

Observations on and Implications of the Decline in Forestry Undergraduate Enrolment in Canada

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Executive summary

The decline in the number of enrolment of forestry undergraduate students has caused a concern in the forestry sector in Canada. Some people speculate that the low enrolments trend is attributed to the trend in the larger economy. However, university enrolment and economic statistics data shows that this is not the case. This trend is not a typical cycle; therefore, a different response is needed in dealing with this issue. The possible factors that contributed to this trend are:

- the negative perception of the forestry industry as being anti-environmental;
- the weak and uncertain job market in the forestry industry;
- the mischaracterization of forestry as utilizing low technology and being academically undemanding; and
- the lack of diversity in its current workforce.

As a result, these factors have made forestry programs unattractive. This has, in turn, affected institutions that teach undergraduate courses as a reduction in funding leads to the decline in the capacity for developing new initiatives. Low enrolment has led to a negative feedback cycle for post-secondary forestry programs. The end result of the cycle is program closure. Only those programs that were able to adapt and evolve with the changing expectations of society were able to break free.

This trend causes implications for industry and government as they will face the challenges of filling these professional positions if they want to continue on with their core business. This will be more significant to government than industry due to the predicted sharp increase in retirees.

In order to address the issue, recruitment strategies target three main sources: high school students, transfer students and current students. Exposing high school students to forestry at an early age was the main goal for the high school strategy. Science fairs, field trips, and tours should be utilized as effective strategies in sparking youth interest. Transfer and current students who have yet to declare a major were targeted with current forestry courses that can be taken as electives. This strategy could utilize introductory courses to instill an interest in students and to provide a message that forests in Canada are important.

Before those strategies can be implemented, several key challenges need to be addressed. One of them is diversifying the workforce. Through diversification, labour supply will be more stable as labour will come from multiple sources. The male dominated industry today needs to include more labour from

non-traditional sources such as: aboriginals, females, and immigrants. All three groups are observed to have a potential impact in filling the needs of professionals in forestry. Another key challenge is to counter the stereotypical image of forestry. As such, greater collaboration within the forest sector is needed to send a consistent message about the exciting and fulfilling careers in forestry, and also the message that forestry is concerned with sustainability and stewardship of the forest. Furthermore, modern web-based technology should be used to recruit and connect with today's youth. Further evidence in showing forestry is vibrant and leading edge is needed in order to overcome the mischaracterization of forestry as being low in technology.

Many other considerations should be taken into account as post-secondary institutions recruit and educate for the forest industry:

- Accreditation to provide ongoing accountability and a consistent high level of education
- The use of non-professionals in a professional role
- Government, industries, small businesses, employers of post-secondary graduate should take part in the advertising and promoting the profession of forestry.

By and large, the forest sector including post-secondary institutions needs to evolve in order to meet with the changing views of society, as well as the demographics in Canada.

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1.0 Introduction

In an age of climate change, forest professionals are becoming exceedingly important. The importance of forest and woodlands to the public has never been higher (Leslie, Wilson, & Starr, 2006). This is reflected by the public interest in charities dedicated to forest conservation, and an increasing interest in forest recreation and environmental issues. However, during the past two decades, undergraduate enrolments across Canadian Universities (and more or less around the world) have seen a significant decline. This trend has been linked to the perception by the mischaracterization of the sector as: embracing low technology, a negative image of the industry, and a lack of diversity in its job description and human resource (Drummond, et al., 2006). Furthermore, the majority of students that continue to post-secondary education come from urban and suburban areas, as such many would lack the practical understanding of forestry. Meanwhile, the public is now faced with the impending shortage of forest professionals and technologists to manage our forests.

Canada's forest sector plays a large role in terms of trade, as the country is the world's leading exporter of softwood lumber, newsprint, and wood pulp (Natural Resource Canada, 2011). Not only that, but the forest sector accounts for at least 50 percent of the economic base for about 200 communities and contributes to about 1.8 percent of Canada's gross domestic product in 2011. Canada's State of the Forest Annual report 2011 states: "Forests are much more than reservoirs of timber: Canadians benefit not only economically but also from the cleaner air and water, carbon storage and recreational opportunities provided by the forests" (Natural Resource Canada, 2011).

In this paper, I will give an in-depth overview of forestry enrolment trends and the implications it can cause for the forest sector in Canada. In the first section of this essay I am going to give some background and trends of undergraduate forestry enrolment. Next, I will discuss the major reasons that contribute to this decline in traditional forestry programs. In addition, I want to touch on how this decline in undergraduate enrolment will affect the industry and government in Canada. Finally, a summary of the key opportunities and recommendations will be presented.

2.0 Background

There has been no question that forestry undergraduate enrolment in the last few decades has declined (Nyland, 2008). Is this decline in enrolment caused by the negative reputation of the forest industry or is this trend associated with the larger trend in the economy (Sharik & Lilieholm, 2010)? According to statistics Canada during the 2003/2004 academic year Canadian universities recorded its strongest increase in enrolment in 28 years. The data also shows that the proportions of youth adults that are enrolling in universities are increasing (Figure 1). Enrolment was up 6.1 percent from the 2003/2004 and up 20.4 percent from the 1997/98 levels (Statistics Canada, 2005). Enrolment increases are seen all across Canada from the late 1990's to the mid 2000's, however undergraduate enrolment in traditional forestry programs in Canada were declining. Despite the decline, we see that the University of British Columbia (UBC), out of all the universities with forestry programs is doing better relative to the other universities. Although enrolment was trending downwards during the early 2000's, UBC has seen a slight rebound by the end of the decade. As observed in Figure 2, we see that enrolment in traditional forestry programs are declining while enrolment in programs that are related to forestry is increasing (Figure 3).

