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**FEASIBILITY ASSESSMENT OF NATIVE PLANT
AND HYBRID POPLAR NURSERY/GROW SITE**

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Management Consultants

EXECUTIVE SUMMARY

PURPOSE OF STUDY

The Okanagan Indian Band and the City of Vernon are considering establishment of a joint venture to develop a native plant and hybrid poplar nursery grow site. Under the joint venture, a parcel of vacant land north of Vernon would be converted into a productive agroforestry area. Other suitable sites may also be identified at a later date.

The purpose of this study is to assess the apparent economic feasibility of developing the proposed native plant and hybrid poplar nursery/grow site. As such, the project will:

- Review market opportunities for the use of native plants and hybrid poplar nursery/grow site in the Okanagan Valley;
- Determine set up and operating costs for a 50 acre nursery/grow site;
- Calculate the break even levels;
- Examine potential partnership or owner/partnership arrangements; and
- Make recommendations regarding requirements for the next phase of the project.

METHOD OF STUDY

The project will be undertaken in two phases. This report represents the output of the first phase of the study, which focuses on reviewing the potential market for the proposed products. The specific steps that were undertaken to complete the first phase of study are as follows:

- Conducted an initial meeting with the Steering Committee to clarify the specific outputs desired and obtain agreement on the work plan.
- Obtained available statistics and reports on the demand for, and supply of, native plants and hybrid poplar.
- Conducted interviews with 44 selected experts regarding hybrid poplar and native plants.
- Prepared a draft questionnaire and preliminary list of representatives to be surveyed, for approval by the Steering Committee.
- Conducted interviews with 43 potential buyers to assess the potential market for the proposed products.
- Analyzed the market research results.
- Prepared the Phase I report.

Before Phase II commences, we will meet with the Steering Committee to review the findings, obtain input on key issues, and gain approval of the proposed work plan.

MAJOR FINDINGS AND CONCLUSIONS

1. Hybrid Poplar

a. Description

The term "poplar" refers to any trees in the genus *Populus*, a part of the botanical family known as *Salicaceae* which also contains the close relatives, the willow, cottonwoods and aspens. The poplars include over 30 different species worldwide. A hybrid poplar is one that has been bred with the best height and diameter traits of both parents. Poplar hybrids can be the results of natural crosses as well as manmade. The hybrid poplar is a very fast growing hardwood that has been bred in commercial applications since as early as the 1920s in the United States.

b. Potential Applications

In the Pacific Northwest and the Canadian Prairies, hybrid poplar has been planted in a crop situation to produce fibre for pulp mills. The fibre has also been used for particle board, Oriented Strand Board, tissue paper and veneer for plywood.

In response to low pulp prices and a shortage of other hardwoods for value added applications, some of the plantations in the US Pacific Northwest are being converted to saw log production by using wider spacings to produce larger trees. Hybrid poplar lumber is suitable for many value added wood applications such as cabinetry, furniture, floors, and pallets.

The fibre has also been used for the following applications:

- Biofuel;
- Feedstock;
- Fuelwood;
- Pollution control and bioremediation/phytoremediation; and
- Conservation and ornamental plants.

c. Constraints to Development

Some of the factors that limit or constrain the market potential of hybrid poplar in the Okanagan include the following:

- The use of the material is limited by its low density;
- The material deteriorates quickly and must be processed soon after harvest;
- The industry and the public tend to have a negative perception of the usefulness of the species;
- There is a lack of reliable market information;
- There is no existing reliable supply of the material to reassure customers and encourage the development of applications;
- There are no large commercial applications, currently in British Columbia, that are in need of hybrid poplar fibre;
- There is no market for hardwood pulp chips within reasonable transportation distance of the Vernon area;
- Wood processors are reluctant to experiment with hybrid poplar without a demonstrated market demand;
- Value-added wood processors have numerous complaints about working with poplar;
- Supplying the value-added industry will require dried and milled materials and there is limited experience with these species in the local wood processing industry; and
- Penetration of the lumber market with hybrid poplar products will require an extensive marketing campaign.

d. Potential in the Okanagan

Potential advantages to using and marketing hybrid poplar for the project proponents include the following:

- The project has some significant cost advantages over other potential proponents due to low land costs and irrigation costs;
- The project has a number of potential partners;
- The proposed land for the plantation appears suitable for growing poplar;
- The species grows much faster than other fibre sources;
- Its light colour makes it suitable for pulp and tissue paper;
- It is easy to raise from stem cuttings;
- Trials have indicated that it has favourable manufacturing characteristics;
- Due to recent research efforts high quality clones are available, and
- It has a flexible harvest date, unlike other crops.

There is considerable uncertainty about the market potential for hybrid poplar because the actual selling date of the material would be over ten years from now and many factors may have changed in that time. At this point, the market with the most potential appears to be the hardwood retailers. Three retailers in the Okanagan import poplar lumber from eastern Canada and the United States. Two of these retailers also have stores in the Lower Mainland. Hybrid poplar lumber would be a comparable or superior product that could be produced locally at a lower price. This appears to be the only realistic opportunity in the short-run.

2. Native Plants

a. Description

There is no clear consensus on a definition but native plants are most often defined as those that evolved in North America over the thousands of years prior to the serious disturbances to the environment created by modern man. There are 2,170 plants considered native to British Columbia, the most of any province. Native plants can be flowers, sedges, mosses, grasses or ferns.

b. Applications

Native plants have a number of applications. These include:

- Private gardens and home landscaping;
- Commercial gardens and building landscaping;
- Disturbed land and stream restoration
- Botanical forest products; and
- Medicinal and pharmaceutical products.

c. Constraints to Development

Some of the factors that limit or constrain the market potential of native plants in the Okanagan include the following:

- The market for native plants for restoration work fluctuates wildly;
- There is no current market information available for landscaping demand;
- Many sources of funds for restoration work using native plants are under review and may not continue;
- Competition in the industry has increased dramatically recently;
- The raising of native plants has a higher risk than other plants (low germination rates for example); and
- A greenhouse would need to be built and a horticulturalist employed, significantly raising the cost of the operation.

d. Potential in the Okanagan

Native plants have some advantages which may result in further development of the market over time. These include:

- There are time and cost advantages to their use;
- More water restrictions are coming into force and they use less water than traditional landscaping plants;
- Native plants attract native fauna;
- Native plants grow in organic conditions;
- A native plant garden is aesthetically pleasing; and
- Native plants will not become invasive.

Due to the cyclical nature of the restoration work market, the greatest immediate potential is in the landscaping area. However, as noted above, competition in this market is intense and there are complicated growing issues.

PLAN FOR PHASE II

The objectives of the second phase of the feasibility study will be to document:

- The appropriate size and scope of the operation;
- Preliminary estimates regarding the cost to develop the proposed operation;
- The estimated operating costs of the proposed operation;
- Appropriate partnership arrangements for the operation;
- The financial implications of the project;
- A marketing strategy for the project and the product; and
- Potential employment implications.

Most of the information needed to document these issues has already been collected in the first phase of the study. Prior to proceeding with Phase II, however, we would like to obtain input from the Steering Committee with respect to a number of issues including:

- *Is there a sufficient potential market for the product?* Phase I of the project has investigated the extent of the use of and potential market for hybrid poplar and native plants. Does the information justify preparing a Phase II report?

- *Should Phase II consider hybrid poplar or native plants or both products?* Phase I results indicated a more favourable result for markets for poplar. Should native plants be eliminated as a potential product?
- *What should be the size and scope of the project?* We have been gathering information based on using a specific 50 acre parcel of land north of Vernon. Should this whole area be used? What is the budget range that we should work with?
- *What partnerships should be pursued?* A number of potential partners were identified in Phase I. Are there any partners the Steering Committee would prefer to pursue?
- *What part of the businesses will be emphasized?* The Steering Committee needs to decide if it prefers to grow full size plants and trees or to operate as a nursery for seedlings that will be sold to business who will grow out the plants.

In addition, some cost items need to be clarified. It needs to be determined if there will be any land rental costs necessary. Also, it has not been determined if the City of Vernon will cover the costs of building the necessary infrastructure for the irrigation system or just the operational costs.

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I. INTRODUCTION

A. PURPOSE OF THE STUDY

The Okanagan Indian Band and the City of Vernon are considering establishment of a joint venture to develop a native plant and hybrid poplar nursery grow site. Under the joint venture, a parcel of vacant land north of Vernon would be converted into a productive agroforestry area. The area in question, a 50 acre plot of land just north of Swan Lake, is part Reserve Land and partly privately held. Other suitable sites may also be identified at a later date.

The primary objective of this study is to assess the apparent economic feasibility of developing the proposed native plant and hybrid poplar nursery/grow site. More specifically, it was intended that the study would:

1. Review market opportunities for the use of native plants and hybrid poplar nursery/grow site in the Okanagan Valley;
2. Determine set up and operating costs for a 50 acre nursery/grow site, including site costs and spray irrigation;
3. Calculate the break even costs and revenue required to make the facility self sufficient;
4. Examine potential partnership or owner/partnership arrangements for the operation of the facility;
5. Make recommendations to the Steering Committee regarding requirements for the next phase of the project; and
6. Produce a comprehensive report for the City of Vernon and the Okanagan Indian Band that details the project findings.

B. METHOD OF STUDY

The project will be undertaken in two phases:

- In the first phase, we assessed the market potential for the proposed product and determined the accessibility of materials necessary to the operation.
- In the second phase of the study, we will assess the feasibility of the proposed operation.

This report represents the output of the first phase of the study. The specific steps that were undertaken to complete the first phase of study are as follows:

- **Conducted an initial meeting with the Steering Committee to clarify the specific outputs desired and obtain agreement on the work plan.**

The Steering Committee consists of representatives from the City of Vernon, the Okanagan Indian Band and local experts. A list of the Steering Committee members is provided in Appendix I

- **Obtained available statistics and reports on the demand for, and supply of, native plants and hybrid poplar.**

We contacted government representatives and industry groups in Canada and the United States to obtain this type of information. We also conducted a search of the Internet and other on-line databases.

- **Conducted interviews with 44 selected experts regarding hybrid poplar and native plants.**

As indicated below, the selected experts were drawn from government, industry associations, private companies and academia.

TABLE 1.1

PROFILE OF THE SELECTED EXPERTS SURVEYED

Organization Type	Hybrid Poplar	Native Plants	Total
Federal Government	4		4
Provincial Government	5	8	13
Industry Associations	7	6	13
Private companies	7	5	12
Academics	2		2
Total	25	19	44

A list of these representatives contacted to date is provided in Appendix II. In addition to market information, we collected information on potential partnerships for the project.

- **Prepared a draft questionnaire and preliminary list of representatives to be surveyed.**

We obtained approval of the questionnaire and sampling strategy from the Steering Committee prior to proceeding with the interview program. It was decided that the interview program would focus primarily on the market for hybrid poplar. A copy of the questionnaire that was used is provided in Appendix III.

- **Conducted interviews with 43 potential buyers to assess the potential market for the proposed products.**

We concentrated our efforts within the Okanagan on the assumption that a regional market would be the easiest one to serve at least in the primary stages of the project. Of the 43 interviews, 8 were conducted with companies and organizations from the plant nursery industry or potential buyers of native plants. These included:

- BC Hydro;
- BC Gas
- Columbia Power;
- Kelowna Municipality;
- Okanagan School District;
- A private nursery;
- A seed collection company; and
- Ministry of Energy and Mines.

The other 35 buyers were drawn from a cross section of the forestry industry as well as the retail/distributor sector.

