PROJECT REPORT

September 30, 2007

FINAL PROJECT REPORT

sustainable forest management network

réseau sur la gestion durable des forêts

Canadian Foresters' Attitudes and Beliefs about Forestry Curriculum and Forest Management

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Canadian Foresters' Attitudes and Beliefs about Forestry Curriculum and Forest Management

SFMN Project: Professional Forestry Certification in the New Millennium: Opportunities and Constraints for Forestry Curriculum Change

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September 30, 2007
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ABSTRACT

The purpose of the project is to describe Canadian professional foresters' attitudes and beliefs in regards to the appropriateness of their undergraduate forestry training and continuing educational opportunities, particularly around public involvement and Aboriginal consultation, for their current work situations. This study analyzes original data from an exhaustive internet survey administered to Canadian registered professional foresters between May 2003 and February 2004 yielding a total N of 956, and a 16% response rate. Survey results suggest that the nature of knowledge areas and skills used by professional foresters changes throughout their career, where technical skills and natural sciences are more important in early career (first five years) and more complex multi-stakeholder, social science and humanities-related knowledge areas and skills are important in late career. In terms of continuing education, RPFs consider skill sets and knowledge areas related to the involvement of Aboriginal peoples as less important then those related to more general public involvement. When asked which training they received that was not useful over the span of their professional career most respondents listed general science, math, computer training and computer programming and that their undergraduate forestry programs placed too much focus on technical skills and did not provide adequate mentoring. Foresters in our sample view Aboriginal peoples as an important stakeholder with land uses that are compatible with other land uses, that Aboriginal peoples should receive more benefits from forestry, and have a unique voice in discussions regarding forest management. Foresters reported that they should consult with the public about forest management, but that it is their expertise above all that should guide them before public preferences, special interest group input or regulation. When asked about the greatest career challenge foresters face in their work, the four key themes in the data were adapting to a constantly changing set of government policies, working with little job security, exercising their own ethics amidst demands by several forest stakeholders, and finding a fruitful way to work with difficult co-workers and associates of the forest industry.

Keywords: Foresters' attitudes and beliefs, forestry curriculum, professional forestry certification, forestry continuing education, role of public involvement and Aboriginal consultation in forestry training.

ACKNOWLEDGEMENTS

We would like to acknowledge the Canadian Forestry Accreditation Board, each of the Professional Forestry Associations of Canada, the Canadian Forestry Institute, the Faculty of Forestry at Lakehead University, the Department of Rural Economy at the University of Alberta, each of the Accredited Forestry Programs in Canada, and the National Aboriginal Forestry Association, for their cooperation and support in this project. In particular, we thank the Sustainable Forest Management Network for their remarkable support throughout all stages of the project.

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RESEARCH QUESTIONS AND OBJECTIVES

The objective of this project has been to provide a comprehensive picture of Canadian professional forester attitudes and beliefs in regards to the appropriateness of their undergraduate forestry training and continuing educational opportunities, particularly around public involvement and Aboriginal consultation, for their current work situations.

Some key questions asked are:

- How often do early and late career foresters use a given set of knowledge areas and forestry skills?
- What kind of professional development did these foresters receive? What parts of their undergraduate training did they find most useful, not useful, and relevant at different career stages?
- How did foresters rate the importance of social knowledge areas and skills in their current work situation?
- To what extent do foresters agree and disagree with various positions on social issues tied to the forestry profession?
- To what extent to foresters agree and disagree with various forestry policies and practices?
- What are the great career challenges foresters face in Canada?

KEY FINDINGS

Who Answered the Survey?

Table 1. Response Rate by Professional Forester Association

Provincial Forester Association	Sample from Association	RFPs in Canada from Association
Association of BC Forest Professionals	47%	48%
College of Alberta Professional Foresters	18%	7%
Ontario Professional Forester Association	11%	11%
Ordre des ingenieurs forestiers du Quebec	16%	28%
Registered Professional Foresters Association of Nova Scotia	2%	2%
Newfoundland & Labrador CIF/RPF program	1%	1%
Association of Registered Professional Foresters of New Brunswick	4%	3%

The provincial breakdown of sample respondents is quite similar to the breakdown of association membership across the country. The exceptions are when it comes to the Alberta and Quebec associations. Our sample was found to over-represent RPFs from Alberta by 9% and under-represent RPFs from Quebec by 12%. As the requirements of membership in each provincial association are varied and we were told of the importance of province during consultation, the 956 respondents were weighted according to their provincial association membership.

