Social Structure, Identities, and Values: A Network Approach to Understanding People's Relationships to Forests

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A social network approach is employed to examine the role that social capital plays in the relationships people have with forested landscapes and to identify the implications of these relationships to forest land-use planning. We argue that network-based processes lead to the development of social identity and to the formation of forest values. By linking the individual level of analysis to expressive outcomes, the relationship between network range, identity diversity, and diversity of forest values is explored. Results suggest that network range is directly related to identity diversity, which mediates the relationship between network range and forest value diversity, and that strong ties are relatively more important than weak ties in explaining the formation of identity and forest value diversity.

KEYWORDS: *Social networks, forest values, forest land-use planning, forest value formation, outdoor recreation.*

Introduction

The management of publicly owned forests in the province of British Columbia (BC) Canada has traditionally focused on timber production and economic outputs. Registered professional foresters, people with specialized training in forestry who carry the legal responsibility for the management of forestry tenures, have dominated the decision-making process in forestry in the province (Mascarenhas & Scarce, 2004). However, there has been a shift in forestry toward the management of multiple values and recognition of the important role of non-timber values in sustainable forest management, including ecological, aesthetic, and recreation values (Prins, Adamowicz & Phillips, 1990; Kimmins, 1991; Carrow, 1994; Robinson, Robson & Rollins, 2001). This shift has also been recognized by the forest industry (e.g., Weyerhauser, 1998). The consideration of outdoor recreation as a non-timber value of forests is an important one, as recreation appeals to a broad range

of people and encompasses a range of activities and opportunities (Cordell, Teasley & Super, 1997; Manning, 1999). For many people, outdoor recreation provides one of the few opportunities for experiencing and interacting with forested landscapes. Bryan (2000) has likened recreation activities to windows to the environment as they provide people the context in which they can experience the natural environment. Understanding this interface is important in addressing growing public concerns with, and expectations of, forest management. However, the perspective of forestry professionals is still dominant.

The shift in forest management toward the management of multiple values has paralleled an increased public awareness of environmental values and issues. Further, there has been a shift from forest management priorities being negotiated between governments and the forest industry, to forest management practices and specific programs being challenged by environmentalists. This shift was motivated by an increase in public awareness of environmental and forestry issues (Carrow, 1999). Carrow has characterized the progression of public involvement in forestry issues as one that progressed from an atmosphere of hostility and antagonism in the 1960s, to one that reflected greater degrees of local empowerment in the 1990s (Figure 1). This progression is evocative of climbing the rungs of Arnstein's (1969) ladder of citizen participation, moving from degrees of non-participation, through degrees of tokenism, finally achieving degrees of citizen power. Other authors have also noted the increase in public participation in natural resource decision-making (e.g., Wondolleck, Manring & Crowfoot, 1996; Overdevest, 2000).

The increase in public participation can be seen in the processes that have been used to plan and manage for outdoor recreation values in particular, and forested landscapes in general. For example, the Limits of Acceptable Change framework (LAC) applies a consensual approach to recreation management decision-making in wilderness areas; members of the public and stakeholders are involved in the identification of potential standards and monitoring along side technical staff (Stankey, McCool & Stokes, 1990; Payne & Graham, 1993; Cole & Stankey, 1997). The LAC has been applied in many jurisdictions, including BC where the Ministry of Forests has used it to plan and manage for outdoor recreation opportunities in wilderness areas (Jackson & Leavers, 2000). Two other developments have increased opportunities for public participation in BC forest management: regional land-use plans

Hostility/ Antagonism → Discussion → Advisory Role → Consensus Building → Degrees of Local Empowerment

———————————— Meaningful participation by public increases ——————————▶

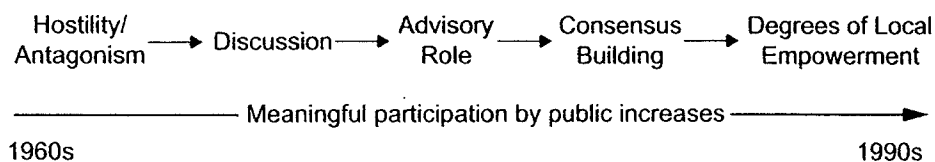1960s   1990s

Figure 1. Progression of public involvement in forestry issues (from Carrow, 1999).