TABLE 1.2

PROFILE OF THE COMPANIES SURVEYED

Company Type	Number	Percent
Value Added	11	31%
Primary Processor	7	20%
Pulp mill	6	17%
Retailer/distributor	3	9%
Log home builder	4	11%
Veneer	3	9%
Oriented Strand Board	1	3%
Total	35	100%

- **Analyzed the market research results.**

We analyzed the results of our market research program to assess the potential market for a hybrid poplars and native plants. We reviewed the survey results, summarized the significant findings and determined the implications of those results.

- **Prepared an interim report summarizing the results of the market research.**

Phase II will commence after the Steering Committee has reviewed the interim report and met with the consultants to plan the next phase.

II. THE MARKET FOR HYBRID POPLARS

A. DESCRIPTION AND HISTORY

The term "poplar" refers to any trees in the genus *Populus*, a part of the botanical family known as *Salicaceae* which also contains the close relatives, the willow, cottonwoods and aspens. The poplars include over 30 different species worldwide. A hybrid poplar is one that has been bred with the best height and diameter traits of both parents. Poplar hybrids can be the results of natural crosses as well as manmade.

Poplars are fast growing, hardy, straight-trunked trees that have large, sticky, fragrant buds. The leaves are shiny and dark green but pale underneath. They can be oval or wedge-shaped. The male and female catkins are found on separate trees. The hairy capsules release a seed that is covered with white fluffy hairs resembling cotton that becomes airborne (hybrids are usually sterile or are strictly males to avoid the cotton discharge). The bark is smooth, yellowish-grey early and becomes thick and deeply grooved later on. The trees are wind-pollinated but also have the capacity to produce asexually by sprouting from the root collar of dead trees, broken branches or from roots after a fire.

In British Columbia, one of these species, the Black Cottonwood (*Populus balsamifera* ssp. *Trichocarpa*) was used by First Nations people for dugout canoes. The Okanagan people made cottonwood into riding sideboards and cradles. The resin from buds were used to treat sore throats, coughs, lung pain and rheumatism. A balm called Gilead came from the winter buds of balsam poplar and was used to relieve congestion. The buds contain a waxy resin with anti-infectant properties still used in natural health ointments. Also, bees collect the resin to make barriers to predators such as mice.

The interest in hybrid poplars has a long history. French explorers in North America took eastern cottonwoods back to Europe and crossed them with European poplars for use as windbreaks and fuel. Poplar hybrids, pollinated by hand, were seen first in Britain in 1912 and were planted after the war in response to wood shortages. The European hybrids were re-introduced into North America soon after. The first large-scale research project with hybrid poplars in the US began in 1925. There were commercial plantings in North America as early as the 1960s, but real commercial success is traced to the work done in the area by the US Department of Agriculture in the 1970's.

In Canada, the poplar is well known and widely distributed. The tree was used extensively in the Prairies as windbreaks, shade, fuel, and to stabilize streams and slopes. In many other places, it was seen as a "water sucking weed" or a junk tree and was often burned as a nuisance tree (the rate of water utilization is, in reality, roughly equivalent to a typical agricultural crop).

B. HYBRID POPLAR AS A CROP

1. Advantages

a. Fast Growing

Hybrid poplars are among the fastest-growing trees in North America and the fastest at this latitude (Vernon). Estimates of growth vary from 10 to 15 feet per year. Trees in Puyallup Washington have reached 20 feet of growth in one year. The US Bioenergy Feedstock Development Program estimates that hybrid poplars, grown under short-rotation silviculture, can produce between 4 and 10 dry tons of wood per acre per year (or 8-22 metric tones per hectare). These returns greatly exceed those possible with species traditionally used for forest products in the Northwest. Some claim that the hybrid poplar is 10 times more productive than Douglas fir in the first ten years of growth. However, yields vary considerably given varying site conditions, management programs and the hybrid type used. Under moist conditions, the tree can live 50 to 60 years.

b. Light Colour

The fibres of the hybrid poplar have a very light colour which is one reason it has been poplar for pulp. The fibres require little or no bleaching for use as pulp and paper or tissue paper. Also, it has a clear smooth grain and appearance.

c. Easy to Raise from Stem Cuttings

The tree grows well from rootless cuttings and sprouts naturally after harvest or a fire. The quick re-sprouting can make replanting after harvest unnecessary.

d. Easily Processed

Trials undertaken by Forintek of Canada and the BC Ministry of Forests determined that the material from the hybrid poplar had favourable manufacturing characteristics. Specifically, the wood is:

- easy to machine and sand;
- easy to stain and painted due to light colour;
- light weight; and
- has a low rate of defects

According to a 1998 Ministry of Forest report, the wood "was comparable to other low to moderate density woods for machinability, fastening, laminating and finishing characteristics and would be well suited for products not requiring high strength, surface hardness or exterior applications" (Solid Wood Product Opportunities from Short Rotation Hybrid Poplar Trees: Michael Carlson, Kalamalka Forestry Centre).

e. Is Considered a Sustainable Resource

As the hybrid poplar plantation is in effect a re-plantable crop, its use is considered to be a sustainably-grown and can avoid environmental group opposition to its use on the basis of destroying natural resources. The use of plantation poplar may appeal to environmentalists as it can reduce the pressure on native and primary growth forests.

f. High Quality Clones Are Available

Due to the extensive research in industry and by academics, there are a wide range of improved varieties of hybrid poplar currently available.

g. It Is a Flexible Crop Regarding Harvest Times

The Hybrid Poplar needs care and attention like any other crop. However, unlike most agricultural crops it is not necessary to harvest and sell the product on a set schedule. If the prices for poplar fibre are low one year the trees can be left to be harvested when prices recover.

2. Disadvantages

a. Low Density

With large growth rings due to the rapid growth of the tree, the wood is not as dense as other slower growing species. This limits the uses of the wood in structural applications.

b. Short Storage Life

The poplar cannot be harvested and then left on the ground until milling time is available. The wood will deteriorate in a few months to the point where it is unuseable. Harvest and processing need to

be scheduled very close together. For veneer, the material needs to be peeled within two weeks of harvest and kept moist. Even the chips for pulp will go black if left for extended periods. At least one US company delivers chips on a "just-in-time" basis, with a maximum of three days between harvest and processing.

c. Negative Public/Industry Perception

The hybrid poplar is not extensively used and is not widely available. The industry and the public have not had extensive exposure to the products possible from the tree. It is often recognized as a weed or junk tree. There is a lack of information available, or at least accessed, regarding the characteristics and uses of the fibre.

d. A Lack of Expertise in BC

There are few experts on growing poplar in BC. The range of true experts appears to be limited to a few nursery growers, the research department of the BC Ministry of Forests, one or two private consultants and one major producer.

e. A Lack of Reliable Market Information

There is no reliable information available on the demand in British Columbia for the various products possible from hybrid poplars.

f. No Reliable Supply Available in BC

To convince an industry to adopt a new raw material, there needs to be enough of the material to ensure that, if a business retools equipment or processes to use it, there are assurances of a long term quality supply. The hybrid poplar available in BC is not at a critical mass where this is possible at this point.

C. APPLICATIONS

1. Pulp and Composite Products

The most popular use of poplar recently has been for pulp and paper. This is due to the rapid growth cycle and the fact that the white fibres require little or no bleaching. It has been a popular substitute for hemlock and balsam fir. The fibre has also been used for particle board, OSB and veneer for plywood. It is somewhat of an irony that a hardwood, poplar, also makes the softest tissue paper on the market.

2. Lumber

There have been limited uses of hybrid poplar for lumber applications such as landscape lumber. However, because it resists splitting, it has been extensively used for children's playground structures, boxes, crates, toothpicks, chopsticks and veneer for fruit baskets.

Hybrid poplar has traditionally been used mainly for pulp, due in part to a lack of research into the mechanical and physical properties of the wood. Most research had been proprietary work by pulp companies. This situation has been mitigated recently by work done by Forintek Canada and the BC Ministry of Forests.

There has also been research undertaken on the possibility of using the lower part of the poplar for saw logs and the upper part for pulp.

3. Biofuel

Utilities in the US are examining poplars as a source of "biofuel" for use in electrical power generating facilities. During use as biofuel, the poplar releases less CO₂ into the atmosphere than it has removed during its life and so can be considered to be a non-contributor to the greenhouse effect (making pollution "credits" possible in some cases). It also produces little sulfur or nitrogen oxides. Since 1978, the US has been funding research into hybrid poplars as a source of biomass to produce ethanol for automobile fuel.

4. Feedstock

First Nations people of the Great Plains used strips of cottonwood as winter browse for their horses. New chemical engineering processes will allow the use of poplar fiber as feedstock for grazing animals.

5. Fuelwood

The low wood density and high moisture content, when green, does not make the poplar ideal firewood. However, it could be used as pelletized fuel. The waste wood from harvest can be used to make these pellets.

6. Pollution Control and Bioremediation/phytoremediation

Recent research has demonstrated that hybrid poplars can be used as biofilters in dealing with landfill leachate, wastewater disposal, groundwater contamination and water management. Hybrid poplars can use irrigation water from agricultural runoff laden with salt, boron and selenium. The use of these trees may reduce the need for evaporation ponds on some farms. The trees "act like 100-foot straws that suck contamination from soil and groundwater" (Seattle Times, September 30, 1998). "Hybrid poplars have been planted specifically to absorb organic chemicals such as trichloroethylene, carbon tetrachloride and atrazine dumped or spilled into the soil" (Jon D Johnson, Hybrid Poplar: An Overview, 1997).

The root system of the poplar, extending 10 to 20 feet deep, draws large amounts of water and nutrients from the soil. It has been claimed that the bioremediation (or phytoremediation) work of the poplar is accomplished at a saving of up to 70% over conventional treatment systems (CHWMHILL). "A simple four-row buffer of hybrid poplar can reduce nitrates by over 90% and significantly lower pesticide concentration in agricultural runoff" (Jeff Braatne: Ecological Considerations of Hybrid Poplar Cultivation in Riparian Settings, 1999).

Researchers at the University of Georgia "have genetically engineered yellow poplar trees giving them the ability to absorb toxic mercury from soil, convert the toxin to a relatively inert form and release the converted matter as a vapor into the atmosphere" ("Science Daily" web site).

There are hopes that poplars can be used to process effluent from such pollution sources as pulp mills. One Alberta company has an application filed with that provincial government to irrigate their poplar plantation with pulp plant effluent currently disposed of in an area river. Scott Paper in BC is negotiating to supply poplars for reclamation of some gravel pits and some mine sites.

7. Conservation and Ornamental Plants

The poplar is an excellent choice for shading fish streams and stabilizing riverbanks. They can also be used for ornamental or shade trees in a urban setting when fast growth is desired.

8. Inter-planting

There is some interest in exploring the possibility of inter-planting poplar plantations with marketable plants that would flourish in the shade of the poplar canopy. If successful, this process would raise the revenue from the land. It may require more manual work rather than mechanical operations in order not to damage the shaded plants.

D. CURRENT RESEARCH AND PLANTATION GROWING OF HYBRID POPLARS

The existing literature focuses primarily on the technical aspects of cloning and cultivating. The selected experts in the field also tend to be concerned primarily with these aspects. There is relatively little documentation regarding the demand and supply for products possible from hybrid poplars or native plants. As a result, we have relied primarily on our expert interviews to assess the potential market.

1. Internationally

The growing of poplar for wood products is well established in many countries. In 1996, the International Poplar Commission (headquartered in Rome) estimated that there were 1 million hectares of poplar plantations in Europe, 160,000 hectares in the middle east, 360,000 hectares in China and 55,000 hectares in Argentina. A variety of European countries are conducting research in this area.

2. North America

In North America, the supply of wild stands of similar trees has traditionally reduced the need for cultivation of hybrids. However, the development of poplar as a crop is receiving increased attention because of:

- improved clones are available;
- wood-processing technology has improved;
- allowable cuts have been reduced;
- supply of native cottonwood is declining as riparian areas are protected; and
- fears of climate change has increased research into biomass for renewable energy.