UBC and University of Alberta has noticed this trend early on in the 1990's and restructured their programs to include environmental management and natural resource conservation. The result is the increase in enrolment of undergraduates. Although we see some forestry school rebound from previous years of low enrolment, school such as University of Toronto (the first forestry school in Canada) now faces closure as it is getting restructured into the Faculty of Arts and Science because of dwindling enrolment (Bradshaw, 2011). Does this show evidence that the declining trend in forestry is independent of the trend in the economy and that people are not attracted to forestry? Normally if there are highs and lows in enrolment, these can be related to the local or regional levels. However, the declining trend in forestry enrolment is not only seen in Canada but in the United States and United Kingdom as well (Leslie, Wilson, & Starr, 2006) (Nyland, 2008). This trend is not a typical cycle; therefore, a different response is needed in dealing with this issue. Employers of forestry graduates will need to be more engaged and involved if they want to succeed with their own business objectives. A collaborative recruitment effort between the post-secondary sectors, professional associations, and the forestry sector will be required if they are going to attract new and returning students (Drummond, et al., 2006). Not only that, this partnership needs to create information and conditions that will make forestry a profession of choice, and also with the goal of creating qualified forest profession to meet with changing demographics in the future.

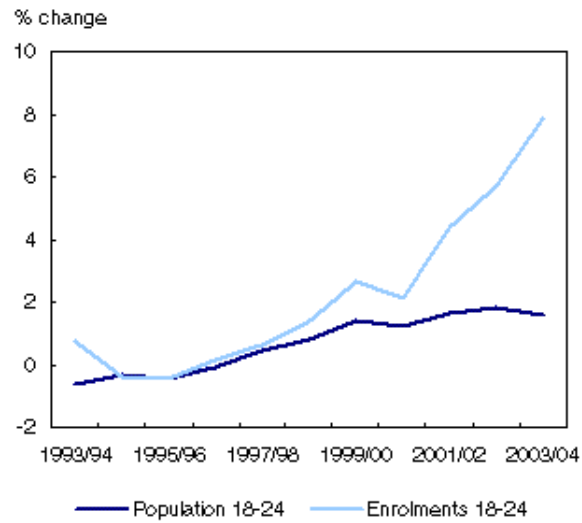


Figure 1: University enrolments of young adults (Statistics Canada, 2005)

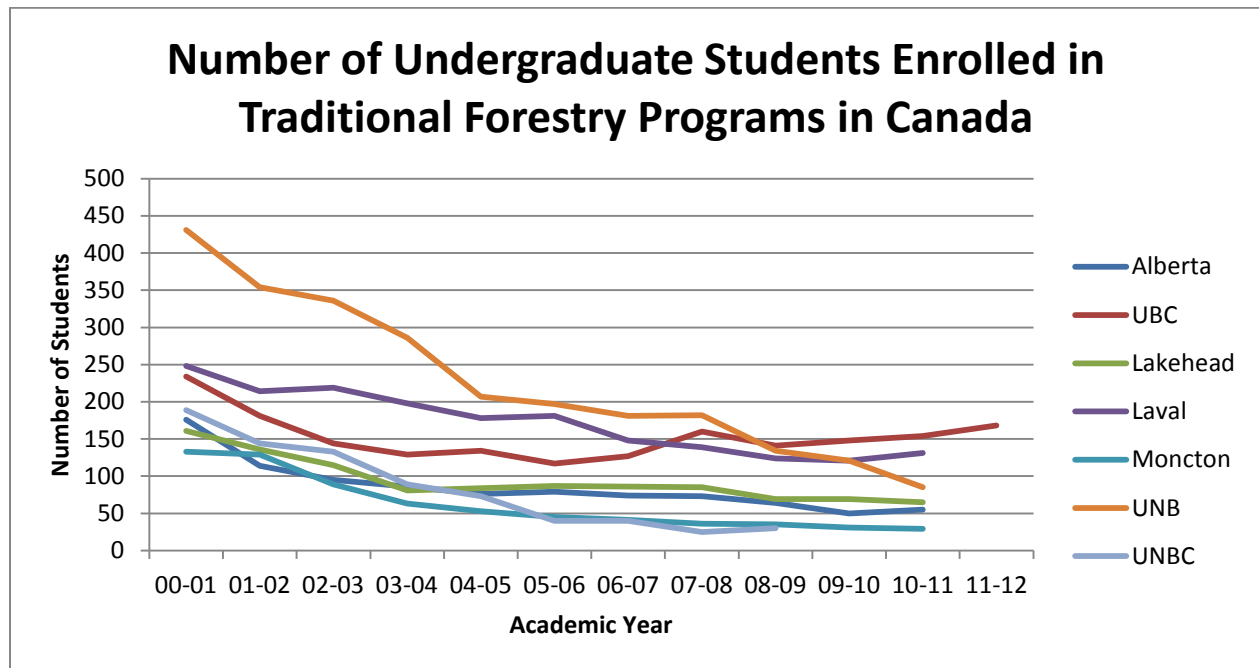


Figure 2: Number of undergraduates enrolled traditional forestry programs in Canada¹

¹ Taken from Peter Marshall presentation: The Changing Nature of University Forestry Education in Canada. Presented at the Second Forestry College Deans Meeting in the Asia-Pacific Region, with permission.