Table 2. Survey Respondent Comparison with Census Demographics for Foresters

Descriptive Category		Survey Sample	RPF Demographics
Gender	Male	80%	83%
	Female	20%	17%
Employer Organization	Private Industry	30%	34%
	Government	29%	30%
	Consultant	20%	19%

$$\text{Index of Dissimilarity} = \sum \frac{(3, 3, 4, 1, 1)}{2} = 0.06$$

After weighting the data by membership, we compared the gender and employer organization demographics of our sample to those of foresters found in the census data from 2003. We established that the gender and employer organization categories were quite similar to those of the population of foresters in the census. We calculated the Index of Dissimilarity as a test of representativeness and found it to have a value of 0.06. According to Sakoda (1981) the index of dissimilarity is one half of the sum of the absolute differences between the two groups. This index can be interpreted as the proportion in the groups that make it dissimilar from an even distribution. A value of 0.10 is considered to be normal and thus our sample can be considered representative of the population.

Table 3. Other Sample Characteristics

Variable	Variable's characteristic	Sample Description
Age	Average	40.9*
	< 30	14.7%
	30-40	36.4%
	41-50	31.0%
	> 50	17.9%
Education	Diploma	19.7%
	Bachelor's Degree	94.3%
	Multiple Degrees	8.9%
	Post Graduate Degree	28.9%
Years at Current Job	Average	8.1*
	< 5	41.3%
	5-10	33.3%
	11-20	16.4%
	> 20	8.9%
Employment Status	Full-time	88.2%
	Part-time	3.4%
	Temporary/Seasonal	5.5%

* Denotes average rather than percentage

We found the average age of respondents to be 41 years and the largest portion of our sample fell within the 30-40 age category. The bulk of our sample (94%) had an undergraduate bachelor's degree while smaller portions had a post-graduate degree (29%) or multiple undergraduate

degrees (9%). The average number of years that respondents had been at their current job was 8 years but a large proportion had been at their jobs for less than 5 years. The majority of respondents were employed full time (88%).

How often do Early and Late Career Foresters use a given set of Knowledge Areas and Forestry Skills?

Table 4. Significantly Different Knowledge Areas and Skills

Knowledge Areas	Early Career Forester Means	Late Career Forester Means	Statistically Significant Differences	More Important for which career stage?
Basic and Quantitative sciences	3.76	3.44	Yes	Early
Forest Sciences	4.48	3.88	Yes	Early
Forest Management and Utilization	4.07	4.49	No	-
Social Sc & humanities	3.35	4.36	Yes	Late
Business & Organizational Management	3.55	4.56	Yes	Late
Communication skills	4.31	4.80	No	-
Technical skills (field)	4.43	3.29	Yes	Early
Computer skills	3.83	3.73	Yes	Early
Managerial skills	3.31	4.62	Yes	Late
Problem solving skills	4.15	4.68	No	-

*(N=769)

The t-test analysis shows that there are some statistically significant differences between the importance of the skills and knowledge areas used in early and late RFP careers ($p<0.05$). On average, foresters ranked technical and field skills, forest sciences, computer skills, and basic and quantitative sciences higher in the early career stage (4.4, 4.5, 3.8, and 3.8 respectively) compared to those in the advanced career stage (3.3, 3.5, 3.7, and 3.4 respectively). Professional foresters in the later stage of their careers were found to rate the importance of social sciences and humanities higher, on average, than those in the early stage. The mean was found to be 4.4 for advanced career stage foresters compared to a mean of 3.4 for early career stage foresters. Managerial skills were similarly ranked higher in this career stage (means of 3.3 for early and 4.6 for late career). These results imply that the nature of knowledge areas and skills used by professional foresters changes throughout their career. They shift from the use of technical skills and natural sciences to more complex multi-stakeholder, social science and humanities-related knowledge areas and skills.

What kind of Professional Development did these Foresters receive?