There are approximately 90,000 acres (36,400 hectares) of hybrid and cottonwoods in the US. Commercial plantings are found in the Pacific Northwest, the Midwest, the Lake States and the southeastern US (Bioenergy Information Network). There are significant initiatives in Minnesota, Wisconsin, Oregon and Washington with extensive research being undertaken at these State Universities. The University of Washington has the Poplar Molecular Genetics Cooperative and Oregon State University has the Tree Genetic Engineering Research Cooperative undertaking extensive research into hybrid poplars. There are also major experimental stations at Klamath Falls, Oregon and Puyallup, Washington. In Oregon and Washington, processors are cultivating over 60,000 acres under drip irrigation systems for use in pulp or OSB. Significant poplar planting has been done by Georgia-Pacific, Boise-Cascade and the formerly named Fort James Corporation.

The Potlatch Corporation has a 17,000 acre hybrid poplar plantation at Boardman, Oregon which is possibly the largest tree farm in the world. Originally begun to meet an anticipated shortage of chips for their pulp mill, the Corporation has recently begun to retool the operation to provide material for saw logs as they view this as having a much higher revenue potential.

In Canada, there are 6000 acres of hybrid poplar in BC and some plantations in Ontario and Quebec. Domtar is utilizing improved poplar species in Quebec. The prairie provinces have been undertaking related research for many years through the Prairie Farm Rehabilitation Administration. Olds College and the Agriculture Canada research station at Morden, Manitoba do research into hybrid poplars and are a source of new varieties. Research has also been undertaken at Laval University and the University of Toronto. Hybrid poplars can be sourced in Alberta, BC, Manitoba, Saskatchewan, Ontario and Quebec.

3. British Columbia

In BC, the testing of hybrid poplar clones by the Ministry of Forests began in 1989. More than 90 clones were planted on coastal and interior sites to study their growth patterns. The first list of acceptable clones for Crown lands planting was published in 1995. There are now hybrid poplar plantations in the interior, on the south coast, mid-coast and Vancouver Island. The main centres for research and production are outlined below.

a. Private Companies

i. The Scott Paper company

The Scott Paper company has managed and used poplars for over 40 years and hybrid varieties for 12 years in BC. The company develops and grows its own poplar planting materials. It purchased and manages poplar growing lands in the Fraser Valley including many islands in the Fraser River. Needing more fibre, the company applied for and received the first Tree Farm Licence for deciduous crops in 1985. To further extend supply, the company has been entering into partnerships with Native Bands in the area to grow poplar on reserve lands.

ii. MacMillan Bloedel/Norske Skog

Prior to its takeover by Weyerhaeuser, MacMillan Bloedel was experimenting with poplar plantations at various sites. The plantations were subsequently purchased by Norske Skog. These included plantations at Menzies Bay near Campbell River, the west side of Vancouver Island and in the Lower Mainland. Norske Skog had originally attempted to sell the plantations it obtained in the purchase but, because of the advanced age of the plantations, is now reviewing its approach to this fibre. Norske Skog has 3000 hectares of hybrid poplar in BC.

It is estimated that there are currently six thousand acres of hybrid poplar growing in British Columbia.

b. Government Sponsored Research

i. Kalamalka Research Station, Vernon

The Ministry of Forest's Research Station at Kalamalka has been experimenting with fast-growing hybrid poplars using reclaimed municipal waste water for the past 15 years. The Research Station personnel have conducted trials in Vernon, the East Kootenay Valley of the Cranbrook area in the Cranbrook Forest District, and in the Kootenay Lake Forest District (the Huscroft Farm).

ii. Vernon Poplar Plantation

The city of Vernon has planted 2,500 hybrid poplars on 10 acres of city land previously used for cattle grazing. The plantation is irrigated with reclaimed city water.

iii. Pleasant Valley Secondary School, Armstrong

For almost 6 years this school and Riverside Forest Products have been partners in raising a poplar plantation. Riverside is experimenting with using the fibre for a variety of applications. The project was begun when chip prices were considerably higher than they are now and Riverside had hoped to use them as alternative fibre for the pulp operations.

iv. Surrey Nursery Demonstration Plantation

The Ministry of Forests has been demonstrating the ability to grow hybrid poplars in the Lower Mainland at its Surrey nursery since 1991. Nutrient-rich effluent is being used for irrigation.

c. Private Nurseries

During the interviews with experts, there were two private nurseries referenced that grow hybrid poplars. These were Stewart Brothers Nurseries (at Grand Folks, Midway and Kelowna) and PRT Reid Collins Nursery at Aldergrove. Stewart Brothers is the largest grower of deciduous trees in Western Canada. Both nurseries report that their major markets are the Canadian Prairies and the US.

E. GROWING ISSUES

1. Objectives

The extent and intensity of plantation management depends on the intended use of the fibre and the desired yield. Some growers use a natural management process that uses very little management and relies on natural processes. These growers are usually interested in the tree as a bioremediation tool, in ornamental applications, or as a soil stabilizer.

Growers who are interested in pulp fibre and especially those who are growing fibre for saw logs utilize what is referred to as an intensive short crop rotation management process. The tree is treated much like any other agricultural crop. This more intensive management system helps ensure faster growing cycles, higher quality fibre and reduced tree mortality. The points below outline in general the major elements of an intensively managed short rotation hybrid poplar plantation.

2. Site Selection

Poplar hybrids grow best on humid and microthermal areas. They are not usually found where the temperatures rise about 38 C or fall below -46C for extended periods. Soils need to be at least 1 metre deep with a relatively shallow water table. The pH ranges that are acceptable are quoted differently in different references but appear, in general, to be from 5 to 7.8 although different hybrids can tolerate different pH levels. The poplars do well on alluvial soil of valley bottoms (less than 8% slope) with loam to clay loam soil.

Direct and sustained sunlight is important. Areas prone to prolonged summer flooding should be avoided as the roots will be deprived of oxygen. Winter flooding is not as much of an issue as the trees do not actively grow in the winter. Once the site has been selected, the work of plantation management begins.

3. Variety Selection

There are a variety of clones to choose from and choosing one known to perform well in the immediate area is preferred. Many experts recommended using at least two different clones to help reduce the chances of crop failure. One Oregon nursery sells a special field test package of 10 different hybrids. *Populus trichocarpa* x *P. deltoides* often referred to as TxD (TD cross and *Populus trichocarpa* x *P. maximowiczii*, or the TxM (TM cross) are two of the most common clones used in BC. The company in North America with probably the most experience in this area, the Potlatch Corporation, states on their web site that choosing the right clone is a highly critical element of the process. "One of the most complicated, critical and challenging aspects of growing hybrid poplar fiber is continuously testing various hybrid poplar combinations to find the best for Potlatch's fiber needs, product requirements and growth."

4. Site Preparation

The site should be cleared of existing vegetation in the fall prior to planting. A herbicide application in late summer is recommended as well as deep plowing in the fall. The field should be tilled and cultivated in the spring prior to planting. Relatively flat and accessible sites have more options for using mechanical means of maintenance.

This stage of preparation is important due to the below ground competition to poplar roots from various types of grasses.

5. Planting

Plantations are begun by planting dormant unrooted stem or branch cuttings or unbolted whips. These are usually purchased from nurseries and planted by hand. The cuttings are stored just below freezing and are warmed and soaked for 10 days before planting. Planting is done between mid-April and early June.

The spacing of the plantings is a function of the product desired. Wider spacing will allow for wider dimension trees for saw logs. Narrower spacing can be used for pulp fibre production. This spacing can reduce the need for weeding as the canopy will develop quicker. The closer the trees are spaced, the shorter the diameter and the rotation.

6. Weeding

Weed control is especially important in the first three to four years until the canopy develops to the point where the shade overcomes the weed competition. Until then, the new trees cannot compete with natural vegetation. Grasses are a particular problem being a below ground competitor. A combination of herbicides and mechanical cultivation is recommended. Care needs to be taken in choosing herbicides that are not harmful to the clone being used. Tilling may be required two to three times during the season.

The use of polyethylene mulch mats has been used as a more environmentally friendly alternative to herbicide use to control vegetation. However, this may raise costs of the maintenance and input costs should be seen to be offset by the shorter rotation achieved. Hog fuel has also been mentioned as a way to keep weeds down.

Weed control is essential to the survival of a hybrid poplar plantation. There have been many plantation failures, including one on the Armed Forces base in Langley, due to inattention to this aspect of poplar cultivation.

7. Fertilizing

Hybrid poplars have an excellent growth response to fertilizers, particularly nitrogen. Soil analysis is recommended prior to planting to ensure an effective fertility management program is established. Soil analysis is also recommended after the third growing season and after harvest. The Potlatch Corporation estimates that their 8 year rotation required an average of 125lbs/acre of nitrogen annually. Hybrid poplars have shown excellent response to waste water used as fertilizer as well.

8. Pruning

Pruning is especially important if growing the fibre for saw logs. The pruning ensures that more of the tree will be clear of defects and suitable for value added wood applications.

9. Irrigation

Poplars respond well to irrigation with increased growth rates. The larger plantations in the US are using automated drip systems. Irrigation with treated municipal waste water has been used successfully in many trials in the US and in Canada. Irrigation also extends the range of sites where the tree can be raised.

10. Pest and Disease Control

Pests such as deer, voles, gophers, porcupines, rabbits and beavers (these have been a real problem on Vancouver Island) can cause damage to new trees and must be kept out of the plantation area. Coyotes have also been known to chew on drip irrigation tubing. This may require fencing. The use of clones bred for pest resistance is one of the best defences. Damage can also occur from leaf defoliators such as the cottonwood leaf beetle and from stem bores.

The fungus shepherd's crook can be a problem but there are clones that have been bred to be resistant to it. A fungicide may need to be utilized. Another major disease is leaf rust which causes premature leaf drop.

11. Harvesting and processing

In a chip production situation, the "harvesting, processing, and transportation account for approximately one-half of the total cost of delivered chips." Careful attention has to be paid to the layout of the plantation to ensure that it will be suitable for the intended harvest method.

For saw log production most customers will want a dried product. Drying hardwood is unlike the process used for softwood. It is slower and uses different temperature mixes. There are very few people in the industry with expertise in drying hardwood lumber.

F. PROFITABILITY ISSUES

1. General Indications

There are no recent, local, detailed analyses available on the true prospects for profit growing hybrid poplar in B.C. Scott Paper has a 1993 cost sheet that it uses to assist its partners to determine their potential profitability when growing fiber for Scott. The BC Ministry of Agriculture and Food has a very general 6 year old cost indicator on its web site and the University of Wisconsin and Oregon have published sample management plans and budgets using US situations.

The second phase of this project will examine costs and potential revenues in detail. The experts interviewed in this phase were cautiously optimistic about the potential for successful commercial plantations in BC. More than one source indicated that growing hybrid poplars for pulp fibre would result in returns roughly equivalent to growing hay. However, this may change as the competition from tropically grown fibre increases. Fibre from South America, southern Africa and southeast Asia from fast growing Eucalyptus is available on 6 to 10 year rotations with an average of 4 to 6 ccf/ac/year. The hybrid poplar is the only tree grown in North America that can keep up with those growth rates.

It is difficult to determine from existing information sources and without primary research the true revenue potential of a poplar plantation at Vernon. Decisions will have to be made about the products desired and the market for high end uses like saw logs. Many experts agree that the increase in demand for wood products will shortly create a significantly larger market for products from plantation hardwoods. Also, the true demand for bioremediation, conservation and ornamental applications needs to be determined. First indications are that demand in these areas is irregular and hard to forecast with any certainty.

