geographic areas best suited to the production of hardy berry crops include portions of Sections 1, 2, 3, 4, and 5 and selected areas in Section 9.

There are many hardy fruit varieties available from central British Columbia, the Prairie Provinces, Quebec and colder areas in the United States. Many of these fruits are untested in the Study Area but should be suited to some areas.

5.2.1 Blackberries

Blackberries and raspberries require similar soil conditions. All blackberries harvested in BC are sold as fresh fruit. Provincially, they are the 73rd most valuable crop. There are many blackberry varieties; some are thornless. Blackberry hybrids vary in hardiness but require mild winter temperatures and are therefore not generally suited to the same areas as other berry crops. Selected microclimates in the Study Area may permit some commercial production.

5.2.2 Blueberries, both highbush and mid bush

Blueberries are the 20th most valuable crop in BC; in 1998 fresh fruit sales totalled 16,764,000 lb. valued at \$12,714,000. Soils must be at least moderately well drained and hold adequate moisture during the summer months. Growing season watertables 30 to 60 cm beneath the soil surface are best. A drainage system combined with raised beds will permit blueberry production where the water table fluctuates to within 30 cm of the surface. Blueberries can be grown in areas of high or moderate suitability for McIntosh apples and areas where strawberries and raspberries can be grown, provided soil acidity is adjusted (if required) to a pH range of between 5.0 and 7.0 and suitable varieties are selected. Census data indicates that blueberries are not commercially produced in the Thompson-Nicola and Squamish-Lillooet Regional Districts. Recent discoveries that blueberries have the highest antioxidant level of over 40 fresh fruits and vegetables are expected to increase demand for this fruit. Hardy varieties are available.

5.2.3 Currants, both black and red

Black currants are the 72nd most valuable crop in BC. In 1998, 2,000 lb. of black currants valued at \$1.85/lb. and 13,000 lb. of red currants valued at \$1.85/lb. were sold from farm and roadside stands; an additional 30,000 lb. of red currants valued at \$1.03/lb. were sold as fresh fruit to the wholesale trade. Both types of currants are better suited to heavier textured soils than to light textured soils but will grow on a wide range of soils. Black currant juice is making a positive impact on the market as people become more familiar with this product. Hardy varieties of both types of currants are available.

5.2.4 Grapes

A total of only 3 acres of grapes are reported in production in the Study Area. Grapes were at one time produced in limited quantities in the Lillooet-Lytton area and in parts of the Thompson-Nicola area (near Ashcroft) and in Salmon Arm. Old varieties for the fresh market have been grown in Salmon Arm since 1905. Cold winters in the Ashcroft area and poor site selection, cold winters and wind damage has hindered expansion in the Lillooet-Lytton area. There is one winery in the Study Area; this winery makes wine from fruit other than grapes. There are many grape varieties that are hardy under the climate conditions in Minnesota and North Dakota, although most are not available in Canada. Some that are available and reportedly hardy in Saskatchewan have not been evaluated in this area; these include Alpha, Beta, Valiant, Dakota, Svelter and Hungarian. Of these Beta and Valiant are the most hardy and are reportedly grown in central British Columbia for jam, juice and jelly production. **Production of these hardy grape varieties is generally suited to Sections 1 and 2 and selected areas of Section 3, 5 and 9.** [For soil descriptions see Report 1: Part 5.2.4, page 25]

5.2.5 Gooseberries

Gooseberries have similar requirements to currants. Hardy varieties are available. Statistics for gooseberry production are not available.

5.2.6 Nuts

Hazelnuts are the 61st most valuable crop in BC and the major type of nut produced. Approximately 24,000 lb. valued at \$1.25/lb. were sold via roadside stands in 1998. **Filberts (hazelnuts) may be grown in various parts of the Study Area.** Soil requirements are similar to those of grapes and tree fruits. Hardy varieties are available and are suited to the same geographic areas as hardy berry crops.

5.2.7 Raspberries

Raspberries are the 13th most valuable commodity in BC. Fresh fruit sales in 1998 totalled 1,222,000 lb. valued at \$1,435,000 (\$1.17/lb.) while processed raspberries totalled 27,300 lb. and were valued at \$10,920,000. Raspberries are deep rooted and sensitive to “wet feet” and therefore require at least 100 cm of unrestricted rooting depth. Hardy raspberries and fall fruiting (primocane) raspberries are available.

