

The History of Reforestation in Ontario:
Current Practices, Challenges and Opportunities

by
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Chapter One- Introduction

Canada's forests are part of the country's heritage and have a direct impact on the well being of Canada as a nation (Natural Resources Canada 2002). Over one hundred years ago there were six billion hectares of forests worldwide, and today there are 17 million hectares a year being eliminated (Cyr 1998). Forests cover almost half or 417.6 million hectares of the land in Canada and account for ten percent of the world's total forest land (NRC 2002). The Canadian forests are composed of 67% softwood, 15% hardwood and 18% mixed wood trees. Approximately 56% of Canada's forestland is capable of growing trees for the commercial forest industry, but only half is used for timber production. Seven point six percent of this land is protected by legislation both federally and provincially. This means that the protected land cannot be logged or cut down for any reason unless indicated by the government (NRC 2002). Six percent of Canada's forests are the property of individual landowners or industries. Forest companies own just a small percentage of the land, about 1.5%. The forestry industry gains its access to forested land by agreements such as contracts or licenses. Ninety four percent of Canada's forests are publicly owned, the federal government oversees 23% of these forests, and the provincial governments regulate 71% (NRC 2002). About 20% of the world's freshwater flows from Canadian watersheds, and at least 140,000 species in Canada depend on the forests for food and shelter (Canada's Forest Network 2002).

In Ontario, Canada's most populated province, there are 110 million hectares of land and water. There are four distinct forest ecosystems, which together encompass 58 million hectares of the province (May 1998). These ecosystems are the far northern boreal, which to forest officials is called the Hudson Bay Lowlands, the boreal, the Great Lakes-St. Lawrence

Lowlands forest, and the southern deciduous, most commonly known as the Carolinian forest. Some of these regions have been significantly impacted by forestry operations throughout Canada's history. Each area is diverse and rich in biological diversity, and is crucial to not only Ontario but to Canada as a whole. Today, these areas are being managed through a type of forest management termed silviculture.

Silviculture has been described as “the art and science of growing forests” (Ontario's Forests 2002). Ontario's ecosystem approach to forest management requires that silviculture practices address ecological issues such as forest health, wildlife habitat and biodiversity, as well as timber production. Forest management, defined as “subjecting forests or tree plantations to human manipulations” (Norse 1990) has become the dominant mode of silviculture in recent years. Silvicultural systems blend cutting, regeneration, tending and protection into a series of forest management operations. These systems ideally complement the natural forces of establishment, growth, competition and decline that are at work in the forests (Ontario's Forests 2002). Ken Drushka, describes the culture of silviculture in his book *Stumped: The Forest Industry in Transition*, as

“Silviculture is not just a set of techniques, nor is it an occupation, a specialization or a profession. It involves more than the kind of knowledge, which can be transmitted in institutions or by training. Neither is it something so subtle and refined as to be possessed only by a select and sensitive few. Silviculture is something a society acquires over time; it is the product of generations of experience. Silviculture advances as much from what is wrong as from what is right. It embraces diversity and variety. It is a science as well as technology, and it is also and art which has as much to do with the psychology of the human beings who practice it as with the biological imperatives of a living, growing forest. It is not a luxury, an unaffordable dream, but a necessity...the real solution lies not in intensive management or sustained yield, but in a profound change in our attitudes and relationship to the forest. Somehow we must learn to manage the forest in the same way that farmers manage their land. We must cease to be merely exploiters of the forest resource and become instead cultivators and nurtures... (Drushka 1985).

Silviculture is practiced in Ontario for a variety of reasons, mainly to “contribute to the goal of every forest plan: a healthy, sustainable ecosystem” (OMNR 1997). “Managing, maintaining and restoring healthy and diverse ecosystems is Ontario’s primary natural resource stewardship responsibility”. In order to do this, Ontario’s government manipulates tree stand development on a site to contribute to a desired future forest condition (OMNR 1997).

There are a variety of different laws and policies that exist in Ontario today to mandate silviculture practices. Some of these are the Crown Forest Sustainability Act (CFSA), the Sustainable Forest License, the Strategic Forest Management Plan, the Ontario Lands For Life Policy and Canada’s Forest Accord. Each of these provides recommendations for the management of logged forest areas in Ontario. These policies have been developed over the years through constantly changing shifts in attitude and perception. Canada began its harvesting operations with an emphasis on timber extraction in the 1800’s, and today has moved into a period of sustainability. Today’s silvicultural practices have a strong emphasis on the need to preserve the forest resources in order to continue to benefit from them in the future.

Ideas, goals and perceptions regarding reforestation operations in Ontario have changed significantly over the years. Changing perceptions of those involved in the logging industry, the government, and the public have resulted in the altering of existing legislation and policy, as well as led to the development of new guidelines that will lead the forestry sector into the future. Silvicultural operations in Ontario have become more sustainable in recent years, and the aim of these practices is to manage Ontario’s forests with future success in mind. The trends have changed for tree planting operations. In the 1980’s the goal was to

plant one tree for every tree cut, with millions of dollars being poured into the operations every year. Gradually, the funds allocated to these replanting operations shifted away from government donations and rested in the hands of the forestry companies. It is now the responsibility of the companies to put money into forestry trusts created for silvicultural uses and in turn the companies can draw on these funds to plant more trees on the land that they have harvested. Despite changes to the number of trees being planted every year, there are still millions of seedlings that get put into the ground each and every spring season across the province.

Goals and Objectives

The goal of this thesis is to research the history of reforestation practices in Ontario and to assess the practices, challenges and opportunities that exist today. An examination of the guiding legislation and a close look at the implementation of these policies is the focus of this paper. In order to accomplish this task, the thesis will pursue the objectives of tracing the historical development of reforestation policy and legislation for regeneration processes in Ontario, summarizing current relevant legislation, describing current practices of reforestation in Ontario, discuss these practices in relation to case studies of reforestation companies, discuss the results of a survey completed by planters and management that relates to the implementation of reforestation practices, and discuss the challenges that exist today in reforestation for contract companies.

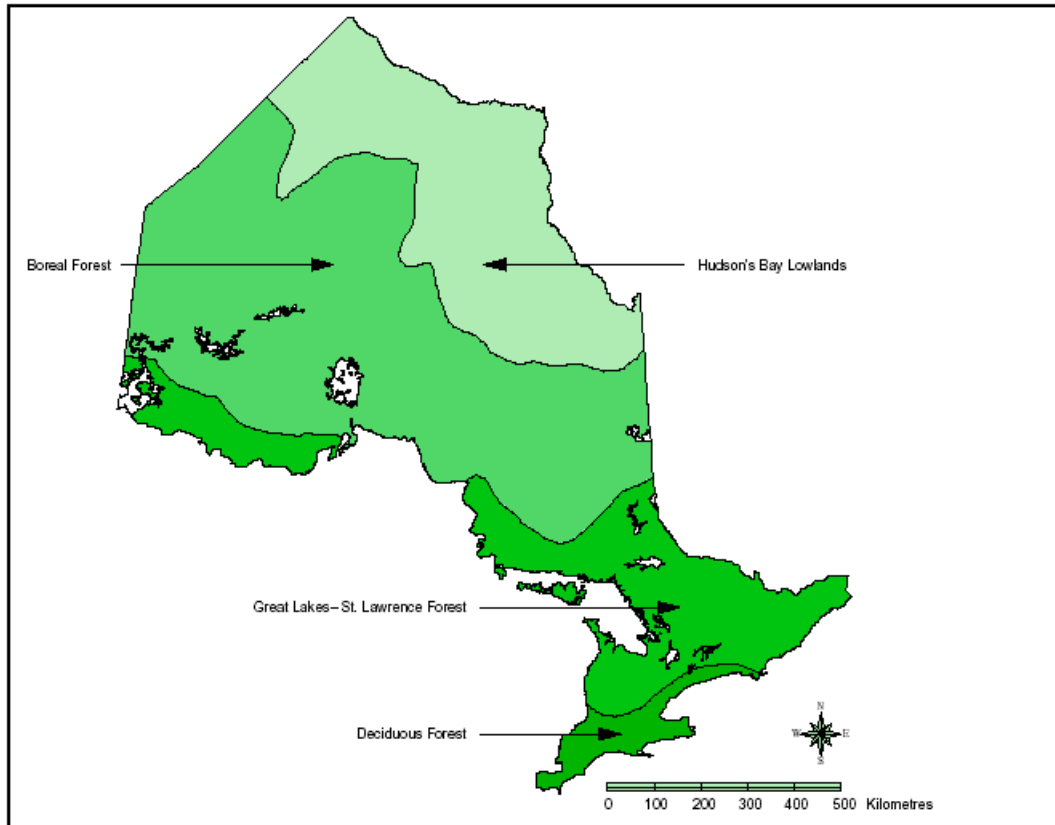
Study Area

This thesis will look at the forests in the province of Ontario with a specific emphasis on the Great Lakes- St. Lawrence Lowlands Forest Region. This forest area is located within the central part of Ontario and reaches up into the northwest region following the north shore

of Lake Superior (Global Forest Watch Canada 2001). This section of Ontario, which is composed of sedimentary rocks, is the location of extensive farmlands, large industrial centers, and vast forest wilderness. This eco-region is characterized by warm summers and cold, snowy winters that are milder to the south. The climate ranges from humid, mid-cool temperate in the south to humid, high-cool temperate in the northeast. The mean annual temperature ranges from 4.5°C to 6°C, mean summer temperature is approximately 16°C, and the mean winter temperature ranges from -4.5°C to -7°C. Mean annual precipitation ranges from 700-1000 mm. This area of the Great Lakes region is located within major snow belt areas (Ricketts and Dinnerstein 1999).

The Great Lakes-St. Lawrence Lowlands are a perfect example of a temperate broadleaf and mixed forest. The Great Lakes-St. Lawrence Lowlands forests lie between the boreal and the broadleaf deciduous zones and are therefore transitional. The forests of this eco-region were once home to over sixty varieties of different tree species. Dominant trees included red and white pine, eastern white cedar, hemlock, black spruce, sugar maple, basswood, aspen, and white and yellow birch (May 1998). The predominant tree species here was the white pine; which later would become the provincial tree of Ontario. Due to excessive logging in the mid 1800's, today less than 3% of the Great Lakes-St. Lawrence Lowlands forests are red or white pine. Characteristic species of today are almost the same, with very few red and white pine, eastern hemlock, and yellow birch, as well as maple, oak, basswood, aspen, ash and elm. Also common in this eco-region, along the top of the Great Lakes-St. Lawrence Lowlands zone, are species such as black spruce, jack pine, aspen and white birch, and few white pines, which are common to the boreal forest zone. In this region, 46.6 million hectares are forested, which is about 4.7% of Canada's land area (GFWC 2001).

Figure 1.1
Ontario's Forest Regions



This map, found in the Ontario Ministry of Natural Resources Annual Report on Forest Management 1995 to 1996, shows the forest regions in the province. The Great Lakes-St. Lawrence Lowlands forest area is alive with a diverse variety of wildlife, which “includes species like the white-tailed deer, moose, black bear, wolves, the pileated woodpecker, as well as various migratory birds, coyotes, snowshoe hares, chipmunks, red and eastern grey squirrels, beaver, muskrat, otter and many other mammals, birds such as the cardinal, the mourning dove and the eastern screech owl, fish and insects” (Ontario Ministry of Natural Resources 1998). All of these species together contribute to the rich diversity of the eco-region of the Great Lakes-St. Lawrence Lowlands.

Methodology

The methodology used in this study to assess and analyze the history of reforestation practices in Ontario and to assess the practices that are in place today will consist of a detailed analysis of various publications and texts on the practice of silviculture in Ontario, as well as the history behind its development and implementation. This thesis will also include a survey of relevant legislation in regards to reforestation in Ontario, through a survey of Government documents both in published form and online documents.

Sources that will be used in the research for this thesis will include both primary and secondary sources; literature reviews of both texts about the Great Lakes-St. Lawrence Lowlands area, the province of Ontario and Silviculture Manuals, as well as a variety of published works on the topic of reforestation and silviculture practices in the province of Ontario and many books which discuss the state of Ontario's forests. Visits to non-Government organizations, reforestation companies and government offices, the internet, and a variety of government of Ontario documents such as legislation, policies, and reports will be used as well. Key organizational sources used will include Tembec, Domtar, Outland Reforestation, Brinkman and Associates Ltd., The Wilderness Group, Algonquin Wildlands League, Natural Resources Canada, Ontario Ministry of Natural Resources, Ontario Forestry Association, and the National Forestry Database Program in association with the Canadian Council of Forest Ministers and Global Forest Watch Canada, the National Forestry Database, and the International Standards Organization. An interview with Ben Kuttner, a registered professional forester at the Algonquin Wildlands League in Toronto is used as a jumping off point for a variety of issues concerning the reforestation of forest lands. These issues will be examined in further detail throughout the paper. Legislation discussed will

include The Crown Forest Sustainability Act, and associated manuals such as The Forest Management Planning Manual, The Forest Information Manual, and The Forest Operations and Silviculture Manual, and the Environmental Assessment Act. Other documents will include the State of the Forest Report 2001, the Silvicultural Guide to Managing Forests in Ontario, and the Annual Reports on Forest Management 1995-2000. All of these sources will provide an extensive overview of the silviculture practices in Ontario and the policies that guide them which will in turn contribute to the goal of achieving the overall goal of the thesis.

A survey will be included in this paper as a tool for identifying, analyzing and understanding the challenges and opportunities associated with reforestation activities in Ontario today. The purpose of this study is to consult treeplanting employees and management to find out what factors within the reforestation operation are problematic and need improvement. This survey will help to identify problems with quality, stock handling, awareness of policy and legislation, proper implementation of the silvicultural practice of reforestation, and a variety of other issues that may be important to the success of these tree plantations across Ontario. This survey is intended to target a wide group of both planters and planting management in order to draw on their experiences as to what problems exist with contract plants in Ontario. Personal experiences will be examined in relation to the forest region where the contract is taking place. Since the study area for this thesis concerns the Great Lakes-St. Lawrence Lowlands, and the very top of this forest region that borders the Boreal Forest, only those surveys that identify these regions will be considered for assessment. The fact is that tree planting operations have changed over the years. Contracts are getting smaller; the number of employees is lower, there are fewer seedlings to go in the

ground each year, and contract companies have less and less land that needs to be planted. There simply isn't as much physical tree planting going on in Ontario as there has been in previous years. There are new methods that are being implemented in order to regenerate the land naturally, with less emphasis on monocultures and plantations. This survey will complement the literature review and will be able to examine the changes that have occurred over recent years and to establish the practice of reforestation activities through contract organizations that exist today. This survey will also identify problems that both planters and management see and can link this to literature in order to assess the problems that exist concerning reforestation today.

Proposed Methods

The first step in this process of information gathering is to design a survey that achieves the objectives that are outlined above. In order to do this, a survey will be designed and developed with the goal of acquiring information that relates to the objectives of the thesis. This survey will be designed in order to accommodate the lifestyle of the average treeplanter. Since most treeplanters are students, or recent graduates, permanent residency is rare. Most people have no specific address, using their parent's home as a mailing address for important documents like bank statements and credit card notices. A large number of tree planters travel in the off-season, and often keep in touch solely by email. Therefore, it is relatively easy to obtain the email addresses of treeplanters. Since this is the most common way of getting in touch with treeplanters, a list will be compiled of addresses for those people that I have personally worked with over the last four years. These names will be input into MSN Hotmail and then the survey will be pasted into the email along with a consent letter and a notice that asks that if the participant is willing, could they please forward the survey to

other planters that they know. That way, many more planters will be able to be contacted, and not specifically those that I have had the chance to meet and get to know. This increases the representativeness of the survey. Anyone who is willing to participate in the survey is welcome. All surveys will be compiled and held relevant with the exception of those who have never planted in Ontario before. These surveys will be disregarded since this thesis deals only with treeplanting in Ontario. Once the results are compiled, the survey will be used in comparison to existing literature that deals with the practice and procedure of reforestation contract companies in Ontario and help define problems and issues identified with these contract companies.

Outline of Thesis

The text of the paper begins with chapter two. This introductory chapter is a literature review summarizing the history of reforestation activities in Ontario since settlement began in the 1800's and farms were the dominant land use in the province. Tracing the growth of industry and activity, this chapter provides an overview of the historical roots of treeplanting in Ontario. It then continues to include a detailed description of the development of policy and legislation in which guides reforestation activities and forestry operations in the province. Forest Management Units, Sustainable License Holders and forestry trusts are discussed as well as the literature that has developed to assist in the ecologically and environmentally sound way of planting trees in the Great Lakes-St. Lawrence Lowlands and Boreal Forest regions. The chapter sums up with a look at the Annual Reports on Forestry, beginning in 1995-1996 and concluding in 2001. Changes, improvements, and deficiencies are examined in relation to the reporting that exists in terms of tree planting activities.

Chapter three looks at the major logging companies in Ontario and their company policies in regards to treeplanting, reforestation practices, and commitment to forest management. A detailed look at Tembec and their planting activities in the Gordon Cosens Forest is included here. Chapter Four examines some of the largest tree planting contract companies in Ontario, and looks at their policies and commitments. These are then compared to the services provided and employee opinions about the day to day operations of the company, as well as including numbers of seedlings planted each year. Chapter five includes the results of the survey created to target treeplanting employees to find out problems and issues that are found with both the treeplanting company and the logging company. This chapter looks at the participants' opinions and relates this to both practice and procedure within the forestry industry. The paper concludes with some recommendations for the future and a synopsis of the text. Appendices such as the survey questions and a summary of the results are included at the end of the paper.

Chapter 2- Literature Review

This chapter will discuss the history of reforestation practices in Ontario, from development of practices and tracing the creation of policy to guide these activities. This chapter will show the increase in public commitment, the changes in funding for reforestation activities, and an overall commitment by both the government and industry to continually increase the healthiness of tree plantations in Ontario. This section looks at how economics drive large logging companies to either plant more trees or to skip the practice entirely. This chapter shows the development of forestry monitoring, which over the years has become a necessary practice in the world of forest politics.

History

The province of Ontario has strong roots in the field of agriculture. Due to its southern location and prime farmlands, the early settlers of Ontario became farmers. At that time, the northern regions of the province were inaccessible and lacked proper routes to encourage travel to remote forests, so the major developments were concentrated in the south. Canada's population had increased by 50% by 1833 since the first wave of immigrants came to live in Ontario, and land grants were being given to anyone who wanted land. There was little attention being paid to the scarcity of forest resources, and vast amounts of forest land were being cleared to make room for settlements (Balsillie, 2003). It was these attempts at reforestation that led to the development of policy and legislation geared towards the protection of Ontario's forests. Preliminary attempts at reforesting logged lands can be traced to the late 1800's and the farmers that lived and worked in this region after the lands had been cleared of forest cover for farming purposes (Armson, Grinnell and Robinson, 2001).

The first piece of legislation that came into play was An Act for the Sale and Better Management of Timber upon the Public Lands in 1849. Although a commissioner had been appointed for the management of timber on Crown Lands in 1827, not many initiatives had been taken to secure a document that dealt with forest management in Ontario. This piece of legislation was the preliminary document that would “manage” the forests. Under its regulation, the Act would govern timber administration until the end of the century. It was responsible for granting timber licenses, acquiring equitable assessments of dues, and was “designed to meet the Needs of industry and allow the government to derive reasonable revenue from timber resources” (Balsillie, 2003). In 1867, a new commissioner began to express his concern for the “wasting of our forests” (Armson et al. 2001). There were large tracts of land that had been cleared but were sitting empty. The commissioner attempted to find a solution to dealing with the landowners who had mass areas of forest land that they were keeping without working them (Balsillie, 2003). Forest fires were also responsible for desecrating large land areas, and there was a growing concern as to what to do with this land. The American Forestry Congress held its second conference in Montreal, Quebec, in August 1882. Some of the papers that were presented at this conference sowed the seeds for ideas in forestry that exist today. Ontario sent three delegates to this conference, an entomologist, a professor at Ontario’s Agriculture College at Guelph, and a representative from the Fruit Growers Association. Issues such as soil erosion, wildlife loss, destructive floods, and climate change were all brought up at this conference. The main themes present at this conference were preserving forest benefits of all sorts, and restoring the benefits that had been lost (Balsillie, 2003). One of the recommendations made was to plant more trees in

agricultural lands. It was becoming clear that forests required protection, particularly from fires, and that government action was needed to ensure the adequate regeneration of forests.

After this conference, the province of Ontario split the forestry division into two sections; timber and forest protection and forestry and regeneration. As a result of this division, a restructuring of the Commissioner's office included the creation of new positions such as the Clerk of Forestry; the first piece of legislation that dealt with reforestation was produced in 1871, called the Tree Planting Act. This act was "intended to encourage roadside planting" (Armson et al. 2001). This act proved to be unsuccessful in stimulating regeneration, so in 1883, the first Clerk of Forestry was appointed and the Ontario Tree Planting Act was passed (Balsillie, 2003). This Act stated that "persons owning land adjacent to any thoroughfare were paid .25 cents for each tree they planted, the cost to be shared equally between the province and the municipality" (Armson et al. 2001).). Hoping to reduce the effect of wind erosion on the forests in these areas, this Act led to the planting of 75,000 trees in Southern Ontario.

It is important to look at the agricultural roots of the province in order to see who the major players in the establishment of reforestation were. Professionals at the Ontario College of Agriculture in Guelph were the leaders in the reforestation field in the 1900's. With the creation of this school came the establishment of a committee called the Ontario Agriculture and Experimental Union which had a forestry sector. It was this section of the committee that urged the Ontario government to take a step forward in implementing reforestation programs across the province. There was much activity in the province during these years, with the College of Agriculture coming under the jurisdiction of the Department of Agriculture, the establishment of the Faculty of Forestry at the University of Toronto, and the appointment of

many graduates of the Agriculture School in Guelph to the new departments and various positions in the government. In 1905 the first professional forester was appointed to the Ontario Government (Balsillie, 2003). The ties between forestry and agriculture remained strong. E. J. Zavitz, called the “father of reforestation of Ontario” was the creator of the Report on the Reforestation of Waste Lands in Southern Ontario 1908, which led to the creation of rehabilitation programs for these areas. This paper identified waste lands in Ontario and estimated the costs of “establishment, potential timber yields, and financial returns from planting waste areas with pine” (Armson et al. 2001). Some of his ideas are still used to this day. Zavitz’s report was able to draw on many of the same factors that are important today, including the significance of reforestation in economically and socially depressed areas, and the importance of retaining these areas for both their natural value as well as their recreational values. He also stressed the importance of retaining these areas for an economic purpose of continuing a timber yield for future generations. The government of Ontario recognized the necessity of involving the municipalities and passed legislation entitled The Counties Reforestation Act, which would provide compensation for planted trees on both public and private land. There was almost no response to this legislation in 1911. Zavitz eventually moved on to become an employee of the Department of Lands, Forests and Mines in 1912. The onset of World War One halted any further development in the field of reforestation. However, the developments that had been made prior to the war were large and could only be seen as stepping stones for a strong future for the reforestation sector of the forestry industry.

Despite the troubled times, students at the Faculty of Forestry at the University of Toronto began to travel to Northern Ontario to carry out intensive field studies, which

resulted in a collaboration of professionals, foresters, and academics to produce experimental nursery and plantation trials to gather data and to begin to implement ideas of reforestation in areas stripped of forest. This sparked an interest in reforesting the northern region of Ontario.

After the War there were continued improvements to the forestry sector in Ontario. In 1921, the Reforestation Act was passed. The Reforestation Act enabled the establishment of tree nurseries and the supply of tree seedlings in addition to planting and management by the province. Counties were able to purchase barren farmland and place it under a “management agreement” with the Department of Lands and Forests. This eventually led to the establishment of municipally run reforestation areas (Lake Simcoe Region Conservation Authority 2002). This act alluded to the realization that in order to reforest the land properly, tree seedlings would have to be produced in high volume as well as produced close to the areas that were to be planted. During this time period, tree seedlings were usually shipped from Europe, and as a result had to travel great distances and were in rough shape once they reached their destination. This ended up costing the government a great deal of money in keeping the seedlings properly packaged and handled. The first provincial nursery was established in 1920 in Angus, Ontario. This was an ideal location due to the variety of red and white pine in the area, the establishment of at least 17 saw mills as well as the close proximity to railways, and suitable water supplies and road infrastructure (Ontario Tree Seed 2003).