2. The Oregon Market Study

A 1998 market study by an Oregon consortium indicated that, at least for the US Pacific Northwest, demand had exceeded supply for hybrid poplar saw logs and lumber. There is a shortage of alder for making furniture in Washington and Oregon and poplar could be used to replace alder for this use. There were also indications during the interviews that a similar shortage of birch for furniture was developing in BC. Other indications of increasing demand outlined in the Oregon report included:

- buyers of basswood are looking for substitutes;
- buyers of alder are looking for substitutes due to high prices;
- buyers of yellow-poplar are looking for substitutes;
- demand is growing for sanded core panels made from cottonwood; and
- there is a shortage of appearance grade knotty pine.

3. Identified Site Advantages

The Okanagan Indian Band and the City of Vernon have identified an area of approximately 50 acres, to the north of Swan Lake, for examination as a site for growing hybrid poplar. This location has many advantages. These are listed below.

a. The area is very accessible.

The area is located very close to a paved highway. It is also mostly flat and suitable for machine use in plantation management. It is also not prone to summer flooding which can have a negative impact on the trees.

b. The soil in the area appears to be suitable.

The soil type in the area is a clay loam and that is considered highly suitable to growing hybrid poplars. The pH of the soil in that exact location is not known but in the immediate area the soil usually has a pH of about 7 which is in the acceptable range.

c. The area has a suitable climate.

The area climate has no extended periods of extreme cold or heat that would adversely affect the plantation. Sunlight is sufficient to meet the needs of the trees. There is possibly less rainfall than would be optimal but the use of irrigation will mitigate this issue.

d. A least part of the land will not need to be bought or leased.

Part of the 50 acres is reserve land that can be used without incurring the expense associated with purchase or lease of suitable land.

e. Irrigation water will be free.

The city of Vernon will be supplying the plantation with enough treated city water to meet irrigation needs. There will be no charge to the enterprise for this water.

f. There is local access to expertise.

The Ministry of Forests Kalamalka Research Station is located just outside of Vernon. This facility has a researcher, Dr. Mike Carlson, that is considered an expert in the field and who is willing to assist the enterprise.

4. Identified Site Disadvantages

a. Potential Competition from Aspen

One question that will have to be addressed is the issue of the availability of Aspen which is similar to hybrid poplars and native cottonwood. There are extensive stands of high quality Aspen in the northern and north central areas of BC. If there is a growing demand for this type of wood, will growing hybrid poplar be more economical than the cost of shipping it from Prince George?

b. Transportation Costs

Depending on the products and markets utilized and the source of cutting supply, the location of Vernon may work against profitability of a poplar plantation. Transportation costs can be a large cost factor and may render the enterprise unfeasible.

c. Delayed Revenue Stream

The growing process of hybrid poplar is very similar to agricultural crops in the amount of care and attention required. However, the returns from this crop do not begin until 8 to 12 years after expenses have begun. Financing for initial and ongoing expenses will need to be arranged without receiving any revenue for potentially a decade later.

G. ENVIRONMENTAL CONCERNS

1. Genetic Modification

There has been genetic engineering employed in the breeding of hybrid poplars and this has attracted the attention of some environmental groups. There are fears that this "super tree" could take over areas from naturally growing native species or somehow harm their genetic makeup. There has been no real evidence to support such a view, however there has been opposition to the process. In November 1999, the "Washington Tree Improvement Association" destroyed a greenhouse of raspberries at the Washington State University Puyallup Research and Extension Center mistaking them for hybrid poplars and claiming that the hybrids threatened native forests

2. Plantations as a Habitat

Some groups believe that a stand of hybrid poplars becomes a habitat for animals, insects and birds. According to the Canadian Poplar Council, these groups sometimes oppose the harvesting of hybrid poplar stands on the basis of their potential damage to the recently resident wildlife. Such impacts may be mitigated by employing partial harvesting techniques within any given plantation, rather than a total removal. This would also provide a diversified age class within the stand and might create a marketing advantage.

H. CURRENT PROCESSING AND APPLICATIONS IN BRITISH COLUMBIA

The processing and use of hybrid poplar in British Columbia is very limited. Most of the applications are with naturally growing poplar or other related hardwoods that could be substituted for by hybrid poplar. Outlined below are the processing and applications that we discovered during the project. It is not a complete list for British Columbia but probably covers most of the activity with related hardwoods in the Okanagan and nearby areas.

1. Oriented Strand Board (OSB)

The Ainsworth Lumber Company Ltd. operates a mill at 100 Mile House that produces OSB. The estimated annual capacity of this mill is 288 million square feet (3/8" basis). This mill utilizes approximately 70% hardwood. The hardwoods used are mostly aspen, birch and cottonwood (most OSB plants use straight Aspen). The mill obtains its fibre from a variety of sources and has no trouble sourcing enough materials for production. The company has been paying approximately \$42 a metric ton for hardwood logs from the Okanagan. This is the closest Canadian OSB plant to Vernon.

2. Retailers/Distributors

There are at least three retailers/distributors in the area that deal with poplar. These companies are importing eastern poplar lumber from the US and Eastern Canada. It is sold mainly as paint grade lumber for furniture as well as for moldings, railings and spindals. The largest of these (and, according to them, the largest user of hardwood in BC) uses 125,000 board feet of poplar annually in BC. One company gave an estimate of the price it was paying for eastern poplar at \$1600 per thousand board feet. The same company estimated that they sell 25,000 board feet per month in the Okanagan and double that in BC as a whole.

3. Oyama Forest Products

Ference Weicker & Company

During the 34 forest sector interviews we found only one log processor that was processing hardwoods. This was a small operation in the southern Okanagan, Oyama Forest Products. This mill regularly processes naturally grown hardwoods such as aspen and poplar. The owner estimates that he uses two logging truck loads per year of this type of material. He has been paying \$30 to \$60 a cubic metre for raw hardwood logs. He has used the materials for pallets, flooring, panelling and furniture.

4. Scott Paper

As stated earlier in this report, Scott Paper grows hybrid poplars on plantations near Hope. This company also assists local Native bands to grow poplar on reserve lands under a right of first refusal arrangement. The company does also purchase some hardwood from other areas but is uncertain at this point whether hybrid poplar grown in the interior would be suitable for this purposes. It is also uncertain whether it would be economical to transport hybrid poplar fibre from the Okanagan to the coast for this purpose.

5. Veneer

Three veneer producers were contacted during this phase of the project. Only one of these used hardwoods on a regular basis. This was Tolko of Kamloops, who reported using 2 weeks of production per year doing runs of poplar peeler logs. The logs come from private lands and the company has been paying \$30 per cubic metre. One other company had experimented with hardwoods but stated that their production was not profitable. The officials from these veneer operations reported that a company in Kamloops had attempted to specialize in hardwood veneer (Thompson River Hardwood), but had gone bankrupt after a few years of continuous operational difficulties.

6. Value Added Wood Producers

Four of the 11 value added wood producers interviewed have had some experience with hardwoods. Among the uses mentioned were:

- flooring;
- furniture; and
- cabinets.

Hardwoods were not a large part of the operations of any of these firms. Two of the firms knew of and had experimented with hybrid poplar through the work of the Kalamalka Research Station.

7. Pulp Mills

Five out of six pulp mills contacted were not using hardwoods and had no intention of using anything other than the softwood materials now employed. The one exception was the Boise Cascade Corporation of Idaho. As noted earlier in this report, this company had planted large plantations of hybrid poplars for use in their pulping operations. This company and the Potlatch Corporation had planted the poplar in anticipation of fibre shortages in the US Pacific Northwest. However, mill closures have meant a decline in the demand for wood (including hardwood chips) and the anticipated shortages never developed. The Potlatch Corporation has decided to use its plantations for sawlog production. Boise Cascade does not anticipate a sawlog market developing and they are uncertain as to whether to follow the lead of the Potlatch Corporation.

8. Kalamalka Research Station

The Forestry Research Station at Vernon has been experimenting with hybrid poplar for a number of years. At this time there is a 14 year old stand of large high volume trees in a plantation at the station. The research staff have been seeking applications and buyers for this material for some time but they have been unsuccessful to date.

9. Private Nurseries

There are nurseries in British Columbia that are producing seedlings for poplar plantations on the Prairies. These plantations are producing fibre for pulp and oriented strand board. It was not possible to obtain estimates of the size of this potential market.

III. THE MARKET FOR NATIVE PLANTS

A. BACKGROUND

1. The Project

In addition to reviewing the market for poplar, the partners in this enterprise wished to examine the potential for growing native plants on the 50 acre parcel. It was assumed that this would be a nursery operation supplying native plants to retail and wholesale customers.

There is no clear census on a definition but native plants are most often defined as those that evolved in North America over the thousands of years prior to the serious disturbances to the environment created by modern man.

2. Native Plants in BC

There are 2,170 plants considered native to British Columbia, the most of any province. Native plants can be flowers, sedges, mosses, grasses or ferns. Some of the native plants that have potential uses in landscaping according to the BC Ministry of Agriculture and Food are listed below by group type. This is by no means an exhaustive list but represents some of the more common varieties currently used.

Coniferous Evergreens:

- Western Hemlock
- Douglas Fir
- Shore Pine
- Western Red Cedar
- Yellow Cedar
- Junipers
- Spruce

Deciduous Trees

- Dogwood
- Vine Maple
- Big Leaf Maple
- Paper Birch

Deciduous Shrubs

- Steven's Spirea
- Subapline Spirea
- Mock Orange
- Flowering Currant

Broad-Leaved Evergreen Shrubs

- Pacific Rhododendron
- Salal
- Labrador Tea
- Kinnikinick
- Tall Oregon Grape
- Oregon Grape

The Native Plant Committee of the BC Landscape & Nursery Association has prepared a comprehensive list of the native plants in BC. Their 1999 publication, "*Native Plants Commercially Grown in BC*", lists 244 different cultivate native plants. Of these varieties, 44 can be found in large quantities from at least 3 different nurseries in BC. Another 51 are available in moderate amounts from at least 2 different nurseries while 149 species are offered by only one producer.

3. Related Organizations

The interest in native plants is demonstrated by the large number of organizations that actively promote the use of native plants. In British Columbia, these include the following:

- Naturescape British Columbia;
- Native Plant Society of British Columbia;
- Alpine Garden Club of BC;
- Vancouver Mycological Society;
- VanDusen Botanical Garden;
- UBC Botanical Garden;
- Vancouver Natural History Society: Botany Group;
- Victoria Horticultural Society (Native Plant Study Group);
- UVIC Native Vegetation Committee;
- Canadian wildflower Society;
- Canadian Herb Society; and
- City Farmer.

In addition to these organizations, various municipalities (including Vancouver and Richmond) are promoting the use of native plants primarily for their ability to prosper with reduced watering.

B. USES FOR NATIVE PLANTS

1. Private Gardens and Landscaping

The demand for native plants for gardening and landscaping is being influenced by the following factors.

- **There are time and cost advantages to their use.**

Native plants appeal to many consumers due to the easy care nature and thus reduced costs of the native plant. There has been a reduction of time and money available to modern households to invest in their gardens. At the same time the cost of water, labour and chemicals is increasing. Native plants reduce the time and money necessary for maintaining gardens and landscaping. (However, it is interesting to note that Americans still spend \$27 billion a year on lawn care and only \$2.7 billion on schoolbooks.) "The average lawn requires 9000 gallons of water per week, and 5-10 pounds of fertilizer per year, more than the entire country of India uses for its food crops" (Turf Wars Escalate, Craig Tufts, Chief Naturalist, National Wildlife Federation).

Very little soil preparation is necessary and the plants should not need fertilizing, cultivating, or irrigating once established. Pruning is minimal and weeding is only necessary in the initial stages. Once established, a native plant colony becomes weed resistant. Native plants are also more durable and better adapted to their environment and consequently have a much reduced mortality rate compared to non-native species. This reduces the need to buy replacement plants.