Table 5. Listing, Ranking of Continuing Education Courses Completed By Respondents

Course Description	Number	% taken	Rank
Provincial Forest Legislation	410	51.4	1
Professional Forester Standards and Accountability	403	50.6	2
Forest Management Planning	360	45.2	3
Silviculture Systems	271	34.0	4
Dispute Resolution, Negotiations, Problem-solving	270	33.9	5
Forest Certification Systems	263	33.0	6
Design of Silviculture, Treatment and Harvesting Prescriptions	258	32.4	7
Public Participation	243	30.5	8
Biodiversity	231	29.0	9
Classification, Inventory and Mapping of forests, including GIS	228	28.6	10
Emerging approaches to Forest Ecosystem, Land Management and Adaptive Management	191	24.0	11
Vegetation Management	165	20.7	12
Forest Pest Management	157	19.7	13
Monitoring and Auditing of Forest Management Practices	156	19.6	14
Forest Soils	146	18.3	15
Aboriginal Consultation	143	17.9	16
Planning and Roads Location	114	14.3	17
Changing Economic and Social Pressures affecting Forest Management	108	13.6	18
Terrain Stability	95	11.9	19
Aboriginal Cultural/Archaeological Resource Management	94	11.8	20
Forest Business Planning	94	11.8	20
Community Forestry or Co-management	73	9.2	21
Community Consultation	72	9.0	22
Environmental Ethics	67	8.4	23
Aboriginal Resource Management	40	5.0	24
International Forest Legislation	24	3.0	25

The average number of continuing education courses that were taken within the past five years was 9. The analysis of the courses taken by respondents shows that the more technical types were ranked in the top half of courses completed. The highest ranked courses taken were provincial forest legislation (51.4%) and professional forester standards and accountability (50.6%). Both courses are important when it comes to maintaining professional knowledge in areas of forestry practice and ethics. These particular courses may be popular due to entrance exam and continuing practice requirements in some of the provinces. Two courses, “dispute resolution, negotiations, and problem-solving” and “public participation”, ranked fifth and eighth respectively. These were the only social sciences and humanities-related courses that ranked among the top half of the courses taken.

Overall, courses related to public participation and Aboriginal involvement were ranked in the bottom half of courses taken. Professional foresters were found to complete courses related to

public participation (30.5%) more often than specific courses related to Aboriginal consultation (17.9%) which placed 16th overall. Less than 18% of professional foresters surveyed have completed a course that would train them in ways to improve their capacity to engage in Aboriginal consultation.

Open-Ended Questions about Undergraduate Training

In general, the qualitative analysis indicates that professional foresters are more likely to list business and organization/people management (19%), computers and technology (8%), communication skills (8%), Aboriginal peoples/community knowledge (7%) and public relations/consultation (7%) as the weakest areas of their undergraduate experience. These knowledge areas and skills were reported as being used by respondents but areas in which they received inadequate training. When asked which training they received that was not useful over the span of their professional career most respondents listed general science, math, computer training and computer programming. From these qualitative findings, it appears some of the computer training received has been irrelevant, where other computer training desired on the job is not provided in the forestry program. Some of the weaknesses identified for current undergraduate forestry programs include the focus on technical skills and the lack of experience or mentoring.

How did Foresters Rate the Importance of Social Knowledge Areas and Skills in their Current Work Situation?

When asked to rank the importance of a set of knowledge areas and skills according to their use in respondents' current jobs RPFs ranked public relation skills the highest (4.25). Dispute resolution, negotiation, and problem solving was ranked second (4.17) with interdepartmental teamwork skills (4.16) and integrated resource management planning (4.15) ranked of similar importance. Public participation and environmental ethics were rated as important overall (means of 3.97 and 4.09 respectively) while skills related to mapping social values and legal training to interpret Aboriginal land use court decisions were rated as unimportant (2.79 and 2.53). There were several other skill sets that had means around the neutral importance level.

