


**WORKING PAPER
2000-6
FOR INTERNAL CIRCULATION ONLY**

sustainable
forest
management
network

réseau
sur la
gestion durable
des forêts



**Public Comprehension
of Alternate Ways
to Manage Forest Land**

A Network of Centres of Excellence
Un réseau de centres d'excellence 

**Thomas Nelson, Thomas Johnson,
Kare Hellum and Michael Strong**

For copies of this or other SFM publications contact:

Sustainable Forest Management Network
G208 Biological Sciences Building
University of Alberta
Edmonton, Alberta, T6G 2E9
Ph: (780) 492 6659
Fax: (780) 492 8160
<http://www.ualberta.ca/sfm>

This working paper is published by the Sustainable Forest Management Network. All Network researchers are invited to present ideas and research results in this forum to accelerate their application and to foster interdisciplinary discussion on knowledge, strategies and tools leading to sustainable management of Canada's boreal forest. Working Papers are published without peer review.

This is an internal document of the SFM Network. Do not cite this Working Paper without the expressed written consent of the author(s).

Public Comprehension of Alternate Ways to Manage Forest Land

by

Thomas Nelson, Thomas Johnson, Kare Hellum and Michael Strong

Sustainable Forest Management Network
University of Alberta, Edmonton, Alberta

March 2000

ABSTRACT

Six forest communities provided a group of citizens who had agreed to participate in a study linking scenarios of forest management to perceptions of managed forestlands and to beliefs about personal, family and community futures. The alternative scenarios were 1) industry and government acting alone, 2) industry and government with citizens in the community acting in an advisory capacity and 3) community and industry with government acting in an advisory capacity.

Results were unfavorable to decision making by industry and government acting alone. Citizens favored having the community in an advisory role with industry and government. The possibility of industry and community based policymaking occupied middle ground. Direct community participation in management may become more attractive to communities as this becomes better developed.

Management scenarios were found significantly related to beliefs about personal, family, and community futures, and to differing outcomes for manufacturing, tourism, recreation and habitat preservation. Concepts of traditional, managerial and justice environmentalism were also related to beliefs about different management scenarios. Results indicated strongest endorsement was given to the idea of justice management.

Four stages of succession development depicted in slides were found to differ significantly on environmental rating scales, but ratings were not significantly affected by type of management scenario.

ACKNOWLEDGMENT

This research was supported by Legacy 2: Strategies for Sustainable Forest Management, Sustainable Forest Management Network, University of Alberta

INTRODUCTION

Debate about what constitutes responsible management of public forestlands in Canada and the United States has been adversarial. Dominated by the forest industry on the one side and by organizations advocating preservation on the other, it remains in a state of transition. Government has acted as arbitrator, relying on the sciences for enlightenment and, for political reasons, what is termed “the public good”.

Often at issue is the fate of remnants of unmodified treed landscapes representative of those that once covered much of the temperate landmass (Peterson, 1996). Many citizens now regard such lands as characterizing the ultimate degree of “naturalness” in wooded landscapes. Preservationists (classical environmentalists) argue that these forests should be exempt from instrumental use, while industry, arguing for managed environments, stresses the successional nature of forests – the inevitability of periodic destruction and renewal. The intellectual depth and emotional intensity of concern for retaining such ecologies has transferred to almost every debate concerning the fate of existing forestlands.

Interesting, is the emergence of new stakeholder groups consisting of local citizens such as the Quincy Library Group (Kiestler, 1999) that have formed not to resolve old issues but to discover what the adversarial groups can live with practically. This is a new environmental force. Justice environmentalism as it has come to be called (Purdy, 2000) insists a basic environmental value exists at the community level – the place that people work and live. In boreal towns and cities this is where forest, industry, and recreation are in ecological union.

Other countries possessing significant forested regions have escaped much of this acrimony. The Nordic countries, in particular, are able to concentrate attention upon benefits and problems associated with different types of forest management (Carlsson, 1999). Also in Nordic countries, public participation in forest management is widespread and policy mechanisms are understood and accepted. This provides a basis for what Sen (1999) describes as “cooperative conflict”. Carlsson noted that in the 26 years spanning 1971 to 1997 there was only a single appeal against a logging decision made by a community-managed forest in Sweden (Carlsson, 1999). However, unlike Canada, Latin America or the USA, Nordic countries lack significant tracts of old growth forest.

Problem

Much of the debate in North America is rooted in heightened awareness of forest management issues and changed attitudes of citizens. Ordinary citizens now show active interest in policies governing management of public lands and regard themselves to be the ultimate stockholders (Carrow, 1999). Along with this new desire to “take charge”, citizens display a disapproving attitude toward commodity based forest management. Data collected in public surveys indicate that the ordinary citizen has replaced long-standing utilitarian attitudes

toward forestland management with views that are more “holistic” (Carrow, 1999; Shindler, 1998).