- **More water restrictions are coming into force.**

The supply of fresh water to urban areas is becoming more of an issue. For example, the Victoria area underwent severe restrictions on garden watering this past summer. In the Okanagan, area municipalities are going to metered water service after many years of flat rate charges.

- **Native plants attract native fauna.**

Modern gardeners are increasingly drawn to creating an urban habitat that attracts birds, insects and mammals. For environmentally aware gardeners there is the added attraction of protecting rare native plant and insect species.

- **Native plants grow in organic conditions.**

With a balance of plant and insects, there is reduced need for pesticides. A lack of fertilizer and cultivation helps create naturally healthy soil. The native plant is naturally drought tolerant and pest and disease resistant.

- **A native plant garden is aesthetically pleasing.**

There is an increase in demand for "natural" landscapes that resemble the wild areas that attract people for recreation and "communing with nature". Promoters of the native plant garden believe it fulfils some of the need for urban dwellers to "connect" with the natural world.

- **Native plants will not become invasive.**

This is a major argument for the use of native plants or exotics. There are, however, many exotics that are as well adapted to the environment as natives and do not become invasive.

On other hand, Native plants are viewed by some gardeners as appearing weedy or unsophisticated compared to other species. Many fear that a native plant garden will be too wild and not fit in with the landscaping in the rest of their neighbourhood.

2. Commercial Gardens and Landscaping

Budget conscious public and private organizations are looking for every possible method to reduce costs and are taking advantage of cost reductions possible through the use of native plants. A Chicago firm, Conservation Design, estimates that it can save \$4,000 per acre in landscaping maintenance using native plants. It also results in energy savings which will be increasingly important in urban settings. The US Federal Government has begun to implement these practices at Federal Building sites.

The adoption of native plants in this context is often referred to as Xeriscaping. Xeriscaping has been interpreted as "zero-scape" to indicate minimalist, drought-tolerant horticulture. More accurately, it is appropriate and sustainable horticulture or regionally appropriate horticulture. This concept has been adopted by various public buildings in the Okanagan including those at the Kelowna airport and Vernon's city hall.

The concept has also been applied to parks, right-of-ways and recreational areas. Many golf courses are embracing native plant landscaping mainly to reduce costs of irrigation and chemical sprays and reduce the environmental damage from those chemicals.

3. Disturbed Land and Stream Restoration

The Forestry industry is the biggest user of native plants in the province when evergreen trees are included. Native plants and trees are used for restoration of disturbed public lands such as landslides or to provide

buffers and shade to salmon streams (often native plants are not used for slide areas but rather a mixture of seeds designed for stability is utilized). The demand in this sector can fluctuate dramatically year by year. The Manager of the Ministry of Forests nursery near Vernon reports that he can require up to 100,000 plants and trees in a given year. However, this year for example, he does not require any.

Other disturbed lands that use native plants are mine sites and pipelines routes. The companies involved in these ventures are required to return disturbed lands to a natural state and this often means purchasing native plant species from nurseries. BC Gas recently completed a large reclamation project in the Okanagan using native plants.

BC Parks is another user of native plants. The Okanagan district resource officer has indicated that they have difficulties sourcing enough native plants to complete their restoration work. This situation has been created due to the large number of fires in the US last year. The US agencies are required to use all native plants for regeneration and they have been coming to Canada to buy them, creating a shortage.

There are a number of non profit conservation organizations that are promoting the use of native plants as well as actively working on reclamation projects. Organizations such as the Land Conservancy, Nature Trust and the South Okanagan Similkameen Habitat Stewardship Program have sponsored projects to replant disturbed private lands with native plants and trees. Funding for some of these projects comes from the Habitat Conservation Trust Fund of the Ministry of Water, Land and Air Protection.

4. Botanical Forest Products

There is an increasing interest in natural forest products such as floral and greenery products. In British Columbia, there are five main categories of these products: greenery, conifer boughs, aromatic oils, basketry filler and fresh or dried flowers. These are usually harvested from naturally growing stands; however, there may be opportunities to cultivate some of the more valuable species. Salal and bear-grass are popular products.

5. Medicinal and Pharmaceutical Products

There are currently 26 plants harvested in British Columbia to produce medicinal and pharmaceutical products. To this point, these plants are harvested rather than commercially grown. However, like other native plants, some of these could be utilized in a native plant nursery if it was determined that there was a sufficient market to justify the effort.

C. POTENTIAL PRIVATE SECTOR CUSTOMERS FOR NATIVE PLANTS

In British Columbia, there are a number of potential customers in the province that currently or potentially could stock native plants or purchase seedlings for growing out. Some may also act as competitors depending on the growing regime and distribution system chosen by the enterprise. These potential customers are listed below.

1. Nursery Producers

There are approximately 250 nursery producers in British Columbia, the majority of which are located in the Lower Mainland. Nursery operations tend to be concentrated in the Richmond, Surrey, Pitt Meadows, Matsqui, Langley and Chilliwack areas. According to Statistics Canada, nursery production area totals about 3,600 acres (1,460 hectares). Many nurseries are not product specific and have their own product mix and style of production. Other nurseries are more specialized and limit the type or size of plant material produced. For example, they produce only conifers or broadleaf evergreens, or only field stock or only containerized plants, or a mix of both. Upright evergreens (a native plant) account for 40% of the total production acreage, followed by deciduous and flowering trees (22%) and liners, seedlings and whips (7%), while roses, berry bushes, vines and ground covers, herbaceous perennials, forest seedlings and bedding plants account for

less than 6% of the total production acreage. Field grown upright evergreens alone account for 37% of total production acreage, followed by field grown deciduous and flowering trees (20.1%) field grown tree fruits (6.5%) and container grown spreading evergreens (5.8%).

The majority of native plant sales are not generated from the nurseries' own stock but rather from independent contractors filling special orders.

2. Landscape Contractors

Landscape contractors are firms which provide landscape construction and/or maintenance services for residential, public, commercial and industrial sites. Landscape contractors may range in size from a single proprietorship specializing in residential landscape maintenance to a medium-sized corporation specializing in industrial landscape construction. While a competitive bidding process is usually employed to select a contractor, small contracts may be awarded based on word-of-mouth recommendations or past experience. In BC, there are an estimated 180 landscape contractors.

There are currently 91 landscape contractors listed in the Central Okanagan. While there are numerous landscape contractors in the Central Okanagan region, the small independent operations constitute a large percentage of this segment. The majority of the landscape contractors can be classified as general contractors (providing service to either commercial clientele, residential, or both).

3. Retail Nurseries

The majority of retail nurseries in British Columbia are small independents with annual gross revenues of between \$1 million and \$2 million. Some chain operations do exist, such as Art Knapps, which consist of individual stores that have banded together to form a larger retail purchasing and advertising group. Most retail nurseries are open year round with the busiest season occurring between April and September.

There are roughly 20 retail nurseries in the Central Okanagan. The majority of retail nurseries in British Columbia are small independents with annual gross revenues of between \$1 million and \$2 million. The retail market for native plant ornaments is apparently growing slowly in BC. One promoter of native plants in retail sales has been the UBC botanical gardens.

4. Grocery Stores

The Central Okanagan region accounts for approximately 20 of the 250 medium to large grocery stores currently in BC. Most medium to large grocery stores are members of one of the large chains such as Super Value, Safeway, The Great Canadian Superstore, Overwaitea and IGA. All of these chains are associated with a company that coordinates the buying, warehousing and delivery for the entire chain. Some of these chains, such as IGA, Overwaitea, Safeway and Super Value, allow each individual store to purchase outside the central ordering company. Grocery stores carry only a limited product line of plants.

5. Department Stores

There are approximately 175 department stores in British Columbia, of which 25 are major chain stores and the remainder are small department stores and mass merchandisers. Approximately two-thirds of department stores in BC carry gardening supplies. There are currently 13 department stores in the Central Okanagan. During the busy season, the garden centres in department stores carry a wide variety of products. The type and number of products handled by these centres is similar to small retail nurseries.

6. Home Improvement/Hardware Stores

There are approximately 200 home improvement and hardware stores in British Columbia, the majority of which are small independents. There are 17 home improvement/hardware stores in the Central Okanagan

region. Despite the large number of independent hardware stores, the volume of sales in this market is dominated by large chains such as Home Depot, Revy, Beaver Lumber and Irly Bird. These chains are made up of retail stores supported by a central head office that handles most of the buying, distribution and advertising for the group.

7. Nurseries Specializing in Native Plants

a. British Columbia

The Native Plant Society of British Columbia claims there are 80 plant nurseries in the province that are utilizing native plants to some degree. A large number of these are focused on producing seedlings for the forestry industry.

The City of Vancouver Waterworks web site lists 31 retail nurseries and seed suppliers specialize in native plants. They include the following interior nurseries:

- Bluestem Nursery, Christina Lake;
- Notch Hill Nursery, Sorrento;
- Sagebrush Nursery, Oliver;
- Byland's Nurseries, Kelowna; and
- Dry Valley Gardens, Kelowna.

This site also contains a list of wholesale nurseries and seed supplies specializing in native plants. There are 13 nurseries from the above retail list that are also on the wholesale list (including Bluestem Nursery at Christina Lake, Notch Hill Nursery in Sorrento, and Sagebrush Nursery in Oliver). In addition, there are 33 nurseries listed as being strictly wholesale (nine of these are on a Ministry of Forests list of forest seedling nurseries) Of these 33, the following are located in the interior:

- K&C Silviculture, Oliver (also listed as a forest seedling nursery);
- Natural Legacy Seed; Armstrong
- Okanagan Plant Propagators, Winefield;
- Quality Seed Collections Ltd., Kamloops (also listed as a forest seedling nursery);
- Riverside Nurseries Ltd., Kamloops (also listed as a forest seedling nursery); and
- Western Tree Seed Ltd., Blind Bay.

There are an additional 24 wholesale nurseries listed that have some native plant varieties but are not considered specialists. They include the following interior nurseries:

- Byland's Nurseries, Kelowna;
- Greenview Nurseries, Grand Forks
- Lange's Landscaping Design and Nursery, Vernon;
- Rosebank Farms, Armstrong;
- Scafri Farms, Salmon Arm; and
- Stewart Brothers Nurseries Ltd., Kelowna, Grand Forks and Midway.

b. Other Jurisdictions

The Department of Natural Resources in Washington State reports 59 nurseries, wholesale and retail that deal in native seeds and plants and 14 public gardens that employ this type of horticulture. The Alberta Native Plant Council lists 49 sources of native plants including retail, wholesale and non-profit organizations. Both Washington and Alberta, like BC, have a number of organizations that actively promote the use of native plants, usually with the objective of increasing bio-diversity and protecting rare species.

8. Domestic Distribution Channels

The products handled by retailers in BC come primarily from garden wholesalers such as Eddi's Wholesale Garden Supplies and Green Leaf Garden Supplies or directly from manufacturers. Of the products handled by retail nurseries, for example, approximately 85 percent are sourced through garden wholesalers. Because there are many manufacturers of garden products, garden wholesalers are used in the distribution chain to provide warehousing service, trucking service, exposure to numerous retail outlets and restocking of product. Thus the garden wholesaler provides more of a product maintenance function than a selling function, (i.e. selling the product to retail nurseries). Most manufacturers provide the selling function for their own products in the form of product representation and various marketing programs.

In contrast, larger retailers prefer to purchase directly from the manufacturer because the product is not marked up by the wholesaler and is, therefore, less expensive. Furthermore, the large hardware stores do not require the services of wholesalers because they provide their own warehousing and restocking. The smaller stores, however, source almost all of their product through the wholesalers.