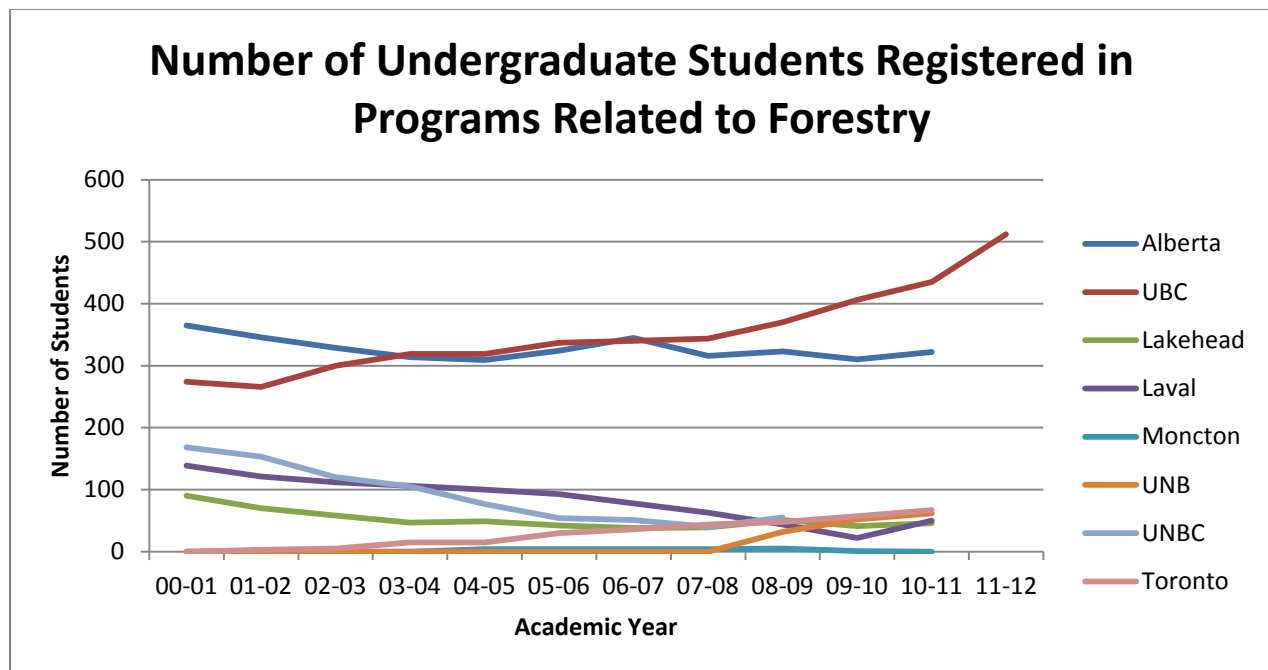


Figure 3: Number of undergraduates enrolled in programs related to forestry in Canada.²

3.0 Possible Aspects That Make Studying Forestry Unattractive

To properly address the issue, we need to first identify why enrolment is so low and where the students are enrolling if it is not to forestry programs. The main speculation that forestry is unattractive is due to the negative image of the forest sector, the mischaracterization of the industry as embracing low technology, and the lack of diversity in its job description and human resources (Drummond, et al., 2006). The industry image strongly influences the workers in the labour market and students enrolled in post-secondary forestry programs. As a result of changing values of society and structural shifts in global and domestic economy, negative perceptions of the forest industry are becoming very common (Huq, 2007). As global awareness of environmental issues increase, criticism of the practices of natural resources industries also started to grow. As a result of the poor perception in the forestry sector, many environmentalists gave forestry a bad name. As a result, many students started to shift away from traditional natural science programs and into new environmentally-oriented programs. Several factors were observed to make forestry unattractive to students:

² Taken from Peter Marshall presentation: The Changing Nature of University Forestry Education in Canada. Presented at the Second Forestry College Deans Meeting in the Asia-Pacific Region, with permission.

1. Weak and uncertain job markets in the forest sector will no doubt effect undergraduate enrolment (Sharik & Lilieholm, 2010). Due to mill closures and layoffs, the prospects of jobs in the forest industry look grim. Unemployment rates are usually higher in the forest industry compared to the average for Canadian industries (Figure 4). As well, it is predicted that job prospects for forestry (besides forest professionals) are limited despite the high levels of forecasted retirement (Huq, 2007).

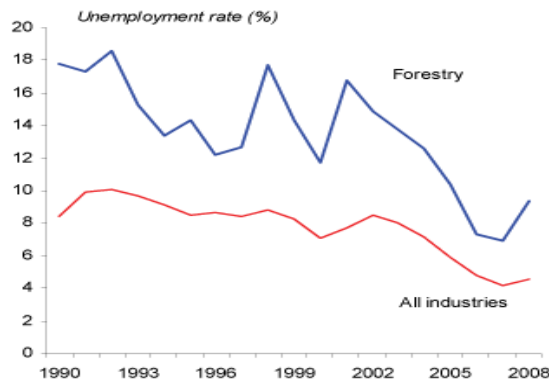


Figure 4: Comparative unemployment rate graph³

2. Many employment positions in the forest industry are seasonal, thus the jobs in the industry are not very stable. Like many of the jobs in the natural resource industries, forestry employment is cyclical. Forestry and logging has the largest part-time employment (Huq, 2007). This is not as surprising due to the seasonality of forestry and logging operations. As a result, unemployment in this industry varies widely. People who desire jobs that are more stable could be deterred by this fact.
3. The working environment is often based in isolated, rural communities. Mills and forestry operations are usually located in remote locations and small towns. An example of this is shown in Figure 5, where more forestry jobs in British Columbia are located in rural locations compared to other industries. In 2005, two-thirds of Canadians lived in Census Metropolitan Areas (CMA), and one-third lived in Vancouver, Montreal, and Toronto (Huq, 2007). Consequently, more and more students that enrol in forestry programs come from urban areas and are less willing to relocate to less urbanized areas. This will especially be true if individuals have a partner that

³ Source: Statistics Canada Via a Guide to the BC economy website under major industries > forestry and logging. Accessed March 1, 2011. http://guidetobceconomy.org/major_industries/forestry.htm

already has a career, because small towns are less likely to provide career opportunities for both individuals.