5.2.8 Strawberries

Provincially strawberries are the 26th most valuable commodity. In 1998 fresh, wholesale and roadside sales totalled 3,940,000 lb. valued at \$5,360,000 (\$1.36/lb.) in BC. Statistics Canada reports approximately 16 acres of strawberries in production in the Study Area in 1995. Strawberries are shallow rooted crops and require moderately well- to well-drained soils with at least 50 cm of unrestricted rooting depth. Protected areas and areas with good snow accumulations may help to protect against severe winter damage. There are other production techniques to assist in winter protection and promote earliness. Varieties hardy for the Study Area are available.

5.2.9 Tree Fruits

Tree fruits are BC's 7th most valuable crop. Census data for the Study Area records 150 acres of apples planted plus 14 acres apricots, 13 acres sweet cherries and 15 acres of sour cherries. Tree density per acre is substantially lower in the Study Area compared to the Okanagan-Similkameen reporting area. Fruit tree production in the Study Area was significant at one time. **Areas with a short growing season and/or a high frequency of low winter temperatures and/or spring frosts that occur after the trees begin to grow and blossom are not suited to tree fruits.** Tree fruit varieties commonly produced in the Okanagan-Similkameen region have limited suitability in the Study Area due to its cold winters. Hardy apple, apricot, sour cherry, plum and pear trees are available from Prairie provinces and central British Columbia. Many of these are suited to fresh markets but may need to be promoted if varietal names are unfamiliar to consumers. Others are suited to on-farm processing into a wide range of products that provide added-value. Cultivars of apples, sour cherries, plums and pears have been evaluated and grown at Beaverlodge, Alberta and at the Crop Diversification Centre North in Edmonton and **may be suited for the Study Area.** Soils that are sandy to silty in texture, free from water to at least 100 cm, have slopes of 20% or less, are non-saline, have a pH less than 8.5 and contain less than 50% coarse fragments are generally suited for hardy apples and most other tree fruits. **Geographic areas suited to hardy fruit tree production include Sections 1 and 2 and portions of Sections 3, 5 and 9. There is Study Area potential for production and processing of sour cherries into jam, pie filling and syrup.** Sour cherry varieties are grown in climate zones that have only 120 frost free days and where winter temperatures reach as low as -40C. The use of hardy rootstocks and other production techniques are used to promote hardiness.

5.2.10 Saskatoons

Saskatoons are native to the Yukon, Northwest Territories, Canadian Prairies, Interior of British Columbia, and the northern plains of the USA. There is interest in utilizing saskatoons as a commercial fruit crop; approximately 500 hectares are planted in Saskatchewan and Manitoba, where most of the profitable acreage is near urban centres. In Manitoba, saskatoon berry production is the second largest commercial fruit crop, second only to strawberries. **Saskatoons will grow over a wide range of soils but appear to grow best in soils that are well drained, are sandy loam or similar soil type, and have a suitable climate.** Commercial production of saskatoon berries was reported in BC in 1995 and 1996. BC

Farm Statistics for 1997 reports 502,000 lb. of “other berries” sold on the farm and at roadside stands.

5.2.11 Chokecherries

Chokecherries are another of the native fruit crops under intensive study and consideration for commercial production on the Prairies. The top clones out of 20 under investigation have been released for planting in Saskatchewan and Manitoba.

5.2.12 Hardy Kiwifruit

Hardy kiwifruit usually requires a 150-day or longer frost free season. When fully dormant hardy kiwi are reported to tolerate temperatures as low as -25° C; however, temperatures this low must be reached slowly. **Areas with late spring frost should be avoided.** Hardy kiwifruit prefers soils with a pH of 5 to 6, but will grow on soils with a pH of 7 and may show signs of nitrogen deficiency. Soils must be well drained, but irrigation water must be provided. Kiwifruit requires a trellis. Vines produce either male or female flowers. Vines of both sexes are required to produce a crop. Kiwifruit is generally fuzzless and the size of a large grape. The Cordifolia variety ripens earlier than the Anansasnja variety; other varieties are available.