The means of skills and knowledge areas related specifically to Aboriginal involvement were found to lie around the neutral level of importance ranging from 3.44 to 2.53. When the means of more general skills are compared with those of the same skills applied specifically to Aboriginal peoples they were found to be ranked of similar importance but consistently higher. For example, public participation or community consultation, partnerships with surrounding communities and mapping social values, were found to have means of 3.97, 3.44, and 2.79 respectively. In contrast, Aboriginal consultation, partnerships with Aboriginal communities, and mapping Aboriginal values were found to have means of 3.40, 3.17, and 2.74. These findings clearly indicate that RPFs consider skill sets and knowledge areas related to the involvement of Aboriginal peoples as less important than those related to more general public involvement.

Table 6. Distributions, Means and Standard Deviations for Social Knowledge Areas and Skill Sets

Knowledge Areas and Skill Sets	Unimpo-rtant	2	3	4	Very Important	Don't Know	Mean (St Dev)
1. Public Participation or Community Consultation	6%	7%	15%	26%	45%	1%	3.97 (1.20)
2. Forest co-management and community forestry	16%	16%	26%	25%	14%	4%	3.05 (1.29)
3. Historical treaty rights and recent developments in Treaty settlements	20%	13%	18%	24%	20%	4%	3.11 (1.45)
4. Traditional Aboriginal land use and knowledge	18%	14%	22%	24%	16%	4%	3.07 (1.36)
5. Aboriginal consultation	17%	12%	14%	24%	30%	3%	3.40 (1.47)
6. Integrated resource management planning	3%	6%	12%	30%	48%	<1%	4.15 (1.05)
7. Environmental Ethics	3%	5%	15%	34%	42%	2%	4.09 (1.01)
8. Dispute Resolution, Negotiations, Problem Solving	3%	4%	15%	30%	48%	1%	4.17 (1.02)
9. Public relation skills	2%	4%	11%	34%	50%	<1%	4.25 (0.94)
9. Policy advocacy skills	7%	13%	24%	36%	18%	2%	3.47 (1.15)
10. Partnership development skills with surrounding communities	10%	13%	22%	32%	22%	1%	3.44 (1.26)
11. Partnership development skills with Aboriginal communities	19%	13%	17%	26%	21%	3%	3.17 (1.42)
12. Mapping social values	22%	17%	23%	22%	10%	6%	2.79 (1.32)
13. Mapping Aboriginal values	25%	16%	23%	20%	11%	6%	2.74 (1.36)
14. Legal training to interpret Aboriginal Land use court decisions	29%	19%	21%	17%	8%	5%	2.53 (1.32)
15. Interdepartmental teamwork skills	2%	5%	12%	34%	46%	1%	4.16 (1.00)

* Mean and standard deviations computed by excluding "Don't know" and non-responses (n=707)

To what extent to Foresters agree and disagree with various positions on social issues tied to the forestry profession?

Table 7. - Distribution, Mean and Standard Deviation for Key Statements about Social Issues in Forestry

Key Statements	Strongly Disagree	2	3	4	Strongly Agree	Don't Know	Mean (St Dev)
1. There are few incentives for RPF to pursue advanced training	15%	21%	22%	28%	14%	1%	3.05 (1.28)
2. Public opinion holds foresters in high regard	18%	33%	28%	17%	2%	3%	2.49 (1.03)
3. Current forestry students need to be able to specialize at the undergraduate level	29%	28%	13%	18%	11%	2%	2.52 (1.36)
4. Maintaining good industry-aboriginal relationships is essential for effective forest management	2%	5%	17%	45%	30%	<1%	3.98 (0.93)
5. Foresters do not substantially increase their employment opportunities when they obtain specialized forestry training	16%	24%	21%	24%	10%	7%	2.88 (1.26)
6. Aboriginal people in and around my forest area have much to contribute to forest knowledge	12%	20%	27%	19%	8%	14%	2.89 (1.18)
7. Maintaining good industry-landowner relationships is essential for effective forest management	1%	3%	9%	44%	40%	2%	4.23 (0.81)
8. The forestry profession is not well respected in my community	16%	31%	26%	16%	6%	4%	2.64 (1.14)
9. I am confident in my ability to use appropriate scientific methodologies in applied forestry research	4%	11%	15%	44%	22%	4%	3.72 (1.05)
10. Maintaining good government-industry relationships is essential for effective forest management	2%	3%	8%	39%	48%	<1%	4.30 (0.86)
11. Aboriginal people's land uses are not compatible with industrial logging	30%	36%	15%	12%	3%	6%	2.17 (1.09)
12. Aboriginal people should not receive special treatment in public consultation for forest management (n=946)	17%	27%	20%	17%	15%	3%	2.86 (1.33)
13. The public should play a key role in monitoring progress towards sustainable forest management	3%	10%	19%	40%	27%	2%	3.78 (1.05)
14. There is not adequate forest land base available for Aboriginal traditional harvests	39%	28%	11%	6%	3%	14%	1.92 (1.07)
15. Community forests encourage greater diversity of forest-based economic development than do large industrial tenures	11%	17%	17%	25%	18%	12%	3.24 (1.32)
16. Aboriginal people receive adequate benefits from forestry development	12%	22%	21%	16%	7%	22%	2.81 (1.20)