In 1912 an agreement was made between Frank Harris Anson and the Abitibi Power and Paper Company to establish a newsprint mill and power supply at Abitibi River in Northern Ontario. The town of Iroquois Falls was built soon after the establishment of the mill. The forest area in this region was cleared for the creation of the mill, the river dam, and

the town, and in 1917, the forestry staff at Abitibi Power and Paper Company purchased 500,000 seedlings to start reforesting the area that had been logged.

Mark Kuhlberg, a professor at McMaster University's Faculty of History in Hamilton, Ontario, is well versed on the subject of the Abitibi Power and Paper Company. His paper on Abitibi Power and Paper Company's Forestry Initiatives in Ontario 1919-1929 looks at the company's "remarkably progressive silvicultural programs" (Kuhlberg, 1999), in managing timber on their leased crown land on a sustained yield basis. This company began to establish intensive programs that were designed to improve the management of their forest lands. Concerned with the decimation of forest cover due to logging as well as natural disturbances such as fire, Abitibi Power and Paper as well as Frank Harris Anson, realized that they were going to have to increase yield on already existing land in order to meet the demand for the growing paper mill. This demand could be met by reforesting the land, and by managing the long-term productivity of the land. At the time there were not government provisions in the province of Ontario that mandated a further obligation to the land by the forestry company, nor were there any government funds allocated to the management of forest lands. In the 1920's there were essentially no companies that were willing to experiment with planting trees on Crown Lands at their own discretion. The 1929 Pulpwood Conservation Act required all pulp and paper companies to supply the Ontario government with complete and accurate information about their holdings and plan the management of their forest resources with a sustained yield basis in mind (Balsillie, 2003). The 1920's and beyond saw great improvements in the field of reforestation. With the established base of professional foresters and graduates of forestry and agriculture schools, this combined expertise was able to allow reforestation ideas to develop even further. Ideas were born and

recommendations were made, all with the intent of managing Ontario's forests with long term gain in mind.

However there were very few advances in the field of reforestation in the 1930's and the 1940's. In 1936, the Forest Resources Regulation Act was geared towards getting the lumber industry in Ontario back on its feet. This included getting men back into logging jobs, and to re-allocate timber limits to those who were cutting down the trees (Balsillie, 2003). It wasn't until 1941 that the Department of Lands and Forests was restructured and divided into 10 different divisions; including timber management, reforestation, conservation, and research. This was a good start for the department in beginning to recognize that the different branches of forestry were unique in nature and deserved the appropriate attention. One of the key goals here was to devise a long range plan to protect the resources that were managed by the Department of Lands and Forests (Basillie, 2003). Extensive research programs were required in order to maintain this commitment.

In 1947, the Forest Management Act required a submission of forest maps and management plans for each forest region where timber activities were taking place. The management plans were to be approved, with changes being made by the Minister of the Department of Lands and Forests. The minister ultimately had all control over operations at this time, and could stop operations or cancel licenses whenever he felt necessary. These plans were to be updated every year and were constantly subjective to departmental approval (Balsillie, 2003).

Regeneration of Ontario's forests became focused on the northern region of the province in the time period between 1945 and 1960. There were two relevant reports that were published in the late 1940's, one being the report of the Royal Commission on Forestry,

which dealt with a variety of forestry issues including protection, fish and wildlife, education, publicity, and land classification, among many other subjects. Even though the forestry community accepted the report, it encompassed very little about reforestation, mainly stating that with research and proper implementation there would be better success at natural regeneration. There were no specific recommendations made for reforesting the northern areas of the province. The report from the Royal Commission on Forestry, however, did make many recommendations about planting trees in the southern part of the province, including specific data and details regarding how many trees should be planted and within what radius of other trees (Armson et al. 2001). The Select Committee of the Legislature on Conservation prepared the second important document that was published in 1950. This report focused largely on the natural forest environment including “soil, water and wood” (Armson et al. 2001). This report made a recommendation that in partnership with the government of Ontario, there should be “ a major reforestation program for the Precambrian Shield south of North Bay, to be jointly financed by the government and Ottawa under the Canada Forestry Act of 1949” (Armson et al. 2001). One interesting aspect of this report suggested that the provincial nurseries increase seed production from 17.7 million to 150 million for southern Ontario alone. This indicates that there were a number of people who were interested in achieving a forest with a sustainable yield, and many who were interested in putting back what was being taken.

In 1948, the Forest Management Act moved through legislation, and mandated forest inventories to be undertaken, 20 year management plans of the forests to be developed and implemented, as well as the development of 5 year operation plans for the logging companies in Ontario. The Canada Forestry Act, passed in 1949, was the most notable piece of

legislation that existed in the Federal Government concerning forestry at the time. The Act enabled the federal government to enter into cost-shared conditional grant programs with the different provinces. These agreements were for

The protection, development, or utilization of forest resources, including protection from fire, insects and diseases, forest inventories, silviculture research, watershed protection, reforestation, forest publicity and education, construction of roads and improvements of streams in forest areas, improvement of growing conditions and management of forests for continuous protection (Armson et al. 2001).

Some of the key initiatives that were undertaken with the passing of this Act included support of a newly established forest inventory, fire protection and reforestation, the establishment of new provincial nurseries in northern Ontario, and the relocation of foresters who were involved in reforestation from the southern regions to the northern regions. This relocation of reforestation professionals to the north led to many problems. Before the nurseries were established in the north, the seedlings had to be shipped from southern Ontario to be planted in the north. This proved difficult because during transportation there was a “heating” of the seedlings that altered their survival rate. Seedlings must be kept at a constant temperature to ensure survival, because when they are removed from the nursery their high metabolic rates lead to heating (Armson et al. 2001). The trees were packaged in the south and then shipped to the north, but the packaging was meant for shorter distances. The failure rate of these early plantations can also be attributed to the disinterest and the feeling of additional burdens being imposed upon foresters in the northern parts of the province. Previously, these professional foresters were solely responsible for timber cruising, scaling and administering the Timber Crown Act and saw the necessity to tree plant as an unwanted extra duty. Those who were brought in to run the tree plant operations were chosen from timber and fire operations and were not really all that interested in seeing the planting

succeed. They wanted to get in and get the job done and get out as fast as possible. In order to get people to plant the trees, a search was done in taverns and bars in the towns of northern Ontario. Those that volunteered just wanted to make a quick buck and be on their way.

Armson, Grinnell and Robinson write that the contributing factors to the failure of these early plantations were uninterested supervisors, a high turnover of the labor force, poor planting stock, improper field storage and inadequate living conditions in the field.

It was in the 1950's that the idea of ensuring correlation between the tree species to be planted and the specific site was introduced. There were numerous seminars organized to discuss planting trees on Crown Lands as well as various manuals created that dealt with methods of planting and seeding that used site classification. There were also programs being introduced by some forestry companies, such as the Great Lakes Paper Company in 1951 that dealt with reforestation programs specific to the company. Their goals were threefold to produce 10% of the mill's pulpwood requirement, to demonstrate to farmers and landowners the value and techniques of silviculture and to better promote regeneration on private land, and to experiment with a variety of reforestation practices (Armson et al. 2001). By the year 1955 the Great Lakes Paper Company had planted approximately 300 000 trees and acquired about 2500 hectares of new land. In co-operation with the government and the Dryden Paper Company about 100,000 trees continued to be planted each year. At this time, Abitibi Power and Paper Company were still leading the way in innovative forestry practices, and established a woodlands laboratory which sought to understand and implement a variety of experimental harvesting practices and procedures. The Spruce Falls Power and Paper Company, in co-operation with its sister company Kimberly-Clark, opened a tree seed nursery in Moonbeam, east of Kapuskasing, in order to meet the needs of their tree planting

operations in northern Ontario. At the time, these operations were one of the largest in the area. Armson, Grinnell and Robinson report “production from the Moonbeam nursery by 1952 was about 1.25 million trees annually in spruce transplant stock” (Armson et al. 2001). Spruce Falls Power and Paper Company implemented tree planting programs that had two major implications in the area of reforestation. The first was the recognition that planting trees had to become a part of the culture of the company, for both the foresters and the technical staff. In order to achieve the desired cultural state the planting was to be done by the timber cutters who worked for Spruce Falls and Kimberly-Clark in Longlac. Hesitant at first, these timber cutters who had originally showed little to no interest in giving back to the land were now proud of the vast tracts of land that they themselves had personally planted. In 1956 these timber workers introduced the idea of tending to the plantations through aerial spraying of herbicides. This idea was picked up by the Department of Lands and Forests shortly after and was adopted as a means of managing plantations. Kimberly-Clark established a seed orchard at Longlac and by 1963 had planted 13 million trees and through the application of herbicide tended 3 089 hectares (Armson et al. 2001).

All of these new developments in the field of reforestation led to an investigation of reforested lands by the Ontario Research Council led by R.C. Hoise. A report was written in co-operation with members of the forest industry, the Federal Forestry Branch and the Ontario Department of Lands and Forests. It was initiated in 1953 and would examine all tree planting efforts from 1918 to 1950. All available surveys and research between these years were to be assessed and examined for inadequacies. The report eventually concluded that reforestation on the logged areas did not take into consideration the natural species and vegetation in the area, or satisfactorily account for the ecological diversity of the area. There

were also very few efforts undertaken to ensure that logging practices were geared towards allowing natural seeding to occur in these areas. The recommendation was that tree planting and seeding would have to be implemented at high volumes. It was also recommended in the report that the foresters gain a greater knowledge as to tree species and site location in order to mimic the natural forest. The report also called for a standardization of terminology, site preparation practices, and techniques. The report, however, did not include a suggestion for a standardized reforestation program or procedures. This seemed to be inconsistent with the overall report, since recommendations had been made to restock the lands that had been cut yet there were no recommendations as to how to do this (Natural Resources Canada, 1996)

There were more changes to come. In April 1953, a new piece of legislation came into play entitled the Crown Timber Act. This Act divided the province of Ontario into 123 management areas. Of these 123 units, 87 were on Crown Land and the other 36 were on land that had been acquired by forestry companies and were on a leased term. These management areas were created in order to further manage the logging operations on Ontario's forests. The act was to be valid for 21 years, and all conditions of the Act were to be standardized (Balsillie, 2003). Amendments were made in 1963 when the Crown took back the responsibility of maintaining forest productivity. Agreements were made about reforesting the forest lands and financial compensation was addressed. The creation of the Ontario Professional Foresters Association in 1958 established the necessity for a "single provincial body that could represent the profession" (Natural Resources Canada, 1996) and recommendations were made to "promote and increase the knowledge, skill and proficiency of its members in all things relating to forestry and to regulate the standards of forestry practice of its members" (Armson et al. 2001). This included the practice of reforestation and

all that it encompassed. The codes of ethics and standards of practice adhered to by members of the professional associations played an important role in responsible forest management.

Many new developments were occurring in terms of the scarification of the land that had been logged. Those who were planting the trees were finding that the land, after being cleared of trees, was next to impossible to plant due to the excess of slash and residuals that were being left on the land. Many experiments were conducted in the field using existing equipment as well as local tools and supplies. One example of the ingenuity that was being demonstrated at this time was the idea of dragging jack pine trees over the land in order to spread their seeds so that the land would regenerate naturally. This was modified to using pipeline casing with tractor pads and anchor chains with spikes to spread the seeds into the exposed mineral soil to facilitate natural regeneration of jack pine (Armson et al. 2001).

These new and innovative ideas are what helped the field of reforestation move into the next sage of history.

Up until the 1970's the primary focus of reforestation was based on artificial means; planting trees on cutover land. Applications of aerial seeding then began to be used more often with the invention of the Brohm seeder, which was mounted on the wings of planes or snowmobiles and the seeds were dispensed in the late stages of winter and early spring. This allowed the seeds to grow once the snow began to melt. In the early years of the 1960's the staff members of the Ontario Lands and Forest Department came to the realization that there were several factors influencing the failure of planting in northern Ontario and the success rate of reforestation initiatives. The first was "the lack of a comprehensive long range regeneration plan," (Wagner and Columbo, 2001). In 1963 it was decided to increase the amount of land slotted for reforestation but this decision did not meet the approval of the

entire department. In 1968 a report was created by the Department of Lands and Forests entitled Long Range Silvicultural Plans and Total Regeneration Need, which, for each management area as defined by the Crown Timber Act in 1953, outlined a guide for regeneration practices in that specific area. This report made suggestions for both natural and artificial regeneration methods between the years of 1969-1978. The second factor that was recognized had to do with the lack of adequate funding that existed at the time for this long range planning. Planting trees was still a relatively small operation and it was deemed unnecessary by the public and the government to provide extensive funding to the program. A third factor, although not recognized as one of the primary determinants of failure in regeneration practices, was the separation of those who did the harvesting and those who did the regeneration activities. There was such a division that often there would be the two groups in one area who had different duties. The loggers would leave the land in such an unsuitable state for planting that it was difficult for the planters to go in and plant the trees. There was much inefficiency created as a result of the separation of these two groups. In 1962, the Crown Timber Act was amended to include a provision that placed the responsibility of regeneration on Crown Lands on the Ontario Department of Lands and Forests and allowed the government to enter into regeneration agreements with the forestry companies. This new provision erased any of the “old ambiguities that still existed under the 1952 Act, which had essentially held licensees responsible for reforestation, a responsibility that they largely ignored” (Armson et al. 2001).

During these years, the survival rates of planted trees were extremely low. The causes that are listed by Armson, Grinnell and Robinson include the following; “poor handling and storage at the nursery, improper transportation to and at the planting site, and inadequate

preparation and planting” (Armson et al. 2001). These problems were similar to the problems that had been in existence over past years when tree planting efforts had been introduced to northern Ontario. Neither the forestry companies nor the reforestation professionals were willing to accept the blame for the poor conditions that existed. Machines largely did site preparation at this time, however, there were numerous attempts at prescribed burns in order to burn the slash and residual that existed on the sites. This caused a great deal of conflict since there was a division of the Ontario Department of Lands and Forests that dealt specifically with halting forest fires; how could prescribed fires be worked into this division? In 1962, policy was developed to allow for these prescribed burns as a means of site preparation. Planting trees also began to acquire a new and much more dependable work force. Women and university students were becoming a steady source of labor in the summer seasons due to the fact that container stock could be planted without the feeling of rushing that came with the planting of bareroot stock. This allowed for more trees to be planted over the summers now that the forestry companies weren’t relying on a labor force that came from the local taverns. Bareroot stock in Ontario consists of mainly coniferous tree species, such as black and white spruce, red and white pine, with less than 5% of deciduous species (ash, oak and maple). Bareroot stock is well suited to “highly-productive, competition prone sites” (Patterson, DeYoe, Millson, Galloway, 2001). The care that is required for a bareroot nursery is quite intense, due to the necessity to grow the trees outside and the extensive preparation of the stock for the transplant can be very expensive. Container stock, which is grown in pots inside a nursery, is kept in a controlled environment. Careful consideration must be given to these seedlings in order to reintroduce them to a natural environment. A wide variety of man-made and artificial materials are used in the creation of these container seedlings. The

predominant species produced as container stock are black spruce and jack pine. 99% of all container stock today is produced in northern Ontario (Patterson et al. 2001).

Some other major developments in the field of tree planting were the creation of cold storage facilities. Snow caches and old mine shafts had been used prior to new construction of cold storage facilities where the seedlings could remain frozen until they were needed. Jack pine was the least adaptable to the freezing techniques. Keeping frozen stock allowed for a longer bareroot season, since the foresters know that there was a supply of container seedlings ready and waiting. Refrigerated trucks, called reefer trucks, became more widely used in the late 1960's and the early 1970's in transporting cold seedlings to the remote regions where they were to be planted. This is the time period when production of container stock increased, and the target production number for 1966 was 20 million seedlings. The reason for the increased production of container stock was due to research findings that the production of seedlings in containers would make storage and transportation less critical factors in the survival rates of seedlings. The production of these seedlings was left to nursery staff in northern locations, with little more than the materials needed and instructions given. In 1966, out of the 17 million container seedlings that were planted, the survival rates "ranged from good success to complete failure" (Patterson et al. 2001). By 1968 the survival rate was less than 70%. The main reasons for the failure of container stock were lack of interest by nursery staff, insufficient training, inadequate site preparation and tending for the planting stock that was produced. Although research at this time found that the container stock only had a 30% success rate in the plantations, and despite the desire to continue planting 20 million seedlings a year, this number dwindled to 6 million in 1970, and 3 million by 1972 (Patterson et al. 2001). The use of container stock in Ontario tree planting

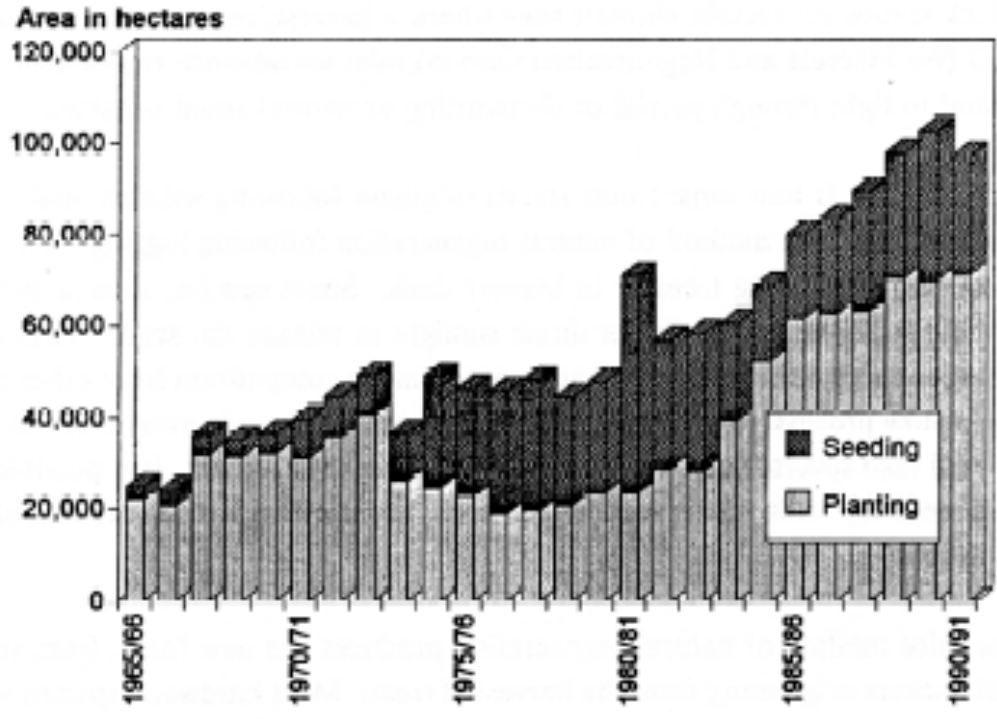
operations grabbed the world's interest, and in 1981 Ontario hosted a symposium on container seedlings that was attended by international delegates.

Changes were about to be made to the Canadian Forestry Act, concerning funding in regards to reforestation programs. The constantly changing plans between the foresters, the licensees and the government weren't clear on the allocations of funding, and who was responsible for providing money to implement the programs. In 1964 Ontario produced an amendment that provided "equally shared joint funding of forest inventory and reforestation on Crown Lands" (Armson et al. 2001). Funding became available to the maximum of \$1,650,000 per annum. In 1968 the federal and provincial governments formed the Canada-Ontario Joint Forest Research Committee which was meant to make the most use of the forestry services available. This committee concentrated a large volume of their work on reforestation.

Throughout the 1960's there were a wide variety of changes and innovations that occurred within the field of forestry and more specifically, reforestation. There still was no long term goal of reforestation in place for the province of Ontario, so the changes that were made were not implemented province wide. There was a realization within the forestry community that it was necessary to estimate the timber yield that was needed over the next generation in order to implement plans of sustainability. Although many recommendations were made, by the early 1970's there had been little or no increase in planting numbers and seedling numbers, yet site preparation techniques continued to be expanded upon, and in the later years of the decade there were greater increases in site tending, such as herbicide spraying. Even though the legislation that existed recommended planting more trees, and now funding had been secured, the forestry companies were still not living up to their end of

the bargain. Very few companies were planting trees, with the exception of Abitibi Power and Paper Company, The Great Lakes Power and Paper Company, and the Spruce Falls/Kimberly-Clark partnership. These companies were leaders in their field as to initiating planting programs on their land with their own money and their own resources. The following graph was released in the Environmental Assessment Board's Report on Regeneration as a result of the Class Environmental Assessment in 1994 and shows that the size of the area treated by both has grown from about 20,000 hectares annually in 1966 to 100,000 hectares in 1991. This indicates that MNR has increased its effort considerably to promote artificial regeneration.

Figure 2.1
Planting and Seeding on Crown Lands in Ontario
(1965-1966 to 1990-1991)



In the late 1970's three major reports were released that had a lot to do with the future of regeneration. One report, entitled the Special Program Review, conducted by the federal

government, was released in 1975. This report dealt with timber licensees taking full responsibility for reforestation practices, but argued the Governments of Canada and Ontario had a financial responsibility as well. The second report was a year long study conducted by K. A. Armson for the Ontario Ministry of Natural Resources that examined forest management in Ontario and also made the recommendation that those who held forest licenses “assume responsibility for planning and implementation of forest management” (Armson et al. 2001). Armson’s report also concluded that harvesting and reforestation should be integrated. The third report that was produced at this time was prepared by the Ontario Forest Industries Association, a provincial trade organization who represents forestry companies who are involved with forest management in Ontario, and dealt with the assumption of forest activities and led to another amendment of the Crown Timber Act in 1979 (Ontario Forest Industries Association, 2003). This Act was created to “assure an adequate supply of timber for Ontario’s forest industry through intensive forest management practices, increased reforestation efforts and improved access” (Smith, 2002). This amendment provided Forest Management Agreements between the Crown and the Province of Ontario that meant that the company would take full responsibility for regenerating logged lands. Abitibi Power and Paper Company, now called Abitibi-Price, was the first to sign one of these agreements. It seems fitting that the one company, which had been the industry leader in planting initiatives in the 1920’s, would be the first company to take legal responsibility for regeneration their leased land.

In response to a new public interest in the continued survival of Ontario’s forests, the Progressive Conservative Party’s goal for the provincial election in 1977 “promised to plant two trees for every one cut” (Armson et al. 2001). Although they didn’t win, in 1978, a

Forest Subsidiary Agreement was signed through the Canada-Ontario General Development Act, and called for a series of allocations of government funds to reforestation programs.

“This agreement for 71.51 million, equally shared, was for five years. Although the largest support, of 60 million, was for the construction of primary all weather access roads, 6.9 million was allocated to the construction of silvicultural camps and the expansion of tree nurseries” (Armson et al. 2001). During the 1970’s, the forestry industry received a great deal of support from Frank Miller, Premier of Ontario, which helped the reforestation sector immensely. He was responsible for the creation of a conference in 1978 called the Ontario Regeneration Conference, held in Thunder Bay that was attended by academics, government and senior foresters. The purpose of this conference was to “identify and discuss the factors which presently inhibit the expansion of the Ontario regeneration program and to recommend solutions so that we can significantly increase the annual area of regeneration” (Armson et al. 2001). At this time the commitments of the conference, as written by Armson, Grinnell and Robinson, were as follows;

1. A firm Commitment to improve forest management
2. The need for close government and industry cooperation
3. Recognition that the regeneration gap is really a symptom and in curing that symptom we launch ourselves into a total improvement of the total forest management system in the province
4. The need for a working definition of the regeneration gap is the difference between the acres cut and the areas regenerated (Armson et al. 2001).

This conference in Thunder Bay was followed up by a second conference in Kapuskasing in 1984 that examined the implementation of the recommendations made at the Ontario Regeneration Conference. Following these conferences, there was yet another amendment to the Crown Timber Act and the Forest Management Areas were placed into this Act.