5.3 Vegetables

Vegetables are BC's 5th most valuable agricultural commodity exceeded in value only by dairy products (1), poultry and eggs (2), floriculture and nursery (3), cattle and calves (4), and are followed by fruit (6), grains, oil seeds and seeds (7), hogs (8), forest products (9) and miscellaneous products (10) such as furs, wool, honey and lambs. More than 60 types of vegetables are grown commercially in BC and more than a third are commercially produced in the Study Area. Eighty percent of BC's field grown vegetables are produced in the Fraser Valley.

Vegetables are successful over a wide range of climate conditions and on a wide range of soils provided suitable varieties are chosen and soils are well prepared and maintained, and are at least moderately well drained (i.e. the watertable is at least 50 cm below the soil surface).

Vegetable crops such as potatoes, carrots, turnips, onions, garlic, parsnips and other root crops are preferably produced in sites where stones offer slight to no hindrance to cultivation and harvest. Root vegetables are better suited to soils that have a water table at least 75 cm below the soil surface. Root crops are better suited to soils in **Sections 3, 5, and 6.** Successful production of annual, non-leafy vegetable crops such as beans, lentils, peas, pumpkin, various melons, cabbage, broccoli, tomatoes and peppers is possible on soils containing up to 50 percent coarse fragments (greater than 2 mm). Heat loving crops such as corn, garlic, melons, peppers and tomatoes are best suited to **Sections 1, 2, 3, 5 and 9.** Annual leafy vegetables with lower heat requirements such as lettuce, celery, leeks, spinach, Swiss chard, radish, celery and other salad greens, as well as carrots, cauliflower, pickling cucumbers, beets and pumpkins are rather tolerant to shallow water tables during the growing season and can be produced on organic or mineral soil deposits. These crops are better suited to cooler climates, which are found in portions of **Sections 3, 4, 5, 6, 7, 8, 9 and 10.** Asparagus is a deep-rooted crop that is best produced on deep, well drained, loamy or sandy soils. It is also more tolerant of soils with a pH range between 7 to 8. Soils and climate are better suited to asparagus in **Section 5.**

The use of plastic tunnels to advance the season is common in other areas for the production of various melons (such as cantaloupe, watermelon, honey melon, pumpkin, marrow, squash, eggplant). Vegetable production of speciality products such as baby vegetables for the ready to use markets (e.g. baby carrots, corn, beets, cherry and roma tomatoes, leeks, squash, spinach eggplants), exotic greens (curly cress, pink cress, dandelion greens, various types of lettuce such as escarole, frizee, red/green oak leaf, red/green romaine, red/green leaf) may provide added opportunities.

Despite British Columbia's diverse population mix, the standard

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vegetables appear to be the predominant ones produced in the province, with the exception of some non-traditional vegetables, such as daikon radish, bok choy and escarole. Total sales in 1998 rank field vegetables by value in the order shown below.

BC Field Vegetable Production Ranked by Value (1998)

Rank	Commodity	Acres	Total sales	
			Quantity '000 lb.	Value \$'000
1	Potatoes	5,703	121,670	22,256
2	Carrots, bunched	190	4,095	1,739
	Carrots, topped	488	17,088	4,198
3	Corn	2,758	27,815	5,435
4	Lettuce, head	380	10,121	2,829
	Lettuce, leaf types	373	6,036	1,339
5	Broccoli	1,265	7,564	3,001
6	Cabbage		16,282	2,889
7	Squash, marrow and pumpkin	597	14,935	2,697
8	Onions, bunched	114	2,341	1,064
	Onions, fall seeded	13	275	94
	Onions, spring seeded	315	11,040	2,270
	Onions, silverskins	9	160	128
9	Peas, shelled	2,065	10,140	2,434
10	Brussels sprouts	564	6,318	2,227
11	Cucumbers, slicing	133	1,887	1,887
	Cucumbers, pickling	185	2,760	2,760
12	Other Vegetables	458	10,182	1,973
13	Beans	1,297	8,598	1,951
14	Chinese vegetables	159	4,786	1,880
15	Cauliflower	550	3,902	1,522
16	Peppers	311	3,005	1,380
17	Tomatoes	203	3,654	1,179
18	Rutabagas	139	4,960	1,119
19	Spinach	148	1,924	1,112
20	Parsley	58	559	968
22	Asparagus	307	641	940
23	Beets, bunched	45	425	177
	Beets, topped	112	2,250	717
24	Garlic	70	320	566
25	Melons	109	1,360	560
26	Rhubarb	95	1,520	555
27	Zucchini	91	1,159	516
28	Parsnip	32	812	500
29	Peas, pod	90	345	270
30	Celery	32	910	216
31	Radishes	90	578	201
Total BC Field Vegetables		20,163	312,417	74,916