* Means and standard deviations calculated by excluding "don't knows" and non-responses (n=244)

When respondents were asked to rate how much they agreed or disagreed with key statements related to social issues in forestry, there was some ambiguity. Generally respondents disagreed with the statements that public opinion holds foresters in high regard (2.49) but they also disagreed with the statement that the forestry profession is not well respected in the local community (2.64). Respondents largely agreed that they are confident in their ability to apply scientific methodologies to forest research (3.72) and also that the public should play a key role in monitoring progress towards sustainable development (3.78).

In regards to their opinions on forestry education, overall they disagreed with the statement that current forestry students need to be able to specialize at the undergraduate level (2.52), but also slightly disagreed with the statement that they do not substantially increase their employment opportunities when they obtain specialized training (2.88). They generally felt neutral on the statement that there are few incentives for RPFs to pursue advanced training (3.05).

A majority of respondents agreed most strongly that maintaining good government-industry relationships is essential for effective forest management (4.30) similarly to landowner- industry (4.23) and Aboriginal-industry (3.98) relationships. The position of these means indicates that while Aboriginal-industry relationships are considered important, they are not considered as important as those relationships with the government or other landowners.

Respondents most strongly disagreed with the statements that there is not adequate forest land base available for Aboriginal tradition harvests (1.92) and that Aboriginal peoples land uses are not compatible with industrial logging (2.17). Although respondents generally disagreed that the Aboriginal people in their forest area have much to contribute to forest knowledge (2.89), they did not agree that Aboriginal people receive adequate benefits from forestry (2.81) or that they should not receive special treatment in public consultation (2.86). In summary, these findings suggest that foresters view Aboriginal peoples as an important stakeholder with land uses that are compatible with others but that they should receive more benefits and have a unique voice in discussions regarding forest management.

To what extent to foresters agree and disagree with various forestry policies and practices?

When asked how they felt about forestry policies and practices, respondents generally agreed that current provincial forest legislation and policies promote sustainable forest management (3.41) and that forestry practices that emulate natural disturbances are the best forest management strategies (3.56) but they did not agreed that species biodiversity is being threatened by current practices (2.77). In relation to more specific practices, they agreed that insect infestation suppression is adequate (3.30) and similarly did not agree that forest fire suppression is inadequate (2.23). Respondents also felt that the conversion of forest land to other uses, rather then logging, is more of a threat to forest sustainability (3.12).

Table 8. , Means and Standard Deviations for Statements related to Forest Management Policies and Practices