Research suggests that citizens are no longer prepared to regard public land use as an industrial use versus environment protection issue. Current value systems appear to be focused in a new way. The welfare of local communities looms large and is put ahead of aims promoted by environmental preservation groups as well as those argued for by industry (Shindler, 1993).

Assuming that public interest in decision-making continues to increase as it did in the last decade (Knopp and Caldbeck, 1990), and is accompanied by widespread concern about the way management decisions impact upon the environment, mechanisms for assessing citizen views can be expected to expand progressively. As this occurs, input by non-professionals will be given greater weight. In respect to public land futures, citizens seem prepared to organize into groups asserting their right to assume stewardship. Thus, we seem to be moving in a direction where forest management and government objectives at least undergo review by local citizens, i.e., toward justice management.

Resource dependent communities can be expected to increasingly explore alternative means to gain control of the future. Policies affecting forest harvesting and utilization loom importantly in citizen beliefs and perception. We can expect active community engagement in the framing and monitoring of forest management policies. Citizens understand that a role in management offers a certain way to communicate economic self-interest. Having a role in management also satisfies the universal human need to be heard, personally recognized and to grow and experience achievement in affiliation with other residents in the community (Schein, 1980). Having a role in management nurtures feelings of personal well-being whereas lack of participation fosters stress. Here we investigate attitudes and aspirations that come into play in such communities.

INVESTIGATION

The present investigation focused on cognitions and perceptions of persons living in one of six forest communities having an important dependence on forest resources. All cooperating communities had an industry actively engaged in tree harvesting providing employment for many community residents. The communities selected were widely separated and geographically distant from Alberta metropolitan areas, and rural in the sense that they were far enough from big urban centres to make daily commuting impractical (Bowles, 1992). To explore linkages between citizen roles in forest policy and economic and personal self-interest, we examined the relationship between three types of forestland management policy on the one hand, and citizen perceptions of personal, family and community futures, and forest practices on the other.

In the first part of the investigation participants were provided with one of three management decision structures and asked to rate how this way of doing things would affect personal, family

and community futures. The second part of the investigation focused on perception of forestland policy and management as exemplified in scenes showing different stages of successional forest development. Participants communicated their perceptions by rating each forest scene on two scales, one reflecting natural fecundity and the other attractiveness.

Hypotheses

Each of the three management scenarios represented a distinct type of organizational environment providing opportunities or constraints for individual citizens and the community as a whole. Overall, individuals operating in each of these environments were conceived to be positioned on a continuum anchored by well-being at one end and stress at the other (McGrath, 1976; Edwards and Rothbard, 1999). Without making stress a central theme or adopting a particular model, we expected that the most desirable scenario would be contrasted with the least desirable on the basis of a) beliefs about future benefits accruing to self, family, other citizens and local community, and b) ratings reflecting perception of forest practices.

Specific to (a), we expected scenarios providing for public participation in management, either in an advisory (Industry-Government with Community Advisory scenario) or executive capacity (Community-Industry with Government Advisory scenario), to evoke less stress and result in more favorable perceptions and beliefs on the part of citizen subjects than the scenario restricting decisions to industry and government acting alone (Industry-Government scenario). This hypothesis was based on results from surveys and observations of citizen interest in management participation (Harvey and Hilljor, 1994; Druinker et al, 1994; Shindler, 1998; Carrow, 1999; Beckley, 1998), and assumptions of basic needs and motivations for recognition, achievement, responsibility and affiliation.

Specific to (b), perceptions of forestry practices in relation to management policy were elicited by four colour slides showing different stages of succession forest growth. We expected a reliable order of preference within the set of slides based on previous findings (Nelson & Taerum, 1999). No prediction was made for effects of alternate forms of forest management on scene preference because perceptions of forest scenes have been found robust.

METHOD

Participants

Twenty-six northern forest communities were invited to participate in an investigation involving perceptions of forestlands and forest communities. The letter of introduction stated that:

The project we are engaged in requires that we get together with cross-sections of persons significant in northern communities. We would like to meet with such persons, females as well as males, and record their perceptions of practices that are

related to assuring sustainable forest resources. Specifically, we are prepared to meet with 12-15 people as a group, explain a forest management procedure to them, and have them look at 4 pictures of forests in various stages of development in order to evaluate them.

Indications of possible interest were followed-up until 6 communities agreed to participate. All cooperating communities have grown over 25 years although growth is not uniform over years and several give evidence of plateauing population growth. Basic characteristics of the communities and the sample are shown in Table 1. Five of the communities are in boreal forest regions and one is located in mountain foothills.