As stated previously, the first forest company to sign a Forest Management Agreement (FMA) was Abitibi Price (formerly Abitibi Power and Paper Company). Those that followed in Abitibi's footsteps were E.B. Eddy Forest Products (now called Spanish Forest), Great Lakes Forest Products (now called Avenor, English River Forest) and Spruce Falls Power and Paper Company (Gordon Cosens Forest). Under the FMA's the companies were allowed to choose the name for the forest region that would be under their management. This was included in the agreement in order to encourage a greater sense of stewardship and responsibility. By the year 1994 there were 28 FMA's in a region of over 180 000 square kilometers (Armson et al. 2001). These FMA's were issued for 25 years on a 5-year renewal plan, (Whan 2000). These Forest Management Agreements caused an increase in the demand for tree seedlings due to the component of the agreements to plant "not satisfactorily regenerated" areas (NSR) and the "move by companies into a much greater program of planting to ensure more rapid and successful regeneration" (Armson et al. 2001). NSR areas must be identified for depletions such as harvest, pests, fire or blow down and must be treated within 20 years (OMNR 1994). The creation of FMA's resulted in the move to using Ontario's private tree nurseries and container stock in order to meet the growing demand for more seedlings. Financial incentives were offered to these private nurseries if they would produce greater volumes of container stock for the Ontario government. This program began in 1985 and produced 5.5 million seedlings. This number had jumped to 77.7 million by 1990, with 34 nurseries in the private sector as opposed to the 8 or so that were in production in the early 1980's. There were many relationships developed between the nurseries, the forestry companies, the government and the silviculture companies at this time. Nursery stock production peaked in 1989 with record production of seedlings of more than 171

million container stock seeds. Vast amounts of money were allocated to the research and development of reforestation initiatives during these years as well, with the Canada-Ontario Forest Resource Development Agreement, a 5-year agreement of \$150 million dollars that was funded by both private companies and the provincial government. This agreement was

Aimed at expanding all aspects of silviculture on federal, provincial and private lands in Ontario. Research was a strong component of COFRDA, resulting in the completion of ecosystem, soil and site surveys for much of northern Ontario. The agreement provided the first fire decision support system for the province, and started the process toward digitizing all forest resource inventory maps, as well as an expanded silviculture program (Canada-Ontario Cooperation in Forestry, 2003).

Most research here was allocated to the survival of tree seedlings, since survival rates were still quite low. With the new allocation of funds and the desire to see seedling live longer, there was an increase in stock survival rates from 60% in the 1970's to at least 90% in the 1980's and early 1990's (Wagner and Columbo, 2001).

There were many committees and councils developed in the 1980's that reflected the burgeoning relationships between the forestry companies and the Ontario government. The province saw the creation of the Ontario Forestry Council in 1984, the Ontario Forestry Research Committee in 1986, which partnered with the Ontario-Canada Joint Research Forest Committee. In the years 1988-1992, there was also an ongoing hearing of public meetings for the Class Assessment of Timber Management on Crown Lands in Ontario, which was a process to outline the correct environmental practices and procedures for forestry practices in Ontario. Approval was granted in May of 1994, and indicated that the priorities would last for a time period of nine years. The Approval provides the legal basis for the Ministry of Natural Resources to carry out timber management activities on Crown land in Ontario. The Timber Management Environmental Assessment approval also sets out the

terms and conditions for carrying out forest management activities on Crown lands in Ontario. It includes requirements for the development of guidelines and programs, as well as activities related to forest management planning, which include the requirement to conduct public consultation, construction of access roads, harvest, renewal and maintenance operations (Ontario Ministry of Natural Resources, 2003).

Existing data at this time concerning regeneration efforts was extremely limited, and if it even existed at all it was for time periods of less than five years. This lack of relevant data resulted in the creation of the Forest Resources Program's initiative to Survey Artificial Regeneration in Northern Ontario in 1984, which was designed to answer three questions concerning regeneration of Crown Land in all the Forest Management Agreement Areas in Ontario. Phase one of the survey culminated in 1986 and resulted in three main conclusions, as stated by Armson, Grinnell and Robison;

1. Where the five main species were planted (white, red and jack pine, and black and white spruce) or seeded successfully, during subsequent stand development a variety of other trees and shrubs were found to inter-grow with them, thus refuting claims that artificial regeneration resulted in monocultures
2. For the five main species, 20-25% of the regeneration areas failed to meet the criteria for inclusion in a new forest inventory
3. Approximately 20% of the regenerating areas for jack pine, black spruce, and white spruce failed to meet free-to-grow standards; red and white pine this was 30% to 50% respectively. Invariably other tree species occupied these areas (Armson et al, 2001).

These recommendations and other results were not published in any specific documents but were presented at a variety of reforestation conferences in Ontario over the years. These conclusions led to the further investigation of forestlands, with an eventual private audit commissioned by the Ministry of Natural Resources that would assess the state of the regenerated Crown Lands. The Northern Ontario Development Agency (NODA) was developed in order to replace the former Canada-Ontario Agreement, which was developed

in 1984 and had been responsible for the production of 166 million seedlings and the regeneration of 110,000 ha of logged land, but expired in 1990. Therefore, a new agreement had to be implemented. NODA was developed in 1991 and contained a forestry section that would provide funds for the research and development of reforestation initiatives in Northern Ontario. This agency emphasized the decrease of artificial regeneration, and called for a greater focus on natural regeneration of logged lands. The NDP government of 1990 laid out a direction in a policy agreement for “more natural regeneration and the pursuit of social and economic uses of forest other than timber production” (Wagner and Columbo, 2001). In March of 1996 the conservative government announced the closing of four provincial nurseries in Midhurst, Thunder Bay, Gogama and Chapleau, with the goal of eliminating all provincial nurseries by 1997. The Ontario government was striving to have all nurseries become privately owned and operated and work directly with the forestry companies. This was the beginning of the new commitment to move away from the intensive tree plantations and to begin to allow the land to naturally re-seed itself.

January 25th 1993 marked a major change in the direction of reforestation efforts in Ontario. Bud Wildman, Minister of Natural Resources at the time, announced a plan to “drastically reduce the planting program” (Wagner and Columbo, 2001) in the province due to high costs, to improve the focus on natural regeneration, and to increase manual tending of plantations. This decision was not well received by the public and was thought to contradict all reports and studies on tree plantations in Ontario. A variety of new initiatives to re-plant Southern Ontario’s decimated forest lands were announced at this time as well.

Sustainability had become a word used often in the forest products industry in the 1980’s. The word was born into the mouths of the public in 1987, once the World

Commission on Environmental Development popularized the concept as “a way to balance environmental protection with the social and economic needs of humans, now and in the future” (Ontario Forest Industries Association, 2003). Sustainable development is development that meets the needs of the present world without compromising the ability of future generations to meet their own demands. Government, non-government organizations and individuals embraced this theory and a vested interest about the sustainability of Ontario’s forests was taken. In 1992 the United Nations Conference on Environment and Development (UNCED) committed to the goal of sustainable development. In the years that followed, Canada became one of the first countries to apply the concept of sustainable development to the realities of forest management. The result was a shift in forest policy and practices that saw the traditional focus on timber expand to include the management and sustainability of entire forest ecosystems. In the context of forest management, sustainable development includes environmental sustainability, a healthy ecosystem that is productive and renewable, social sustainability, awareness and understanding of changing social needs and values, and economic sustainability, benefits that exceed costs and the ability to generate economic value now and in the future (Ontario Forest Industries Association, 2003). Sustainability became the guiding principle towards forest related activities in Ontario.

In 1994, a new piece of legislation called the Crown Forest Sustainability Act replaced the Crown Timber Act. The Crown Forest Sustainability Act has a comprehensive ecosystem approach to the forests of Ontario. The Act is based primarily on the 127 recommendations of the Class Environmental Assessment for Timber Management on Crown Lands in Ontario, which will be discussed further in the chapter. The Crown Forest Sustainability Act is important because it puts the cost of renewing the forest and ensuring

sustainable forestry on the shoulders of industrial licence holders. Fees from harvesting are put into the Forest Renewal Trust, which reimburses silvicultural expenses. Another fund, the Forestry Futures Trust, pays for silvicultural expenses in Crown forests where trees have been killed or damaged by fire or natural causes; where the forest resource license holder becomes insolvent and for intensive stand management and pest control (Boreal Forest Network, 2003). This new Act was intended to accurately reflect the future for forestry practices in Ontario.

Over the years there have been many changes in forestry policy and legislation, as well as a wide spectrum of public ideas and perceptions. Developments have been large scale and diverse, and will continue to evolve as Ontario ages and new research is completed, new data is available, and goals and objectives change. The next section of the paper will discuss current practices of silvicultural operations.

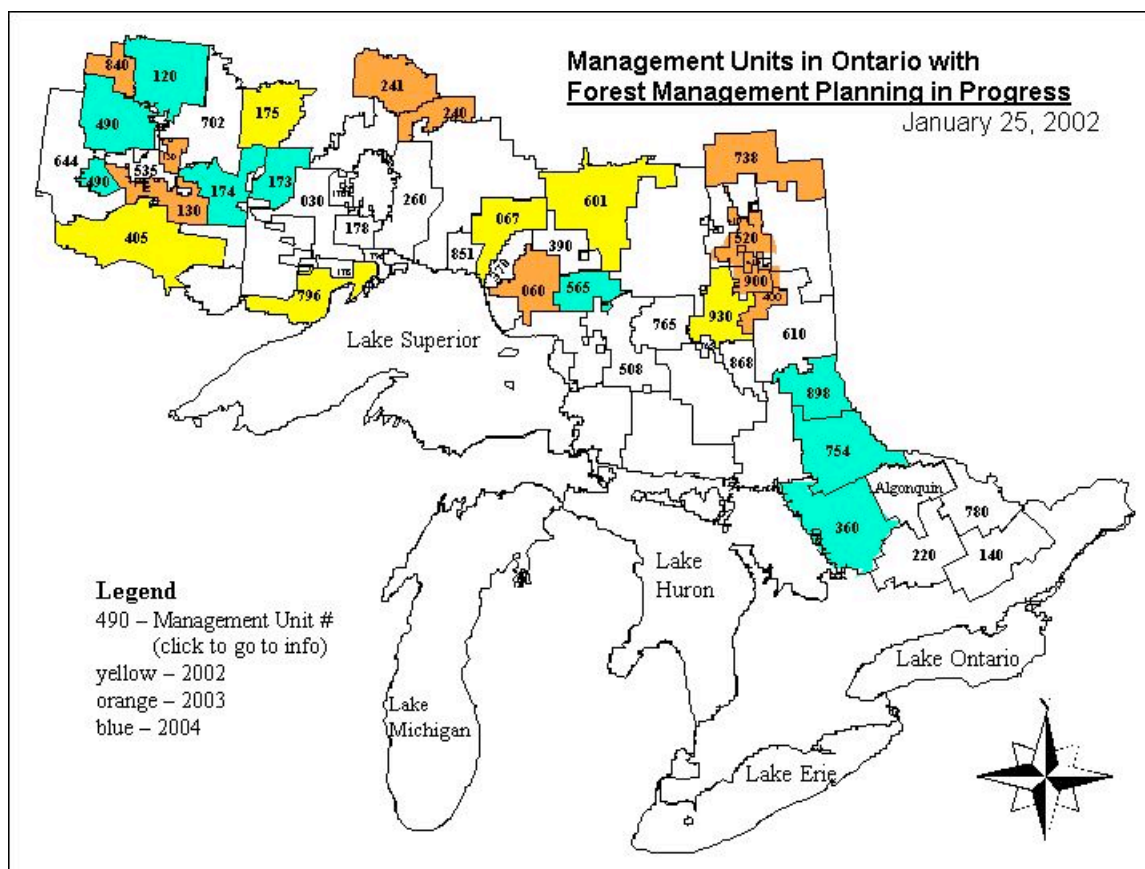
Forestry Legislation and Policy

This section will examine the current forestry legislation and policy in Ontario. Procedures, guidelines, regulations and requirements will be looked at and their cumulative impacts discussed. This section of the paper will give an overall view of what policies exist today in Ontario that guides the practice of forestry and reforestation.

The key forest Act in Ontario is the Crown Forest Sustainability Act. The Act is “enabling legislation that provides for the regulation of forest planning, information, operations, licensing, trust funds, processing facilities, and remedies and enforcement, and transitional provisions” (Ontario’s Forests, OMNR, 2003). The creation of this Act was meant to allow for an expansion of the traditional management focus from timber to include all forest-based values. The Crown Forest Sustainability Act, implemented in April of 1994,

was created “to provide for the sustainability of Crown forests and, in accordance with that objective, to manage Crown forests to meet social, economic and environmental needs of present and future generations” (Ontario Ministry of Natural Resources 1994). The Act provides mechanisms to ensure the sustainability of Ontario’s Crown forests. The Act recognizes that Ontario’s forests are unique in ecological processes and biological diversity and should be conserved. It also recognizes that in order to ensure the long term survival of these forests the forest practices used on these lands should “emulate natural disturbances and landscape patterns while minimizing adverse effects on plant life, animal life, soil, air and social and economic values, including recreational values and heritage values” (OMNR 1994). The Crown Forest Sustainability Act (CFSA) deems that forest management plans be established for each designated Forest Management Unit (FMU) and be included in a document entitled the Forest Management Planning Manual (FMPM). The forest management plan is required to state the management objectives and the strategies applicable to the management unit while at the same time respecting the natural features of the environment. This map shows the forest management units in Ontario in 2002 and shows over twenty areas which were in the process of being developed into FMU’s.

Figure 2.2 Forest Management Units in Ontario



The Crown Forest Sustainability Act, most recently amended in 2002, is legislation in Ontario that states “the Minister enters into agreements with landowners such as municipalities and conservation authorities to manage the forest lands; and that the Minister, with the approval of the Lieutenant Governor in Council, may establish programs for the encouragement of forestry” (OMNR 2003). This act deals with forestry agreements, tree conservation, and reforestation areas, in addition to several specifics about forestry fees and other such things. Section 12 discusses the agreements for forestry purposes, stated here;

“The council of any municipality may enter into agreements with the owners of land located in the municipality providing for,

- the reforestation of portions of the land;
- the entry and planting of trees upon such portions by the employees or agents of the council; and
- the fencing of the portions and conservation of all growing trees thereon by the owner. 2002, c. 17, Sched. C, s. 12 (4).“ (OMNR 2003).

Section 19.2 deals with replanting and states

“If a person is convicted of an offence under clause (1) (b), the court shall consider all evidence given in respect of the necessity of replanting the area on which trees have been destroyed and may order the owner of the area to,

- replant the trees, in the manner and within the time that the court considers appropriate; and
- adequately maintain the replanted trees in the manner the court considers proper. 1998, c. 18, Sched. I, s. 21” (OMNR 2003).

The CFSA provides for supply agreements and establishing licenses for harvesting of timber resources on managed Crown land. These 20-year renewable licenses are called Sustainable Forest Licenses (SFL) and require the bearer to carry out forest renewal and maintenance activities on the Crown land that ensures the long-term sustainability of the forest resource. On a short-term basis, the CFSA provides that the Forest Resource License holders may also enter into agreements with the Minister of Natural Resources for renewal and maintenance activities (OMNR 1994). The SFL licensee is responsible for operational activities, which include: forest management planning, providing information about the forest to the Ontario Ministry of Natural Resources, harvesting, forest renewal and forest monitoring. The OMNR requires Sustainable Forest License holders to perform these activities according to ministry rules and guidelines and to ensure that activities support the long-term health of the forest. The SFL will provide the license holder with a renewable license, lengthy tenure, and access to a long-term wood supply. SFL holders gain greater control over planning and conducting their forest operations that improve their business

efficiency. An SFL is an incentive for the SFL holder to demonstrate it manages sustainably. Some markets may only accept forest products from forests that are certified as sustainably managed. The Crown Forest Sustainability Act also requires that those who hold the forest licenses pay the Crown harvesting charges relating to the forest resources.

This Act has made room for the establishment of a Forest Renewal Trust Fund and a Forestry Futures Trust Fund to “reimburse silvicultural expenses incurred in Crown Forests” (OMNR 1994). The Forest Renewal Trust Fund is funded through a portion of the harvesting fees that are paid by the logging company to the Crown. The money in this trust may only be used for a specific forest renewal activity. MNR requires an SFL holder to develop a forest management plan for managing the forest sustainably. The SFL holder must follow Ontario Ministry of Natural Resources CFSA guidelines for sustainably managing forests on Crown land. These guidelines are a series of criteria laid out within the Forest Management Planning Manual for Ontario’s Crown Forests, published in September 1996. The management plan will show where a company may harvest, how it may harvest, the standards to meet for forest renewal, and areas of forest that must be protected. Forest management plans also provide the authority to carry out forest management activities including road access, timber harvest, and forest renewal, tending and protection treatments. An SFL holder must have received OMNR approval of its plan before it begins its logging operations. The Crown Forest Sustainability Act further ensures that Sustainable Forest License holders will follow the set guidelines by requiring the company to be more accountable for their own actions in their Forest Management Unit. The Ontario Ministry of Natural Resources assumes the responsibility of carrying out “spot checks” and audits on the operations of the forest companies, by focusing on areas where the potential for environmental degradation and destruction is greatest.

Companies that do not comply with the regulations for sustainable forest management are subject to administrative penalties of up to \$15,000, court fines up to \$1 million, and may be liable for the costs of remedial work (OMNR 1998).

The Crown Forest Sustainability Act has established four manuals designed to guide various aspects of forest management in Ontario. These manuals include the Forest Management Planning Manual, Forest Information Manual, Forest Operations and Silviculture Manual, and Scaling Manual. Ontario's forest management guides include technical considerations, guidance, and performance targets used during the preparation and delivery of forest management plans. They include both standards and guidelines. They may also include suggestions on the best ways of carrying out forest management operations, sometimes referred to as "best management practices" (OMNR 2003). Each of these manuals provides a detailed description for the management of silviculture operations on Crown Forest Land in Ontario. Each guide reflects current scientific knowledge as it applies to the province of Ontario, as well as provides descriptions of general standard site types for use in developing silvicultural ground rules in timber management plans (OMNR 1997). They are revised and updated approximately every five years based on experiences in using the manuals, and as new scientific information becomes available. Revisions to the four manuals will be made through consultation with non-government organizations and advisory committees such as the Provincial Forest Policy Committee and the Provincial Forest Technical Committee (OMNR 2003). These four main guides are further sub-divided into specific manuals that deal with a variety of forestry issues. One manual that exists with relation to reforestation practices in Ontario is the *Artificial Regeneration of Ontario's Forests: Species and Stock Selection Manual*, which provides an overview of artificial

regeneration operational procedures, including: seed considerations, types of nursery stock, selection of nursery stock, ordering seedlings, handling and care of planting stock, and monitoring seed health (OMNR 2003). Another relevant manual is the *Boreal Mixedwood Silvicultural Guide*, which describes the silvicultural practices for this forest region, and the two silvicultural manuals that are directly related to the management of the forest ecoregions of the Great Lakes-St. Lawrence Lowlands Conifer Forest and the Black Spruce, Jack Pine and Aspen on Boreal Ecosites. Because this paper will be focusing on the Great Lakes-St. Lawrence Lowlands Conifer Forest, mainly along the top of the identified zone, where species such as white pine, black spruce, jack pine, aspen and white birch species common to the Boreal forest zone, an examination of the *Silvicultural Guide to Managing for Black Spruce, Jack Pine and Aspen on Boreal Forest Ecosites in Ontario* would be most appropriate here.

The *Ontario Ministry of Natural Resources: Direction '90s- Moving Ahead in 1995*, a document issued in January of 1995, identified the need for the Ontario Ministry of Natural Resources to concentrate on those roles that were most vital to ensuring that the provincial interests in resource management were defined and achieved (McDonough, 1997). The report outlines the general goals and objectives for the ministry, based on sustainable development concepts expressed by the World Commission on Environment and Development. A Statement of Environmental Values was established under the Environmental Bill of Rights (EBR), and describes how the purposes of the EBR are to be considered whenever the decisions that might significantly affect the environment are made in the ministry. The EBR calls for an “ecosystem based (ecological) approach to the management of Ontario’s natural resources” (*Silvicultural Guide for Managing Black Spruce, Jack Pine and Aspen on Boreal*

Ecosites in Ontario, OMNR 1997). Although this seems like a realistic goal, who is enforcing that all decisions made are compared to these environmental values? An overall commitment by the industry to the continued healthiness of Ontario's forests seems more likely to be achieved than the EBR merely stating that goals and commitments need to be "referred to" when the Ministry is making decisions.

There are many incidents that occur when the government makes decisions based on politics and the betterment of the government in charge. Currently, the Algonquin Wild lands League reports that the Ministry of the Environment in Ontario has released a declaration order to allow logging on public lands in the province. This is just another government action that puts timber values and economics behind the continued future value of the forests. The Wildlands League claims hat this decision will lead to implications that include

- 1) Eroding accountability to the public for forestry operations,
- 2) Guarantying industry a wood supply that is unsustainable by overriding environmental consideration, and
- 3) Weakening requirements for monitoring the impact of forestry on our forests (Algonquin Wildlands League 2003).

The Wildlands League states that these decisions will further prove that the legally binding rules for forest management on public land have not been upheld. These rules expire in May 2003, and once this happens, there will be many consequences to the sustainability of Ontario's forests (Algonquin Wildlands League, 2003).

Sections of the manual concerning reforestation discuss many specifics as to silvicultural practices. One example can be found in Section1 p. 3 and discusses the Forest Management Planning Manual (OMNR 1996) and the Crown Forest Sustainability Act

(CSFA 1994). The overall guideline for forest management in Ontario is the Policy Framework for Sustainable Forests (OMNR 1995). The goal to be achieved in Ontario's forests is "...to ensure the long term health of our forest ecosystems for the benefit of local and global environments, while enabling present and future generations to meet their material and social needs." On the topic of reforestation this is achieved through Section 2 pp.3. Section 2 discusses "the establishment of a tree crop by natural or artificial means (seeding or replanting)" and states that silviculture practices take the steps that are necessary to help meet the province of Ontario's management goals and objectives under sustainable development. This section goes on to further state that tree planting as a choice of regeneration is made through consultation of a variety of steps, such as considering factors like

- Reproduction habits of the desired and competitive species
- Access to site
- Availability of nursery stock/seed
- Availability of seed on site
- Slash volume and distribution
- Availability of micro sites
- Management objectives
- Management constraints
- Pre-harvest stand characteristics
- Quantity and distribution of advance growth
- Site type or ecosite
- Site characteristic, limitations and hazard potential (OMNR 1997)

Artificial Regeneration is the topic discussed in Section 2 p. 33. Artificial reforestation is described as "the establishment of a tree crop by either direct seeding or planting seedlings or cuttings." The act of planting trees is described by Natural Resources Canada as "establishing a forest by setting out seedlings, transplants, or cuttings in an area" (NRC 1995). Using planting as a type of silviculture practice in Ontario provides the greatest control over stand density and structure to achieve Ontario's management objectives. It is

considered to be one of the most intensive and most expensive silvicultural activities and is suitable for a wide range of sites. It is also recognized as the best choice for productive, competitive or degraded sites (OMNR 1997). Planting trees in Ontario provides:

- A choice of stock types
- A faster and more successful method of re-establishing crop trees on a site
- An opportunity to match growing stock to the site
- Control over species composition
- An opportunity to introduce genetically improved stock (faster growth rates, disease resistance)
- Uniformly spaced stands can be more productive than the stands established by seeding or other natural methods (OMNR 1997).

Before choosing planting as an effective silvicultural tool, the manual states that the following things must be considered;

- Can other less intensive regeneration methods be employed?
- Is the stock from an appropriate seed source, reducing the risk of manipulations?
- Is stock available and is the type/species well matched to site conditions
- Is direct planting without site preparation an option?
- Is deep planting an option for the site
- Is area-based planting an option
- Is spacing appropriate for management objectives
- Will ingress of naturals cause overstocking?
- Is local seed available making it possible to maintain the local gene pool? (OMNR 1997)

The *Silvicultural Guide for Managing the Great Lakes-St. Lawrence Conifer Forest in Ontario*, recommends on page six in section 7.6, that Planting is used to regenerate areas where:

- Crop tree seed sources are missing, such as in clear cuts or abandoned fields
- Seedling establishment is considered to have a low probability of occurring, e.g. white pine
- Red pine may be planted in shelterwood cut sites if seed crops do not coincide with site
- Preparation
- Competition from non-crop plants limits survival of naturally regenerated

seedlings

- Conditions or events limit the managers ability to create site conditions that favor
- Germination of seeds of desired trees (OMNR 1998).