Statements	Strongly Disagree	2	3	4	Strongly Agree	Don't Know	Mean (St Dev)
17. Current provincial forest legislation and policies promote sustainable forest management in my province	10%	15%	17%	39%	19%	1%	3.41 (1.24)
18. Species biodiversity is being threatened by current forest management practices	19%	29%	17%	21%	11%	4%	2.77 (1.31)
19. forest fire suppression is not adequate in preventing major forest fires	33%	25%	13%	12%	5%	12%	2.23 (1.25)
20. the expansion of the forest industry will improve my province's economy	11%	20%	17%	26%	23%	3%	3.29 (1.33)
21. most environmental groups tend to exaggerate the environmental damage caused by forest management practices	5%	8%	10%	35%	41%	3%	4.00 (1.14)
22. insect infestation suppression is inadequate	7%	19%	19%	25%	17%	13%	3.30 (1.24)
23. forest practices that emulate natural disturbances are the best forest management strategies	6%	11%	21%	40%	19%	3%	3.56 (1.10)
24. forest companies should be given a wider range of private property rights on Crown lands	38%	21%	14%	14%	9%	3%	2.33 (1.38)
25. Water resources in forested areas are well protected	10%	24%	18%	36%	11%	2%	3.14 (1.19)
26. In managing this forest area, more attention should be given to preserving nature for its own sake rather then to produce goods	14%	29%	24%	22%	9%	2%	2.82 (1.19)
27. The forest is a public trust that should be carefully managed to protect the interests of future generations	2%	6%	11%	38%	42%	1%	4.15 (0.95)
28. Timber harvesting is usually the best way to enhance other multiple forest uses	13%	28%	28%	21%	6%	3%	2.79 (1.12)
29. It is more important to manage this forest area for local employment than for environmental quality	27%	38%	24%	8%	2%	2%	2.18 (0.97)
30. The media tend to exaggerate the environmental damage caused by forest management practices	3%	8%	14%	41%	33%	1%	3.96 (1.01)
31. In my forest area, conversion of forest land to other uses is more of a thereat to forest sustainability than logging	20%	18%	13%	21%	24%	4%	3.12 (1.50)
32. The best strategies for resolving most forest issues in my province	4%	8%	15%	49%	24%	<1%	3.82 (1.01)

are public involvement and negotiations with stakeholders							
33.The best strategies for resolving most forest issues in my province are reliance on existing regulations	16%	33%	30%	18%	3%	1%	2.59 (1.05)
34.The best strategies for resolving most forest issues in my province are reliance on experts and professionals	2%	8%	17%	49%	25%	<1%	3.87 (0.94)
35.Communities and municipal governments should have more power in making forest management decisions in my area	15%	25%	22%	27%	11%	1%	2.95 (1.24)
36.Forest management planning and operations adequately meet legal obligations with respect to Aboriginal and treaty rights	5%	14%	19%	26%	10%	26%	3.29 (1.14)
37.Meeting with forest stakeholder groups and responding to their questions takes up too much of my time	29%	32%	18%	11%	4%	6%	2.24 (1.12)
38. The demands of most interest groups are usually not consistent with sound resource management	7%	22%	24%	31%	12%	4%	3.19 (1.14)
39.Forest regeneration practices are adequate to ensure future economic needs	8%	19%	15%	38%	16%	5%	3.39 (1.20)
40.Public consultation mechanisms in my district provide the public with adequate involvement in forest management decision-making	8%	16%	15%	39%	15%	7%	3.39 (1.20)
41.Forests in my area are successfully managed for a wide range of use and values	5%	17%	18%	40%	18%	2%	3.49 (1.13)
42.My province has enough protected areas such as provincial and national parks	15%	18%	12%	26%	27%	3%	3.34 (1.43)
43.Intensive forest management is a realistic forest management supplement to current practices	3%	10%	15%	40%	27%	6%	3.82 (1.06)
44.Placing high regard on public opinion represents a departure of my responsibility to manage the forest according to the principles of scientific management	21%	34%	17%	20%	5%	3%	2.55 (1.19)
45.Aboriginal values are adequately protected in forest management practices	5%	22%	21%	24%	9%	20%	3.13 (1.11)
46.In a democratic society, public preferences should ultimately prevail, even when these preferences conflict with the judgment of resource	25%	37%	18%	15%	6%	1%	2.39 (1.17)

professionals							
47. The province where I work is doing a good job of meeting Canada's commitments under the Convention on Biological Diversity	6%	10%	19%	33%	9%	22%	3.38 (1.09)
48. Forest policies adequately take into consideration the role of provincial forests in climate change	14%	21%	17%	16%	4%	29%	2.65 (1.17)
49. Forest inventories do not provide adequate information for good forest management planning	10%	21%	15%	28%	22%	4%	3.31 (1.32)

* Mean and standard deviations computed by excluding "don't knows" and non-responses (n=288)

In relation to forestry and the economy respondents generally agreed that the expansion of the forest industry would improve the provincial economy (3.29), and that current regeneration practices are adequate to ensure future economic needs (3.39). Overall though they did not agree that it is more important to manage the forest for local employment than for environmental quality (2.18).