D. CULTIVATING NATIVE PLANTS

Due to over-harvesting and extensive urbanization, many native plant species have been greatly reduced in numbers. For this reason, collecting native plants is discouraged and their propagation has fallen to commercial nurseries.

Nursery crops are grown either in fields or containers. The usual practice is to use containers as the yield is three to eight times higher than field production. Native plants are normally raised in containers rather than bare root systems. This is a relatively complicated procedure. "Container production is more intensive and mechanized and requires more technical training by staff and more capital investment than field production" (BC Ministry of Agriculture Food and Fisheries). Native plants usually prefer sandy soil. As the soil at the designated site is a clay loam, this makes another argument for using containers in the production of native plants.

Native plants are usually raised in a greenhouse and the growing is timed to reach market in one year. It is necessary to use greenhouses in order to control moisture, nutrition, and heat for young plants.

E. PROFITABILITY ISSUES

There is even less current information available about the economic potential of native plants than there is about hybrid poplar. The literature on native plants tends to focus almost exclusively on biodiversity and contributions to the environment and ecology. While there is some information available about the plant nursery industry overall, there are very few specifics about the demand or supply of native plants in BC or in other jurisdictions. In general (but not unanimously), the experts whom we interviewed believe that the demand for native plants is increasing but there is much uncertainty about the rate of growth or the ability of current native plant suppliers to meet that demand. There is no reliable data on the size of the native plant industry or on comparative supply and demand characteristics. The issues below that will affect the profitability of a native plant enterprise were generated in the phase one discussions with related experts.

1. The market for native plants fluctuates wildly.

The retail market has "not really taken off" and much of the native plant sales are for land restoration work undertaken or financed by government. The demand in this sector is not consistent and can fluctuate between huge orders one year and virtually none the next and is subject to government budget decisions. In addition, many government agencies receive native plant materials at no cost from government nurseries. However, there are indications that there may be niche markets for specific products especially native plant seeds.

There were conflicting opinions between the interviewed experts about the state of supply and demand. One expert reported a glut in the market this year while others bemoaned a lack of supply for reclamation projects. It is likely that the supply and demand characteristics vary greatly between various plant species and between subregions. Demand is, no doubt, very niche specific.

2. Competition has increased dramatically recently.

Due to the increased profile of the sector and the need for native plants for restoration work, many nurseries have recently entered the sector. According to at least one expert, the competition now in this field is fierce. Most of the producers in the Okanagan are small often part-time ventures. Two of the native plant producers contacted during this phase of the project are attempting to sell their business. They remain dedicated to the concept of using native plants, but they cited long hours as a reason for leaving the business.

3. Fifty acres is a large area to use for production.

The fifty acres set aside for potential growth area of native plants is quite large given apparent demand, at least in the public sector. This large an area dedicated to native plant raising could by itself, according to some interviewees; supply at least the public demand for many years to come.

4. The raising of native plants has a higher risk than other plants.

Native plants have germination rates in the 50's, while commercial seeds can usually be relied on for germination in the high 90's. In addition, a variety of types is usually grown and this requires a variety of management regimes further complicating the enterprise. Also, some native plants are very zone specific and the market for them will be limited to the zone where they prosper.

5. A horticulturalist may have to be employed.

The level of complexity of the operation may require at least a part-time, on-site horticulturalist experienced with this type of horticulture. Kwantlan College in BC and Olds College in Alberta have horticulture programs for native plant propagation.

6. A greenhouse will be necessary.

Use of a greenhouse will incur costs of construction and maintenance of the structure as well as the costs of climate control, pest control and fertilizing. If multiple species are raised it may even be necessary to have more than one facility to accommodate growing environments for different varieties.

F. POTENTIAL MARKETS

There are two main markets for native plants:

- The first is through public agencies and private companies involved in reclamation work for areas disturbed in a development process.
- The second is the home garden and the professional landscaper sector where the native plants are used in place of non native varieties for landscaping around commercial buildings and private homes.

The market opportunities outlined below do not constitute a comprehensive list of the market potential in the Okanagan but reflects what was discovered during the limited number of interviews undertaken for this part of the project. The input from the selected experts and literature review indicated that the market for native

plants was probably not sufficient to spend more of the project time investigating it further. As a result of this, most of the buyer interviews were conducted with potential buyers of hybrid poplar rather than native plants. The 8 interviews that were conducted with potential buyers of Native plants confirmed the limited market potential. The results of the interviews are outlined below.

1. Reclamation

a. BC Hydro

British Columbia Hydro disturbs the natural environment through the building of power lines. Hydro's main concern is keeping the rights of way to these lines clear. To this end, any fast growing plants are removed and replaced by slow growing varieties that will require less clearing to keep the lines clear.

There is no legislative requirement for BC Hydro to use native plants; however, they often meet the criteria of BC Hydro for use on power line access corridors. The large interior region of BC Hydro (Lillooet to Alberta to Osoyoos) has approximately 23,000 hectares of power line corridors. This region buys an average of \$6,000 of native plants annually for this purpose. The varieties that are used include the following:

- Black Hawthornes;
- Red Dogwood;
- Hazlenut;
- Saskatoon berries;
- Chock Cherry;
- Elderberry;
- Junipers; and
- Willows.

The interior region of BC Hydro is accessing its native plant supplies in the Lower Mainland and would welcome a local supply. The company prefers 2 metre tall shrubs and trees to reduce the mortality rate from deer and moose grazing. They often know a year in advance what species they require but this year there was only 2 months notice given. The late notice is a function of the budget of the Corporation. This type of work is considered outside of the line budget and is funded from special funds set up when extra funds are identified.

b. Columbia Power

This company uses native plants extensively for its restoration work. Part of the reason for the use of native plants were requests by Native Bands for the use of this type of vegetation on reserve lands crossed by power lines. The company has just completed a large restoration project and does not anticipate another such project until 2006. Columbia Power has been purchasing its native plants from a nursery run by the Ktunaxa-Kinbasket band in the Kootenays.

c. Kelowna Municipal Parks

The City of Kelowna is committed to using native plants for its parks and other locations disturbed by development. However, the funding for this objective appears to be inconsistent and often dependent on the ability of staff to obtain grants outside of the budget process. It can also depend on volunteer labour to place the plants purchased by these grants. Consequently, it is not known year-to-year what varieties or volumes of plants will be required.

Plant species that have been purchased by Kelowna Parks include the following:

- Dogwoods;
- Ponderosa Pine;
- Service berry;
- Snow berry;
- Sumax; and
- Native rose.

d. BC Parks

BC Parks has a policy of using native plants for restorative projects. Again there is no legislative requirement for this; it is only an operational policy. The south Okanagan area of BC Parks is pursuing a large project near Oliver to reclaim a former ATV area. They anticipate that they will be requiring a large number of native plugs and native grass. However, they are able to access some of their required plants for free from government nurseries, reducing the private market demand for this project. This Park region reports a consistent shortage of seeds. However, once again, the funding for these projects appears to vary year to year and is subject to frequent budget variations for this type of activity.

e. Ministry of Energy and Mines

This ministry supervises mine reclamation projects in the province. As with other government areas, there is no legislative requirement to use native plants for reclamation activity (unlike in the US, where there are strict regulations in this area regarding native plant use). Each mine is different and each site requires different treatments. Native plants are not always popular in these operations due to their low germination rates. The reclamation projects are looking for rapid soil stability and this cannot always be achieved with native species. Consequently, there is no demand reported for native plants in mine reclamation in BC.

2. Landscaping

a. Okanagan School District

The Okanagan School District uses native plants due to their ease of maintenance, specifically the lower watering requirements. The District's plant needs vary significantly year to year. Last year the District did \$200,000 worth of landscaping last year with 60% of this figure representing plant costs. This year there has been virtually no work in this area. The District reports an ample supply of native plants in local nurseries and no difficulty finding desired species. The species most often used include various grasses, trees and shrubs.

b. Westwind Nursery

This nursery grows its own native plants and supplies them to a variety of retail customers as well as to reclamation projects. The major difficulties in the business appear to be the changing nature and volume of demand. Native plants must be grown on "spec". This makes decisions about what to grow very difficult.

The nursery does purchase some plants from wholesalers in Montana, Oregon and Idaho. These are mass production operations that use an immigrant labour force to keep costs down. There is a consistent supply of good quality reasonably priced native plants. The nursery does not anticipate requiring another supplier.

c. Quality Seed Collections

This is a Kamloops company that collects native plant seeds from crown land. They sell most of their seeds to nurseries that grow native plants. The seeds that they collect include the following:

- broadleaf conifers;
- shrubs;
- wildflowers; and
- poplar trees.

The collection season is summer through fall. There is not very much notice about what type of plants are in demand, which complicates collection planning. The company reports that it has not noticed a great deal of demand fluctuation since 1992; they noted that demand related to reclamation and private lands has remained relatively constant.

IV. SUMMARY OF PHASE I FINDINGS AND CONCLUSIONS

This chapter summarizes the major findings and conclusions regarding our review of the potential markets for hybrid poplar and native plants.

A. HYBRID POPLAR

- 1. There are no large commercial applications, currently in British Columbia, that are in need of hybrid poplar fibre.**

The only company in British Columbia that consistently uses fibre from hybrid poplars is Scott Paper. Scott Paper makes toilet paper from hybrid poplar. This company supplies its hardwood fibre needs from its own plantations, a tree farm licence, and contracts with independent growers in the Lower Mainland. The company is not in a position where it is seeking new sources of supply. In addition, the company has some concerns that a poplar grown in the interior would not grow fast enough or have characteristics suitable for their purposes.

The absence of a large player in the business makes it more difficult to find a market for this type of product. It is often difficult to find a market if there is not already a consistent supply available.

- 2. There is no market for hardwood pulp chips within reasonable transportation distance of the Vernon area.**

The pulp mills in Kamloops, Castlegar, Nanaimo and Quesnel report that they do not use hardwoods of any kind. According to our interviews, the reasons for this are:

- These facilities are using softwood and cannot mix hardwood and softwood chips;
- Hardwood pulp prices are down and it is not economical to use hardwood chips for pulp;
- There are few confirmed markets for hardwood pulp;
- Their customer base demands softwood pulp products; and
- The sawmills that supply their logs are not geared to processing hardwoods.

The Norske company pulp mill at Harmak (Nanaimo) can use hardwood chips but their management do not believe that poplar is a cheaper alternative to their softwood chip supply. In addition, they inherited hybrid poplar plantations from MacMillan Bloedel. As such, they have a sufficient supply of hardwood if they decide to move into this area of production.

In the Northwest US, both the Potlatch Corporation and Boise Cascade use poplar chips in their pulping processes. However, both of these companies have a more than sufficient supply for their needs and are not interested in accessing other sources of fibre.

- 3. A large number of the people in the industry are unaware of the characteristics or potential of hardwoods or hybrid poplar.**

This is not entirely surprising as softwood dominates the industry in this province. However, it is still significant for the market potential of hardwoods in general and hybrid poplar in particular that so few people in the industry have used or are aware of the properties of this alternative wood. The table below illustrates the low level of experience and awareness of the survey respondents.

TABLE 4.1

EXPERIENCE AND FAMILIARITY WITH HARDWOODS AND HYBRID POPLAR

Question	Yes	Percent	No	Percent
Have you used hardwoods such as poplar, cottonwood or aspen in your operation in the past two years?	11	32%	23	68%
Are you familiar with hybrid poplar?	9	26%	25	74%
Have you used hybrid poplar in the past few years?	5	15%	29	85%

Even the people reporting familiarity with hybrid poplar were not often able to identify its major characteristics. In addition, 6 of the people reporting having used hybrid poplar were not using it as a regular feature of their business but only as a one time experiment.