5.3.1 Greenhouse Production

BC greenhouse (hothouse) production of crops is expanding. Greenhouses can produce 15 to 20 times more product per unit area than field grown crops. Production is dependent on the availability of bright sunshine during the winter months plus economical power (three-phase power and natural gas or another source of heat).

The location of greenhouses is not soil dependant, however, greenhouses should not be located in areas that are subject to flooding such as portions of **Sections 3, 6, and 7** and should be located in areas where there is a maximum amount of natural light during the winter months. Approximately 80% of the province's floriculture (including potted plants, foliage plants, bedding plants and flowers) and 80% of the provincial greenhouse vegetable production (tomatoes, sweet bell

peppers, hot peppers, long English cucumbers, butter lettuce, herbs, spices, eggplant, sugar peas and melons) are located in the Lower Mainland. **Expanded production of greenhouse tomatoes, peppers and cucumbers in the Study Area is feasible in co-operation with the Interior Vegetable Marketing Agency Co-operative.** Provincially, the total value of greenhouse vegetable production in 1998 was \$96 million of which greenhouse (hothouse) cucumbers were valued at \$13.8 million; greenhouse tomatoes were valued at \$44 million and other crops (mostly sweet and hot peppers but also includes crops other than lettuce) were valued at \$35 million. **There is a growing market for locally produced greenhouse crops including, roses, geraniums, chrysanthemums, poinsettia, freesia, gerberas, azaleas and other houseplants and garden plants.**

5.4 Other Production Possibilities – Highlights

For details see *Back to the Land* Report 1, Part 5 – pages 29-32

5.4.1 Mushrooms

Mushrooms are BC's 10th most valuable crop (1998 total sales value \$50,618,000 – 35,300,000 lb. at \$1.06/lb. to the fresh market and 16,500,000 lb. at \$0.80/lb. to the processing market; 1993-97 average sales value \$34,488,000). Almost all mushrooms are produced in the Lower Mainland. The BC Mushroom Marketing Board regulates all production, including production and sale of cultivated button mushrooms and specialty mushrooms such as enoki, maitake, pompon, shimeji, wine cap, oyster and shiitake. A Marketing Board licence is needed to produce and sell mushrooms; levies are paid on volume of product sold. **Mushrooms are currently produced commercially outside the Lower Fraser Valley but not in the Study Area. Mushroom production is not dependent upon agricultural lands. Producers require three-phase power and/or natural gas.** Compost for button mushroom production is purchased from specialised producers in the Lower Fraser Valley, **a transportation cost issue for any Interior grower.** This removes the need to produce compost on-site as well as odour concerns. Spawn (a mixture of mushroom spores and cereal used to inoculate mushroom compost for mushroom production) has no odour and could be produced on-site or purchased from specialty producers. Spent mushroom compost is sold for use as a soil conditioner.

5.4.2 Nursery Crop Production

Nursery crops are BC's 6th most valuable crop in (1998 value of \$92,300,000 and 1993-97 average sales value of \$70,256,000). BC is the second largest Canadian producer. The industry is comprised of retail and wholesale producers of a wide selection of plants. Crops may be grown in fields or in pots placed on fields, or in combinations of field and pots, and greenhouses and hoop houses. In-ground nursery crops generally tolerate a wide selection of soil textures and slopes and are suited for a wide range of locations. Above-ground nursery crops in containers require winter protection through sawdust mulch or temporary hoop houses. **Nurseries that use greenhouses require three-phase power and/or natural gas.** There is a growing interest in native plant material referred to as native botanicals for use in landscaping and reclamation projects as well as for medicinal purposes.