Procedure

Each of the six groups of participants was assembled in a public hall in their local community. The general nature of the investigation was explained in the same way in each community. The same rating scales were presented in the same order in each community. Type of management scenario was randomly assigned to communities such that two communities received the “Industry-Government” scenario, two the “Industry-Government with Community Advisory” scenario, and two received the “Community-Industry with Government Advisory” scenario. The content of each scenario represented a unique combination of management responsibilities to be assumed by the local community, the forest industry, and the provincial government as outlined in Table 2. This Quick Reference outline was adapted from Beckley and Korber (1996).

After a short discussion period focusing on procedure, participants read the management scenario assigned to their community. The “Industry-Government” scenario (Table 3) is an example of the form shared by all three types of scenarios. Participants were instructed to imagine that the scenario was actually in force in their area and that they should answer questions from this perspective. After this, it was pointed out that the management procedure provides for management functions involving data gathering and analysis, short-term planning (5 years), long-term planning (20 years), harvest allocation decisions, implementation, enforcement of regulations and monitoring. Following this, participants were provided a copy of the Quick Reference (Table 2) and told that this summarized the scenario that was discussed.

The experiment began with the rating of the four forest scenes. Participants were instructed to consider each scene to be a result of practicing the type of forest management described in the scenario they had just read. The scenes showed old growth, 15-year re-growth, clear-cut and burned over forestland (Figure 1). Each slide was rated on 12 dimensions. The first six ratings were made using 7-point rating scales anchored at “not at all” and “exceptionally well”. These six scales measured perception of “affordance”. Gibson (1979) defined affordance as what an environment “offers the animal, what it provides, or furnishes, either for good or ill---It implies the complementary of the animal and the environment” (p. 127). The specific measures were 1) plenty of dry wood for a fire; 2) plenty of fruit and berries to eat; 3) good protection from the

wind; 4) good quality/tasting water; 5) plenty of birds and small animals; and 6) good view of surrounding environment. Scales 7-12 measured visual impact of the environment employing 7-point semantic differential type scales (Osgood, 1953). The specific polarities used were 7) living – dying; 8) active – inactive; 9) beautiful – ugly; 10) poor – rich; 11) healthy – sick; and 12) pleasant – unpleasant. These scales were taken from Nelson and Taerum (1999).

After a short pause, the group was reminded of the forest management policy they had read earlier, its critical features, and instructed to complete a questionnaire. The questionnaire contained 24 items measuring participant beliefs in five areas related to (a) self, other persons and groups; (b) areas of community activity; (c) community futures; and (d) recreational pursuits and ecological preservation.

Following this, participants responded to a number of questions designed to assess personal reactions to living in northern forestland. These items included anxiety about animal encounters, getting lost, getting caught in a storm, being bitten by insects and not having help in an emergency. This was to assure that irrational levels of fear did not color responses given by participants (Bixter and Floyd, 1997)

Finally, participants provided information on gender, education, income and years of residence in the community. Participants were not required to identify themselves on materials turned in for analysis. Also, groups were assured that the data provided would not be put in a form that would allow individual communities to be identified. It is for this reason that Table 1 does not identify communities by name.

RESULTS

Perception of Forest and Forest Management Scenarios.

Forest Scenes

Table 4 summarizes MANOVA analyses employed to test for effects of forest management policy on ratings of successional forest scenes. Hypothesis one was confirmed by presence of a reliable within-subjects difference in the ordering of forest scenes by questionnaire item. However, alternate forms of forest management did not have a significant affect on perceptions of forestry practices. This means that the four forest scenes are distinguished from one another in the same way by every group on every measure of fecundity and attractiveness. Type of forest management scenario made no difference.

Fecundity Measures

Fecundity measures 2, 3, 4 and 5 in Group A reflected type of forest landscape in the same way. “Old growth forest” was rated most favorably, “15 year re-growth” was next, “Recent clear-cut” placed third and “Burned forest” was last. That is, in the opinion of residents in northern forest communities, fruit and berries, protection from wind, good water, birds and small animals were associated “very well” with “old growth forest” and medium age re-growth. In

contrast, recent clear-cut and burned forest were seen to be “deficiency” landscapes within Appleton’s (1975) scheme since these two landscapes received ratings of “not at all” or “slightly” on fecundity dimensions 2 through 5. In absolute terms, the greatest deficiency hazard was lack of food.

This was not the case for items 1 and 6. The availability of “dry wood” for a fire was most obvious in fire-damaged forest and least obvious in the forest scene showing trees of medium growth. In the case of “good view”, clear-cut was superior to all other landscapes, and most limited in fire damaged and mature forest areas. Thus, clear-cut and burned forests were perceived to have limited merit.