4. Wood processors are reluctant to experiment with hybrid poplar without a demonstrated market demand

The majority of the wood processors interviewed during this project did not see any advantages to them of producing products with hybrid poplar or any other hardwood. The reasons given during the interviews included:

- It is problematic to compete with offshore low wage hardwood producers of some products (eg. chopsticks);
- There is no customer demand for the products;
- They have tried it in the past and it didn't pay; and
- There is a market for softwood and no supply problems so there is no reason to change.

In general, the respondents to the survey were unwilling to try a new material as indicated below:

TABLE 4.2

WILLINGNESS TO TRY HYBRID POPLAR

Survey Question: Would you consider purchasing hybrid poplar if a nursery was set up in Vernon?

Response	Number	Percentage
Yes	5	15%
No	26	76%
Want to see the product	3	9%
Total	34	100%

The respondents who answered "yes" or "want to see the product" were either retailers or value added producers. None of these respondents said that they would definitely buy the product. The

common response was to "call me in ten years when the product is available" and they would review the market conditions at that time.

This reported unwillingness to use hybrid poplar fibre is confirmed by the difficulty encountered by the Kalamauka Research Station in its attempts to interest local buyers in their hybrid poplar stands.

5. Buyers willing to investigate a hybrid poplar product have a number of conditions.

The respondents who would be considering purchasing the product (i.e. "yes" or "want to see the product" to the question in the table above) had some specific conditions that would have to be met. These were as follows:

- It would have to be competitively priced;
- It would have to be of high quality and have a good appearance;
- The lumber would have to be kiln dried;
- The lumber would need demonstrated ease of machining;
- There would have to be a consistent supply; and
- The logs and lumber would have to be straight and clear.

6. Many wood product producers have negative perceptions of poplar.

Many of those interviewed held the traditional view of poplar and similar species that they are merely weeds. The species is not valued and some producers who have used the species report getting it for free for removing it from a logging area. The species is often left in the woods during logging or on the side of the road for the public to take for firewood.

7. Value added wood processors have numerous complaints about working with poplar.

During the formal interviews there were a number of complaints about the difficulty with working with hardwoods in general and poplar in particular. The complaints were centered on naturally grown hardwoods as few of the processors had ever used hybrid poplar. Some of the complaints included the following:

- The wood is unpredictable, it warps and twists too much;
- It marks easily;
- The moisture content is too high;
- The drying process is too complicated; and
- It has rotting problems when used in outdoor applications.

8. There is some local use of naturally growing hardwoods that have the potential to be replaced by plantation grown hybrid poplar.

The respondents to the survey who reported using poplar on a regular basis were three retailers and two value-added wood producers. The value added wood producers purchase the poplar from the retailers who are importing it from eastern Canada and the US. These firms were using the species

as a paint grade product for furniture, moldings, cabinets, filler for variety of applications and flooring. The end users were pleased with the price of the product and the fact that it takes paint and other finishes very well.

There is a possibility that locally grown hybrid poplar could replace these "imported" materials if produced at competitive prices and quality.

9. The potential market will require processed materials.

To have the potential to appeal to retailers and value added producers, any hybrid poplars will have to be processed into lumber. This will require milling and kiln drying. Kiln drying of hardwoods is unlike drying softwood and requires different processes and expertise. The process for drying hardwood is slower and requires different temperatures than for softwood. There was only one processor found during this project that had experience with drying hardwoods.

10. The most experienced researcher in BC and possible in Canada lives in Vernon.

As stated earlier, there is a lack of expertise in British Columbia in regards to growing and processing hybrid poplar. However, the Vernon area has the benefit of the most experienced research into this species in the Province. Dr. Mike Carlson of the Ministry of Forest Kalamalka Forest Research Station has been researching the growing and applications for hybrid poplar for many years. His expertise could be a significant advantage at the implementation stage of this project.

11. The project partners will need to determine which part of the business they wish to emphasize.

Assuming there would be no interest in actually breeding hybrids, there are two main areas of a business involving hybrid poplars. There is the growing of seedlings for other people to grow and there is the growing of a poplar crops with the purpose of selling the fibre.

12. The penetration of the lumber market with hybrid poplar products will require an extensive marketing campaign.

There is a large amount of resistance by processors and value added producers to using hardwoods. They need to be educated regarding the potential of the materials for appropriate applications. The technical specifications need to be widely distributed in order that potential users can compare them with currently used materials. The perception of the tree as a low value or weed tree needs to be overcome.

13. The project has some significant cost advantages over other proponents.

Much of the intended growing area reserve land. This eliminates the need to purchase or rent land. In addition to this, irrigation water will be provided free by the City of Vernon. These factors significantly reduce the project costs.

14. The project has a number of potential partners.

Despite the complications involved in the growing of hybrid poplar and the uncertain markets, there are still a number of potential partners for the project were identified. These include the following:

- Scott Paper Company has offered to supply the needed cuttings for the original plantings at no cost;

- The First Nation Forestry Program has reached the end of its budget for this year, but may be able to help if the program is extended next year;
- There is the potential for some assistance with the planting costs from the Tree Canada Foundation;
- Dr. M. Carlson of the Kalamalka Research Station has offered to help with the initial set up of a plantation; and
- Riverside Forest Products is interested in participating in any project in this area and is willing to lend its expertise from the experiments it has undertaken with the species.

B. NATIVE PLANTS

The major findings and conclusions arising from our review of the potential market for native plants are as follows:

1. There are conflicting opinions regarding the market for native plants.

There was disagreement amongst the representatives surveyed regarding the size of the market for native plants, trends in the industry, and the potential for the future. The industry has not compiled any statistics on sales and revenues. Some representatives believe that the industry is growing while others said it was stagnant. Some buyers said there was a shortage of plants while others were satisfied with their supply chain. A key contributing factor is that supply and demand factors vary significantly by subregion, year to year, and market segment. Some of the segments most interested in products (e.g. those involved in reclamation projects) tended to report shortages in supply but tend to have very limited budgets to pay market prices for products.

2. The demand for native plants for reclamation projects is highly cyclical.

There appears to be a very unpredictable market for native plants. Budgets and grants vary significantly year-to-year and so does the demand for different varieties. One plant grower interviewed during the project referred to the business as a lottery. Another involved in growing native plants has had to throw a number of plants away this year because the anticipated demand did not develop. This grower was reported to have said that this would be the last year he would grow plants on "spec" for government projects.

3. Publically funded projects are under review and may be severely restricted.

Much of the reclamation/restorative work done with native plants is dependant on special grants or extraordinary funding mechanisms. This contributes to the cyclical nature of demand. Governments are reducing funding levels in general and the Provincial Government is in a particularly extensive budget reduction exercise. Programs supporting native plant reclamation projects will no doubt be affected. One agency that has been a source of funds for these types of projects, the Forest Renewal BC crown corporation, has been singled out as being the objective of severe spending restrictions.

4. Growing native plants is a complicated and costly exercise.

Growing native plants is complicated by their low germination rates. Native plants are designed to survive in their environment. This often means that not all the seeds germinate at the same time in order to improve the overall survival rate. However, this can frustrate a grower and reduce the revenue stream usually associated with plants with higher and more consistent germination rates.

Even though the plants are native, to achieve reasonable germination and survival rates it is necessary to begin cultivation in a greenhouse environment. This greatly increases the initial levels of financing required for such an endeavour.

5. A native plant nursery will not use as much recycled city waste water as a poplar plantation.

One of the objectives of this project is to allow the City of Vernon to partner in the enterprise by providing irrigation water. This water will be from the treated sewage of the city. Part of the city's interest in the project is the opportunity to dispose of this waste water. A native plant nursery would be much smaller than a hybrid poplar plantation and consequently would not well serve the project objective of using large amounts of waste water for irrigation.

6. It may be possible to combine hybrid poplar and native plant growing.

There are some projects that are "interplanting" plant varieties between rows of poplar trees in plantations. These plants would be introduced after the poplars had achieved a canopy. They would be varieties that flourish in shade. The decision to interplant would not necessarily need to be made at the inception of the poplar project, if sufficient spacing was allowed.

V. WORK PLAN FOR PHASE II

A. PHASE II OBJECTIVES

The objectives of the second phase of the feasibility study will be to document:

- The appropriate size and scope of the operation;
- Preliminary estimates regarding the cost to develop the proposed operation;
- The estimated operating costs of the proposed operation;
- Appropriate partnership arrangements for the operation;
- The financial implications of the project;
- A marketing strategy for the project and the product; and
- Potential employment implications.

Most of the information needed to document these issues has already been collected in the first phase of the study.

B. PHASE II WORK PLAN

The tasks that will need to be undertaken by the consultant to complete Phase II of the project are listed below.

1. Meet with the Steering Committee to review the interim report

After the Committee has had a chance to review the interim report, we will meet to discuss the implications of the information discovered during phase I. The questions that need to be answered at this meeting should include the following.

a. Is there a sufficient potential market for the product?

Phase I of the project has investigated the extent of the use of and potential market for hybrid poplar and native plants. Does the information justify preparing a Phase II report?

b. Should Phase II consider hybrid poplar or native plants or both products?

Phase I results indicated a more favourable result for markets for poplar. Should native plants be eliminated as a potential product?

c. What should be the size and scope of the project?

We have been gathering information based on using a specific 50 acre parcel of land north of Vernon. Should this whole area be used? What is the budget range that we should work with?

d. What partnerships should be pursued?

A number of potential partners were identified in Phase I. Are there any partners the Steering Committee would prefer to pursue?

e. What part of the businesses will be emphasized?

The Steering Committee needs to decide if it prefers to grow full size plants and trees or to operate as a nursery for seedlings that will be sold to business who will grow out the plants.

f. Some cost items need to be clarified.

It needs to be determined if there will be any land rental costs necessary. Also, it has not been determined if the City of Vernon will cover the costs of building the necessary infrastructure for the irrigation system or just the operational costs.

2. Determine the setup and maintenance costs of the chosen operation.

To develop the estimates, we would contact a sample of equipment suppliers and local contractors. Key operating costs will include labour, materials, energy, transportation and delivery, administration and marketing.

3. Identify the investment requirements and potential sources of funding for the operation.

Some of the potential financial sources could include equity contributions from business partners, government funding, bank and other debt financing, and special funding vehicles such venture capital or the Equity Capital. At this time, government funding is largely limited to loan programs such as Community Futures, Western Diversification's Loan Investment Fund Program, the Forest Community Business Program, or Small Business Loans Program.

4. Determine other appropriate partnership arrangements

In addition to financing the operation there are opportunities to work closely with individuals and organizations to enhance the feasibility of the project. These partnerships will be pursued.

5. Based upon the projected revenues, operating costs, and interest expenses, assess the potential financial viability of the proposed operation.

We will prepare pro-forma financial statements for the proposed operations and would assess the break-even level for the operation.

6. Make recommendations regarding marketing of the investment.

The recommendations will outline the process, materials and strategies that should be adopted to market the investment to potential investors.

7. Make recommendations regarding an appropriate marketing strategy for the product.

The recommendations will address:

- ▶ How the products should be promoted;
- ▶ The key characteristics that should be incorporated into the product;
- ▶ How the products should be priced; and
- ▶ Through which channels the products should be distributed.

8. Assess the potential employment impact of the operation.

We will determine the number of jobs that could be created directly by the operation and would use standard industry figures to estimate the indirect and induced employment that would be created. We will also review the worker adjustment training that would be required to fill the positions that would be created.

9. Prepare a draft report of the study findings, conclusions, and recommendations.

This draft report will include recommendations for the process of implementation.

10. Meet with the Steering Committee to review the draft report.

Based on the comments received, we will undertake any additional analysis or research required.