and the sustainable forest management certification movement. Regional land-use planning in BC is currently facilitated through Land and Resource Management Plans, which draw local stakeholders and government officials together in consensus-building processes that seek to develop and implement regional land use recommendations (Mascarenhas & Scarce, 2004). The recommendations of these sub-regional planning tables allocate forest land into four categories: protected areas, special management zones, general resource extraction, and enhanced resource extraction (Frame, Gunton & Day, 2004).

Although there have been advances in the role that public participation has played in natural resource decision-making, there is evidence that some problems remain. Cashore, Hoberg, Howlett, Rayner and Wilson (2001) conclude that despite the use of a shared-decision-making framework, a focus on consensus-building, and an increased level of participation from the public, land-use planning outcomes in BC have been influenced (and dominated) by economic and political considerations. In a review of national studies of Canadian attitudes towards forest values and management, Robinson et al. (2001) conclude that societal values have not been represented in forest policy, perhaps due to inadequate representation of forest stakeholders. Economic and market concerns have influenced the manner by which public participation has been incorporated into commercial forest management: as forestry companies have sought certification that their management and operations are ecologically, socially, and economically sustainable so as to be seen as responsible corporate citizens, they have formalized the role of public participation through the creation of public advisory committees. These committees make comments and recommendations about forest management plans and address public concerns, but generally have no decision-making authority (Parkins, 2002).

The inclusion of non-timber values in forest management has typically been addressed through the application of resource economics. For example, the satisfaction and utility that people derive from wildlife viewing can be taken into account in economic trade-off analysis. The recognition of the important economic role that non-timber values[1] play has been influenced by an increased demand for non-timber values as a result of society placing increased importance on amenity services, and the ability to identify the distribution and impacts of non-timber resources (Condon & White, 1994). However, forest managers and decision-makers have faced a problem with the application of economic valuation, namely balancing the costs and benefits of timber and non-timber values; this problem has been further exacerbated by the fact that many non-timber values, such as non-commercial recreation, are not market-traded and subsequently are not priced (McKenney & Sarkar, 1994). One means of addressing the problems of economic and political influence in natural resource decision-making is to incorporate other approaches to understanding values. In a non-economic sense, values can be conceived of as "cultural ideas about what are desirable goals and

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[1]Non-timber values and non-economic values are used synonymously in this paper.

what are appropriate standards for judging actions . . . they are emotionally charged beliefs about what is desirable, right, and appropriate" (Tindall, 2003, p. 693). Value formation can be understood to some degree by understanding the relationships a person has to other people (i.e., social ties) and the social structure in which these relationships exist (i.e., social networks). Values are formed partly through social comparison and communication in social networks; further, particular social identities tend to be associated with particular values or clusters of values (Erickson, 1988; Friedman & McAdam, 1992).

In this study social capital is employed as the overarching theoretical framework in which we examined the relationships that people have with forested landscapes that have been fostered through their social networks. Social capital "is defined by its function. It is not a single entity, but a variety of entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure" (Coleman, 1990, p. 302). Social capital can be considered social goods, such as information and social influence, which are produced and dissipated through social relations. There has been some debate about whether social capital is a collectively- or individually-held resource (Warde & Tampubolon, 2002). One perspective of social capital looks at the relationship between the social ties of whole networks and collective expressive outcomes; expressive outcomes are emotional or symbolic actions that are ends in and of themselves (Hoult, 1977), such as the formation of values or norms (e.g., Coleman, 1988; Putnam, 1995a, 1995b). Another perspective views social capital as a resource that is embedded within personal social networks that have instrumental outcomes. Instrumental outcomes are rational actions that are often in one's self-interest (Hoult, 1977), such as social mobility (Lin, 2001); within this perspective social capital resides within the realm of the individual as a function of network capital, or "the form of social capital that makes resources available through interpersonal ties" (Tindall & Wellman, 2001, p 278). Despite these differences, there is general agreement about the important contribution that social networks make to the creation and transfer of social capital (Hemingway, 1999; Tindall & Wellman, 2002; Warde & Tampubolon, 2002; Glover, 2004).