5.4.3 Commercial Dried Flowers

Dried flower production (everlasting flowers) is a new value-added industry driven by changing interior design trends that have resulted in increased consumer demand. Producers process their crop and market it to wholesalers, florists, interior designers, real estate companies and retailers. Each type of flower has its own drying requirements; time will be needed to research markets and drying techniques. Annual statice, larkspur, strawflower, Gypsophila, yellow statice and German statice are popular with Saskatchewan and Alberta producers. Information about the BC dried flower industry is lacking.

5.4.4 Honey Bee Production

Honey ranks 35th in value in a list of 75 BC commodities (1997 value of \$5,406,000 and 1993-97 average sales value of \$4,216,000). In 1997,

2,200 registered beekeepers operated 45,000-50,000 hives and 300 commercial honey producers produced most of BC's honey. Honey bees produce honey, bee pollen, royal jelly, bee wax and propolis and are essential for crop pollination. Bees are overwintered in protected and warm sites, then transported to other areas when needed for pollination and the production of honey.

5.4.5 Aquaculture

Aquaculture is the 4th largest agri-food industry in BC, exceeded in value only by dairy, floriculture, nursery and poultry. Farm gate value was \$238 million in 1998, up from \$186 million in 1997. Operations such as trout farms exist throughout BC, with major concentrations on Vancouver Island, in the Lower Fraser Valley and in the Thompson River/Okanagan Lake area. Provincially regulated commercial freshwater finfish aquaculture grow-out and 'U-Catch-Em' operations in BC totalled 105 in 1999, up from 99 in 1998. A license is required for all commercial operations, which include aquatic plant production and fish-for-a-fee farms for tourists. On-farm processing of fish or fish products (e.g. smoked fish products) diversifies the business.

5.4.6 Herbs and Spices

Herb and spice plant uses include landscape, culinary, cosmetic, medicinal, industrial, decorative and aromatic purposes. Canadian production is centred in Manitoba, Saskatchewan and Alberta, although some herb production occurs in BC. Proper scientific (Latin) names consisting of the genus and species must be used to ensure that the correct plant is used. Listings and information can be obtained from Internet sites such as the British Columbia Herb Growers Association (www.bcherbgrowers.com), the American Botanical Council (www.herbalgram.org) and International Herb Society (www.iherb.org).

5.4.7 Medicinal plants

More than 20 medicinal plants are grown for commerce in Canada. Of these ginseng, evening primrose, comfrey and echinacea (3 species) are in oversupply. Most medicinal plants are suited to well drained soils with neutral soil pH and a few are suited to soils with a pH as low as 4. Most medicinal plants are perennials that are hardy to plant hardiness zones 3 and 4; plant hardiness zones in the Study Area range from zone 3 to zone 6. Most medicinal plants grow well in full sun. The global market for garlic as a nutritional supplement exceeds \$100 million. Increasing public awareness of garlic's seasoning and health benefits are expected to continue. **A good business plan and market research and marketing skills are required for the successful production and sale of medicinal herbs.** Buyers of medicinal herbs and roots may want these to be produced by organic methods. Pesticides needed to control pests in these crops have not yet been registered.

5.4.8 Ginseng

BC's acreage in ginseng increased from approximately 1,200 acres in 1993 to 2,600 acres in 1997. Production during that time went from 534,000 lb. to 1.2 million lb. The value per pound also changed from \$42/lb. in 1993 to \$18/lb. in 1997 and \$14/lb. in 1998.

1.4.9 Sea Buckthorn

This hardy shrub is adapted to sites with gravelly or stony soils, but not to areas that are wet. It is a relatively new crop. Oil from the seed and the fruit is used in the cosmetics industry. Leaves are suitable as feed for livestock. It is also used as a shelterbelt plant. Sea Buckthorn has low moisture requirements and adapts to a wide range of soils but does not like "wet feet". Seeds must be harvested mechanically.