Even though planting has a long history in Ontario, success rates on plantations are not always guaranteed. For example, the *Silvicultural Guide* provides surveys that show white pine, red pine and white spruce plantations were in most cases “over-topped by poplar, red maple or balsam fir” (OMNR 1998). Failure of most of these plantations can be attributed to:

- Failure to develop and implement adequate pre- and post-treatments
- Poor stock quality
- Poor planting stock storage and handling practices
- Failure to consider all known factors, such as browsing, that may impact on planting success (OMNR 1998).

The Guide states that planting programs are more successful when:

- Proper attention is paid to planting stock and site selection
- Planting stock is properly stored and handled (*refer to Guidelines for Proper Handling of Planting Stock*, OMNR Science Specialists 1998).
- Stand and site conditions before and after harvest are carefully considered and a vegetation
- Management strategy is developed
- The consequences of all known factors are considered. For example, are ungulate
- Populations likely to be high when the seedlings are within browsing height?
- Many cedar and hemlock plantings have failed in central Ontario because they were established within areas prone to high browsing pressure from deer or moose (OMNR 1998).

Section 7.4 on page 7 of the *Silvicultural Guide to Managing for the Great Lakes-St. Lawrence Conifer Forest in Ontario* discusses Stock selection and timing of planting operations. Many different nursery stock types are available today. The two types of nursery

stock available are container and bareroot. Most forest managers know that it is important to match stock, species, stock size and method of culture, to site conditions. Information on planting stock performance of conifers in the Great Lakes-St. Lawrence forest is quite limited. Results on planting white spruce in boreal sites suggest that larger stock (bareroot) is usually better than smaller stock (container) (McMinn, 1998). Studies comparing container stock with bare-root stock suggest that if both stock types are similar in size at the time of planting, container stock will have better survival and growth size (Mattice et al., 1998). There is evidence, primarily from boreal planting trials, that spring is the best season to out-plant seedlings. These findings support “operational experience that spring planting in the Great Lakes-St. Lawrence forest results in good performance.” There have been very few fall tree plants in the Great Lakes-St. Lawrence forest regions recently that would be able to determine the comparative advantages of late season planting to early season planting.

Section 7.4.2.2 describes stand and site conditions. Logging operations on forest land often take only the best quality trees, therefore leaving behind the poorest quality tree stands. This is an important factor that contributes to the failure of many tree plantations. The guide describes an example, where,

Mixedwood sites with low quality white birch, red maple, balsam fir along with pine and spruce are often converted to pulp quality species when only the pines and spruces are harvested. Follow-up site preparation and tending is required when tree-size, polewood-size or seedling-sized stems of potentially competing species are left in cutovers. Ecosites may be used to match desired tree species and site conditions. Ecosite groupings may be used to identify suitable species and site matches when developing Silvicultural Ground Rules (OMNR 1998).

Section 7.4.2.3 discusses seedling quality. Nursery managers need to make sure that only hearty seedling stock is shipped to the field. Forest managers need to be assured by the nursery that their planting stock is healthy. A small difference in initial healthiness can mean

major growth differences that may be maintained over the life of a tree. These differences in growth, when accumulated over large forest areas and many years can affect the forest management objectives. Seedling quality may be affected by nursery practices, storage and handling, and quality may be “determined by observation of physical attributes such as the presence of mould, dead needles and other features described in brochures on stock handling and storage” (OMNR, 1998). To minimize the planting of unhealthy seedlings, it is recommended in the guide that seedlings are inspected before shipping and are monitored regularly in the field by trained personnel.

These regulated manuals outline strict guidelines that must be followed by forestry companies in Ontario. These manuals are a form of regulation because the Crown Forest Sustainability Act provides the legal authority for all four manuals, which outline the rules and procedures for forest management on Crown lands in Ontario. The rules are used to guide how strategic policy direction, legislation, regulations, program policies and strategies, obligations and commitments are achieved through the business practices of the Ministry and its partners. The procedures establish how policies, programs and related activities are to be delivered in the field from an administrative point of view. Together, the rules and procedures constitute a list of sequential tasks that must be performed according to defined levels of competency. Like regulations, these manuals are approved by Cabinet and define the responsibility of government officials and business partners as well as the basic fixed and managerial arrangements regarding forest management. Unlike regulations, they provide more detailed information for forest managers in their daily operations (OMNR 2003).

The Environmental Assessment Act in Ontario is a key piece of legislation that forestry professionals must comply with. In order to comply with this legislation, the Ontario Government prepared an environmental assessment of the activities associated with forestry and included the areas of construction and maintenance of access roads, harvesting and reforestation. In April 1994, the Environmental Assessment Board, which presided over the Environmental Assessment hearing on the Ministry of Natural Resources Class Environmental Assessment (CEA) for Timber Management on Crown lands in Ontario, issued its decision. That decision approved timber management in Ontario, subject to 115 legally binding terms and conditions, which include 25 associated appendices (OMNR 2001). Chapter 6 of the Reasons and Decisions of the class environmental assessment for Timber Management on Crown Lands in Ontario is entitled “Regeneration: Helping the Forests Grow Back.” It discusses the conflicting opinions between the forest industry and the government in terms of regeneration of Crown Land. There is a general consensus that the forest industry and the public want the forests to be regenerated, the challenge is to find a general consensus as to how to go about that. The CEA reported that the majority of Ontario’s timber supply comes from conifer species in the boreal forest. “About 30-35% of this even-aged harvest is being regenerated by planting, another 15% by seeding and the remainder by planned and unplanned natural regeneration” (OMNR). Almost all of the uneven-aged harvest, mostly in the Great Lakes-St. Lawrence forest, is regenerated by natural methods. Most harvest and regeneration now takes place on Forest Management Agreement lands, so the forestry companies and their agreements with the Ontario government are prominent in any discussion about forest renewal in the area where reforestation will occur. This chapter discusses the methods used to prepare a site for

regeneration treatments, the planting and seeding techniques known as artificial regeneration and the different methods of natural regeneration, both "planned" and "unplanned." The chapter also discusses how professional foresters decide whether artificial or natural regeneration is the preferred treatment for a cutover. Chapter six concludes that a wide variety of regeneration methods are appropriate for different site conditions and necessary for successful regeneration across the area of the undertaking (Ontario Environmental Assessment Board, 1994). The main results of this report indicate that planting trees in Ontario has been satisfactory and that successes have been proven. There were many examples of how the right choice of artificial reforestation on the right piece of land can prove to be beneficial. The Environmental Assessment Board was convinced by information from the Ontario Ministry of Natural Resources that some level of artificial reforestation is essential to renewing depleted forest resources (Ontario Environmental Assessment Board, 1994).

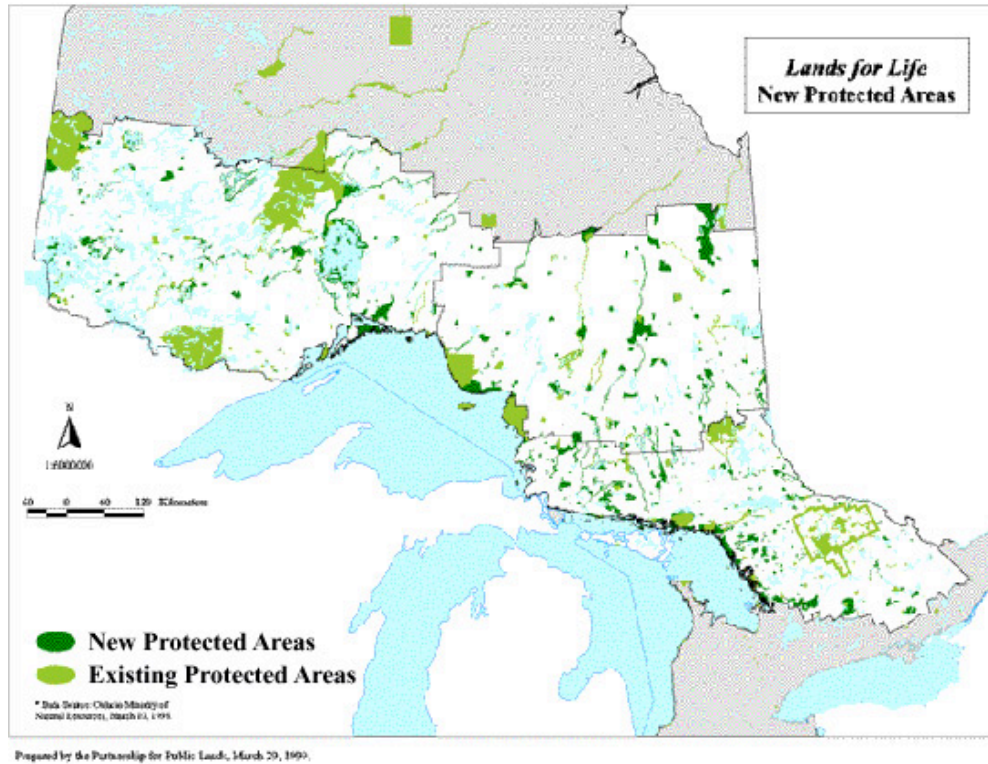
Another important policy that exists in Ontario and concerns the forestry sector is the Ontario Forest Accord. The Accord is a series of 31 commitments that committee members agreed to provide a framework for the future cooperation and will outline the direction for areas such as forest science, policy and timber licensing. Those involved in the implementation of this policy include members of the forestry industry, the Partnership for Public Lands consisting of representatives from the Algonquin Wildlands League, the World Wildlife Fund and the Federation of Ontario Naturalists, and the Ministry of Natural Resources. These committee members joined together to create a series of established protected natural areas in Ontario while at the same time considering the needs of the forest industry. This Forest Accord was released at the tail end of the public consultation process

called Lands for Life that took place in 1997 and 1998. The Lands for Life process was established to examine the existing comprehensive land use policy in Ontario and to amend this policy so that it would be in tune with the attitudes and the ideals of the time. The goal was to increase the existing protected areas by 12% in Ontario (OMNR 2001).

In July of 1999, the Ontario government released a strategy called Ontario's Living Legacy, a product of the Lands for Life procedures. This land use strategy was the province's plan for 39 million hectares of public land and water in the province's central and northern areas (OMNR 2001). Ontario's Living Legacy provides "strategic direction for the long term health of our natural resources in an area that cover 45% of the province" (OMNR 2001). The result of this strategy added 2.4 million hectares of new provincial parks and conservation reserves to the existing system of protected areas. A recent decision that has been made with the support of Ontario's Living Legacy was the 450,000 dollars towards the acquisition of 3.7 hectares of undeveloped waterfront property on Nottawasaga Bay in Ontario. The area is one of the few remaining undeveloped areas on Nottawasaga Bay and is noteworthy for an abundance of well-preserved fossils. "The black shale making up the shoreline contains trilobites, nautiloids and other creatures that once inhabited the sea that covered this area 425 million years ago" (OMNR 2003). Premier Ernie Eves announced in February 2003 that the town of the Blue Mountains will match this amount and that the funds will go toward protecting and improving fish and wildlife habitat, providing employment for young people, and enhancing opportunities for tourism and outdoor recreation (OMNR 2003). Although the area is small, the point is that there are actions being taken that uphold the Lands for Life and Ontario Living Legacy Policies. Sometimes the size of the area doesn't matter as much as it does that these areas are being protected. The map below shows

the new protected areas that were established as a result of the Lands for Life process (Wildlands League 2003).

Figure 2.3
Lands for Life: New Protected Areas (2003)



John Snobelen, the former Ontario Minister of Natural Resources stated that

The Ontario Forest Accord and the work of the board have once again demonstrated that the forest industry, the environmental community and the government can co-operate in making significant recommendations on the use of our forests. Together we can protect both the province's natural heritage and the economic viability for the forest industry and our northern communities (OMNR 2002).

Although many of the 31 commitments outlined in the Ontario Forest Accord deal with the topics of intensive forest management and forest management areas, there are no specific commitments that deal with reforestation of forest land.

Some of the new developments in recent years concerning the forestry sector are the volunteer licensing program that has become popular among the industry. Called “green forest licensing” by Ben Kuttner at the Wildlands League in Toronto, Ontario, these licenses are a way for forestry companies to gain a larger portion of the market share in Ontario, as well as Canada. Ben Kuttner identified four certification options for companies to increase their public profile and opinion. These are the Canadian Standards Association, the International Association for Standardization, the Sustainable Forest Initiative, based in the USA, and the Forest Stewardship Council. Tembec, a “company of people building their own future,” became a leader in the forest industry with the company's decision to obtain one of these forest certifications (Tembec 2003). Tembec is an integrated Canadian Forest Products Company principally involved in the production of wood products, market pulp and papers. With sales of over \$4 billion dollars annually, Tembec operates over 55 manufacturing units in Ontario as well as in New Brunswick, Quebec, Manitoba, Alberta and British Columbia, with other divisions in France, the United States and Chile. Tembec employs approximately 10,000 people (Tembec 2003). Ben Kuttner explains that Tembec believes that these voluntary certification systems are the promise of the future, and realizes that they are not an overnight solution, that the change will come as a result of new knowledge and implementation of this knowledge. In conjunction with Impact Zero and Forever Green, Tembec has implemented an Environmental Management System (EMS) in accordance with ISO 14001, a certification from the International Organization for Standardization.

ISO 14000 grew out of ISO's commitment to support the objective of "sustainable development" discussed at the United Nations Conference on Environment and Development, in Rio de Janeiro, in 1992. The ISO/IEC Strategic Advisory Group on

Environment (SAGE), set up in 1991, brought together 20 countries, 11 international organizations and more than 100 environmental experts to define the basic requirements of a new approach to environment-related standards. EMS's are “part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy” (IOSC 2003). The Environmental Management Standard as taken on by Tembec sets out the management structure that is required by both Impact Zero and Forever Green for forestry management. The EMS is a series of company specific management tools and procedures followed by Tembec to ensure that the environmental aspects associated with Tembec's manufacturing and forest activities are under control, and that environmental objectives are properly managed (International Organization for Standards Committee 2003).

The Ontario Professional Foresters Association, on February 15th, 2003, posted a notice on their bulletin board that Forest Certification was gaining strength in North America. Although this report contains data for all of Canada and the United States, there is some specific information in regards to what is occurring in the province of Ontario. A report originally released by the Certification Watch, an independent organization researching and reporting on the global forest certification developments, states that overall, forest certification has gained strength over the last year. The 65-page report gives an overview of the state of forest certification, certified forest product procurement and related initiatives in North America (OPFA, February 15 2003).

In Canada, the Forest Products Association of Canada now requires forest certification for membership in the organization beyond the year 2006, and the Canadian

Standards Association Standard underwent a significant revision while regional standard development continued under the Forest Stewardship Council, particularly for the boreal forests (OPFA 2003). In other provincial news, a group of 21 private landowners, making up the Eastern Ontario Certified Forest Owners (EOCFO) and the Eastern Ontario Model Forest (EOMF) alongside the Forest Stewardship Council obtained FSC forest certification that began January First 2003 and ends on December 31st, 2007. “The members of the EOCFO collectively represent 10,000 acres of forest land” (OPFA 2003). After two and a half years of an extensive certification process, the finished wood products from the forests owned by the private landowners areas can now be sold as certified and come with an assurance that the products come from a well managed forest (OPFA 2003). This example shows that there is a way of achieving sustainable forestry in the field. With private landowners on the certification bandwagon as well as public landowners, the certification process will continue to make leaps and bounds with each passing year.

Summary of Reforestation Trends Since 1995

As a result of the Class Environmental Assessment for Timber on Crown Lands in Ontario, the Ontario Ministry of Natural Resources is required by law to produce a provincial Annual Report on Timber Management that must also be recorded in the Provincial Legislature. The intent of this requirement was to provide the public with important statistics on forestry. The first provincial Annual Report on Forest Management was produced for 1995-1996 and included statistics for the following; “forest inventory; forest industry statistics and harvest volumes; timber losses due to insects, disease, fire, and other causes; government revenues; area harvested; regeneration activities, surveys and expenditures;

roads built and maintained” (Ontario’s Forests 2003). A report has been filed every year since, with a cumulative State of the Forest report to be filed every 5 years.

The Canadian Parks and Wilderness Society stated in a news release in November of 2000 that the Provincial Auditor of Ontario found that the Ministry of Natural Resources does not have enough data available to meet the annual requirements for these Annual Reports. Specifically, despite being required by the Environmental Assessment Board to report the accurate findings every year, the last report issued by 2000 was for the 1995-1996 fiscal year (Canadian Parks and Wilderness Society, 2000). Eric Peters, the Auditor General in 2000 said that he “couldn’t assure the public that our forests are being managed sustainably” (CPAWS 2000). The report released identifies problems with the management plan and makes recommendations about how to fix them. The report notes on page 222 that “in 25% of the FMU’s audited by registered professional foresters, that due to a lack of information, the foresters could not assess the harvest area successfully...” (CPAWS 2000). Other issues that were identified include forest inventory resources that are over 20 years old which cannot possibly contribute to accurate data collection, significant violations of the ministry policies indicating a need for an upgraded forest industry inspection process, such as developing a formal ministry oversight program (CPAWS 2000). Combined with inconsistent enforcement of penalties, these issues indicate that these annual reports may not be the best sources of information in regards to forest management in Ontario.

The first of the Annual Reports was published in 2001 and is a document which “overviews Ontario’s forests regions, the managed forests, industrial wood supply, the legal and policy requirements for state of the forest reporting, and the provincial, national and

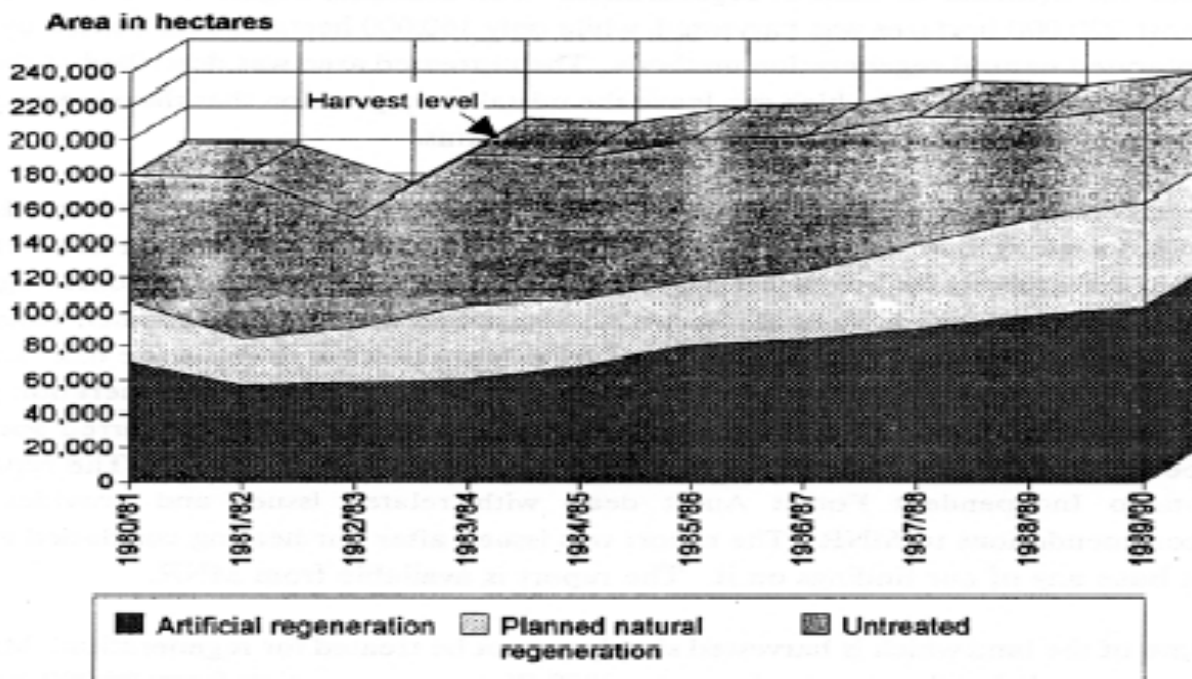
international context for C & I reporting and forest sustainability evaluation” (Ontario’s Forests 2001). The report lists the forests for which management plans are being prepared, were initiated or had been approved. It also discusses results of negotiations with Aboriginal peoples and reports MNR progress on scientific research, technical development programs and policy development programs.

As of writing this thesis, the State of the Forest Report did not contain information that dealt specifically with forest renewal. The reasoning that was given for this was due to the discrepancies in documentation that exists within the companies in terms of recording regeneration activities. In the past, before the logging companies took over the responsibilities for planting trees through the sustainable forest licenses, records were not kept in an accurate and organized fashion. Forest managers often preferred to report natural regeneration after regeneration surveys had been completed. This caused a delay in reporting, and resulted in the reported annual renewal levels being much less than the reported annual harvest levels. In 1996, new reporting procedures came into affect that require natural regeneration to be reported at the time when forest harvest is completed. With the current commitment to recording and publishing accurate forest statistics, it was mentioned that once all reports for a five year basis, commencing in 1998, were completed, then there would be initiatives taken in order to assess all provincial economic expenditures with regards to planting. This information would be available and assessed in the year 2007. The report states that a “comparison of reported harvest and regeneration levels, both natural and artificial, on an annual basis is not appropriate because of the regeneration establishment period and the reporting delay” (OMNR 1995-1996). The information that is contained in the Annual Reports is intended for a “baseline tracking purpose” (OMNR 1995-1996). A

projected date of 2007 seems high if the data is begun to be collected in 1998, when the report stated that in 1996 the new reporting procedures came into affect. If the data begins to be compiled for the year 1997, then potentially, the data can be available in 2001, and a second five year summary in 2006. It seems unreasonable that the data will not be available until 2007.

Chapter Six of the Annual Reports on Forest Management in Ontario for each year discusses forest renewal. It states here that in the province of Ontario, forest regeneration is achieved through both natural and artificial methods. It also states that these methods are outlined in the Forest Management Plan of the logging company, both how these methods are to be implemented and where these renewal activities will take place. The report shows that regeneration levels tend to follow fluctuations in harvest and, to a lesser degree, forest depletions from natural causes such as forest fires, disease and insect epidemics. The decline in logging in 1991, which has been followed by a steady increase ever since is reflected somewhat by renewal levels, and the report states that “regeneration levels declined and reached their lowest levels in 1994 and have since rebounded” (OMNR 1996-1997). When looking at the data brought forward in the Class Environmental Assessment by the Ministry of Natural Resources for Timber Management on Crown Lands in Ontario, we can see that the statistics show more land is logged every year in Ontario than is treated, wither for natural or artificial regeneration. These untreated areas are often referred to as a “regeneration gap,” the amount of land or area between the harvested land and the area that is planted. It is the land that remains in limbo, undecided as to what will become of it (Ontario Environmental Assessment Board, 1994). The chart below indicates further these gaps that were reported by the Ministry of Natural Resources.

Figure 2.4
Provincial Crown Land Regeneration and Harvest Levels
(1980-1931 – 1989-1990)



The increase of natural regeneration is discussed in the 1997-1998 Annual Report, as well as why the lack of data that exists because this method of regeneration was previously not recorded once the natural methods had been implemented. “This delay in reporting in addition to the regeneration establishment period resulted in the reported annual renewal levels being substantially less than the reported annual harvest levels” (OMNR 1997-1998).

The 1998-1999 Annual Report on Forest Management’s Chapter Six on forest renewal includes a comparison of reported harvest and regeneration levels on an annual basis which is not appropriate due to the regeneration establishment period and the reporting delay, as described above. A comparison of average harvest and regeneration levels over a five-year period is more appropriate here, but at the time of writing this information was unavailable.

This annual report contains specific information as to the regenerating methods used in the forest management units as well as the species and stock type used. In this report, the areas under study were in the six Forest Management Units of Driftwood Forest, Timmins Forest, White River Forest, Kenora, Pembroke, and Timmins. The report states that the area of natural regeneration reported was significantly lower in 1998-1999, but the artificial regeneration activities, such as planting and seeding, were considerably higher compared to the previous year. The use of bareroot seedlings decreased again in 1998-1999, and made up only 10 percent of the total planting activity in the province. Container stock was used in 90 percent of all other tree plantations. The total number of seedlings planted in 1998-1999 was about 134.0 million trees, which was a 23 percent increase over 1997-1998 levels. The area planted also increased from 1997-1998 to 1998-1999 by about 15 percent to 84,704 hectares. This was partly due to efforts to replant larger areas burned by wildfires in the three-year period from 1995-1996 to 1997-1998 (OMNR 1998-1999). Jack pine was the main species used for seeding, most of which was done in the Northwest Region of Ontario, and, to a lesser extent, in the Northeast Region. The overall seeding levels were slightly lower in 1998-1999 than in 1997-1998. Mechanical site preparation is the main method used in all regions. (OMNR 1998-1999).