Semantic Meaning

Semantic meaning measures are summarized in Group B of Table 4. The predicted order of ratings by scene was reliable. The structure of ratings was identical across all six dimensions. Old Growth forest was regarded as the most “living”, “active”, “beautiful”, “healthy” and “pleasant”. Fire damaged locations received the most negative ratings on each descriptor. The range of ratings over the four scenes was largest on the “pleasant – unpleasant” dimension and smallest on “poor – rich” and “healthy – sick”. In absolute terms, burned forest was indicative of “dying”, “inactive”, “ugly”, “poor”, “sick” and “unpleasant” while ratings of clear-cut scenes never exceeded the neutral position. Clear-cut and burned forests were very unattractive to viewer groups.

Beliefs and Forest Management Scenarios

Results of analyses of responses to the 24 questionnaire items are summarized in Table 5. Significant differences attributable to forest management policy were found within each of the four item groups: (A) self, persons and groups; (B) areas of community activity; (C) community futures; and (D) recreational pursuits and ecological preservation.

Acceptability of forest management policy in relation to self, other persons and groups

Responses to items in Group A (Table5) revealed that forest management policy providing citizens an advisory role in policy formulation was most favored and that industry - government policy formulation was least favored. It is noteworthy that policy formation by industry - government acting alone approached the “unacceptable” level (scale rating of 3 or less) for items related to self, family, and “in relation to what you think is being done now”.

Community activity and management policy

For Group B items, traditional industry-government management was regarded as most advantageous when manufacturing activities were the issue. In contrast, tourism and recreation were most advantaged by community-industry partnerships.

Management policy and community investment

Analysis of Group C items revealed that this is an area where forest management policy appears to exert little effect on citizen anticipations. The only definitive issue relates to the future of community children. Answers to this important question indicated that a citizen advisory role in policy formation offers the best assurance of future opportunities for the children of northern forest communities.

Management policy and recreational pursuit / ecological preservation

Finally in Table 5, ratings of Group D items revealed preference for community-industry management over other management arrangements. In all three cases where reliable effects occurred, most confidence was shown in policy formation dominated by community and industry with government in an advisory position. Bird watching, photography, camping, hiking and preservation of forest and lake were favored when citizens serve as the major policy makers.

Forest Community Futures

Responses to questions about forest community futures are summarized in Table 6. MANOVA results showed that forest management scenario had no significant affect on the time estimation given in response to the four questions. On the other hand, duration estimates differed reliably between questions. The “strictly forest-based economy” was judged most severely, in that it implies the shortest expected life for the community (21-25 years). The “diversified forest-based economy” was viewed as offering the best alternative – citizens assign a 31-40 year expected lifespan. Dissatisfaction was further communicated by the belief that “strictly forest-based economies” should last longer (26-30 years) than citizens indicated they expect them to last (21-25 years).

Individual Factors

Management

Analysis of individual factors by MANOVA showed women to have a much greater belief than men that the average person is satisfied with forests being professionally managed (5.09 vs. 1.34). However, gender was not a factor influencing the degree to which any particular scenario was accepted

Education

Education results are summarized in Table 7. Those with high school or less education indicated a high expectation that professionally managed forest benefits tourism, recreation and volunteer based activities, while those reporting some university education or an advanced degree were doubtful that such a relationship exists.

Results bring to light the relationship of education to matters of possible business development, occupational advancement, maintenance of residence after retirement and possibility of a balanced natural environment. Except for the item related to business

development, the better educated were more pessimistic than other education groups that community benefits would spill over from forest-based industry, no matter how managed.

Importance of leisure pursuits / ecological preservation

Granting the existence of managed forests close to the community, participants expressed the view that hunting, fishing, bird watching and photography are significantly more appropriate activities in these forests than camping and hiking, habitat and wildlife preservation (4.93, 4.64, 4.54 vs. 4.49, 4.44; $F(2.56, 256)=2.87, p<.05$).

Fear

With respect to fear, women reliably exceeded men when “aggressive bear or cougar” was the issue (4.87 vs. 3.57). Income level interaction occurred in somewhat unexpected forms. Lower income persons indicated higher fear of encountering large aggressive predators than did other income groups (5.50 vs. 2.94). Fears of “being caught in a storm” (3.77 vs. 2.61) and “not having help in an emergency” (4.86 vs. 3.64) were highest for middle-income residents. These results are difficult to summarize beyond saying that there were no outstanding fears at the community level.