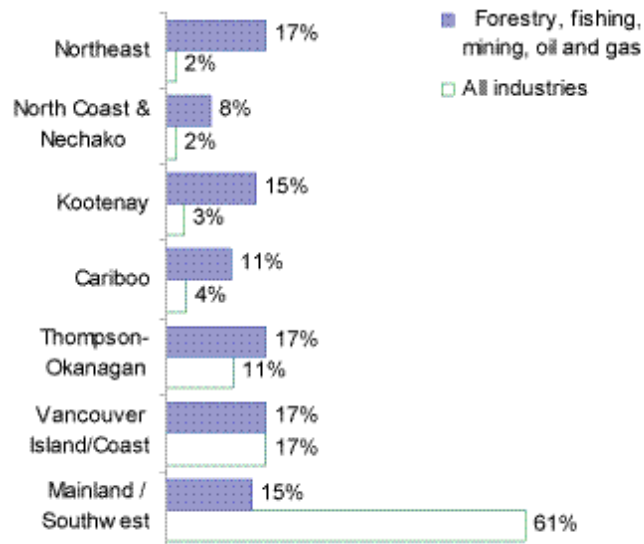


Figure 5 Regional distribution of employment in British Columbia.⁴

4. The lack of connections to the forest can make people unaware of forestry as a profession (Blanchart, et al., 2009). As mentioned above, more and more people are living in big urbanized centers. As a result, most people will not have much direct experience in forestry and interest of the sector is largely based on the public image it receives (Leslie, Wilson, & Starr, 2006). Therefore, as society becomes more urbanized the disconnection between people and the forest increases.
5. Forestry can be viewed as an academically undemanding discipline that would lack credibility (Leslie, Wilson, & Starr, 2006). Compared to other industries, the forest industry has a larger proportion of low-skilled occupations and fewer occupations that require a university degree or management position (Figure 6) (Huq, 2007). As seen in Table 1, only two forest-specific occupations require a post-secondary degree or diploma. Forest professionals are more likely to hold a Bachelor's degree while Forest Technicians and Technologists are more likely to hold a college diploma. The rest of the forest-specific occupations are mostly made up of people with a high school diploma or less (Table 2).

⁴ Source: Statistics Canada via a Guide to the BC economy website under major industries > forestry and logging. Accessed March 1, 2011. http://guidetobceconomy.org/major_industries/forestry.htm

Table 1: Minimum Educational Requirements of Forest-Specific Occupations (Huq, 2007)

Bachelor's Degree	College Diploma	High School Diploma	Some High School
<ul style="list-style-type: none"> Forestry Professionals 	<ul style="list-style-type: none"> Forestry Technicians and Technologists 	<ul style="list-style-type: none"> Supervisors, Logging and Forestry Supervisors, Forest Products Processing Papermaking and Coating Control Operators Sawmill Machine Operators Pulp Mill Machine Operators Papermaking and Finishing Machine Operators Other Wood Processing Machine Operators Paper Converting Machine Operators Lumber Graders and Other Wood Processing Inspectors and Graders Woodworking Machine Operators Labourers in Wood, Pulp and Paper Processing 	<ul style="list-style-type: none"> Logging Machine Operators Silviculture and Forestry Workers Logging and Forestry Labourers Other Wood Products Assemblers and Inspectors

Table 2: The education level of forest-specific occupations (Huq, 2007)

NOC-S	Occupation	High School Diploma or Below	Trade Certificate	College Diploma	Bachelor's Degree	Graduate Degree
C022	Forestry professionals	7.8%	4.2%	17.2%	54.8%	16.1%
C123	Forestry technologists and technicians	18.6%	13.6%	55.0%	8.2%	4.5%
I111	Supervisors, logging and forestry	50.4%	12.7%	26.2%	8.9%	1.8%
I151	Logging machinery operators	78.0%	16.9%	4.2%	1.0%	0.3%
I161	Chain-saw and skidder operators	79.2%	13.8%	5.6%	0.7%	0.8%
I162	Silviculture and forestry workers	50.8%	17.8%	18.6%	8.9%	3.8%
I216	Logging and forestry labourers	72.6%	12.8%	11.8%	2.4%	0.0%
J015	Supervisors, forest products processing	54.5%	19.3%	17.8%	6.8%	1.6%
J113	Pulping control operators	63.7%	15.2%	16.7%	3.9%	0.0%
J114	Papermaking and coating control operators	73.6%	15.2%	7.9%	2.4%	0.7%
J141	Sawmill machine operators	80.6%	13.1%	5.4%	0.8%	0.1%
J142	Pulp mill machine operators	68.3%	17.0%	12.6%	1.8%	0.2%
J143	Papermaking and finishing machine operators	76.6%	13.7%	7.3%	2.1%	0.3%
J144	Other wood processing machine operators	76.9%	14.2%	8.0%	0.9%	0.0%
J145	Paper converting machine operators	78.5%	10.4%	9.2%	0.9%	1.0%
J146	Lumber graders and other wood processing inspectors and graders	62.6%	24.3%	10.2%	2.0%	0.9%
J193	Woodworking machine operators	75.5%	13.7%	8.9%	1.4%	0.4%
J223	Other wood products assemblers and inspectors	79.5%	10.1%	7.3%	2.5%	0.6%
J314	Labourers in wood, pulp and paper processing	78.3%	12.1%	8.1%	1.4%	0.1%