The area of natural regeneration reported was significantly higher in 1999-2000. The largest change for area reported as clearcut with natural regeneration is in the Northwest Region of Ontario. Overall, the higher natural regeneration area from clearcuts offsets any reductions in 1999-2000 in natural regeneration area from seed tree cuts and uniform shelterwood cuts in the Northeast and Southcentral Regions. Assisted regeneration activities were also slightly higher compared to the previous year, particularly in the Northwest and

Northeast Regions. The Southcentral Region had a reduction in assisted regeneration (OMNR 1999-2000). The use of bareroot seedlings decreased even further in 1999-2000, and made up only six percent of the total planting activity in the province. Container stock was used in the other 94 percent of the program. This number reflects the industry trend towards the increased use of container stock to meet planting requirements as described in Chapter One. The following chart will show the decrease in use of bareroot stock since 1996 and the increase of container stock use, as well as a total number of seedlings planted by the artificial method of tree planting.

Table 2.1
Number of Bareroot Seedlings and Container Stock Seedlings
Planted in Ontario (1969-2001)

Year	Planting (per hectare)	Trees-Bareroot	Trees-Container	Total
1969-1997	72,566	19,919	81,384	101,303
1997-1998	73,907	14,677	94,010	108,687
1998-1999	84,704	13,077	120,994	134,077
1999-2000	92,956	8,460	125,039	133,499
2000-2001	81,716	2,981	119,734	122,715

The total number of seedlings planted in 1999-2000 was about 133.5 million trees, which was almost equal to 1998-1999 levels. The area planted however, increased from 1998-1999 by about 10 percent, to 92,956 hectares. Jack pine is the main species used for seeding, most of which was done in the Northwest Region and, to a lesser extent, in the Northeast Region. The overall seeding levels were slightly lower in 1999-2000 than in 1998-1999, except for seeding areas following site preparation. Total regeneration (both assisted and natural) increased in 1999-2000 as compared to the previous year (OMNR 1999-2000).

The Annual Report for 2000-2001 includes 18 management units, differs only slightly in terminology, and still contains the same components as the last 4 years. It is stated here that container stock now makes up 98% of the provinces planting stock, meaning that bareroot stock has been almost completely eliminated. (OMNR 2000-2001). The area of natural regeneration reported was significantly higher in 2000-2001 than in previous years. The largest increase in clear cut areas using natural regeneration was in the Northeast Region. This was due to an increase in the use of Careful Logging around Advance Growth (CLAAG) methods. Careful Logging around Advance Growth is “an operational practice where the objective is to remove the over storey, protect under storey advance growth, and regenerate an even- aged stand” (OMNR 2000-2001). Another operational practice known as Harvesting with Regeneration Protection (HARP) is a silvicultural method applicable only in uneven-aged lowland black spruce. HARP “protects and retains stems below a set diameter, leaving an uneven-aged and uneven-sized stand” (OMNR 2000-2001).

Assisted regeneration activities decreased in 2000-2001. There was a trend towards more effective use of natural regeneration methods, especially in the clear-cut regions of the Northwest and Northeast parts on Ontario. In many cases, natural regeneration can be supplemented with “fill in” planting and then spaced out to produce an “acceptable stand”. The recent trend towards this method of planting is an attempt to mimic the natural forest instead of planting a monoculture. When much of the original forest cover remains, there can be natural regeneration that will more than likely be closer to the original forest. When only a few seedlings are planted in specific areas that may need assistance, it is possible to allow these areas to seed artificially but at the same time benefit from the natural forest area. As stated above, bareroot seedlings declined in 2000-2001, and made up only two percent of the

total planting stock in the province. The total number of seedlings planted in 2000-2001 was 123 million, a reduction of ten percent from the previous year. The reason for this reduction was the increasing industry trend towards the use of natural regeneration and “fill in” planting, which uses less planted stock. There was a corresponding reduction in the area planted (OMNR 2000-2001). Jack pine was the main species used for seeding, and there was a reduction in the use of direct seeding in the Northwest Region, again due to the increased use of natural jack pine regeneration. Black spruce was also seeded on lowland sites in the Northeast Region only. The overall seeding levels were somewhat lower in 2000-2001 than in the year before. The total area regenerated, including both artificial and natural methods, increased in 2000-2001 as compared to the year before (OMNR 2000-2001).

The following chart shows the five-year periods in which the amount of harvested area and the total area regenerated are compared and shown in a percentage of the amount that is less than the area harvested. This shows that in the 1990's there was a definite movement away from the general idea in the 1980's to plant one tree for every tree that is cut down. Although there is a significant amount of area being planted, there is still a large amount of land sitting cutover, but regenerating naturally. The amount of that area is decreasing each year, yet it seems contradictory to the statement that more areas are being left to regenerate naturally. It appears that more and more land is being regenerated. The data could, however, be indicative of both natural and artificial regeneration, and the increasing percentages meaning that less land is being left untended. The Annual Reports are not specific as to what type of regeneration is included in the percentage less than the average harvest level.

Table 2.2
Harvested and Regenerated Areas in Ontario
(1991-2001)

Year	Harvested Area (Hectares)	Area Regenerated (Hectares)	Non-regenerated area (%)
1991-1995	200,000	161,000	20
1992-1996	206,000	170,000	17
1993-1998	211,000	175,000	17
1995-2000	198,478	188,000	12
1996-2001	221,902	198,000	7

The following chart shows the numbers of seedlings planted each year since the Annual Reports came into publication. The trend here is that the number of seedlings planted has been decreasing each year, mainly due to a reliance on natural regeneration and a movement to methods like CLAAG and HARP. These methods promote careful logging procedures, a commitment to site and species protection, and allow parts of the old forest to remain so that the new forest can grow and receive benefits from the original forest cover.

Table 2.3
Seedlings Planted
(1998-2001)

Year	Seedlings Planted (millions)
1998-1999	134.0
1999-2000	133.5
2000-2001	123.0

The Canadian Council of Forest Ministers mandated the National Forestry Database Program (NFDP) in 1990 to establish a database describing forest management activities in Canada. Soon after this mandate was established, the NFDP identified a need to develop a system for measuring, analyzing, and reporting national forest regeneration statistics. The issue was viewed as a question; were forestry practices in Canada ensuring satisfactory

regeneration of harvested lands? REGEN was developed to report on forest regeneration activities and conditions on harvested lands. The data is presented on a Web site provided by the provincial and territorial agencies responsible for the management of forest resources in their jurisdictions. “REGEN’s underlying conceptual model clearly identifies the linkage between treatments (harvesting and other silvicultural activities) and regeneration status, and characterizes the transitional nature of regeneration” (National Forestry Database Program, 2003). The approach “allows for the incorporation of updated information on the status of regenerating conditions as it becomes available”. The level of regeneration conditions are described in categories that relate to levels of stocking of commercial species and degree of competition. The regenerating land base of Crown forest lands harvested under even-aged forest management systems since 1975 was about 16 million hectares in 1998. Most harvested areas are regenerating successfully. Natural regeneration plays a much bigger role in Canadian forestry than planting or seeding. The area of forest land that remains understocked after harvesting is decreasing, which continues to be the theme in all data available today.

Chapter Two has reviewed the history of reforestation in Ontario, showing the development of tree planting programs in the province, and detailing the developments of practice and procedure. The literature review has shown that an evolution in the reforestation sector has been constant, and with the commitment of the provincial government to planting trees in cutover areas, privatizing tree nurseries, and changing the management of forest areas to the responsibility of the logging company, the improvements in policy, practice and procedure have been tremendous. With a continued commitment to responsibly managing Ontario’s forests, making sure that tree plantations are geared specifically to the area that has

been logged, and a balance between natural and artificial reforestation, plantations can only improve in the years to come. It is up to the contract companies, the logging companies, and their employees to make sure that this goal is carried through in all activities that relate to the reforestation sector.

Chapter Three- The Logging Industry

This chapter will discuss some of the major players in Ontario's forestry sector. It is important to recognize that each of these companies are major international conglomerates who have merged many smaller independent logging firms in the province. This chapter strives to understand the backgrounds of these companies and examines the reforestation sector of the company. Some companies have more extensive operations in place mainly due to their size and financial position. However, there are specifics on how many trees must be planted in relation to how many can be cut. This is called the annual allowable cut.

Ontario does not determine an annual allowable cut in either area or volume. Area regulation is used to determine the level of harvest in hectares for a five-year term within the context of a forest management plan for each forest management unit in the province. These plans also provide estimates of the volumes available (National Forestry Database, 2001). In the past, the level of harvest has been determined "as a limit to all depletions including natural depletions (e.g. fire) and reserves (established to protect values)" (NFDB, 2001). The figure calculated for each management unit "was a gross level of harvest which was netted down through the planning process to determine the actual area available for harvest. About one fifth (or 19%) of the figures by management unit, which are included in the 2000-2001 AAC, still represent that method of calculation of allowable cut" (NFDB, 2001). The following chart shows the summary of factors in the AAC determination for 2000-2001.

Table 3.1
Annual Allowable Cut (2000-2001)

	Softwood	Hardwood	Total
Area (ha)	191,371	121,441	312,812
Volume (cubic metres)	20,464,008	11,439,101	31,903,108

There are a limited number of major logging firms in Canada. These companies control the rest of the smaller logging firms in the province, being the larger corporate structure in the forestry game. Some of these companies are Weyerhaeuser, Domtar, Tembec, Timiskaming Forest Alliance and Kimberly-Clark. Each of these corporate players has control over the smaller companies in Ontario and is responsible for carrying out the forestry operation in that area. Other forest management companies, such as Clergue Forest Management Inc, have access to a variety of forestry regions and are responsible for the activities that take place within these regions. Clergue Forest Management is a forest management company that is responsible for forest management planning, access, harvest, renewal and maintenance on the Algoma and Wawa forests. It is made up of six management companies, St. Mary's Paper Ltd., Domtar, Weyerhaeuser, Midway Lumber Mills Ltd., and Columbia Forest Products. In another example, Northshore Forest inc. is the Sustainable Forest Licence holder for Northshore Forest and is managed by a board of directors. Domtar Forest Resources has been hired as the management contractor to deliver the forest management program to the Northshore Forest. Domtar, on behalf of Northshore Forest Ltd. is responsible for directing the planning, harvesting, renewal and tending for the management unit (Canada's Forest Network, 2003).

Domtar Inc.

Domtar Inc., an integrated forest products company, has operations all over the world. 82% of their business lies in pulp and paper, 10% in packaging and 8% in lumber (Domtar Inc., 2003). Domtar's vision is "to grow and be a world leader in forest management and in paper, pulp and wood products" (Domtar, 2003). Domtar also owns 52% of Normapac Inc., Canada's largest producer of containerboard and corrugated containers and is part owner in a variety of mills in Ontario, including the Elk Lake Planing mill in Elk Lake. Domtar Inc. manages private and public lands in Quebec and Ontario with both direct and indirect land management responsibilities of 11.5 million hectares of forest land, and has adopted a policy of ensuring the public that all of the company's forest management activities are conducted in accordance with the principles of sustainable forest management. Their mission is "to anticipate and meet the ever-changing needs of customers, to provide shareholders with attractive returns and to foster a dynamic and creative environment in which shared human values and personal commitment prevail" (Domtar, 2003). As a multi-faceted company, Domtar has a variety of business ventures within the logging industry.

In the early 1990's, Domtar, along with many other logging companies, made a commitment to the idea that companies would be responsible for their own reforestation activities. At this time, they also began releasing environmental reports to the public as well as creating policy statements. The E.B. Eddy Group, in 1993, released a report on sustainable development, stating its dedication to forest regeneration as

To achieve the company's wood supply objective, a forest renewal strategy was adopted which should produce 1.3 million cubic meters of softwood annually by the year 2050. to achieve this volume, intensive reforestation techniques are carried out in the most productive areas available. Seedling survival rates after five years are 90%. E.B. Eddy forester's routinely analyze regeneration projects to ensure that harvest areas are reforested to standard or better. Over 98% of the areas harvest by E.B. Eddy

between 1980-1985 have met or exceeded government standards (Wagner and Columbo, 2001).

These commitments show a dedication to continuing the long term wood production, as Domtar is a money making business, however, the acceptance of responsibility of many of these companies shows a commitment to ensuring the long term survival of Ontario's forests. Despite the financial position of the company being the main goal of logging firms, they seem to have recognized the importance of preserving the wood supply of the province. At a time when public interest in the health of forests was growing, it was almost necessary for logging companies to publish their policies on forest management, especially if the information was positive. Much of the information that is available about forestry activities in the early 1990's indicates that there were vast improvements in regeneration programmes. Many successes were achieved, and a conscious effort was being made to understand the ecological effects of regeneration techniques. Overall, these companies were now fully committed to making the best decisions possible in terms of forest renewal.

Timiskaming Forest Alliance Inc.

Timiskaming Forest Alliance Inc. (TFIA) is a private forest management company that has assumed the forest management responsibilities for the Kirkland Lake Administrative District since October of 1994. The Timiskaming Forest is more than 10,000 square kilometres. A consortium of forest industries, TFIA ranges from small independent logging operators such as Rosko Forestry Operations Ltd. and Paiement and Sons Ltd. to large forest products producers such as Domtar, Tembec, and Norbord Industries Inc. TFIA assumes responsibility for forest management planning, forest renewal, establishing a forest resource inventory as well as assuming responsibility for forest maintenance (Timiskaming

Forest Alliance Ltd., 2003). TFIA is responsible for ensuring the long term renewal of the forests within its region. Treeplanting is a major component in this category. Although the company recognizes its commitment to replanting logged lands, the work is usually contracted out to local service providers. Each and every contractor has a vested interest in the establishment of successful reforestation programs. By adhering to the established harvest plan, the contractors may “change their techniques to reduce the costs of regeneration and to improve the overall effectiveness of the renewal efforts” (TFIA, 2003). TFIA is responsible for the entire cycle of forest management activities within their region in Ontario. In 2001 TFIA planted 8 million trees in Ontario, and this number indicates a rise in treeplanting efforts as the overall logged areas have not increased. Before TFIA assumed responsibility of the Kirkland Lake Administrative District, the Ministry of Natural Resources in Ontario was planting just less than 2 million trees. Timiskaming Forest Alliance has pledged its commitment to sustaining local economies, and has four nurseries located within the Timiskaming Forest land base, including North Sun Nurseries and PRT North Gro, and one nursery in Timmins, Ontario, Milson’s Forestry Service. The trees that TFIA plants are planted and tended to by three reforestation companies, Treeline Reforestation based in Swastika, Matachewan First Nation in Matachewan, and Wahgoshig First Nation in Matheson (TFIA, 2003). The commitment to local industry and services is further reflected in the choice of contractors located within the area. Timiskaming Forest Alliance has created a mandate for self compliance, and has “implemented a comprehensive self-compliance program to monitor all activities undertaken by the company and its shareholders” (TFIA, 2003). This includes a “pre-harvest assessment in order to verify that the planned silvicultural prescriptions are appropriate and effective” (TFIA, 2003) as well as regular inspections of all

operations that the company performs in order to ensure adherence to both company and ministry standards and requirements. Follow up regeneration assessments and constant monitoring of planted land relates this commitment to self-compliance.

In terms of forest renewal, Timiskaming Forest Alliance states that forest renewal is “one of the most important responsibilities” (TFIA, 2003) that their company has. Once a block is cut, there are a number of steps that are taken in order to help the forest return to a healthy forest that will continue to benefit all. The seeds must be collected and the seedlings have to be grown and nurtured. The block must be site prepared in order to accept the tree seedlings or the seeds from an Ariel spray and the trees must then be planted, thinned and protected. The average tree plant for TFIA is 6 million trees, which does not include seeding and natural regeneration. TFIA contracts out their renewal operations, and the logging contractor ensures that the block has been prepared in a way that will facilitate the planting of trees. TFIA contracts out the seedling growing, tree planting, tending and protection to local service providers such as nurseries and contract reforestation companies. TFIA’s “integration of harvesting and forest renewal operations and the development of local services have resulted in the majority of the harvested blocks being regenerated within one year of harvest” (TFIA, 2003). TFIA has a commitment to regularly checking with staff and auditors to ensure that their quality and performance is up to standards. The Ontario Ministry of Natural Resources follows up with their system of monitoring and verification to ensure compliance with the Sustainable Forest Licence. Although planting trees is an expensive process, the availability of the Forest Renewal Trust Fund allows TFIA to utilize the revenues for the sole purpose of regenerating the forests. Over the last five years, TFIA has spent 20 million

dollars locally on forest management planning, renewal and maintenance (TFIA, 2003). In the summer of 2001, 8 million trees were planted in the Timiskaming Forest (TFIA, 2003).

Norbord

Norbord, a hardwood overlay supply plywood mill in Cochrane, Ontario, consumes over 150,000 cubic metres of wood from Crown Land annually, and employs 225 people in the region, with another 50 on a contract basis (Norbord, 2003). There are treeplants that are located in Northern Quebec, run by contractors located in Ontario. Norbord is a daughter company of Nexfor, previously Noranda Forest. There are mills owned and operated all over Quebec and Ontario which utilize the wood supply. In a policy statement released in 1991, the Noranda Forest Inc. stated “Our performance in forest renewal is demonstrated by the consistent restocking of logged areas within the period prescribed in approved forest management plans” (Columbo and Wagner 2001). Similar to Domtar, the company recognized its responsibilities to ensuring the long term commitment to forest renewal. This statement and company commitment has carried through the years over changes of ownership.

Tembec

Tembec is an integrated forest products company that is primarily involved in the production of wood products, market pulp and papers. With sales of over \$4 billion dollars, the Company operates over 55 manufacturing units in the Canadian provinces of New Brunswick, Quebec, Ontario, Manitoba, Alberta and British Columbia, as well as in France, the United States and Chile. Tembec employs approximately 10,000 people (Tembec, 2003). Tembec’s environmental responsibility is “to establish policies and guidelines in all phases of operations which provide for responsible stewardship and sustained yield and development

of resources, while protecting the health and safety of employees, customers and the public” (Tembec, 2003). Tembec was created in 1973 in Temiscaming, Quebec, when the community rallied in support of their livelihood. The town’s economic sustenance, a pulp mill owned by a large multinational corporation, was shut down in 1972. The mill’s former employees and Temiscaming residents began a fight to save their jobs, and their efforts “created a unique and unprecedented relationship among entrepreneurs, unionized employees, the community and levels of government” (Tembec, 2003). The mill was purchased and Tembec was born. By 1997, Tembec owned sawmills in Timmins, Hearst, Cochrane, Kapuskasing and Kenogami and pulp mills in Smooth Rock Falls and Kapuskasing. In Ontario, Tembec manages and operates on 3.5 million hectares of productive forest on six sustainable forest licenses and three forest management units. Tembec is committed to “the regeneration of the forest by sanctioning a large section of human, technical and financial resources towards this goal” (Tembec, 2003). There have been two Environmental Management Programs initiated within the company, called Forever Green and Impact Zero. Frank Dottori, President and Chief Executive Officer, stated “these programs will allow us to demonstrate responsible stewardship of our resources and a continual improvement of our environmental performance” (Tembec, 2003). In addition to these management programs, Tembec has become ISO 140001 certified, as described in Chapter Two.

Dan Simis, Registered Professional Forester, is the Area Forester of the Gordon Cosens Forest working out of the Kapuskasing office of Tembec. Simis is responsible for the Spruce Falls tree plant, which accounts for 5 million of the 9 million trees planted annually in the Gordon Cosens Forest. The Gordon Cosens Forest has had a long history of tree planting.

The forest area is located in the middle of the clay belt in Northern Ontario, and has predominantly low wetland forest types that are harvested in the winter. This allows the mosses to be protected under the snow cover, and allows for a more successful natural regeneration in the spring. Tembec in Spruce Falls uses the CLAGG (Careful Logging Around Advanced Growth) method and Group Seed Trees in the forest area with “excellent renewal success” (Simis, 2003). Tembec plants trees on about 5000 hectares each year, on lands that require more intensive treatments in order to “remain conifer efficient” (Simis, 2003). In a letter received from Mr. Simis, he reports that Tembec has moved away from planting bareroot stock and has planted container stock exclusively for the past two years. There are two nurseries that supply Tembec’s Kapuskasing plant with tree seedlings, Forestcare in St. Williams and Northern Clonal Center in Moonbeam. Tembec (Spruce Falls) typically has two contractors for the spring tree plant. The first has been Outland Reforestation for a number of years, and the second is a company run tree plant. The company plant consists of laid off woods workers who are responsible for planting approximately one million seedlings every spring. These employees are unable to work in the spring due to the company’s policy to not harvest in the spring in order to reduce impacts on the land. The contract plant generally has two separate camps working with around 85 planters to plant about 4 million trees within the duration of the contract. Mr. Simis writes “as far as quality assessments go, we maintain a significant presence during the tree plant. We have quality assessments done on both the company and contractor tree plants. Approximately one assessment plot per three hectares is carried out. We have a contractor representative on each plant wherever they (planters) are working. The minimum quality for the contract tree plant to receive full payment is 88%” (Simis, 2003). The following is a chart

that was created by Mr. Simis and shows the number of seedlings that have been planted in the Gordon Cosens Forest by Spruce Falls, the Ontario Ministry of Natural Resources, and various third parties since 1948 to the past year, 2002.

Table 3.2
Trees Planted in the Gordon Cosens Forest
Trees planted by Spruce Falls (Tembec), OMNR, and Third Parties
(1948-2002)

Year	# of Trees	Cumulative Total Planted
1948	1,200	1,200
1949	1,075	2,275
1950	43,500	45,775
1951	317,515	363,290
1952	530,005	893,295
1953	920,620	1,813,915
1954	1,235,350	3,049,265
1955	1,313,704	4,362,969
1956	1,556,900	5,919,869
1957	1,253,620	7,173,489
1958	1,514,400	8,687,889
1959	1,184,000	9,871,889
1960	1,430,050	11,301,939
1961	1,160,000	12,461,939
1962	1,426,800	13,888,739
1963	1,287,917	15,176,656
1964	1,496,515	16,673,171
1965	1,626,240	18,299,411
1966	1,524,536	19,823,947
1967	1,404,069	21,228,016
1968	1,208,165	22,436,181
1969	1,513,067	23,949,248
1970	1,399,620	25,348,868
1971	1,280,297	26,629,165
1972	1,553,684	28,182,849
1973	1,553,541	29,736,390
1974	2,103,655	31,840,045
1975	2,757,207	34,597,252

1976	2,340,929	36,938,181
1977	2,531,025	39,469,206
1978	2,243,480	41,712,686
1979	2,381,925	44,094,611
1980	3,583,313	47,677,924
1981	3,507,950	51,185,874
1982	3,586,914	54,772,788
1983	5,604,971	60,377,759
1984	7,152,196	67,529,955
1985	9,492,655	77,022,610
1986	12,323,446	89,346,056
1987	13,431,873	102,777,929
1988	10,142,535	112,920,464
1989	11,318,463	124,238,927
1990	11,705,755	135,944,682
1991	11,814,931	147,759,613
1992	9,252,229	157,011,842
1993	8,642,953	165,654,795
1994	7,498,088	173,152,883
1995	7,549,148	180,702,031
1996	7,945,667	188,647,698
1997	7,245,730	195,893,428
1998	9,959,654	205,853,082
1999	9,792,074	215,645,156
2000	9,324,668	224,969,824
2001	9,126,872	234,096,696
2002	8,955,804	243,052,500

This chart shows that each year in the Gordon Cosens Forest, the number of seedlings being planted has increased. This would seem contradictory to the data that exists in the Annual Forest Reports that state tree planting numbers have been decreasing over the years now that there has been a conscious effort on behalf of the industry to move away from intensive plantations. These reports stated that the highest regeneration levels in Ontario were reached in 1996-1997, yet the numbers above would indicate that there was a significant increase in the number of seedlings being planted since 1987. The important thing here is that each

individual forest will have specific numbers that indicate either an increase or a decrease in planted seedlings. The Annual Reports are on the entire province, and relate to the entire area being planted. Each company may have a different set of priorities, problems and successes that influence their numbers. The data also includes only some of the Forest Management Units, each year increasing in the numbers that are surveyed. The data that Tembec has provided above may not have been included into these data sets. The Annual Forest Report states that assisted regeneration activities declined in 200-2001, due to a trend to return to natural regeneration. In the chart provided by Tembec we are given data that relates specifically to tree planting, not natural regeneration. In order to assess whether or not the company has increased their natural regeneration programs, we would have to look at those numbers in comparison to the number of seedlings being planted each year. It is entirely possible that Tembec has doubled the amount of area being naturally reseeded in comparison to those areas which are being seeded artificially. In the Gordon Cosens Forest, the numbers show that there has been about a 10 million seedling increase each year since 2000. This data is not representative of the Annual Forest Reports, yet consideration must also be given here to realize that the data may not be indicative of the entire province.