Phobia

MANOVA results for phobia items showed highly reliable differences in the level of fears associated with prolonged exposure in a northern forest environment. The order of apprehension from least to greatest was “insect bites” (2.91), “being caught in a storm” (3.02), “getting lost” (3.22), “not having help in an emergency” (3.88) and “meeting an aggressive bear or cougar” (4.00). Although differences between ratings were reliable, ($F(3.14, 228) = 7.9, p<.01$), fears were weak. In absolute terms all ratings were within a range indicative of “little concern”. There was little indication that residents in these communities fear living in a community bordering on a forest environment.

Discussion and Conclusions

Results confirmed that the route by which forest policy and practices are decided significantly affected how residents of northern communities regard the future for themselves, families and community. Responses were in a direction doubting public acceptance of policy making by industry and government acting alone. This was the least acceptable management scenario and was rated at levels close to “unacceptable”.

In the eleven cases where forest management policy made a reliable difference (Table 5), the lack of public confidence in Industry-Government management consistently appeared. Except for encouraging “manufacturing”, which of course industry already does, (four of six communities have large mills), Industry-Government management of public forests received the lowest endorsements in terms of community futures for self, family, children, tourism, recreation, camping and hiking, photography and bird watching. And, despite familiarity with the concept of sustainable forest management, the Industry-Government scenario received a low mark as means of habitat preservation. Thus, managerial environmentalism did not win a vote of confidence.

Community acceptance of Industry-Government management significantly increased when local citizens are provided an advisory role. Our findings indicated this to be the best of the three alternatives for assuring the future of self, family and children in the eyes of the community. We conclude that it is this type of resource management that best reduces stress at the community level. The idea of justice management is represented here.

The scenario that puts government in an advisory role with an Industry-Community team occupied a surprisingly positive position given that it is not an alternative practiced in the province where data was collected. It was seen as the best choice for supporting tourism, recreation, habitat preservation, camping and hiking, photography and bird watching. This is clearly seen to be the best of the three from the “green” point of view. It is also a form of justice management.

It is possible that Industry-Government forest management that assures an advisory role for local citizens coupled with Industry-Community management of a separate comparatively small parcel of land (e.g., two or fewer sections) offers a reasonable way to realize the highest value from management of public forest. While large-scale community forests are a vibrant success in Scandinavia (Carlsson, 1999), we note that the political histories leading to community forces in Nordic countries are different than those leading to industry management in Canada and the United States. Notwithstanding this, we believe that community forests, perhaps of a more limited scale provide a way for northern communities to increase their resource base through development of tourism and local industry and offer a sound way for aboriginal groups to educate other northern populations about the benefits derived from original land uses.

Post session discussion with community leaders indicated a definite need for community forests. At proper scale, such place a part of the community future solidly in citizen hands. They can quell fear of “sudden-death” that seems to haunt every resource based community (Bowles, 1992). The lingering presence of this fear is obvious when the question “How long do you think a community can depend upon a strictly forest based economy” was answered as “21-25 years”. The message that forests can be managed to assure a sustainable harvest is not reflected in this estimate. The fact that the duration estimate jumps to 31-40 years when the word “diversified” replaces “strictly” indicates the direction in which public confidence may lie. As the community forest becomes a more widespread and realistic option for northern communities, the future security they are perceived to offer should enhance its general attractiveness.

Dual-track resource management is not new. British Columbia has been a leader here. For example, the town of Houston, a forest industry community of 4300 persons, petitioned the B.C. Ministry of Forests to provide protected lands suitable for local recreational use. In 1989 a block of 4200 hectare was set aside that is currently used for cross-country skiing, hiking and fishing. The area is managed by the Province and town jointly, excepting decisions relating to commercial activity. This remains in government hands and only logging of diseased trees has been permitted.

Northern forest community evaluations of slides showing forest in four states of management were constant across experimental groups and independent of management provisions or personal factors. Old growth forest was perceived consistently to be most fecund

and always elicited the most favorable environmental impressions (beautiful, healthy, active, rich, pleasant). Medium re-growth was favorably perceived too. Recent clear-cut and burned forest elicited negative impressions of fecundity and unfavorable environmental impressions. Perceptions of burned forests were more negative than those of clear-cut, however. These results are consistent with prior findings showing the same preferential ordering by persons residing in agricultural, professional, resource extraction and forest communities (Nelson and Taerum, 1999). The same investigators also report that exposure to arguments supporting either environmental management or environmental preservation alternatives had no measurable affect upon how the landscapes were perceived. They conclude as Appleton (1975) and Gibson (1979) that response to nature reflects a strong genetic component, what Wilson (1993) terms biophilia and biophobia. We believed this is involved also.

Evidence of influences by personal factors was present in the results. Northern forest communities are complex not monolithic social structures. Gender, education and income exert an effect on particular forms of community awareness. Interestingly, years of residence in the community was not related to community awareness. This means that residence in communities differing in age does not contribute greatly to variability in personal judgment.