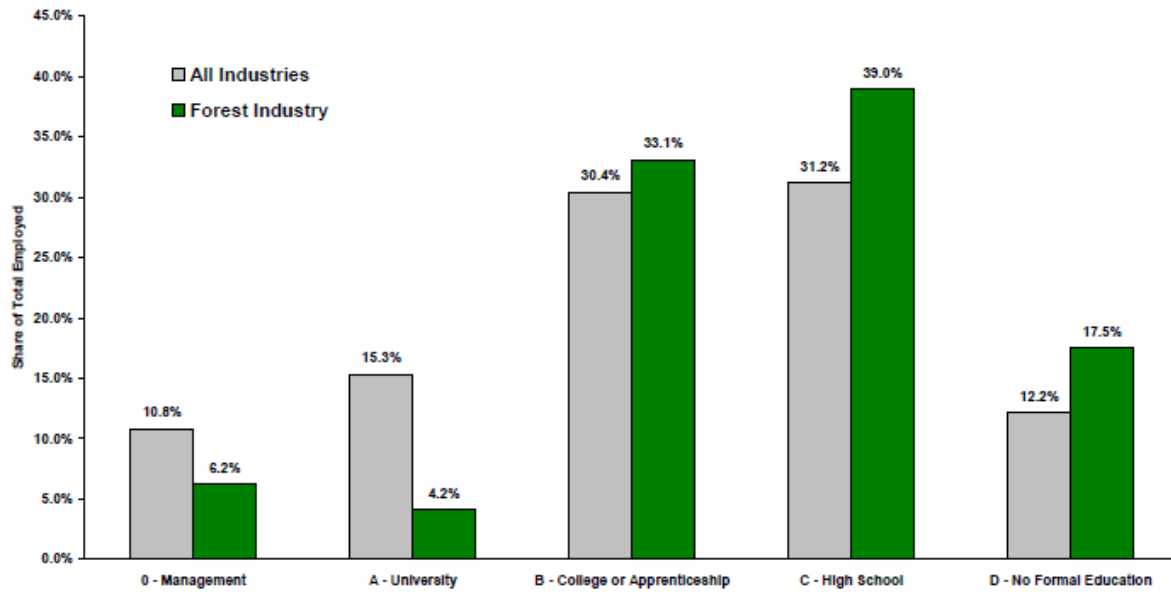


Figure 6: Forest industry employees by skill level relative to all the other industries (Huq, 2007).

6. Related fields such as environmental science can potentially capture traditional students as they offer more employment opportunities, appears to have better use of technology, and are seen to have a better public image relative to forestry (Drummond, et al., 2006). There is a prediction that there will be a shortage of workers in all sectors; therefore, in order to meet the expectations of Canada's youth, these environmental fields are using modern web-based technologies to gain their interest. Forestry and other natural resource programs on the other hand are slower to embrace new technology in their recruitment efforts, particularly with the use of the internet (Drummond, et al., 2006).
7. Forest industries are perceived as being low-tech in terms of recruitment and innovation (Drummond, et al., 2006); (Huq, 2007). Forest industries introduced less product innovation but more process innovation relative to other manufacturing industries. Companies in the forest industries innovate to improve product quality and address environmental issues (Huq, 2007). The result of not producing new products led to the misinterpretation of the forestry industries as being low-tech. Not only are the industries seen as low-tech, but recruitment strategies are also falling behind. As mentioned above, competing professions such as environmental science are more aggressive and experienced when using high-tech technologies to attract students.

The use of modern, web-based technology is used to send more attractive messages and the delivery of these messages is better presented to students.

4.0 Implications of Decreased Forestry Undergraduate Enrolment for Industry, Government, and Post Secondary Forestry Institutions

As mentioned above, there are many underlying reasons as to why forestry undergraduate enrolment is decreasing. So what does this decline mean for forestry industry, government, and post-secondary institutions? Why should they be concerned?

Graduates of post-secondary forestry programs are the future professional and technical workforce for the forest industry. It will be incredibly difficult to find future forest practitioners and qualified individuals if forestry undergraduate and technical programs are discontinued. In order to maintain the economic standing of the forestry sector in Canada, we will need modern well-trained professionals that have obtained their skills from forestry post-secondary programs (Drummond, et al., 2006).

The decline in enrolment for post-secondary institutions means that they will have less funding and support for their programs. This will lead to the eventual closure of the program. The poor perception by potential students; thus, low enrolment has led to negative feedback cycle for post-secondary forestry programs (Drummond, et al., 2006). The cycle pattern is shown in figure 7.

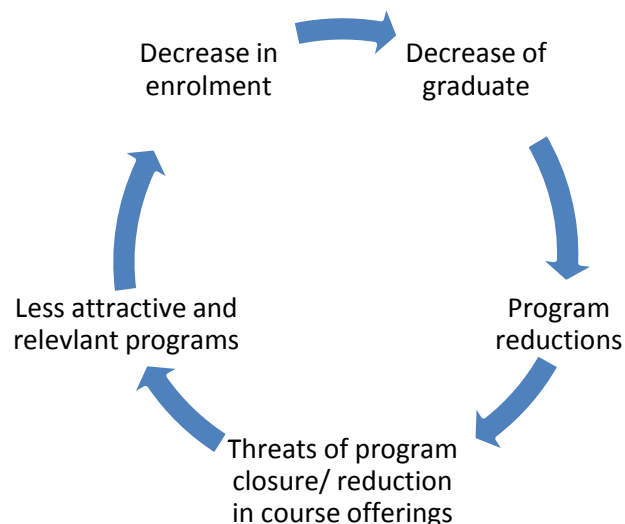


Figure 7: The negative feedback cycle caused by decrease enrolment in forestry undergraduates (Drummond, et al., 2006).