Chapter Four- Reforestation Contract Companies

This chapter is an examination of the main contract companies in operation in Ontario. Outland Reforestation, Brinkman and Associates Reforestation Ltd., Broland Reforestation, and Wilderness Reforestation are all private reforestation companies that specialize in planting trees throughout Ontario. Many of the head offices are based in major cities, such as Outland's head office in Toronto, and have smaller branch offices in cities closer to the areas where the trees are being planted, such as North Bay, Thunder Bay, Timmins and Kapuskasing. Each contract company bids on a tree plant for each of the major companies in Ontario for the right to plant on the land available, such as those companies profiled in Chapter Three. Once the contract has been obtained, the treeplanting season typically begins in early spring, around the first of May. Each spring, hundreds of people head out into the forests of Ontario to work for these contract companies. Although there are many positive things associated with these treeplanting companies, the fact of the matter remains that these companies are there to make a profit, which may conflict with the best environmental and ecological practices.

Brinkman and Associates Ltd.

One of the oldest and foremost reforestation companies in Canada, Brinkman and Associates Reforestation Limited, has been in operation since 1969. By 2001, the company was celebrating the planting of its 600 millionth seedling. "BARL is recognized as a leader and innovator throughout the forest industry" (Brinkman and Associates Ltd. 2003). Their company mission statement, "To be known as the best in forest renewal worldwide," reflects the commitment to reforestation practices not just in Canada but worldwide. The underlying approaches to BARL's Silviculture and restoration services are based on "ecologically-sound

practices” (Brinkman and Associates Reforestation Ltd. 2003). Under the leadership of owner and operator Dirk Brinkman, BARL has been a driving force in the development of Canada's reforestation industry. In 1997, British Columbia passed a silviculture regulation, which required logging companies to reforest their land at their own cost, making sure that they were paying particular attention to ecologically appropriate species that were to be grown until they were free from species competition. Dirk Brinkman was a major lobbyist of this regulation, and since then, the regulation has transformed the reforestation industry in BC and across Canada. Other provinces have followed suit, and Brinkman’s operations in Ontario adhere to this framework (Cyr 1998). A founding member of silvicultural contractor associations across Canada, the company has participated on many steering committees and roundtables addressing national and provincial forest resource issues. Dirk Brinkman is also the editor of the Canadian Silvicultural Magazine. Many of BARL's innovations in equipment and operations have become industry standards, including planting bags and speed spades, girdling, mixed species/microsite planting, on-site camps, and seedling containers (BARL 2003).

The broad range of services that Brinkman offers its clients have proven to be effective in a variety of ecosystems all over the world. The success and professional reputation earned by the company are due to its employees, a core staff group that has established 35 specialized crews with over 1000 seasonal employees. BARL is a long-term supplier to many of Canada's major forestry companies, some of these for over 20 years (BARL 2003). Brinkman’s website lists their strengths as the following;

Reputation: Brinkman is a preferred supplier to Canada's leading forest companies, both large and small. They trust the company to develop and deliver the most effective silvicultural services and to maximize the return on their silvicultural dollar.

Personnel: The management and field operations team at Brinkman have an average of over 12 years of industry experience in the management of silviculture operations, meeting tight time deadlines and overcoming logistical difficulties. The health and safety of each person working on or visiting our operations is our top priority.

Policy Influence: Lead by Dirk Brinkman and Joyce Murray, the company has played a critical role in the development of the current regulatory environment for silviculture in Canada.

Facilities and Infrastructure: Brinkman has consistently expanded the facilities and infrastructure of the company to increase the quality and range of services offered to clients. The existing main and field offices, logistical facilities and equipment allow the company to offer integrated services across a wide range of silvicultural, restoration and technical activities.

Research Program: In order to stay at the forefront of silvicultural practice in Canada, Brinkman carries out research across a broad spectrum of activities, focusing on operational research, with a smaller concentration in theoretical areas (BARL 2003).

In regards to the area of silviculture, Brinkman and Associates' primary services have been “hands-on silviculture carried out by skilled workers at remote sites across Canada and around the world” for over 30 years (BARL 2003). Treeplanter.com and The Treeplanting Webpage offer company reviews so that both rookie and veteran treeplanters can have a forum to hear what others think about the company they work for. The comments that exist for BARL in message board formats on these websites seem to be the most positive of reviews for the three companies discussed here. Many of their employees, both past and present, state fair and reasonable tree prices, timely tree delivery, and a commitment from management to be fair and understanding. In accordance with BARL’s listing of company strengths as a major goal, planters have stated that Brinkman management is always willing to listen to complaints and issues being raised. Employees seem to be understanding about problems that arise associated with events out of their control, such as weather and nursery problems, and pay cheques were never an issue of not being received. Many tree planting contract companies have had problems with paying their planters full payment at the end of the season. Leslie, a Brinkman planter for 2 seasons in 1996 and 1997, said that “Brinkman is

a great company to work for. They make an investment in their planters by treating us well and keeping us happy. Planters will do a better job under fantastic management” (Canadian Treeplanter, 2000). Wade Girundi, the author of the Treeplanting Web Page, stands by Brinkman, calling their company “great” and that “their general attitude toward employees, work ethic, professionalism and humanitarianism management philosophy make them an outstanding company” (The Treeplanting Web Page 2003). Although treeplanting remains the company's primary activity, Brinkman silviculture crews also carry out activities on thousands of hectares such as brushing, spacing, and surveys each year, as well as girdling, fire control, slash burning and pre-commercial thinning. Brinkman and Associates recognizes all silviculture activities as both

Establishing and managing forest stands to maximize growth and performance for both timber and non-timber values; and restoring forest ecosystem dynamics to ensure long term ecological, social and economic sustainability (BARL 2003).

Tree planting contracts are no longer victims of the “lowest bid wins” curse, and the planters are valued for their high quality work. Many relationships between foresters, treeplanters, and contractors have been developed as a result of the commitment to Brinkman’s employees. Many of these relationships have developed into long term careers.

Brinkman & Associates has a “history of practical innovation in sustainable forest ecosystem restoration and management, including developing practical tools, techniques, operational systems, treatments and policies, such as the L'il Beaver Power Girdler, and Results Based Reforestation” (BARL 2003). Today, Brinkman divisions work across Canada from British Columbia to Ontario, as well as in Central America. Each Brinkman division provides a wide range of services to a wide range of private forest land managers, crown land licensees, and government clients.

In respect to plantation management, Brinkman and Associates have been “developing plantations designed to achieve high investment returns while providing significant ecological and social benefits since 1994” (BARL 2003). Plantation development is an extension of the company’s history of silviculture experience. Brinkman and Associates’ plantations “demonstrate that sound returns, in terms of both wood quality and quantity, can be achieved through the use of carefully planned and implemented intensive management” (BARL 2003). Accurate timing of treatments such as thinning and pruning is crucial in order to “maximize returns from plantations growing at rates in excess of 20 cubic meters of wood per hectare per year” (BARL 2003). Brinkman and Associates is a leader in the forestry industry in both planning and undertaking the necessary treatments required in establishing the best plantations and creating the highest return on investment.

As an example of further commitment to environmental management on land under reforestation contract, Brinkman and Associates “recognizes that healthy ecosystem function is a foundation for sustainability, and integrates ecosystem restoration goals into all silviculture and land management activities” (BARL 2003). Whether in an urban setting, along major highways and service roads, or in forest ecosystems, restoration can help to sustain the current ecological productivity, and restore it in damaged areas. Restoration designs, which use an area’s native species and recreate local ecosystem relationships, not only provide ecological value, but also can minimize ongoing maintenance costs and reduce the use of water, fertilizers and other energy and materials (BARL 2003). Brinkman’s restoration services in Ontario “range from slope bioengineering, to riparian restoration, to the re-establishment of core elements of complete ecosystems” (BARL 2003). While some restoration projects are focused primarily on achieving ecological goals, Brinkman

recognizes that “social, educational and aesthetic elements may also be part of successful restorations” (BARL 2003). Recent projects have ranged from remote site slope stabilization, to highway right-of-way naturalization, to placement of logs and rocks in an urban, artificial salmon stream (BARL 2003). It is this commitment to the overall successes of the reforested area that continues the success of this company. Brinkman continues to strive to be the leader in its field, and by constantly increasing their services available, this can only continue.

Yet another example of exceptional commitment to the overall package of successful reforestation, the Seedling Care division of Salt Spring Treeplanting, a Brinkman and Associates subsidiary, is dedicated to providing the company with high quality products that “assist in the establishment and growth of forest plantations and ecological restoration plantings” (BARL 2003). The goal of Seedling Care is “to provide cost effective products that minimize requirements for post planting treatments” (BARL 2003). Seedling Care currently focuses on browse control products which include Tubex and mesh tube seedling protectors and ties, and high quality stakes. Besides the complete browse control package, these products are available separately.

As a multi-faceted silvicultural company, Brinkman and Associates has made the change over the years away from a company that solely plants trees to a well rounded silvicultural organization dedicated to the success, management and restoration of its tree plantations not only in Canada but worldwide. It is this dedication and commitment that will continue to allow Brinkman to remain a leader in their field.

Outland Reforestation

Outland Reforestation Inc. is part of a national group of reforestation companies that includes Coast Range Contracting, Natural Borders and La Forêt de Demain. Regardless of

the companies names, Outland is one company, working together. Outland operates primarily in Ontario, Manitoba and the United States. Natural Borders and Coast Range operate in BC, Alberta, Yukon, NWT, Saskatchewan and Manitoba and La Foret De Demain operates exclusively in Quebec based in Rouyn Noranda. Outland Reforestation Inc. is “a leader in the field of providing reliable, high quality, cost-effective forestry services to Canada's Forest Products Industry” (Outland 2003). Established in 1985, Outland has a long track record of meeting their customer’s diverse needs on time and at full quality. It is their ability to “deliver a hassle-free service under a wide range of circumstances” (Outland 2003) that has helped Outland to become one of the largest tree plant contractors in Canada. With the overhead costs spread out over many jobs, Outland can offer highly competitive prices combined with the strongest quality and on-time completion guarantees in the industry. Outland’s client list is extensive and includes many major logging companies currently operating in Canada as well as many smaller companies. Some of these contracts have lasted for years, such as the Spanish Forest (formerly E.B. Eddy) contract and the Tembec contract in Kapuskasing, and the Grande Cache contract in Alberta. Outland has planted millions of trees over the years it has been in operation and has successfully completed a wide variety of other projects for many of their clients. In 1999, the combined companies of this organization planted an estimated 90 million seedlings. Together with their sister companies, Outland Reforestation is the largest tree plant contractor in Canada.

Since Outland was founded in 1985, it has planted hundreds of millions of seedlings and has become an industry leader at providing reliable, high quality, cost-effective forestry services.

The Outland challenge is;

To offer the best customer service in the industry. To be the best in such an aggressive business environment requires finely tuned field operations, development of competent staff, and maintenance of safe work practices, creativity and growth. Business growth has allowed Outland to offer an ever-increasing range of services to meet the forest product industry's needs. Much like the clients we work for, growth is one of the key elements to long term sustainability (Outland Reforestation 2003).

Outland Reforestation has a variety of recognized key strengths. One of these is a commitment to their employees. At Outland they focus a great deal of time and energy on ensuring that their employees and management are well trained. A mandatory two-day training session is required for all management prior to the start of a contract. However, two days doesn't seem to be quite so much when you consider that there are supervisors responsible for anywhere up to 85 people. Considering some management have been with the company and the industry for upwards of seven years, this training may very well be sufficient as every season is a learning experience. In each camp there is a safety officer, a veteran planter who is responsible for health and safety issues in the camp. In my experience, this position is held by someone who has been around for a few years yet doesn't always do the best job. The commitment to employee satisfaction has given Outland a highly motivated and experienced workforce. Outland hires a certain number of rookie planters each year in order to maintain a managed turnover among its workforce. However, the percentage of rookies to veterans can at times be as high as 80%. There are often three crews in one camp that are made up almost entirely of rookies, with maybe one vet on each crew. The final crew may be comprised of all vets and only one or two rookies. In each camp, there is one supervisor who oversees the entire contract, and a crew boss who runs each crew and is responsible for their production and recording the numbers of how many trees are planted

each day by each crew member. Crew bosses typically acquire more returning planters the longer that he or she has been working for the company and this proves to be more financially profitably for them in the long run. Crew bosses receive payment based on the production of their crews, and with a crew full of rookies, this payment may be lower than that of a crew of experienced planters.

Outland's supposed experience ratio is to be one of the highest in the industry and it translates into higher quality and faster completion times for the client. Outland's commitment to training new workers and retraining old ones allows them to maintain a consistently high level of experience and skill in their workers and management year after year. Yet there are still problems associated with this training as well. You can not train for time related incidents, and you cant train for general disorganization and inability to communicate with the planters. Many former Outland employees cite poor management-planter relations and feel as if the planter is just another face in the crowd. The goal sometimes becomes making money, and this affects the overall attitude of the camp. Unlike many smaller operations, Outland maintains that it is not fully dependent on a few key people. Their large employee base allows the company to have a managed turnover, steadily training new workers and management to replace those who leave the industry. As a result Outland can guarantee that now and in the future their company will have experienced management and employees ready to handle the client's forestry related needs.

Outland has a commitment to reliability. Due to the tremendous impact the weather can have on operations in the bush, it is not uncommon to see start dates delayed due to snow, frozen ground, washed-out roads etc. Due to the timing requirements for a sensitive operation such as treeplanting, delays are costly and can even jeopardize the success of the

program. At Outland, it is recognized that timely completion of a contract is a vital concern to their customers. Outland has a solid record in the business for completing contracts on time, even when facing poor weather and access conditions. Outland has completed every contract that it has undertaken. Outland has often been called upon to help other company's complete contracts that run past their deadlines. It is not uncommon to start a contract with one camp of planters, and by the end have increased the production crew to include those who have finished their contract and have moved on to help the rest of the contract company with its production. With a large workforce Outland has the ability to send crews of experienced planters to other jobs if they fall behind schedule. As a treeplanter, you sometimes expect to see a minimum of three contracts in a given spring.

A third commitment for the company is safety. Part of this commitment to the company's employees has been the "establishment of safety policies and programs to ensure worksites remain accident free" (Outland 2003). Outland is extremely proud of their safety record and the fact that they have never had a fatality or a serious, disabling injury among their employees. Although the company states this, it is common knowledge within the company that on the coast, there have been serious accidents that have occurred due to lack of sleep for management. Accidents do happen, however, and while Outland stresses prevention, they also have set-up safety representatives, first aid stations, accident response plans and extensive first-aid training certification among our management and employees (Outland 2003). Generally, once you get to a camp, the planters receive the necessary information to handle a variety of safety issues. Bee stings, broken bones, sprains and strains are all part of the job, yet long term illnesses can occur after planting careers end. A mysterious ailment called "Christmas toe" by planters all over Ontario is named for the

numbing sensation that planters may experience from their big toe hitting the front of their steel toed boot after kicking away the top layer of organic material, which is referred to as “duff” in the planting world. The numbness is rumored by some to last up until Christmas. Many planters from all different companies list carpal tunnel, back pain, and joint problems as issues that have always been an issue for planters in the long term.

The final recognized commitment of Outland Reforestation is flexibility. In reviewing the list of services and policies, Outland encourages clients and prospective clients to please keep in mind that above all else they are always willing to adapt to meet the needs of the client. Each customer has different priorities and requirements and Outland prides themselves on being able to adjust what they do to give the customer what they want. Outland Reforestation has over thirteen years of experience meeting various health and union regulations and can promise that their bush camps will meet all relevant requirements without question. Minimum standards are met and periodic visits by the health and safety official in the area are common. Union representatives will often show up to make sure that things are running in accordance to policy. In Kapuskasing, Tembec’s union requires that all planters sleep on raised wooden platforms so that they are not sleeping on the cold hard ground. On the Spanish Forest Contract, treeplanters are only allowed to work for 5 days in a row on union land, and the sixth day will be a day where non-union land is planted so that the union requirements are met.

The Outland website lists their tree planting specifics as the following;

- Experienced management
- Extensive training to adjust our experienced planters to customer specifications
- Comprehensive safety plan
- Self administered projects
- New, reliable and safety inspected project equipment & vehicles

- Tree / block inventory control system
- Stock handling and transport which exceed industry standards
- Computer generated block and daily summaries
- Assessments & quality sampling
- Permanent plots / survival lines
- Area based planting
- Specialized access equipment (helicopter, rolagon, hagglund, muskeg carrier, boat, quad) (Outland Reforestation 2003).

In addition, the company also provides a variety of other services, such as herbicide spraying, thinning, fire control, brushing, tree staking and nursery harvest management. The wide variety of these activities shows the commitment that Outland Reforestation has to the overall success of tree planting and forest management.

Broland Reforestation

Broland Reforestation hand plants ten to fifteen million seedlings each year. Full service contracts are offered by Broland, managing all aspects of a tree planting operation. Experienced managers are provided, along with reliable equipment and exceptional quality standards. At the peak of the tree planting season Broland employs between four hundred and five hundred people, on a contract or seasonal basis. Most of their work force consists of university and college students from all over Canada. However, Broland is committed to employing individuals from Northern Ontario communities. Broland Reforestation offers thinning seeded or naturally regenerated areas, clearing brush and hardwood out of plantations, orchard maintenance and road side clearing. Slash pile burying, cut-block layout, mapping, cone collection, ground spray, and data collection are all services that Broland Offers. Broland's clients include Domtar, Kimberly-Clark, Abitibi Consolidated, Bowater, Weyerhauser, and Kruger. Broland became ISO 9002 certified in 1994 (Broland 2003). Broland merged with Wilderness Reforestation to become the Wilderness Group in 2001 to offer their clients more quality services.

Wilderness Reforestation

Wilderness Reforestation is a tree planting company based out of Wawa, Ontario, and is now part of the Wilderness Group. The company began modestly, planting 835,000 trees for Algoma Central Properties and the Ontario Ministry of Natural Resources, in the Wawa District. Wilderness currently participates in large contracts with 4 major private lumber companies as well as a large amount of contracts for the Ontario Ministry of Natural Resources all over Northern Ontario. In addition to tree-planting, activities include data collection, coning, thinning, ground spraying and slash pile burning.

In 1989, Wilderness decided to embark on the Ontario Ministry of Natural Resources provincial roadside treeplanting operation. Trees were planted in Kirkland Lake, Kapuskasing, Espanola, Chapleau and Wawa. Wilderness expanded its MNR contracts in 1990 when it planted in, Sudbury, Sault Ste Marie, Thunder Bay, Cochrane, Kirkland Lake and Kapuskasing. Work was continued with both Dubreuil Forest Products and Algoma Central Properties. In addition to planting, Wilderness expanded its silvicultural activities by thinning 75 hectares of brush (Wilderness Reforestation 2003).

In 1991, Wilderness continued planting trees with the provincial government in a variety of districts. This year also included thinning and planting for Superior Forest Management/Green Forest Lumber in Chapleau. Planting contracts with the crown in 1992 included the districts of Blind River, Temagami, along with the other contracts they had had the previous year, as well as continued thinning and planting work with Superior Forest Management. Data collection and chemical application were some of the new activities that Wilderness added to their silvicultural services. Planting contracts in 1993 were continued with the Ontario Ministry of Natural Resources as well as with Superior, Dubreuil and CP

Forest Products. Domtar (White River) and Green Forest Lumber contracted Wilderness to complete a total of 300 hectares of thinning. The company also worked with Green Forest during a shelter-coning project that included 1,000 cones. Wilderness Reforestation was contracted to ground spray and collect 12,800 trees as part of a data collection project in the Wawa area (Wilderness Reforestation 2003).

In 1994 Wilderness added Avenor, J.E. Martel & Sons, and Domtar to their list of clients. The number of seedlings being planted was increasing, and the list of clients was expanding. Wilderness' 1995's plant also included a heli-tree plant contract with Green Forest for 400,000 trees. The year 1996 included the addition of the company's latest silviculture projects, slashpile burning and a stocking survey. Four thousand hectares were burned and 4,500 hectares surveyed in the Chapleau region. A total of 11,000,000 trees were planted for Superior, Dubreuil, Avenor, J.E. Martel, Domtar (Nipigon), North Bay and Wawa MNR Districts (Wilderness Reforestation 2003). The following chart shows the numbers of seedlings that Wilderness Reforestation planted since 1986, with their 100 millionth seedling being planted on June 12th, 1999 by an unknowing Wilderness Reforestation employee.

Table 4.1
Seedlings Planted by Wilderness Reforestation
(1986-1999)

Year	Seedlings (#)
1986	835,000
1987	1,445,000
1988	14,870,000
1990	7,253,000
1991	5,462,000

1992	5,795,000
1993	8,055,000
1994	7,745,000
1995	8,100,000
1996	11,000,000
1997	13,900,000
1999	20,000,000

This company, who started small back in 1986, has continued their commitment to improving the quality of tree plantations by expanding their services offered and increasing the amount of seedlings planted each year. Gord Paddock, one of the Owners of Wilderness, has stated that his company gives out bonuses to experienced planters based on production, and that the daily averages of planters have been rising each year. He feels as if planting in Ontario for Wilderness is just as good as planting for any other Ontario outfit (The Treeplanting Web Page, 2002).

Each of these companies has established a similar reputation in Ontario. Although Outland is one of the largest operations in existence, it has not always been hailed as the best. Brinkman Reforestation Ltd. has gone above the current industry standards and added an extensive list of superior operations to their list of services. Wilderness Reforestation, from company reviews listed on The Treeplanting Web Page, has a reputation in the tree planting industry to hire and fire employees very quickly, has continuously been driven to increase the number of contracts that they have and expand their services as well. Broland Reforestation often gets lumped in with Wilderness now that they have merged to become the Wilderness

Group. Unsafe vehicles, poor quality food and bad management are some of the main concerns expressed by previous employees (The Treeplanting Web Page, 2003). Whether or not the company has a good or bad connotation associated with it, these companies have achieved a rightful place in the industry through hard work and dedication to getting the job done.

Chapter Five- Survey Results

In this chapter 78 survey responses will be examined in an in-depth analysis of reforestation company's policies and practices. These companies are both located and operational in Northern Ontario, and include Outland Reforestation, The Wilderness Group, Broland, Pacific Regeneration Technologies Frontier, Brinkman and Associates Ltd., Moose Creek Reforestation, Thunderhouse Forest Services Inc., and Treeline Reforestation. Moose Creek Reforestation has been in operation since 1984, and is family owned and operated by the Skene family. This makes the company different from other contract firms by adding family values that have been in existence for over 100 years. Since beginning treeplanting, Moose Creek has planted over 28 million trees, and is now planting an average of three million trees a year. Moose Creek also offers regeneration surveys, thinning, seed orchard maintenance, nursery stock maintenance and cone harvesting to their clients. Thunderhouse, operating in Hearst since 1994, provides silvicultural and planning services that include forest inventory, regeneration surveys, timber valuation, GIS applications, planting, thinning, spraying, and site preparation in addition to tree planting. PRT Frontier is located in Dryden and has been involved in treeplanting activities since 1989, planting over 88 million trees since. The prediction for the 2003 season is to have 200 employees planting 12 million seedlings in Northern Ontario for companies like Weyerhaeuser, Kimberly-Clark Inc., Buchanan Forest Industries, and Red Lake Forest Management. This chapter will look at the various comments from treeplanting employees, both past and present, and relate that information to the literature and policies that exist in terms of reforestation activities in Ontario. This section of the thesis will examine current problems, issues and challenges that the reforestation contract companies face on a daily basis.