Women in our study had greater concern than men about presence of large carnivores in nearby forests. However the overall level of concern expressed was low, as befits residence in a northern forest community. Encouraging was the greater optimism of women that forest management can provide community benefits.

Level of education had a modifying effect on perceptions. The better educated expected fewer community benefits to derive from forest management. In areas where the better educated did expect benefits from professional forest management they focused on increased business opportunities, better jobs, improved retirement circumstances and a healthier environment. Overall tentativeness may decrease as community involvement in management increases.

REFERENCES

- Appleton, J. J. (1975). Experience of Landscape. New York: John Wiley.
- Beckley, T. M. (1998). Moving toward consensus-based forest management: a comparison of industrial, co-managed, community and small private forests in Canada. The Forestry Chronicle, 74, 736-744.
- Beckley, T.M and Korber, D. (1996). Clear cuts, conflict and co-management: Experiments in consensus forest management in northwest Saskatchewan. (Information report NOR-X-349). Northern Forestry Centre, Edmonton, Alberta.
- Bixler, R. D. and Floyd, M. F. (1997). Nature is Scary, Disgusting, and Uncomfortable. Environment and Behavior, 29, 443-467.
- Bowles, R. T. (1992). Single-industry resource communities in Canada's north. In D. A. Hay and G. S. Basran (eds.) Rural Sociology in Canada. Toronto: Oxford University Press, 63-83.
- Carlsson, L. (1999). Still going strong, community forests in Sweden. Forestry, 72, 11-26.

- Carrow, R. (1999). Canada's model forest program: Challenges for phase II. Forestry Chronicle, 75, 73-80.
- Druinker, P. N., Matakala, P. W., Chege, F. and Bouthillier, L. (1994). Community forests in Canada: an overview. Forestry Chronicle, 70, 711-720.
- Edwards, J. R. and Rothbard, N. P. (1999). Work and family stress and well-being: An examination of person-environment fit in the work and family domains. Organizational Behavior and Human Decision Processes. 77: 85-129.
- Harvey, S. and Hillier, B. (1994). Community forestry in Canada. The Forestry Chronicle, 70, 725-730.
- Gibson, J. J. (1979). The Ecological Approach to Visual Perception. Boston: Houghton Mifflin.
- Kaplan, R. and Kaplan, S. (1989). The Experience of Nature. Cambridge: Cambridge University Press.
- Kiester, E. (1999, July). A Town Buries the Axe. Smithsonian, 30, 4, 70-78.
- Knopf, R.C. (1987). Human behavior, cognition, and affect in the natural environment. In Handbook of Environmental Psychology, Vol. 2. D. Stokols and I. Altman (Eds.). New York: John Wiley & Sons, pgs. 783-825.
- Knopp, T. B. and Caldbeck, E. S. (1990). The role of participatory democracy in forest management. Journal of Forestry, 88, 13-18.
- McGrath, J. E. (1976). Stress and behavior in organizations. In M. Dunnette (ed.), Handbook of Industrial and Organizational Psychology, pp. 1351-1395. Chicago: Rand McNally.
- Nelson, T. M. and Taerum, T. (1999). Beauty and the forest. In T. S. Veeman, D. W. Smith, B. G. Purdy, F. J. Salkie and G. A. Larkin (eds.), Sustaining the Boreal Forest: Conference Proceedings. Edmonton: Sustainable Forest Management Network.
- Osgood, C. (1953). Method and theory in Experimental Psychology. New York: Oxford University Press.
- Petersen, G. F. (1996). Natural Woodland: Ecology and Conservation in Northern Temperate Zones. Cambridge: Cambridge University Press.
- Purdy, J. (2000). Shades of green. The American Prospect, 11, 6-7.
- Schama, S. (1995). Landscape and Memory. New York: Alfred A. Knopf.
- Schein, E. H. (1980). Organizational Psychology (3rd ed.). Englewood Cliffs, New Jersey: Prentice Hall.
- Sen, A. (1999). Development as Freedom. Cambridge: Cambridge University press.
- Shindler, B. (1998). Does the public have a role in forest management? Canadian and U.S. perspectives. Forestry Chronicle, 74, 700-702.
- Shindler, B., List, P. and Steel, B. S. (1993). Managing federal forests. Journal of Forestry, 9, 36-42.
- Statistics Canada (1996). 1996 census profiles CD-ROM. Ottawa: Statistics Canada.
- Wilson, E. D. (1993). "Biophilia and the Conservation ethic". In The Biophilia Hypothesis. S. R. Kellert and E. D. Wilson (Eds.): Washington, D. C.: Island Press.