In general, respondents agreed that the forest is a public trust that should be carefully managed to protect the interests of future generations (4.15). When it comes to who decides what those interests are and how they should be protected, respondents by and large positioned forestry professionals as the knowledge authority. They agreed that environmental groups (4.0) and the media (3.96) tend to exaggerate the environmental damage caused by forestry practices. While they may not agree that placing high regard on public opinion is a departure of their responsibility in managing the forest (2.55) or that meeting with forest stakeholders takes up too much of their time (2.24), they also did not agree that public preferences should prevail even when they conflict with the judgment of resource professionals (2.39). Furthermore, they agreed that the best strategies for resolving forest issues is to rely on experts and professionals (3.87), and to include the public and negotiate with stakeholders (3.82) rather then rely on existing regulations (2.59). These responses indicate that when it comes to forest management foresters should consult with the public but that it is their expertise above all that should guide them before public preferences, input or regulation.

One important note about the means reviewed from Tables 7 and 8 is the low number of records used to compare the means. This is the result of a high number of respondents whom did not answer or answered that they did not know if they agreed or disagreed with specific questions in each section. In the statements found in Table 7 a large number of respondents did not rate the 4th statement (maintaining good industry-aboriginal relationships are essential for effective forest management). There were 520 respondents who did not answer this question which represents approximately 54% of the records.

Similarly a high number of respondents replied that they did not know if they agreed or disagreed with the 18th, 27th, 29th and 30th statements from Table 8. These statements relate to the legal obligations towards Aboriginal and treaty rights (don't know = 26%), protecting Aboriginal values (don't know = 20%), commitments to biological diversity (don't know =

22%), and the role of forests in climate change (don't know = 29%). The research team intends to explore the findings where certain questions are eliminated due to their high non-response rates and "I don't know" responses, particularly to those regarding Aboriginal issues.

Open-Ended Questions about Greatest Career Challenges

In addition to the close-ended questions, the survey asked foresters what were the greatest career challenges they faced in their careers. The following is a list of the top four career challenges foresters face in their careers:

1. Changing Government Policy
Respondents find the frequency and volume of forest policy, regulations and legislation changes as career challenge. Respondents reported a limited ability to influence governmental policy as a frustrating part of their careers.

2. Economic Security
Respondents frequently saw the economic viability of the forest resource sector, and thus their job security, as a career challenge. More specifically, respondents felt little option to leave a job they did not like, and find a better one, given the shortage of positions, workload increases in all forestry positions, and the uncertainties around organizational change.

3. Ethics
Respondents found it challenging exercising their personal ethics in some of the hierarchical work positions in which they found themselves. They also felt under scrutiny by too many stakeholders, including the public, Aboriginal groups and employers (company and government).

4. Workplace Culture - Internal Relationships
Many respondents reported difficulties of working with others at their workplace, in particular internal relationships with co-workers, supervisors, fellow professional foresters and other professionals outside of forestry. Foresters emphasized the need for more training in management, conflict resolution, and communication to improve workplace relationships.

KEY DELIVERABLES

Publications
Author(s): Allen, Trena, Naomi Krogman, Peggy Smith and Ken VanEvery
Year of publication: 2004
Article title: Renewal and Relevance: The Challenges Facing Forestry Education
Journal name: Aboriginal Times. Volume 8. Issue 4. Pages: 8-11.

Trena Allen has a full draft of her thesis completed, but due to working full time for the past 2 years, and having a child, her defense is delayed until late 2007. A copy of her thesis will be sent

to SFMN upon its completion. Ken VanEvery and Kendra Isaac received training as graduate students working on this project. Trena Allen's thesis includes two papers:

1. Allen, Trena and Naomi Krogman. "Career challenges for Canadian foresters: Implications for training and workplace culture." In preparation for Society and Natural Resources

2. Allen, Trena, Naomi Krogman and Peggy Smith. "From the Classroom to the Field and Back Again: Can Professional Forestry Education Do Enough?" In preparation for the Forestry Chronicle.