11. Prepare a final report on the feasibility of the proposed operation.

APPENDIX I: LIST OF STEERING COMMITTEE MEMBERS

Allan Louis, Councillor and Chair
Economic Development Committee
Okanagan Indian Band

Dan Bulford
Economic Development Officer
Okanagan Indian Band

Rob Hutton
Natural Resource Department Manager
Okanagan Indian Band

Keith Wahlstrom
Municipal Engineer
Engineering Department
City of Vernon

Dave Forai
Economic Development Manager
Regional District of North Okanagan

Alice Klim
Councillor
City of Vernon

APPENDIX II - LIST OF INDIVIDUALS INTERVIEWED IN PHASE I

A. INFORMAL INTERVIEWS IN FIRST STAGE OF PHASE I

HYBRID POPLARS

Jack Smyth, R.P.F
Chief, Forestry Development and Aboriginal Affairs
Canadian Forest Service
Natural Resources Canada
Ottawa

Chris Hollstadt
Southern Interior Forest Extension and Research Partnership
Kamloops,

Gary Crooks, President
Interior Lumber Manufactures Association
Kelowna

Chuck Kaisar
Alberta-Pacific Forest Industries Inc.
Boyle, Alberta

Glenn Rousseau
Executive Director
Interior Value Added Wood Association Kelowna

Greg Uhlorn
Manager, Hybrid Poplar Program
Potlatch Corporation
Boardman, Oregon

Barry McDougal
Marketing Consultant
Vernon

Mike Gale
Sales Manager
Stewart Brothers Nurseries

Randy Butcher
First Nations Forestry Program
Canadian Forest Service
Victoria

Randy Sunderman
Communities Investment Officer
FRBC
Kamloops

Keith Thomas, Research Scientist
Hardwood/Mixed Wood management

Ference Weicker & Company

Forest Dynamics and Silviculture
BC Ministry of Forests
Victoria

Dr. Jon Johnson
University of Washington:
College of Forest Resources
Hybrid Poplar Research Program

Willy Andrew
Resource Management Officer
Seabird band

Tony Willingdon, Manger
Surrey Nursery,
Ministry of Forests

Dr. Mike Carlson
Kalamalka Forestry Research Centre
BC Ministry of Forests
Vernon

Cees Van Oosten
Poplar Consultant
Parksville

Gwen Telling
J H Huscroft Ltd
Creston

Duncan Morgan
National Research Council
Kelowna

Jan Langton
National Research Council
Summerland

Dave Minhas
Scott Paper
Hope

Dan Carson
Silviculture Manager
Scott Paper
Richmond

Richard Hallman
Provincial Agroforestry Specialist
BC Ministry of Agriculture
Abbotsford

Dave Haley
Woodlot Forestry

Ference Weicker & Company

Ministry of Forests
Victoria

Peter McAuliffe, Manager
PRT Reid Collins Nursery
Aldergrove

Kevin Murphy
District Agrologist
Ministry of Agriculture, Food and Fisheries
Vernon

Peter Schmid, Executive Director
Northwest Innovative Business and Technology Centre, Inc.
Portland, Oregon

Sandra Williams, Executive Director
Poplar Council of Canada
Edmonton

Lisa Zabek
Agrologist
UBC

NATIVE PLANTS

Claire Kooistra
Manager, Nursery Services South
Ministry of Forests
Vernon

Brian Baehr
BC Agriculture Council
Kelowna

Dave Woodske
AGF Crop Industry Development Program
Abbotsford Provincial Nursery Specialist
BC Ministry of Agriculture

Ross Waddell, President
Native Plant Society of British Columbia
Vancouver

Karen DeJong
British Columbia Landscape & Nursery Association
Vancouver

Dianne Gertzen
Extension Services Special Projects Culturist
Ministry of Forests

Reference Weicker & Company

Glenda Chapman
Landscape Nursery Trades Association
Calgary

Catherine E. Hovanic
Washington Native Plant Society
Seattle

Lisa Scott
Environmental Consultant
South Okanagan Similkameen Habitat Stewardship Program

Judy Millar, Resource Officer
BC Parks
Ministry of Land Water and Air Protection
Summerland

Robert Black
EPG Environment Planning
Landscape Architect
Penticton

Eva Durance
Grassland Nursery
Penticton

Michele Boschard
Okanagan Nation Fisheries Commission

Steve Mathews, Fish Biologist
Ministry of Land, Water and Air Protection
Penticton

PEOPLE FORMALLY SURVEYED

POPLAR: PULP

Bill Pottle
John Ledadoff
Celgar

Merv Peterachuck
Weyerhauser
Kamloops

Gord Russell
Cariboo Pulp & Paper
Quesnel

Ray Levac
Quesnel River Pulp
Quesnel

Lance Richardson

Eberence Weicker & Company

Boise Cascade Corp
Washington

Mike Thompson
Norske Skog
Crofton

Norm wilcox
Mark Cunningham
Ainsworth
100 mile

Canoe Federated Co-op
John Walker
Canoe

POPLAR: SAW LOGS AND VALUE-ADDED

Alvin Rauch
Weyerhaeuser
Princeton

Harry Piazza
Evans Forest ProductsMalakwa,

Warren
North Enderby Timber Ltd
Enderby, BC

Kerry Baran
Canada Japan Chopstick Corp
Kelowna

Robert Bird
Canwood Furniture Inc
Penticton,

Peter Beulah
Greenwood Forest Products
Penticton,

John Horning
M.V.P. Veneer Inc.
Kamloops

Dave Poggemoeller
North Enderby Timber Ltd.
Enderby

Ed Tarasewich
Oyama Forest Products
Oyama

Herb Treat

Ference Weicker & Company

Paragon Wood Products
Enderby

John Fotos
Paxton Pacific Resource Products Inc.
Monte Lake

Doug Rouck
Rouck Bros. Sawmill Ltd.
Lumby

Barry McDougal
Specialty Wood Processors Group
Vernon

Brian Hayashi
Tomco Wood Products
Kamloops

Philip Powell
Vernon Kiln & Millwork
Vernon

J.H. Huscroft
J H Huscroft J H Ltd
Creston

John Saul
Gorman Bros
Lumby

Jim Johnson
Bell Pole Company
Lumby

Art Faris
Coldstream Kitchen Design
Vernon, BC

Murray Ohlhauser
Heritage Woodworks
Vernon

Brian Esso
Tolko Industries Ltd
Lavington

Steve King
Tolko
Vernon, BC

Bryan Leach
Bigfoot Manufacturing Inc.

Ference Weicker & Company

Salmon Arm

Don Gervais
Ideal Export Log Homes
Salmon Arm

Tom Jackson
Leatherwood Log Homes Ltd.

Peter Sperlich
Sperlich Log Construction Inc.
Vernon BC

Sunrise Log Homes
Morgan Johnston
179 - 1210 Summit Drive
Kamloops BC V2C 6M1
(250) 319-8656

Wayne Mattioda
Upper Canada Forest Products

Colin Reimer
Reimer Hardwoods
Kelowna/Vancouver

Henry Buckley
Hardwoods A Div Of Sauder Industries Ltd
Vancouver

NATIVE PLANTS

BC Gas
Bill Manery (Vancouver)
Rob Grenal (Kelowna)
Greg Flavel (Kelowna)

BC Hydro
Cam Matheson (Vancouver)
Aboriginal Relations Division
Kevin Delgarno (Vernon)

Columbia Power
Walley Penner

Quality Seed Collections Ltd.
Sandy Gregory
Kamloops

City of Kelowna
Parks Department
Lorna -Rowland

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& Company**

Westwind Nursery
Brent McDonald
Kelowna

Central Okanagan School District
Nate Ferguson
Kelowna

BC Ministry of Energy & Mines
Russ Horton
Kamloops

INTERVIEW GUIDE

We are working with an organization that is considering development of a nursery in Vernon that would produce native plants and hybrid poplars. *(Provide a brief description of the possible applications of these products for their business).* As part of our review process, we are talking with people such as yourself who may be potential buyers. Do you have time now to answer some questions about your potential interest in these products?

A. TO BE COMPLETED BY INTERVIEWER

Contact: _____ Organization: _____
Phone: _____ Location: _____

B. HYBRID POPLAR

1. Have you used hardwoods such as poplar or aspen in your operation in the past two years?

_____ Yes _____ No _____ Other (_____)

IF NO, GO TO QUESTION 2

1a. What was the hardwood used for? _____

1b. Where did you obtain the hardwood from? (Did you purchase it or obtain it some other way?)

2. Are you familiar with hybrid poplar?

_____ Yes _____ No _____ Other (_____)

IF NOT, GO TO QUESTION 4

2a. What do you see as the advantages, if any, of hybrid poplar over other hardwoods that you might use _____

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2b. What do you see as some of the disadvantages? _____

3. Have you used hybrid poplar in the past few years?
_____ Yes _____ No _____ Other (_____)

IF NO, GO TO QUESTION 4

3a. When did you use it last? _____

3b. What volume did you use? _____

3c. What was it used for? _____

3d. Did you purchase it or obtain it some other way? _____

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3e. (If purchased) Where did you purchase it? What form(s) was the product in? What price(s) did you pay?

Product Form/Name of Supplier	Prices

Comments: _____

4. Would you consider purchasing hybrid poplar if set up a nursery was set up in Vernon?
 _____ Yes _____ No _____ Other (_____)

4a. Why or why not? _____

IF NOT, GO TO SECTION C

4b. What volumes might you be interested in buying? - over what time period? _____

4c. What form or forms would you want the product in? _____

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4d. In terms of the product itself, what key characteristics or specifications would you be looking for? _____

4e. From a marketing and promotional perspective, what is the best means to make buyers such as yourself aware of the product and to encourage you to purchase it? _____

4f. Apart from what we have discussed so far, what else would consider in deciding whether to purchase hybrid poplar? _____

4g. Who else in the industry would you recommend that we contact in order to find out more about the potential for hybrid poplar? _____

B. NATIVE PLANTS

1. Is your organization involved in planting and/or reselling shrubs and trees?

- _____ Planting
- _____ Reselling
- _____ No
- _____ Other (_____)

IF NO, GO TO QUESTION 2

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1a. How are they generally used (i.e. by whom and for what applications)? _____

1b. Where did you obtain them from? (Did you purchase them, grow them, or obtain them some other way?) _____

2. Are you familiar with native plants such as (Provide examples and a definition of native plants)?
_____ Yes _____ No _____ Other (_____)

IF NOT, GO TO QUESTION 4

2a. What do you see as the advantages, if any, of using native plants over others that you might use? _____

2b. What do you see as some of the disadvantages? _____

3. Has your organization planted or sold native plants in the past few years?
_____ Planting
_____ Reselling
_____ No
_____ Other (_____)

IF NO, GO TO QUESTION 4

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3a. Which ones? _____

3a. When did you plant them (or sell them) last? _____

3b. What volumes did you plant (or sell)? Where did you obtain them from? (If purchased)
What prices did you pay?

<i>Plant</i>	<i>Source</i>	<i>Volumes</i>	<i>Prices</i>

4. Would you consider purchasing native plants from a nursery that was set up in Vernon?
_____ Yes _____ No _____ Other (_____)

4a. Why or why not? _____

IF NOT, GO TO SECTION C

4b. What plants and what volumes might you be interested in buying? Over what time period?

<i>Plant</i>	<i>Volumes</i>

Time Period: _____

4c. What form or forms would you want the plants in (including age)? _____

4d. In terms of the product itself, what key characteristics or specifications would you be looking for? _____

4e. From a marketing and promotional perspective, what is the best means to make buyers such as yourself aware of the product and to encourage you to purchase it? _____

4f. Apart from what we have discussed so far, what else would consider in deciding whether to purchase native plants? _____

4h. Who else in the industry would you recommend that we contact in order to find out more about the potential for native plants? _____

THANK YOU FOR YOUR COOPERATION

APPENDIX IV: PROJECT REFERENCES

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