Table 1.**Sample characteristics of six forest communities**

Characteristics	Community					
	1	2	3	4	5	6
Population in 1996	7424	5883	2321	7399	6553	2030
Number in Sample	9	10	9	9	13	10
Gender						
Male	56%	70%	90%	67%	69%	30%
Female	44%	30%	11%	33%	31%	70%
Average Household Income	\$46,250	\$65,000	\$63,750	\$55,800	\$41,000	\$57,600
Percent Reporting Some Post Secondary Education	100%	70%	89%	87%	92%	50%
Average Number of Years in Community	14	13	13	23	12	21
Average Age	46	39	41	42	45	48

Table 2.

Quick reference to forest management responsibilities according to community scenario

Management functions	Stakeholder		
	Local Community	Forest Industry	Provincial Government
I. Industry-Government			
Data gathering and analysis	IN	P	P
Short-term planning (5 years)	IN	A	P
Long-term planning (20 years)	IN	A	P
Harvest allocation decisions (how much)	IN	A	P
Implementation (annual operating plans)	IN	P	A
Enforcement of regulations	IN	IN	S
Monitoring	IN	IN	S
Policy decision-making	IN	A	P
II. Industry-Government with Community Advisory			
Data gathering and analysis	IN	P	A
Short-term planning (5 years)	IN	A	P
Long-term planning (20 years)	IN	A	P
Harvest allocation decisions (how much)	A	IN	P
Implementation (annual operating plans)	IN	P	P
Enforcement of regulations	IN	IN	S
Monitoring	P	IN	S
Policy decision-making	A	IN	P
III. Community-Industry with Government Advisory			
Data gathering and analysis	P	IN	A
Short-term planning (5 years)	P	A	A
Long-term planning (20 years)	P	A	A
Harvest allocation decisions (how much)	P	A	IN
Implementation (annual operating plans)	P	A	IN
Enforcement of regulations	IN	IN	S
Monitoring	P	P	S
Policy decision-making	P	A	IN

IN = indirect or no role, A = advisory role, P = primary responsibility, and S = sole responsibility

Table 3.

Example forest management scenario

In general:

In this forest management arrangement, **provincial government**, **forest industry**, and **local community** have differing roles. The **provincial government** owns and has charge of the land and leases it to a **forest industry**. The **provincial government** ultimately controls what land is used and how, by the **forest industry**.

Active participation in decision making processes affecting policy formation, short and long term planning and harvesting includes only the **provincial government** and **forest industry**. Both the **provincial government** and **forest industry** interact, negotiate, and forge a deal that will determine investment, training, employment opportunities, wages, and tax incentives. The **local community** has little direct say in what happens.

Responsibilities:

Data and other information relative to the forest being managed is collected and analyzed both by **forest industry** and **provincial government**. Types, sizes, acreages of trees, soil types, the presence of disease, fire damage are all used to develop a policy for forest land use. The **provincial government** determines policy on what land can be used, how much land can be harvested, and how recovery of the forest is to take place. With advice from the **forest industry**, forestland use policy shapes short and long term harvesting and reforestation strategies.

On a day-by-day basis, the **forest industry** decides what types of trees are cut down, how many, and where they are taken from. Harvesting decisions are made to accord with the government's forest planning policy. The **forest industry** advises the **provincial government** about current harvesting and planting decisions.

Table 4

Fecundity and semantic meanings ratings for four forest scenes

Rating Scale	Forest Scene							
	MG		FF		OG		CC	
	χ	σ	χ	σ	χ	σ	χ	σ
A. Fecundity Measures								
1. Plenty of dry wood for a fire	2.12	1.51	6.03	1.95	3.75	1.68	5.42	1.96
2. Plenty of fruit and berries to eat	2.35	1.63	1.30	1.11	5.07	1.55	2.82	1.80
3. Good protection from the wind	3.00	1.66	1.85	1.49	6.17	1.22	1.97	1.21
4. Good quality/tasting water	2.90	1.77	1.80	1.33	5.27	1.78	2.68	1.47
5. Plenty of birds and small animals	3.82	1.90	1.88	1.40	5.65	1.63	3.28	1.55
6. Good view of surrounding environment	4.77	1.80	3.37	2.20	3.80	2.02	5.50	1.52
B. Semantic Meaning Measures								
7. Living – Dying	3.08	2.15	5.72	1.83	2.60	2.19	4.42	1.72
8. Active – Inactive	3.27	2.02	5.43	1.82	2.33	1.86	4.02	1.66
9. Beautiful – Ugly	3.70	1.71	5.92	1.57	2.02	1.74	4.95	1.63
10. Poor – Rich	4.32	1.57	2.60	1.74	5.53	1.86	3.40	1.44
11. Healthy – Sick	2.82	1.73	5.18	1.91	2.25	1.70	4.20	1.62
12. Pleasant – Unpleasant	3.42	1.84	5.82	1.62	1.77	1.48	4.63	1.76