We have drafted another paper for publication from the early focus group findings:

3. Krogman, Naomi, Peggy Smith, Trena Allen and Solange Nadeau. "Challenges in Forestry Schools of Canada to Adapt Curriculum to Changing Socialscape of Forestry." In preparation for the Forestry Chronicle.

We have agreed to work on a 4th paper for publication:

4. Krogman, Naomi, Peggy Smith, Kendra Isaac, and Trena Allen. "Forester attitudes toward Aboriginal content in Forestry Curriculum and Continuing Education." To be submitted to The Environmental Professional.

We have presented the findings of this study at SFMN conferences, to the Canadian Forestry Accreditation Board members, to the Association of British Columbia Professional Foresters, and at numerous academic conferences. Numerous posters have also been presented.

Trena Allen, an Aboriginal MSc student, has nearly completed her MSc degree, and obtained a professional position as a key researcher and writer for the National Aboriginal Forestry Association. Ken VanEvery is a full time practicing professional forester, still contemplating completing his MSc.

Kendra Isaac is completing her first year in the Rural Sociology MSc program at the University of Alberta.

BENEFITS TO PROJECT PARTNERS AND OTHERS

Professional forestry associations can benefit from this work by understanding their members' undergraduate and continuing education needs, particularly in the areas of public relation skills, dispute resolution, negotiation, problem solving, and interdepartmental teamwork skills.

Forestry programs (for RPFs) in Canada can also benefit from this project in terms of recommendations for curriculum reform, particularly in regards to innovative teaching methods that may be required to teach foresters how to engage with the public and Aboriginal peoples,

given the importance it holds for foresters but the lack of importance they see to be specifically trained in these areas.

Academics can benefit from the project by seeing the trends in attitudes and beliefs of foresters across key areas, including their own training, their needs for skills and knowledge at different stages of their career, and the orientation RPFs have toward various social issues in Canada. This is the only survey of its kind in Canada, and could be used for comparison across provinces, across age groups, among men and women, foresters employed in different sectors, etc., thus providing a rich data set for future subgroup comparisons.

MANAGEMENT/POLICY IMPLICATIONS

There are three key management and policy implications the research team wishes to emphasize:

1. Given the nature of knowledge areas and skills used by professional foresters changes throughout their career, where technical skills and natural sciences are more important in early career and more complex multi-stakeholder, social science and humanities-related knowledge areas and skills are important in late career, continuing education programs need to provide more opportunities and perhaps requirements to complete courses and experiential learning opportunities in these late career areas, of which are not strong in undergraduate training. Forestry programs needs to provide students more mentoring from experienced foresters.

2. While foresters in our sample view Aboriginal peoples as an important stakeholder with a unique voice in forest management, and generally agree that Aboriginal peoples should receive more benefits from forestry, foresters did not rank the importance of Aboriginal-related formal training highly. This suggests that forestry educators need to create innovative learning environments for topics which are of importance on the job, but not seen as those learned best in a classroom at the undergraduate level. This finding could also imply that the value of understanding Aboriginal history and entitlements has not been cultivated in forester education, thereby devalued later on, even when it is clear to foresters Aboriginal people are not just another stakeholder.

3. Our open-ended question about foresters' greatest career challenges suggests that foresters feel ill-prepared to demonstrate social skills across a wide range of demands on the job, including understanding and translating (shifting) policy into action, exercising their own ethics amidst demands by several forest stakeholders, and finding a fruitful way to work with difficult co-workers and associates of the forest industry. Foresters appear to need far more support in these areas from their professional forestry associations, and more training to see alternatives to respond to difficult social situations and choices among competing interests.

SUGGESTIONS FOR FUTURE RESEARCH

Future studies on forestry education should measure outcomes of various courses and innovative experiential training programs, such as mentorship and internship programs, to gauge the extent to which foresters increase their capacity to change workplace culture, and address various Aboriginal and public forest values in their management decisions. A long term panel study of the needs of foresters over time, in terms of skills, knowledge, and career counseling, could inform Canadian forestry schools and professional forestry associations about how to provide relevant training at different stages of a foresters' career.

REFERENCES

Sakoda, James. (1981) A Generalized Index of Dissimilarity. Demography: 18(2) 245-250.