The negative feedback cycle caused by decreased enrolment in forestry undergraduates are reducing the ability for some forestry schools to counter the problem. The result of the decrease in enrolment will be an increase cost per student to deliver the program. This will subsequently cause a program to decrease the cost per student resulting in less attractive and relevant programs. By and large, the cycle will continue until the program is discontinued or merge with another faculty in order to receive financing. Only a few forestry schools are able to break free of this cycle by rebranding and restructuring its program offerings. Other forestry programs, such as the Faculty of Forestry at the University of Toronto, was deemed “not financially viable” and is facing the prospect of getting “absorbed” by the faculty of arts and science (Bradshaw, 2011).

Government and industry should be concerned as they will face a staff shortage in the near future (Huq, 2007). Coupled with the impending retirement of the “baby boom” generation, government and industry will face the challenge of filling these professional positions if they want to continue on with their core business. The natural resource sector has on average an older workforce relative to other Canadian industries. The forest sector has 41 percent of its workforce over the age of 45 (Huq, 2007) (Figure 8). Given the relatively older workforce, the forest sector will face a large retirement of experienced workers in the next decade. Many forestry positions will experience a higher than normal retirement rate and fewer new positions will be created as the labour demand will be driven mostly by retirement.

While the forest industries need technical and professional workers to manage their operations, it is provincial governments that are going to be most affected by low enrolments (Drummond, et al., 2006). Like the industry, provincial governments have been reducing their staff due to the downturn of the sector. However, governments generally retain their employees based on seniority. Now that these employees are facing retirement, there is not only going to be staff shortages, but also a loss of experience. One of the major constraints on labour supply is the time it takes to train new employees. Generally the higher skill level of the occupation, the longer it takes to train the individual to meet the minimum requirement. Completion of post-secondary education is the first step in becoming a forest practitioner (ABCFP, 2012). As a result, the provincial ministries are faced with an impending shortage of experienced staff, while industry has to deal with the indirect effect of “a less optimal and functional regulatory relationship with provincial ministries” (Drummond, et al., 2006) as it tries to rebuild its staff.

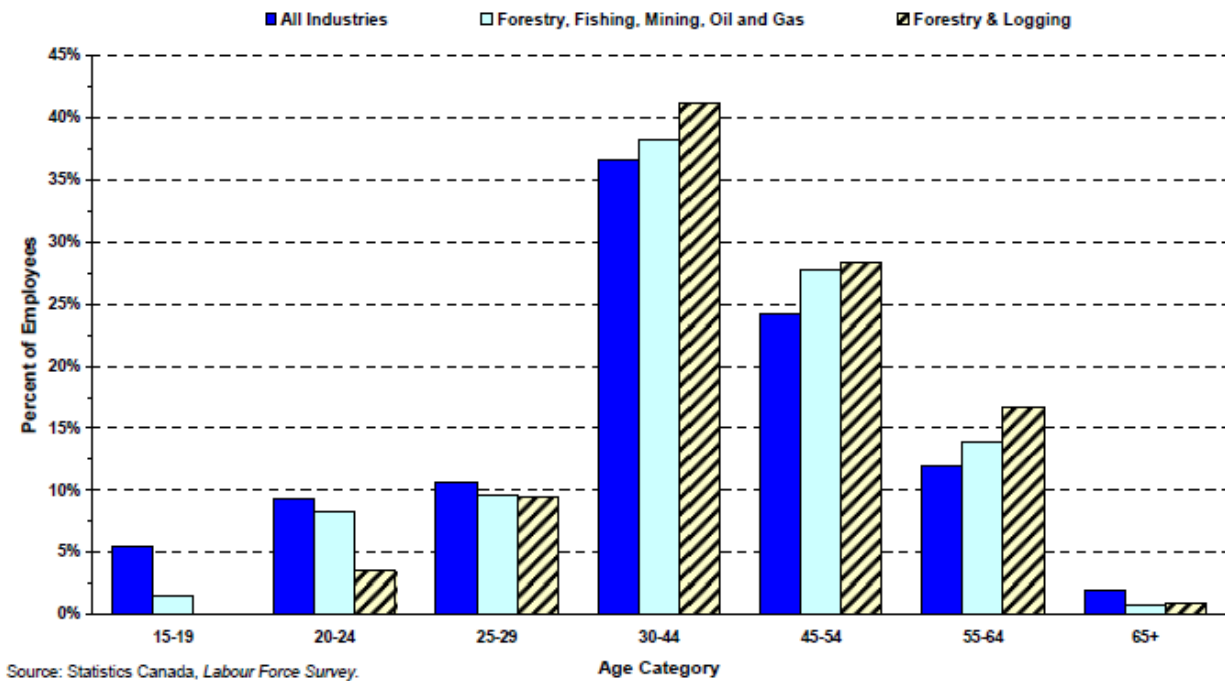


Figure 8: The age groups in the natural resource industries (Huq, 2007).