*Forest scenes differed significantly on all scales by a MONAVA, $p < .05$

MG = Medium Growth; FF = Forest Fire; OG = Old Growth; CC = Clear Cut

Table 5
Means and significance levels for 24 questions posed to forest communities

Survey Question	Forest Management Policy					
	I		II		III	
	χ	σ	χ	σ	χ	σ
A. How acceptable do you think this forest management arrangement would be to: (< 4 = not acceptable; 7 = acceptable)						
1) yourself?***	3.06	1.56	5.05	1.47	4.09	2.07
2) the average person in your community?	3.94	1.64	4.84	1.42	4.41	1.44
3) your family?*	3.24	1.92	4.84	1.46	4.50	1.68
4) the average Albertan?	4.06	1.56	4.79	1.36	4.32	1.59
5) children in the community?*	3.47	1.87	5.16	1.50	4.55	1.82
6) the average Canadian?	4.06	1.39	4.74	1.24	3.82	1.62
7) in relation to what you think is being done now?*	3.29	1.86	5.05	1.54	3.91	2.09
B. Type of forest related enterprise/undertaking you think this forest management arrangement encourages? (< 4 = disagree; 7 = agree)						
8) Manufacturing*	6.12	1.41	5.47	1.39	4.68	1.89
9) Tourism***	2.94	1.39	4.26	1.48	5.27	1.70
10) Recreation***	3.00	1.58	4.42	1.71	5.18	1.53
11) Non-profit	3.65	1.77	4.84	1.12	4.68	1.99
C. How might this type of forest management advantage or disadvantage community investment in: (< 4 = disadvantage; 7 = greatly advantage)						
12) Business developments	5.06	1.34	5.05	0.91	4.59	1.79
13) Employment opportunities	4.71	1.40	5.21	0.71	4.91	1.69
14) Occupational advancement	4.29	1.21	4.58	1.02	3.73	1.35
15) Social life	3.82	1.07	4.58	1.43	4.86	1.55
16) Personal life	4.12	1.22	4.68	1.34	4.23	1.77
17) Children*	3.71	1.05	4.74	0.93	3.91	1.34
18) Retired persons	3.59	1.12	4.68	1.29	4.09	1.54
19) Balanced natural environment	3.53	1.81	4.58	1.80	4.95	1.84
D. How compatible might this type of forest management be with: (< 4 = incompatible, 7 = very compatible)						
20) Hunting and fishing	4.47	1.70	5.05	1.54	5.36	1.53
21) Bird watching and photography**	3.65	1.87	4.79	1.62	5.45	1.74
22) Camping and hiking*	3.71	1.69	4.63	1.50	5.27	1.58
23) Habitat preservation*	3.71	1.83	4.42	1.54	5.18	2.11
24) Wildlife preservation	3.88	1.80	4.42	1.50	5.00	2.16

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

I = Industry-Government; II = Industry-Government with Community Advisory; III = Community-Industry with Government Advisory

Table 6**Estimated number of years community can and should depend on forest based and diversified forest-based economies**

How long do you think that a community:	χ	σ
1. can depend on a strictly forest based economy	4.38	2.37
2. can depend on a diversified forest based economy	5.69	1.84
3. should depend on a strictly forest based economy	4.93	2.37
4. should depend on a diversified forest based economy	6.26	1.36

Scale: (1) 5-10 years; (2) 11–15 years; (3) 16-20 years; (4) 21-25 years;
 (5) 26-30 years; (6) 31-40 years; (7) more than 40 years

Table 7**Forest benefit and fear ratings by level of education**

Questionnaire Item	Level of Education					
	HS		PS		AD	
	χ	σ	χ	σ	χ	σ
Forest Benefits						
Manufacturing*	5.45	1.81	4.53	1.87	5.73	1.41
Tourism*	5.55	1.37	4.71	1.49	3.47	1.83
Recreation*	5.36	1.36	4.65	1.46	3.63	2.01
Volunteer Activities*	5.36	1.63	4.82	1.29	3.90	1.83
Fears						
Business Development**	5.09	1.30	4.12	1.80	5.27	1.01
Occupational Advancement**	5.09	1.14	3.76	1.48	4.00	1.05
Retired Persons**	4.82	1.25	4.47	1.18	3.60	1.52
Balanced Environment**	5.36	1.21	4.88	1.96	3.73	1.93

HS = High school or less; PS = Post secondary work AD = Advanced Degree

* p<.05 ** p<.01

Figure 1 Forest Landscape Scenes



Old Growth Forest



15 Year Regrowth Forest



Recent Clearcut Forest



Burned Forest