5.4.10 Stevia

Stevia rebaudiana is one of 300 species of stevia plants. Leaves of this particular species contain glycosides 10 to 15 times sweeter than sugar. Stevia has the potential to replace all artificial sweeteners on the market today, has no calories, does not raise blood sugar levels, is fluoride compatible but does not cause tooth decay and is stable when used in cooking. Stevia is used as a sweetener in Japan, where more than 700 tons of this sweetener are consumed annually. **Stevia could be grown as an annual transplant in warm to hot areas in the Study Area with light textured soils (Sections 1, 2, 3, 5, and 9). Extraction of the glycosides from stevia is a patented process. Royal Sweet apparently holds the patent.** Despite extensive research in Canada the company has not yet pursued commercialization of this crop.

5.4.11 Christmas Tree Production

Major Christmas tree types produced in BC are Douglas fir, Grand fir, Noble fir, Scotch pine, White pine, Concolor fir and various spruces. They are produced in all areas of the province. Provincially there were 592 Christmas tree farms recorded in the 1995 census, with 23,358 acres in production. Only 285 farms reported sales (282,203 trees). Most trees were produced in the Lower Mainland (123,800), the Kootenay area (93,537) and the Vancouver Island area (47,790). The Columbia-Shuswap Regional District produced 6,682 Christmas trees. In 1995 there were three Christmas tree farms in the Squamish-Lillooet Regional District and nine in the Thompson-Nicola Regional District; collectively they sold an unknown number of trees. Christmas tree production within the Study Area is possible on most agricultural lands, except wetlands or organic soils. Proper seed selection is an important part of Christmas tree production – the seed selected should delay the onset of terminal growth early in the growing season and thereby avoid damage from late spring frosts. **Selected areas of Sections 3, 4, 5, 8, 9 and 10 are best suited to Christmas tree production.**

Report 1: Appendix 3 – Commercially Grown Crops in the Study Area (1996, 1991 & 1986 censuses – acreage in brackets)

	1996	1991	1986
Berries and grapes for sale	Grapes (3), raspberries (6), strawberries (11), other berries (6)	Blueberries, grapes, raspberries, strawberries, other berries	Blueberries, grapes, raspberries, strawberries, other berries
Field crops grown	Pasture, hay, wheat, oats, barley, corn, rye, alfalfa, field peas, dry beans, canola	Pasture, hay, wheat, oats, barley, corn, rye, alfalfa, soybean, alfalfa for seed, forage for seed	Pasture, hay, wheat, oats, barley, corn, rye
Tree fruits grown for sale	Apples (150), apricots (14), peaches (6), pears (6), plums & prunes (13), sweet cherries (15), sour cherries (2), other tree fruit and nuts (4)	Apples (119), apricots (7), peaches (11), pears (15), plums & prunes (3), sweet cherries (10), sour cherries (1), other tree fruit and nuts (3)	Apples (121), apricots (3), peaches (12), pears (5), plums & prunes (10), sweet cherries (12)
Vegetables for sale	Asparagus, beets (4), broccoli, Brussels sprouts, cabbage (9), carrots (14), cauliflower, Chinese cabbage, cucumbers (12), dry onions (32), green peas (6), green onions (2), lettuce (4), peppers (7), potatoes (207), radish (3), rhubarb (1) rutabaga (3), spinach (2), squash, zucchini, pumpkins (22), sweet corn (136), tomatoes (33), wax beans (4), other vegetables (24)	Asparagus (1), beets, broccoli, Brussels sprouts, cabbage, carrots (4), cauliflower, Chinese cabbage, cucumbers (12), dry onions (19), green peas, green onions, lettuce (1), peppers (6), potatoes (111), radish (4), rhubarb, rutabaga (3), spinach, squash, zucchini, pumpkins (8), sweet corn (113), tomatoes (39), wax beans (3) other vegetables (12)	Asparagus, beets, beans, broccoli (2), Brussels sprouts, cantaloupe & melons (9), cabbage, carrots, cauliflower (2), cucumbers, dry onions, green onions (1), lettuce, parsnip, peppers, potatoes (90), rhubarb, rutabaga (4), spinach (1), squash, zucchini, pumpkins, sweet corn (172), tomatoes, other vegetables

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