The survey questions were developed based on numerous criteria directly relating to the objectives of this thesis. The survey was intended to identify the impacts of reforestation practices on contract companies and identify challenges that exist today concerning reforestation activities for contract companies. A list of 37 questions was created, ranging from information concerning age and gender to which company the participant worked for, how long they have been planting and their personal opinions as to what problems exist and how the participant interprets these problems. These questions are included in Appendix A at the end of the text. The purpose of this study was to consult treeplanting employees and management to find out what factors within the reforestation operation are problematic and need improvement. This survey assisted in identifying problems with quality, stock handling, awareness of policy and legislation, proper implementation of the silvicultural practice of reforestation, and a variety of other issues that are important to the success of tree plantations across Ontario. This survey was intended to target a wide group of both planters and planting management in order to draw on their experiences as to what problems exist with contract plants in Ontario. Personal experiences were examined in relation to the forest region where the contract is taking place. Since the study area for this thesis concerns the Great Lakes-St. Lawrence Lowlands, and the very top of this forest region that borders the Boreal Forest, only those surveys that identify these regions were considered for assessment. The fact is that tree planting operations have changed over the years. Contracts are getting smaller; the number of employees is lower, there are fewer seedlings to go in the ground each year, and contract companies have less and less land that needs to be planted. There simply isn't as much physical tree planting going on in Ontario as there has been in previous years. There are new methods that are being implemented in order to regenerate the land naturally, with

less emphasis on monocultures and plantations. This survey will complement the literature review and will be able to examine the changes that have occurred over recent years and to establish the practice of reforestation activities through contract organizations that exist today. This survey helped to identify problems that both planters and management have raised as concerns and will link this to the information that is available in order to assess the problems that exist concerning reforestation today.

This survey was designed in order to accommodate the lifestyle of the average treeplanter. Since most treeplanters are students, or recent graduates, permanent residency is rare. Most people have no specific address, using their parent's home as a mailing address for important documents like bank statements and credit card notices. A large number of tree planters travel in the off-season, and often keep in touch solely by email. Therefore, it is easy to obtain the email addresses of treeplanters. Since this is the most common way of getting in touch with treeplanters, a list was compiled of addresses for those people that I have personally worked with over the last four years. These names were input into MSN Hotmail and then the survey was pasted into the mail along with the consent letter and a notice that asks that if the participant is willing, could they please forward the survey to other planters that they know. That way, many more planters were contacted, and not specifically those that I have had the chance to meet and get to know. This increased the representatives of the survey. Anyone willing to participate in the survey was welcome. All surveys were compiled and held relevant with the exception of those who have never planted in Ontario before. These surveys were disregarded since this thesis deals only with treeplanting activities in Ontario. Once the survey was emailed to the participant list, those who completed the questions emailed them back to my personal email account. Once this stage

was completed, the surveys were assessed for relevancy to the thesis project. Those who had not planted in Ontario were eliminated from the analysis. The total number of eliminated surveys was 4. In order to present the participants with an online forum that would be fast and efficient, an online survey program was enlisted through a random search. After investigating a few different resources, a company called Advancedsurvey.com was chosen for its ability to create surveys and allow participants to select an answer one at a time, and then submit the results. This company was able to input the information from the surveys in an online format where participants could select the survey answers and input their comments. Once the participant had finished the survey, the online agency compiled the list and produced an analysis that included percentages of participants who had filled it out. When there were no more participants for a period of 2 weeks, the data was compiled in full and the results were documented below.

Although the process of planting trees is one that continues to advance in technology, the methods used date back to when tree planting began. The job requires the planter to carry a bag over their shoulders filled with trees, or plastic holsters called cowbells and manually plant the seedlings using a shovel or a similar tool. There have been other methods available to plant, but they were ineffective and inefficient. New and advancing technologies have improved the way that the trees are stored; refrigerated trucks keep the trees longer, and the areas that have been logged are now more accessible by boats, helicopters and quads. Site preparation has also come a long way. The way that the land is prepared has been selected in order to make it easier for the planters. The equipment used has developed in such a way that the bags are more comfortable and the shovels can be tailored on a way that makes them optimal for the planter (Cyr 1998).

The planting crews have evolved from being made up exclusively of males to crews that include females as well. With the ever changing face of forestry, there are now crews of Native Americans, all women, travellers, recent immigrants to Canada and crews that have been together for many years (Cyr 1998). Each crew works on the basis of piecework, where each tree planted is valued at a certain price dependant on the quality of the land. The conditions of the season are dependent on the amount of money that the planter can make. Treeplanting is one of the hardest jobs out there. It is easy when you are planting to question the ethics of the job. Even if you have the best intentions in mind, in reality you're working for a logging company, not for an environmental organization concerned with saving the forests. Rob Simpson states

The more one looks at the big picture of forest mismanagement the angrier one becomes. It's hard not to be cynical about planting. Planting is the end whip of the harvest model. We planters struggle amidst all that is ugly about logging, struggle to apply an obviously inadequate poultice on our earth, struggle to finish a season without injury, struggle to collect our pay-and we struggle with our consciences. What treeplanter wouldn't happily give it up tomorrow to end clearcutting today? (Cyr 1998).

A relatively well known profession, it seems as if every Canadian knows someone or knows of someone who has planted. Treeplanting is repetitive, boring, hard and painstaking work that is done in challenging weather and terrain. In no other job will you leave a bush camp at 5 a.m., drive for an hour or more, ride a boat or fly in a helicopter just to get to the location where the days work will begin. "Treeplanting is like a marathon", says Stephane Leduc. "It's a horrible job, but those who plant often return year after year in order to reap the various rewards" (Cyr 1998). It is a job where you will learn more about yourself than you ever thought possible. It teaches you how to work hard, physically and mentally, and this will carry over into everything that you will ever do. Paul Raven believes that "treeplanting is

social, but at the same time it is a solitary activity completely removed from the mainstream culture” (Cyr 1998). It allows people from all over the country to come together and share the unique experience of hard labour under adverse, stressful situations in a devastated natural environment.

Of the 78 survey participants, the following tables show some of the specific questions that relate to the participants, like age, gender, and location.

Table 5.1
Group A- Age, Gender, Location

Age (years)	Count (#)	Percentage (%)
0-18	0	0
19-22	40	51.28
23-26	32	41.03
27+	6	7.69

Home City	Count (#)	Percentage (%)
Toronto	9	11.54
Waterloo	7	8.97
Peterborough	1	1.28
Guelph	7	8.97
Thunder Bay	4	5.13
Other	50	64.10

Gender	Count (#)	Percentage (%)
Male	45	57.69
Female	31	39.74

Included in the 64.10% of treeplanters who live in other locations during the rest of the year when they are not tree planting are Montreal, Vancouver, Victoria, Halifax, Ottawa, and Winnipeg, Edmonton and Calgary. The reason for selecting the locations for the where do you live question were due to the location of Universities, specifically those which have outdoor education programs, forestry programs, and other environmental related educational programmes. This was due to the fact that a large number of treeplanters are in school for

many of these programs, such as forestry, fish and wildlife management, biology, and environmental studies. With these responses, it should be noted that 78 participants were included in the answers to the age question, 76 participants responded to the home city question, and 76 to the gender question. The reason for this may be that some participants chose not to answer the question, or may have skipped over it in order to move through the questions faster.

The next few questions deal with some of the specifics of treeplanting careers of the participants, such as how long they have been planting, how they found out about planting and why they became interested in this job. The charts below will summarize the responses.

Table 5.2
Group B- Years Planted, Length of Planting Career, Interest Gained

Years	Count (#)	Percentage (%)	Why did you become interested?	Count (#)	Percentage (%)
1	22	28.21	Personal Interest	26	33.33
2	23	29.49	Money	42	53.85
3	15	19.23	Help the Environment	1	1.28
4	6	7.69	All my friends were going	2	2.56
+4	12	15.38	Other	5	6.41

How did you learn about planting as a summer job?	Count (#)	Percentage (%)
Friend	58	74.36
Crew Boss/ Foreman	1	1.28
Supervisor	0	0
Job Fair	3	3.85
School	4	5.13
Other	11	14.10

Some of the “other” answers for the *How did you learn about treeplanting as a summer job?* Question were that friends of the participants had done it the summer before, summer camp counselors had told one participant about it, there was a message board at a college that listed

treeplanting as a great summer job, or a participant's girlfriend/boyfriend was going that summer and in order to avoid a break-up, the couple would go together. Family members like siblings were key influencers, as well as friends from school and other activities. It seems as everyone had some sort of prior knowledge of someone who had done the job or was going to do the job, with very few people finding out about the job on their own. One participant says

I went to the Ottawa Youth Employment Center and responded to a treeplanting notice. This was Friday. My interview was on the following Monday, during which I was hired and told we were leaving the next morning! So I didn't really have time to do very much research before leaving! (Anonymous, 2003).

Participants in the *How did you become interested in treeplanting?* question had a variety of different responses. These varied from "the ONLY legitimate reason to treeplant is money" to "I wanted to do something really hard that I saw lots of people fail at (specifically my ex-girlfriend)" to "love for the outdoors and a drive to pursue a challenging and rewarding experience." Money was a major driving factor behind the reasons for going treeplanting in the summer, as well as curiosity about life in the bush. Most participants wanted to work outdoors, and to have a personal challenge for the summer that would encourage a strong work ethic. Answers here also vary in the response numbers as some people may have skipped over the questions and did not answer all of them.

The following questions dealt with which company the participants worked for. Overall, the survey was completed mostly by Outland Reforestation employees, mostly because these were the contacts that the survey was initially sent to. This may have a significant effect on the results of the survey due to the fact that some responses may be biased towards Outland. There may not be enough experience in the group to make

legitimate assumptions about the contract reforestation industry in general. 55 participants, or 70.51%, were Outland employees, although the rest of the participants were spread out evenly over the other companies listed. The next question, *how were you hired*, appears to have two major responses. This table lists the answers.

Table 5.3
Hiring Processes

How were you hired?	Count (#)	Percentage (%)
Application without prior contact	25	32.05
Job fair	4	5.13
Knew the crew boss/foreman or supervisor	12	15.38
Had a friend get you on their crew	23	29.49
Other	9	11.54

The interesting thing about this question is that most people were hired on a cold call application process, or through a friend. This is synonymous with the data that is provided directly from the contract companies that they hire rookies to even out the turnover rate. It makes sense that on crews which are 75% rookies, they would have been hired anonymously through an interview process. If you are a returning planter, you would be hired again through a friend or contact that you made in the company. Some of the “other” answers were applications on-line, which would fall into the application without prior contact, and one participant’s sister was his crew boss. Most of the answers were through friends and contacts made, phone calls and meetings. In this section, there were only 73 participants who filled out this question. Assumptions can be made that the participants who did not answer just skipped over the questions.

Most of the participants who filled out the survey indicate that they know a significant amount about their planting company who they work for. The question was *how*

familiar are you with the day to day operations of your contract company, and 5 people said that they knew nothing at all, 26 people said that they knew a little, 29 said a lot, and 13 people said they knew everything. It would seem reasonable to assume that most planters have an idea as to what is going on within their company on a day to day basis, that the routines are obvious to employees.

The next set of questions deals with start dates, areas of work, length of the contract, type of camp facilities, and management positions. These responses are noted in the table below.

Table 5.4
Group C- Contact Length, Location of Camp, Camp Facilities

Contract start date	Count (#)	Percentage (%)	How long does the Contract typically last?	Count (#)	Percentage (%)
Prior to May First	10	12.82	Less than 2 months	0	0
May First	23	29.49	2 months	57	73.08
After May First	40	51.28	More than 2 months	11	14.10

Where do you work?	Count (#)	Percentage (%)	Type of Accommodations	Count (#)	Percentage (%)
North central Ontario	20	25.64	Bush camp	65	83.33
North western Ontario	30	38.46	Hotel	1	1.28
North eastern Ontario	17	21.79	Apartment	0	0
Southern Ontario	3	3.85	From home	0	0

The question concerning number of planters in the camp and the number of management in camp were received as textual responses. The answers here varied, depending on the number

of trees that each contract was awarded. Toward the end of contracts camps usually fill up with extra people as people quit or have to leave for various reasons. As the contract deadline nears, more people are recruited to finish up the trees that are left. Each company looks to give their employees as many opportunities to work as possible, while at the same time ensuring that their contracts are completed on time. There are usually about 15 people on a crew, give or take a few, and two to four crews in a camp. The average from this survey would be about 45 planters, and one supervisor, one cook, one assistant cook, two tree delivers, one quality checker, one safety officer that is also included as a planter, and 3 crew bosses. Most contracts begin after May 1st, after the ground has thawed and seedlings can survive without the risk of frost or the inability to be planted in soil tightly so that the root systems can take hold. Spring contracts typically last 2 months and the majority of the facilities for lodging are bush camps. Sometimes the logging company provides an old ranger camp, or a deserted logging camp for the planters, but most times the bush camp is the main lodging site. These camps are close to a water source, have road access, and are large enough to fit the camp's requirements. From personal experience, a contract may see upwards of three campsites, and each one is unique, from gravel pits to picturesque lakeside spots to boat launches. It depends on the availability of a water source in the area, space, and closeness to the "blocks" (the area where the trees are to be planted).

The results of questions about company representatives, both logging company and contract company, are varied. It depends on who is running the contract, if it is a large company like Domtar or Tembec or if it is a smaller plant for a company like Timiskaming Forest Products. Some companies have their representatives in the form of quality assessors (checkers) out on the block every day, or every other day. It depends on your location

whether or not you will see the checker that day. You will see the contract company's quality assessor every day, or every other day. It is a well known fact in most planting companies that the full time quality assessors for the logging companies very rarely like to get out of their trucks and travel into back pockets and deep pieces. They will stay close to the road and inspect the land from the perimeter. Younger forestry students, who are summer employees, will be everywhere, as it is a new experience for them to be on the block, and they enjoy exercising their authority. They are new and eager to do a good job, and you will most likely see these assessors every day. One participant wrote in response to *how often do you see company representatives (logging company reps)?*

Varies from client to client, from daily when there are one or more checkers dedicated to a single job, to infrequently (like once per weekly shift) when such a client rep is simultaneously overseeing many contracts. Really, it just depends on how much the client really cares about the quality of work being done, and is ready to spend money to have it run correctly (Anonymous, 2003).

One participant wrote that on the White River Domtar contract, he saw representatives every day; however on every other contract he has worked on he has never seen anyone except for the first few days of the contract. As you can see from the responses, it varies from company to company. Domtar has the strongest reputation for quality assessors on the block every single day. Most companies have a quality assessor on the block at all times, and if not every day, every few days. The logging company officials who are often foresters in charge of reforestation in that area are usually seen a few times on a contract, and most will always make a point to meet the planters on the first day to voice expectations and quality specifics. The question in regards to how often the Ontario Ministry of Natural Resources representatives are present varies significantly. Some participants report that they see the reps

a few times, but most report that they never see them. One participant reported that he saw someone once when the roads were shut down due to heavy rains and one person reported

In eight years, of at least one contract in Ontario every year, almost never! Back in 95 I worked on a short contract directly for the OMNR. I think that could be the only time I may have seen a ministry rep. It is pretty much unheard of as far as I know (Anonymous, 2003).

Although unrelated to reforestation, one participant stated that he was on a herbicide spray once where a few OMNR people came out to assess whether or not the ground should be sprayed, but has never seen any reps at any other time. Overall, the fact remains that OMNR reps are virtually non-existent on the block. In Quebec, it is standard practice for the ministry to be involved in the operations of the tree plant, and their province has stricter guidelines for reforestation practice. In Ontario, it may be correct to assume that due to the new legalities and responsibilities of the sustainable forest license holders, OMNR representatives on the blocks are deemed unnecessary due to logging companies having all responsibilities to forest management plans and reforestation activities. The provincial government sets the standards and guidelines, but it is the responsibility of the company to carry out all activities related to these guidelines.

The next section deals with forest legislation, policies and standards certification. Some forest policies that have been discussed in previous chapters were listed in order to see which ones planters were aware of. The responses are summarized below;

Table 5.5
Knowledge of Forest Policy and Legislation

Forestry Legislation/Policy	Count (#)	Percentage (%)
Crown Forest Sustainability Act	31	39.74
Lands For Life	15	19.23
Sustainable Forest Licences	21	26.92
Environmental Bill of Rights	15	19.23
Ontario Forest Accord	8	10.26
Environmental Management Systems in accordance with ISO 14001	25	32.05

These questions yielded a lot of high numbers. It seems that most people are aware of current forestry legislation. Since many of these terms, like sustainability, have been around since the early 1990's, it would make sense that many participants knew about the CFSA. This may also correlate to many treeplanters going to school for forestry and environmental studies programs. Of all the participants who were asked *are you aware of forest management areas (FMA's)*, or 28.21% said that they knew what a FMA was. Of the remaining 42 participants, 53.85% said that no, they were not aware of FMA's. It was surprising to see that only 10% of the participants knew about the Ontario Forest Accord, which sets out the guidelines and recommendations for continued sustainable forest activities. That policy sets the stage for some of the other policies, and seeing as 15 people knew about the Lands for Life policy, it would seem odd that only 8 know about the Ontario Forest Accord, which came as a result of Lands for Life. One reason for this could be that the Lands for Life policy receives more media coverage than the Ontario Forest Accord.

This section of the analysis identifies quality training, stock handling, and other quality related issues. When asked if the participants had received any quality training prior to beginning the contract, all the participants stated that at the beginning of the contract there

is always a rundown of quality specifics, expectations and what-to-do's. All planters receive information on proper stock handling, micro site identification proper techniques for planting the seedlings. Typically this is held on the first day in camp, with the planters going out onto the block and receiving instruction through a series of "stations" which cover all the issues necessary to planting quality trees. The second day of the contract, generally the first work day, and the entire camp meets the client and learns what they expect. First year planters then go off in small groups to small pieces of land where they learn to plant properly under supervision of an experienced planter. Some other training that is given includes fire safety, bear safety, stock handling while refrigerated trucks are being unloaded, how to handle the trees in general, flagging your line so that other planters beside you know where their piece ends and yours starts, and camp health and safety procedures. Of all the participants who filled out the survey, 58.97% claim that they are aware of the logging company's quality specifics, and 16.67% say that they are not aware of these specifications. This seems slightly unreasonable that the planters are unaware of these specifics, even if they miss the first day of the contract, they should learn within the first few days of production.

At one time or another, a planter has to go back to a piece and re-plant the trees in the piece. 35 participants answered that they have had to re-plant at one time or another, while 24 participants state that they have never had to go back into a piece to fix it. Some of the reasons given for having to replant are listed below;

Table 5.6
Reasons for Having to Replant a Piece of Land

Reasons for having to re-plant a piece of land	Count (#)	Percentage (%)
Below quality	8	10.26
“Leaners”	4	5.13
Buried Leaders	0	0
Poor Spacing (too tight, too loose)	14	17.95
Bad plot overall	4	5.13
Other	29	37.18

Some of the participants stated that re-planting is a natural progression into a good planter. One participant noted “in my rookie year, I replanted a few times in the first few weeks before I figured things out” (Anonymous, 2003). One survey listed quality problems due to uncontrollable weather, such as frozen ground, land that was too wet, or land that was wet and then dried up. These are quality issues that sometimes are unavoidable, especially with snow or heavy rain. Most responses included statements that re-planting is done due to all the reasons listed, and that every planter has had to re-plant at least once in their career.

One question that was asked was *when working on a contract do you feel as if planting trees is a major goal of the contract?* The responses to this question ranged from “absolutely not” to “of course it is; it goes without saying.” The main theme here was that if you plant bad trees, you have to re-plant them, and re-planting costs you money. Also, if you do not plant trees that meet the quality expectations full payment is not received. One response stated “for the most part, yes, but sometimes, when trees are left over and we are running out of land, quality is sacrificed simply to meet the goals. The results are close trees, or trees planted in areas where they won’t grow (red rot, dry clay, bogs, etc.)” (Anonymous, 2003). One person remarked that quality goals are company specific, and certain contracts

may not have a high standard of quality as others, while another stated that quality was the number one goal of their contract. As any experienced planter knows, you don't need to plant perfect trees, just trees that are good enough to pass quality specifics. There is a balance that needs to be found when planting between good and bad. A remark was made once to a rookie that the goal of planting to make a lot of money was to learn how to plant the best possible trees as fast as possible to just meet the quality specs. Most planters are there to make money, and this is all that they personally care about. One senior management remarked

If trees aren't put in the ground properly we won't get away with it. Understandably, our client is not paying us to put trees in the ground that will not yield a profitable harvest. At the same time, I have worked on one job where the checkers and the quality expectations were so high that it went down in history as the worst and longest running contract in Outland's history. Our clients must allow for a certain percentage of human error (Anonymous, 2003).

Many participants stated ethics and morals as the driving force between planting good and bad trees. One planter said that after becoming management, quality is now a direct responsibility of his, and recognizes that quality is vital to maintaining contract and client relations. This respondent reported that as a planter, he was in it for the cash, and would stretch the limits as much as possible if it meant putting in more trees. Basically, quality is important in receiving payment, keeping good relations with the client, and not having to re-plant.

The remaining part of the survey deals with questions requiring personal opinion. It calls for opinions on changes over the years, recommendations for changes, and problems and issues identified by the participants. Many of the responses deal with improvements in safety measures, such as an increase in precautions like high visibility vests, hard hats, safety glasses and enforcement of steel toe boots. There has been an increase in safety in the bush

camp, changes to vehicle safety in terms of repairs and speed at which they are driven, as well as better training for management to respond to health and safety concerns on the block. It is interesting to see that there were negative connotations associated with every response about an increase in safety gear. Planters seem to be opposed to wearing items that “get in the way” or cause irritation. One participant stated “[there is]...an increased focus on the perception of safety...not so much the safety itself, but the company appearing “safe” to the client” (Anonymous, 2003). Many responses dealt with an increase in health issues, such as knee and wrist ailments, back pain and heat stroke. One participant remarked that “there has been an ever-increasing focus on safety and injury prevention, seems to have gone beyond sensible...ie. No standing on logs???” (Anonymous, 2003). The Ontario Forestry Safe Workplace Association has recently released a health and safety guide for treeplanters, as well as a video entitled *Survival of the Fittest*. Brinkman and Associates Ltd. has been a leader in the field of treeplanter safety and has supported a website called Treeplanter.com which gives an unbiased view of planting life, and contains an entire section on proper training and workplace safety, as well as an extensive list about where to go in search of assistance with safety concerns. Treeplanting has serious health risks associated with the job. Because of its seasonality, employees are exposed to dangerous situations that they may be unprepared for. Union representation is a logical step in protecting the health and safety of treeplanters. Since the majority of the work is done by students for 2 month periods, there is little experience and knowledge when it comes to things like walking on rough terrain, carrying heavy bags, exposure to sun, fatigue and insects. In an example set by the Ontario Forestry Safe Workplace Association (OFSWA), the organization is expanding its forestry health and safety services to include Ontario’s treeplanting employees. In November of 2000

an extensive survey of injury and ailment of planters was undertaken by the organization (OFSWA 2000).

A major concern is the tree price, however these responses were varied. Some people say that they are dropping and others state that prices are remaining stagnant. On unionized contracts, the price per tree is higher than on on-union contracts, and planters feel like it is getting harder to be motivated to do the job while tree prices are staying the same yet the cost of living in the city is rising. Quality concerns seem to be rising, as more and more companies are concerned with the way that trees are going into the ground. Gone are the days where planters fly through the land and slam the trees into the ground. Quality specs are rising and there is stricter enforcement from logging personnel. The last survey that was returned summed up the view of many participants; “not too much [has changed]...changes come without saying. Live with it or get out” (Anonymous, 2003).