5.0 Approaches to Increasing Enrolment

In order to develop a recruiting strategy, a clear definition of recruitment should be used. In general terms it can mean to sign-up or enrol someone. In business, it can mean finding and attracting capable applicant for employment (BusinessDictionary, 2012) . “In an era of rapidly changing demographics and in a broad sector such as forestry the term means attracting, enrolling, retaining, and completing the programs of qualified and appropriate applicants for post-secondary forestry/forest land management programs” (Drummond, et al., 2006).

So how can we increase the number of student interested in a major in forestry? The most used option to increase undergraduate forestry enrolment is recruitment (Lockhart, 2008). Recruitment efforts are usually conducted by having recruiters meet prospective students on campus, at high schools or career fairs. They meet with students individually or as a group and present a slideshow describing the university and the forestry programs. However, it is unknown how effective this strategy is in developing an interest to students. Generally there are three sources to recruit: high school students, transfer students, and current students. Effective ways in which to attract each cohort of potential students are listed and described below.

5.1 High School Students

- **Broaden subject areas and courses from traditional courses** such as Mathematics, English, History, Language, Science, and Geography. Offer advanced courses that would be tailored to the interest of students. Some examples of advanced courses that are in most high schools include law, psychology, tourism, etc. An advanced course in forestry or natural resources would raise the profile of the sector and make students become more aware at an earlier age.
- **Promote forestry through tours and field trips.** This would be effective as students can have a firsthand experience in touching the trees, hearing the sounds of the forest, and having the recruiter pointing out interesting facts to spark student interest.
- **Develop interest in students through science fairs.** Science fairs are a collection of scientific projects that are made by elementary or high school students. The main goal is for the student to design a project based on their interest, use scientific methods, develop a display, present it at their local school, and possibly compete at a higher level (Lockhart, 2008). Science fairs enable students to pursue an interest that can lead to their chosen career field and at the same time have fun. Students are able to meet with experts in the field of their interest, creating a mentoring environment for which they can develop a career path (Lockhart, 2008). Greater involvement from forest professionals in developing these science projects can help spark interest in students at an early age.

5.2 Transfer Students and Current University Students

- **Offer more introductory courses that are available more often** (even in the summer) so that students that have yet to declare a major can take them as electives and can potentially take more of the same courses or inspire them to switch majors. Also, identify the best professors that are enthusiastic and persuasive, so that they can teach these courses.
- **Modernize and update course content and names of courses** to increase the curiosity of prospective students.
- **Create new courses to meet today's needs.** For example: climate change and sustainability are important topics today.
- **Give the option to students to minor in forestry** to meet the needs of students that are interested in forestry but are still unsure if they want to switch majors yet.

Another important factor that influences the students' choice of study is their parents. The parents of (especially younger) students could be paying for the students' education and many students may not

know what they want to pursue yet. Some students can be influenced by their parent's own view of a particular field or they can be influenced by their parents' own aspirations. Therefore, it is important to also consider the students' parents during the recruitment process.

All of the strategies described above can effectively increase forestry undergraduate enrolment in forestry programs if properly implemented. However, before any of those strategies can take place, the forest sector needs to overcome key challenges that they face such as the negative perception of the industry, the mischaracterization of the industry of embracing low technology, and the lack of diversity in its job description and human resources (Drummond, et al., 2006).

Creating a diverse and stable future labour supply for the forest sector will depend on attracting workers from non-traditional sources of labour (Huq, 2007). Non-traditional sources of labour are women, youth, immigrants and migrants from other Canadian regions. The representation of aboriginals and these non-traditional sources of forestry labour are also far below average for Canadian industries. There are many reasons to take each group into account.

5.3 Aboriginal

"The role of aboriginals should be considered natural partners in forestry" (Drummond, et al., 2006).

Most aboriginal communities are situated in forested environments and have ongoing land claims considerations for ownership. As such, aboriginals have cultural and economic connects to the forest. The industry is already one of the major industrial employers of aboriginals and their communities are becoming increasingly involved in forest management (Huq, 2007). As such, aboriginals should be highly considered in collaboration with forestry schools.

However a large percent of aboriginals are not completing high school compared to the general rate of the population (Huq, 2007). Therefore many of them would not have the necessary prerequisites to enter post-secondary forestry programs. The opportunities and challenges faced by Canada's aboriginals will be a key part in forestry recruitment.

5.4 Females

There is an increasing trend in Canada towards females enrolling in most post secondary programs. As such, they can have an impact on future forestry enrolment. Data from statistics Canada in Table 3 shows that there are more full time and part time female enrolled in an undergraduate program than there are males. However, traditional forestry programs have generally attracted a higher percent of

males. Nonetheless, if recruiters want to increase forestry undergraduate enrolment they will need to develop school-based programs that specifically target women.

It should be noted that females are tend to be drawn more towards environment science which focuses more on conservation and policy (Huq, 2007). Traditional forestry programs tend to be less attractive to them. If the pool of potential students consist of more females over time, and they are attracted to non-traditional forestry programs, the trend for enrolment in forestry can continue to spiral downwards (Drummond, et al., 2006). For that reason, recruitment efforts should be still concentrated on both genders, but recruiters should be aware of the changing make up of post-secondary students.

Table 3: Female and male enrolment Canadian universities (Statistics Canada, 2005)

University enrolment by registration status						
	1997/98	2001/02 ¹	2002/03	2003/04	1997/98 to 2003/04	
Undergraduate level²	633,000	687,100	726,700	776,900	22.7	143,900
Full-time ²	481,100	528,400	563,800	616,100	28.1	135,000
Male	212,900	223,400	238,400	258,500	21.4	45,600
Female	268,300	304,900	325,400	357,600	33.3	89,300
Part-time ²	151,900	158,700	162,900	160,700	5.8	8,900
Male	57,300	61,900	63,200	61,400	7.2	4,100
Female	94,600	96,900	99,600	99,300	5.0	4,700
1. Percentages are based on actual, non-rounded figures. 2. Enrolment figures may not add up due to the exclusion of the unknown sex category, the other program level category or because of the rounding to the nearest 100.						

5.5 Immigrants

Declining birth rates and an aging population means that immigration will be the main source for labour force growth in the coming years (Huq, 2007). Immigrants tend to settle around large urban areas as there are more economic opportunities and they already have established better immigrant networks. As a result of this trend, fewer immigrants tend work in the forest industries. The proportion of immigrants that work in the forest industry is significantly lower than the Canadian average (Table 4). Nonetheless, Immigrants are going to be a major source of labours in the coming years and would be

valuable for the forest sector if they can attract them. One way in which colleges and universities can attract foreign students training to become foresters is through international exchange programs.

Table 4: Percent of immigrants working in the forest industry (Huq, 2007)

	Immigrants	Recent Immigrants
Forest Industry	9.9%	2.4%
Forestry & Logging	4.9%	0.9%
Wood Industries	13.7%	3.8%
Pulp and paper	7.4%	1.0%
Canadian Average	19.9%	6.4%

A major goal for forestry post secondary programs is to increase undergraduate enrolment. However, caution should be taken when using non-professionals in professional roles. The quality of students should not be sacrificed for the quantity of students. In addressing the idea of filling professional/technical forestry workers with graduates in related fields, clear guidelines with respect to credential upgrades must be met to practice in the forestry profession. An example of such standards is the “Allied Forester in Training” program through the Association of BC Forest Professional (ABCFP) (Drummond, et al., 2006). Accreditation for post-secondary forestry programs is important for keeping a high standard of relatively consistent education. Furthermore, accreditation will provide ongoing accountability to the forestry profession. This would in turn help reduce the image of forestry being an academically undemanding discipline.

The programs in the faculty of forestry at UBC are an example of a school that have restructured its course offerings to increase its undergraduate enrolments. The diversity of programs and courses at this faculty are proving to help enrolment as undergraduate students can take programs in forest sciences, forest resources management, forest operations, natural resources conservation and wood products processing. Furthermore, courses that are offered ranges from sustainable forest management and aboriginal forestry to Geographic information systems (GIS) and remote sensing. Current enrolment statistics shows there are 682 students enrolled under the faculty of forestry at UBC. Of the total, the natural resources conservation program makes up 46 percent of the enrolments (The University of British Columbia, 2012). This new program which has been recently introduced has essentially helped the faculty to increase its overall enrolment of undergraduate students. Moreover, the conservation

program currently attracts 185 female students which are the most among all the undergraduate programs in the faculty. The Faculty of Forestry at UBC is a prime example of an institution re-branding itself from traditional forestry programs. As a result, it is seeing an enrolment increase in many of its programs.

The declining undergraduate enrolment is not just a problem to post-secondary forestry programs, but it is also a problem that must be shared by all players in the forest sector in Canada (Drummond, et al., 2006). Low enrolment numbers in post-secondary schools can have negative consequences for the forest professionals in Canada. Post-secondary forestry programs can face the threat of closing due to low enrolment. Also a decrease in enrolment today can mean a decrease in professionals in the future. This is especially critical as a large retirement in government and industry is predicted. It is clear that forest practitioners face many challenges in recruiting students to forestry programs and to a career in forestry. As such, having a united effort for recruitment in the forest sector will be needed in order to re-brand forestry and to make forestry a viable discipline. A collaborative effort between government, employers, and post-secondary institutions will be needed to coordinate a structured approach in order to:

- send a consistent message that forestry has provides job opportunities and an excellent lifestyle both at work and at school;
- Improve the public perception of the industry as being anti-environmental by promoting forestry as being committed to sustainability and stewardship of the forest (Drummond, et al., 2006);
- commit to supporting existing post secondary capacity and providing vibrant and modern educational programs; and
- change the misconception of forestry being a low tech industry, by incorporating spatial information system programs such as GIS, and Remote Sensing (Lockhart, 2008).

6.0 Conclusion

Canada's forests provide considerable social, economic, and environmental benefits to the nation. As well, forests are becoming more relevant in a global context as they play roles in mitigating climate change and as a medium for carbon sequestration. Canada's commitment to being a world leader in maintaining forest productivity may be compromised by the lack of qualified professional foresters

(Drummond, et al., 2006). Mindful management of the forest resources is needed to protect this important resource for future generations. To continue with the flow of these good and services for Canadians and the rest of the world, innovative, modern, and knowledgeable foresters will need to be educated by post-secondary forestry programs.

Low enrolments numbers in forestry post secondary programs could cause implications for government, industry, and the post-secondary institutions themselves. The threat of program closure can have an adverse effect on labour supply for government and industry. With large retirement rates predicted in the forest sector, new graduates will need to replace the workforce of the “baby boomer” generation. This problem should be addressed by all players of the forest sector.

A collaborative effort between employers, government, and post-secondary institutions will be needed to coordinate a structured approach in order to re-brand forestry. Furthermore, a consistent message about forestry and its importance in Canada needs to be communicated to the public in order to address the incorrect perception of forest practices. Marketing strategies need to include non-traditional groups in order to diversify and stabilize the future labour supply in forestry. Moreover, the use of modern, web-based technology needs to be applied to educational programs and recruitment to connect with today’s youth. By and large, the forest sector, including post-secondary institutions needs to evolve in order to meet with the changing views of society and demographics in Canada.

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