Problems and issues that planters identified on their contracts deal with a variety of topics. One response was quite detailed;

Outland is a huge planting company that has consistently underbid all competition in Ontario to sew up the market. As such, safety and equipment is lacking. Planters on Outland contracts work 10 hours a day, reside in the dullest bush camps I have ever seen, and pay 25\$ a day to be transported to the block in school busses, while coming home to “communal duties” such as washing the cooks dishes, changing camp garbage’s, etc. that’s basically paying a premium for the privilege of sleeping in a tent, traveling in rickety buses down logging roads, and coming home at the end of the day to work that has already been paid for...client wise, Domtar and Weyerhaeuser lack corporate intelligence. They are both lean, mean, Ontario outfits committed to logging and reforestation at minimal costs to maximize their profit margins. This is completely evident when looking at their cuts, and the bargain basement prices they pay to reforest those cuts (Anonymous, 2003).

Obviously, this is one isolated opinion. It does, however, raise valid concerns about the contract company making the largest financial gain at the expense of their employees. An

interesting point was that a great number of participants stated high, strict and unreasonable quality as a problem/issue/concern. Many responses in the previous question stated an increase in the commitment to planting trees, but it must be pointed out that most planters are doing the job to make money. They want to make as much as possible as quick as possible, because the truth of the matter is, planting trees is a terrible job. It may be fun at the end of the day, but when you are living your entire life outdoors, in the rain, snow, sleet and cold, you can't possibly think that you are having the best time. People want more money to do this job, and they want everyone to leave them alone while they do it.

A major concern is unpaid "communal duties" as expressed in the response above. Unloading tree trucks, walking to pieces of land that are an hour down an inaccessible road, and unpaid travel times are big concerns. On union contracts, you are supposed to be paid for walk-ins that take longer than 45 minutes or an hour, yet somehow, the company seems to get around that. Travel times to the block are supposed to be paid if longer than a specified time, but conveniently, the campsites are located just under these times. There seem to be ways around everything, such as in the instance of unions only planting for five days, when on the 6th day, the contract company plants on non-union land in order to get around this policy. From personal experience, there was one contract that required the planters be compensated for travel times longer than one hour, but the contract company told the logging company that the planters were finding their own transportation to a common location in the morning so that travel times did not have to be compensated for, when in reality, management had reasons for remaining at the current camp and didn't want to move locations.

One issue raised that was separate from all the other responses was that some land was already planted, either through Ariel seeding or another person having planted it another year, resulting in over planting due to an excess of trees and not enough land to put them in. Based on personal experience, there have been contracts where quality specs were enforced one way at the beginning of the shift, and decreased as the days went on, so at the end of the shift, there were so many trees in a piece of land that you couldn't take one step in any direction without stepping on a seedling. There have been planters who have been dropped off at pieces that were already planted, and given a set number of trees to put into the land. There are also planters who have been dropped off at the same piece of land for five days in a row and told to keep planting trees in as many spots as they can find. These concerns are both company and contract specific. It all depends on how strictly the rules are enforced, and how often this occurs. Is this common practice for many companies? Or are these isolated incidents? It's possible that depending on the client, the time constraints, and the amount of trees that remain in comparison to the amount of land left, that these incidents might be isolated events. There have been companies who don't particularly care how the trees are planted, and planters have dropped, thrown, or handful planted trees because they could, and made a great deal of money doing so. There is no consistency across the province in terms of quality.

An issue that has been raised time and time again is the lack of communication between management and planters. Numbers are over estimated or underestimated, so that planters never have an idea about how many trees are left to go into the ground at any given time. This issue may not be that important in the eyes of some, as management is in charge and may use these techniques to motivate planters or to get them to plant the day knowing

that there are so many trees to go into the ground, and then be surprised when there are no more trees left and the day is over. These methods vary depending on the management, and may be beneficial or detrimental, depending on the planter. Many planters feel that they are being lied to, or that they have important information hidden from them. That can be looked at in two ways; one being that management has no obligation to tell employee's specifics, or two, that management is sneaky and untruthful. It all depends on who is asked.

Some recommendations for changes include increasing tree prices and more working days, smaller crews, treating planters with "more respect" and increased quality of scarification. One participant cited elimination of the ability to smoke cigarettes on the block as a recommendation. The main issues raised all have to do with the planters themselves; in fact, very few had to do with the overall operation of reforestation and other silvicultural activities. One participant, though, wrote a very detailed response;

The forest products industry needs some incentive/requirement (from the government perhaps) to raise tree prices to planters for piecework. This would include the experience level and motivation for the planter work force that play a critically important role in the planting of tomorrow's forests. It is apparent from my experience that forest products companies don't care about the trees that they plant, their only goal in awarding and overseeing planting contracts is to get some amount of trees (which presumably they are required by the government to plant) in the ground as cheaply as possible. Their silviculture budgets are so constraining that even the most diligent forester has no room to perhaps spend some money to improve the long term quality or value of the forest being planted (Anonymous, 2003).

This comment can be interpreted many ways. Obviously there are a lot of facts that this person is unaware of, such as the government not being responsible for the amount of trees that are planted, and that there is a silviculture budget. The forestry trust has been set up for the specific purpose of reforestation, and a great deal of money goes into this fund every year. Yet the participant raises many valid concerns about finances and the fact that even the

most concerned foresters may have little control over the situation. It seems a bit naive to assume that all companies are on the same page that they don't care about the trees and the quality in which they are being planted. Other concerns include checking blocks before bringing planters to them, making sure that seedlings are thawed out completely before arriving on the block, informing the planters about what is going on instead of keeping everyone on a need to know basis. It seems as if many of the same issues and concerns keep arising from the survey participants.

Overall, this survey was unsuccessful in identifying some of the issues that are important in assessing the overall effectiveness of contract companies. Many of the problems and issues that arose were planter specific, such as living conditions and safety issues. There were very few comments received about the scarification of the land, the species of trees planted, and the location of the cut over areas. Some participants were quite vocal in their opinions about the logging companies being out to make a dollar, not caring about the quality of trees being planted. The comments about the quality specifics were useful, however, in the fact that over the years, quality has become increasingly important. This is crucial in identifying due to the fact that many of the major logging firms have stated that their reforestation management plans pay great attention to detail, and those plantations are becoming more and more successful. If the survey had indicated that there had been no increases in quality standards, and in fact identified a decrease in quality, then the literature that exists about tree plantations becoming more successful would be false.

The 1994 Class Environmental Assessment by the Ministry of Natural Resources for Timber Management on Crown Lands in Ontario report on Reasons for Decision and Decisions identifies that “the effects of forest renewal are generally positive” (OMNR 1994).

The Ontario Environmental Assessment Board (EAB) recognizes that successful attempts at regeneration have been made, and that the harvested forests are indeed being regenerated through planting trees. The overall recognition is that there will always be a need for artificial regeneration of forest lands. The EAB stated that planting trees “can hasten the growth of a new forest, and increase control over density, spacing and species composition” (OMNR 1994). The most labour intensive silviculture operation, tree planters are able to get into areas that have been logged that need special attention. The opinion that areas which are left to regenerate naturally will never renew themselves to a healthy and fully functioning forest can be alleviated by planting site specific seedlings in order to ensure successful regeneration.

In order for tree plantations to continue to be successful, the EAB recommended that the experience and knowledge of foresters about the past results of regeneration on similar sites in Ontario is crucial to make sure that artificial regeneration is the appropriate method. Tree plantations should be located in areas where the wood supply will be harder to regenerate, in order to ensure future wood supply. Sites with high levels of competition species most often require artificial regeneration in order to produce positive results. Sites that are easily accessible by roads, closeness to mills and soil characteristics must be considered when choosing the appropriate method of reforestation. The availability of trained employees, equipment, seeds and seedlings are important factors in choosing an artificial regeneration method such as tree planting. If the materials aren't easily available, then another method should be selected. Successful plantations occur when all the factors are right, and the contract companies are able to go in and do the job the best way that they can. The EAB recognizes that the choice of planting method is site specific and is the decision of

the forestry companies, who are guided by legislation and policies that are already in existence (OMNR 1994).

The main complaint in regards to contract companies in charge of replanting the logged areas from the OMNR is the hard, physical labour that planters endure for less than 10 cents a tree. Grant Bodeur, a private contractor in Northern Ontario, described in 1994 the harsh conditions during the short planting season;

...in 1990 we were planting 162 million trees at about 2000 trees per hectare on average, that's about 80,000 hectares of land that are going to be hand planted by planters. That means every six feet there is some guy that is going to be sticking his hand into cold wet dirt and planting a tree. That's a lot of bending over if you have to do deep knee bends 162 million times (OMNR 1994).

This statement brought recognition to the fact that untrained, inexperienced university students were planting trees in Ontario and the contract companies were exploiting student labour. In response to this complaint, the Environmental Assessment Board received significant information from the OMNR that there is considerable supervision and monitoring of tree planting on these contracts. The survey here on treeplanting activities in Ontario in 2003 suggests that this statement is true, that planters are receiving adequate training before being sent into a piece of land. The Ontario Ministry of Natural Resources reported that Abitibi Price conducts a one week training program in which planters must successfully plant above quality trees for the duration in order to be hired. It is general knowledge in the industry that if the contractor does not achieve the minimum quality standards, payment is not made and the contractor is responsible for damages. In response to hiring university students, Herb Martin, another private contractor in northern Ontario, told the EAB that "with only six weeks work available on many contracts many local people are not interested in working in the tree planting field...local residents will not live in bush

camps...who else is going to work for low wages and uncomfortable living conditions?” (OMNR 1994).

It is clear that planting trees will continue to be used as an effective regeneration tool in Ontario's forests. There are problems and issues that have been identified with contract companies, specifically, untrained and inexperienced labour, and poor enforcement of quality specifics. Hammish Kimmins further identified some problems associated with tree planting, such as a lack of understanding of seedling physiology and ecology, a failure of tree nurseries to apply this knowledge to the seedling production, the inappropriate storage of seedlings, careless handling and improper planting processes. These problems have been carried over into the plantations and have died as a result. Kimmins admits, however, that in recent years, a greater understanding of these issues has been recognized and led to vast improvements in the way that trees are being produced and planted. A commitment from industry, contract companies, government and tree planters themselves will encourage these problems to continue to be eliminated as time goes on (Kimmins 1992).

Chapter Six- Conclusion

This paper sought to achieve the objectives of researching the history of reforestation practices in Ontario and to assess the practices, challenges and opportunities that exist today. Through an in-depth examination of the guiding legislation and a close look at the implementation of these policies, the focus of the paper was maintained throughout. By pursuing the objectives of tracing the historical development of reforestation policy and legislation for regeneration processes in Ontario, summarizing current relevant legislation, describing current practices of reforestation in Ontario, this paper was able to discuss these practices in relation to case studies of reforestation companies, discuss the results of a survey completed by planters and management that relates to the implementation of reforestation practices, and discuss the challenges that exist today in reforestation for contract companies. Identification of current issues, challenges and opportunities was made possible by analyzing the comments that were given by the survey participants.

It is safe to say that this paper was able to identify some key issues in the reforestation sector of silvicultural activities occurring in Ontario's forests. These issues were increased quality training for management including both planters and supervisors, improving commitments to safety through hard hats and steel toed boots, and increased attention to vehicle safety. All are key problems that contract companies have recognized as needing improvement. This paper was able to identify that over the past years, changes have indeed been made within the logging companies as well as the contract companies. Relationships between both are becoming stronger as the commitment to successful plantation becomes more and more prevalent. The logging industry is changing, and

reforestation practices are beginning to become more and more site specific. Natural regeneration is a common theme, and it should be noted that tree plantations in Ontario are becoming less and less popular. There are fewer contracts to be had, smaller crews to work on these contracts, and fewer trees to go into the ground.

The main challenge for contract companies today is to plant high quality trees. Without a company commitment to achieving full quality on all jobs, the ability of the logging company to produce an ecologically balanced plantation diminishes significantly. Among planters, the general consensus is that tree prices are not rising and the work is getting worse. Pieces of land to be planted are smaller and being cut over in methods that will help protect the land, although clear cuts are still the method of choice in most areas of Ontario. Some of these clear cut areas are logged with the intent of leaving behind some tree stands, and patches of natural forest cover in order to assist natural regeneration. Planters are now planting pieces where much of the area is scarified into corridors to allow some natural vegetation to remain, and slash piles, the extra debris left over from cutting, are growing larger as burning these piles is being practiced less.

This paper has traced the evolution of reforestation practice in Ontario as citizens, academics and professionals gained interest in the state of the forest. The policies and legislation that mandate Ontario's forests have become more detailed and focused on preservation for the long term, and allow land to be set aside for protected areas. The biggest changes that the industry has seen have been the privatization of tree nurseries, a change in management of forest areas and the segmentation of land into Forest Management Units, and the allocation of funds into trusts specifically for reforestation activities. Now that individual companies are responsible for both cutting and reforesting their land, there is a commitment

in the forestry industry to make sure they are making responsible choices about the health of their forest. Market share has an enormous impact on this new way of thinking, but companies such as Tembec and Abitibi Price seem to have made these goals into a long term commitment. Contract companies are beginning to mimic the goals of the major logging firms by increasing their services to include land surveys and expanding their aerial seeding programs, as well as improving quality standards. It seems as if these two parts of the industry are moving in the same direction.

Overall, this thesis was successful in achieving its goals and objectives. Some interesting points were made by planters, planting management, non-government agency employees, and logging company representatives. Assessing these points of interest and relating them to the practices in reforestation today have made this thesis into a paper that will allow the reader to gain insight into world of contract companies and tree planting in Ontario. Although the results of the survey were not necessarily representative of the industry as a whole, based on most of the respondents having planted for one company, it seems as if there is a consensus within the planters. The limited sample size may not have given the whole picture, but was able to raise some valid issues such as inconsistent quality assessors and a failure of the Ministry of Natural Resources to be present on a regular basis, if at all. Perhaps this question was unfair in that the ministry sets the rules and regulations, yet it is up to the logging company to enforce them. The problem of inconsistent quality specifications and varied interest in planting “good trees” may be affected by little enforcement from a government agent. This may be something that could change the practice of planting quality trees for the better in the future.

What remains to be seen is the success of these plantations. Are the contract companies doing a good job? We know that in the 1990's, it was reported by the OMNR that the forests are growing back. What remains to be seen is if the forests of today are growing back better than ever with the new commitments to future sustainability, less monoculture, smaller clear cuts, and more natural regeneration methods. The recognition of problems of today can hopefully help to influence the forests of tomorrow.

Appendix 1- Survey Questions

1. Age
 - 0-18
 - 19-22
 - 23-26
 - 26+
2. Gender
 - Male
 - Female
3. Where do you live during the off season? (when you are not treeplanting)
 - Toronto
 - Waterloo
 - Peterborough
 - Guelph
 - Thunder Bay
 - Other
4. How many summers have you worked as a treeplanter?
 - 1
 - 2
 - 3
 - 4
 - More than 4
5. How did you learn about treeplanting as a summer job?
 - Friend
 - Crew Boss
 - Supervisor
 - Job Fair
 - School
 - Other
6. Why did you become interested in treeplanting?
 - Personal interest
 - Money
 - Help the environment
 - All my friends were going
 - Other
7. What contract company do you work for?
 - Outland Reforestation
 - Wilderness
 - Broland
 - PRT
 - Brinkman and Associates
 - Other
8. How familiar are you with the day to day operations of your contract company?
 - None at all
 - A little
 - A significant amount
 - Everything!

9. How were you hired?
 - Application without prior contact
 - Job Fair
 - Knew the Crew Boss/Supervisor
 - Had a friend get you on their crew
 - Other
10. Did you know any of your management crew before hand?
 - Yes
 - No
11. What time of year do you begin work? (contract start date)
 - Prior to May First
 - After May First
12. Where do you travel to in order to work?
 - North Central Ontario
 - Northwestern Ontario
 - Northeastern Ontario
 - Southern Ontario
13. How long does the contract that you are on typically last?
 - 2 months
 - More than 2 months
14. How many treeplanters are typically on your contract? (in your camp)
15. How many people have positions of authority above you on your contract? (in your camp)
16. What type of accommodations do you have on your contract?
 - Bush Camp
 - Hotel
 - Apartment
 - From Home
17. How often do you see company representatives? (logging company reps)
18. How often do you see quality assessors? (either logging company and contract company)
19. How often do you see Ontario Ministry of Natural Resources employees?
20. Have you ever planted on more than one contract in a given season?
 - Yes
 - No
21. If so where/what contract/which province
22. Which forestry legislation and forestry policies are you aware of? (check all that apply)
 - Crown Forest Sustainability Act
 - Lands For Life
 - Sustainable Forest Licences
 - Environmental Bill of Rights
 - Ontario Forest Accord
 - Environmental Management Systems in accordance with ISO 14001
23. Are you aware of Forest Management Areas (FMA)?
 - Yes
 - No
24. If so whose FMA do you work in?
 - Domtar
 - Weyerhaeuser
 - EB Eddy/Spanish Forest

- Tembec
 - Other
25. Please describe some of the changes that you have witnessed over the years of your treeplanting career.
26. What problems and issues might you have identified with your contract
27. Recommendations for changes.
28. Have you ever received any quality training before your contract began?
- Stock handling
 - Micro site identification
 - Proper technique for site selection
 - Other
29. Are you aware of the logging company's quality specs?
- Yes
 - No
30. When working on a contract do you feel as if planting quality trees is a major goal of the contract?
- Yes
 - No
 - Please feel free to explain
31. Have you ever been encouraged to "just get rid of stock?"
- Yes
 - No
32. Have you ever had to replant a piece of land?
- Yes
 - No
33. If so what were the reasons given
- Below Quality
 - "Leaners"
 - Leaders buried
 - Poor Spacing
 - Bad Plot
 - Other
34. Have you ever planted on private land before?
- Yes
 - No
35. If so how has this differed from planting on public land?
36. How many trees have you planted over the span of your career?
37. Would you say that you love planting trees or that you hate it?
- Love it
 - Hate it

Appendix 2- Survey Participants Count and Percent

Survey Question/Answers	Count	Percent
1. Age:		
0-18	0	0.00%
19-22	40	51.28%
23-26	32	41.03%
27+	6	7.69%
2. Gender:		
Male	45	57.69%
Female	31	39.74%
3. Where do you live during the off-season? (when you are not treeplanting):		
Toronto	9	11.54%
Waterloo	7	8.97%
Peterborough	1	1.28%
Guelph	7	8.97%
Thunder Bay	4	5.13%
Other	50	64.10%
4. How many summers have you worked as a treeplanter?:		
1	22	28.21%
2	23	29.49%
3	15	19.23%
4	6	7.69%
more than 4	12	15.38%
5. How did you learn about treeplanting as a summer job?:		
Friend	58	74.36%
Crew Boss	1	1.28%
Supervisor	0	0.00%
Job Fair	3	3.85%
School	4	5.13%
Other	11	14.10%

6. Why did you become interested in treeplanting?:			
Personal Interest	26	33.33%	.
Money	42	53.85%	.
Help The Environment	1	1.28%	.
All my friends were going	2	2.56%	.
Other	5	6.41%	.
7. What contract company do you work for?:			
Outland Reforestation	55	70.51%	.
Wilderness	1	1.28%	.
Broland	1	1.28%	.
PRT	1	1.28%	.
Brinkman and Associates	2	2.56%	.
Other	15	19.23%	.
8. How familiar are you with the day to day operations of your contract company?			
None At All	5	6.41%	.
A Little	26	33.33%	.
A Significant Amount	29	37.18%	.
Everything!	13	16.67%	.
9. How were you hired?:			
Application without Prior Contact	25	32.05%	.
Job Fair	4	5.13%	.
Knew the Crew Boss/Supervisor	12	15.38%	.
Had a Friend Get You on Their Crew	23	29.49%	.
Other	9	11.54%	.
10. Did you know any management crew before hand?:			
Yes	18	23.08%	.
No	55	70.51%	.
11. What time of year do you begin work (contract start date)?:			
Prior to May 1 st	10	12.82%	.
May 1 st	23	29.49%	.
After May 1 st	40	51.28%	.

12. Where do you work?:			
North Central Ontario	20	25.64%	.
Northwestern Ontario	30	38.46%	.
Northeastern Ontario	17	21.79%	.
Southern Ontario	3	3.85%	.
13. How long does the contract that you are on typically last?:			
2 months	57	73.08%	.
More than 2 months	11	14.10%	.
14. How many treeplanters are typically on your contract (in your camp)?:			
15. How many people have positions of authority above you on your contract (in your camp)?:			
16. What type of accommodations do you have on your contract?:			
Bush Camp	65	83.33%	.
Hotel	1	1.28%	.
Apartment	0	0.00%	.
From Home	0	0.00%	.
17. How often do you see company representatives (logging company reps)?:			
18. How often do you see Ontario Ministry of Natural Resources employees?:			
19. How often do you see Quality Assessors (either logging company and contract company)?:			
20. Have you ever planted on more than one contract in a given season?:			
Yes	51	65.38%	.
No	12	15.38%	.
21. If so where/what contract/which province:			
22. Which forestry legislation and forestry policies are you aware of (check all that apply):			
Crown Forest Sustainability Act	31	39.74%	.
Lands For Life	15	19.23%	.
Sustainable Forest Licences	21	26.92%	.
Environmental Bill of Rights	15	19.23%	.
Ontario Forest Accord	8	10.26%	.
Environmental Management Systems in accordance with ISO 14001	25	32.05%	.

23. Are you aware of Forest Management Areas (FMA):			
Yes	22	28.21%	.
No	42	53.85%	.
24. If so whose FMA do you work in?:			
Domtar	15	19.23%	.
Weyerhaeuser	7	8.97%	.
EB Eddy/Spanish Forest	12	15.38%	.
Tembec	5	6.41%	.
Other	24	30.77%	.
25. Please describe some of the changes that you have witnessed over the years of your treeplanting career?:			
26. What problems and issues might you have identified with your contract?:			
27. Recommendations for changes:			
28. Have you ever received any quality training before your contract began?:			
Stock Handling	9	11.54%	.
Micro site identification	8	10.26%	.
Proper technique for site selection	5	6.41%	.
Other	37	47.44%	.
29. Are you aware of the logging company's quality specs?:			
Yes	46	58.97%	.
No	13	16.67%	.
30. When working on a contract do you feel as if planting quality trees is a major goal of the contract?:			
Yes	50	64.10%	.
No	9	11.54%	.
31. Have you ever been encouraged to "just get rid of stock?":			
Yes	28	35.90%	.
No	31	39.74%	.
32. Have you ever had to replant a piece of land?:			
Yes	35	44.87%	.
No	24	30.77%	.
33. If so what were the reasons given?:			

Below Quality	8	10.26%	.
Leaners	4	5.13%	.
Litres Buried	0	0.00%	.
Poor Spacing	14	17.95%	.
Bad Plot	4	5.13%	.
Other	29	37.18%	.
34. Have you ever planted on private land before?			
Yes	34	43.59%	.
No	25	32.05%	.
35. If so how has this differed from planting on public land?:			
36. How many trees have you planted over the span of your career?:			
37. Would you say that you love planting trees of that you hate it?:			
Love it!	47	60.26%	.
Hate it!	12	15.38%	.

Total Survey Responses: 78

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Abstract

Ideas, goals and perceptions regarding reforestation operations in Ontario have changed significantly over the years. Changing perceptions of those involved in the logging industry, the government, and the public have resulted in the altering of existing legislation and policy, as well as led to the development of new guidelines that will lead the forestry sector into the future. Silvicultural operations in Ontario have become more sustainable in recent years, and the aim of these practices is to manage Ontario's forests with future success in mind. The trends have changed for tree planting operations. In the 1980's the goal was to plant one tree for every tree cut, with millions of dollars being poured into the operations every year. Gradually, the funds allocated to these replanting operations shifted away from government funding and rested in the hands of the forestry companies. It is now the responsibility of the companies to put money into forestry trusts created for silvicultural uses and in turn these companies can draw on these funds to plant more trees on the land that they have harvested. Despite changes to the number of trees being planted every year, there are still millions of seedlings that get put into the ground each and every spring season across the province.

The goal of this thesis is to research the history of reforestation practices in Ontario and to assess the current practices, challenges and opportunities that exist today. An examination of the guiding legislation and a close look at the implementation of these policies is the focus of this paper. In order to accomplish this task, the thesis will achieve the objectives of tracing the historical development of reforestation in Ontario, stating the development of policy and legislation for regeneration processes in Ontario, summarize current and relevant legislation, describe current practices of reforestation in Ontario, discuss these practices in relation to case studies of reforestation companies, discuss results of a survey completed by planters and management that relates to the implementation of reforestation practices and discuss the challenges that exist today in reforestation for contract companies.

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