A social network approach to understanding social capital focuses on an examination of the characteristics and effects of social structure. Tindall and Wellman (2002) note the core concern of social network analysis "is to understand how social structures facilitate and constrain opportunities, behaviours, and cognitions" (p. 266). Past researchers have examined how network diversity[2] is related to social capital (Lin, 1999, 2001), cultural capital (Er-

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[2]We use the terms "network range" and "network diversity" interchangeably to mean the number of ties a person has to diverse social locations (Burt, 1980). However, this term has been used somewhat inconsistently. Lin et al. (2001) use network range to describe the difference between a person's highest status tie and their lowest status tie. Burt's (1980), and our, conception of network range is similar to Lin et al.'s conception of extensity, or the extent to which a person has diverse ties.

ickson, 1996), and identification with a social movement (Tindall, 2002). Social network analysis has been employed in the field of leisure to examine a range of issues, including leisure tastes and consumption (Warde & Tampubolon, 2002), the role of leisure in addressing the social problems faced by interracial couples (Hibbler & Shinew, 2002), community gardens as examples of social networks (Glover, 2004), and gender differences in the choice of a leisure partner (Stokowski, 1990).

This paper explores how network range (or diversity) is related to diversity of identities, particularly those having to do with the outdoors and natural resources, and to diversity of forest values. In the context of contemporary forest management wherein managers are tasked with managing multiple values, "having diverse forest values" can be seen as a type of social capital. Tindall (2001) has argued that a person's forest values are related to their relationship to the forest (e.g., through recreation, occupation, voluntary organization membership, etc.). We are interested in the relationships between network diversity, identity diversity, and diversity of forest values. In this regard, we offer the following hypotheses:

H1   The more diverse people's personal networks are, in terms of their ties to people from different occupations/organizations, the more diverse their identities will be.

H2   The more diverse people's personal networks are, in terms of their ties to people from different occupations/organizations, the more diverse their values will be.

H3   The more diverse people's identities are, the more diverse their values will be.

As figure 2 illustrates, we propose the effects of network ties on an individual's values may be either direct or indirect.

The data for this study were collected during a transition period in the processes employed to address land-use planning in BC, as detailed planning solutions at sub-regional scales replaced the broad recommendations that
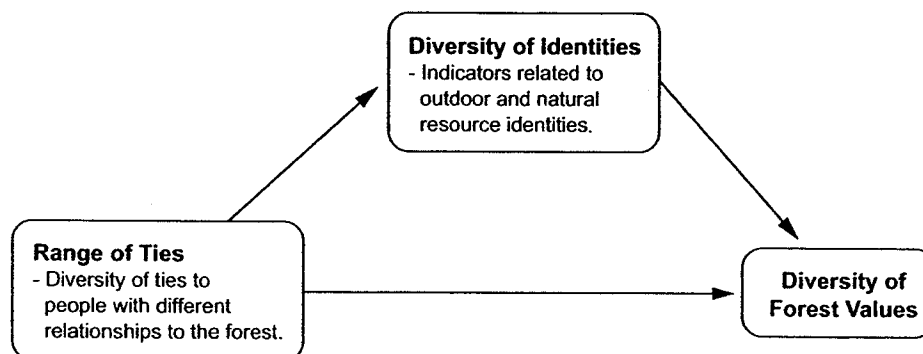

Figure 2. Theoretical model explaining the relationship between range of ties, diversity of identities and diversity of forest values.

had been made at regional planning tables. This transition was, in part a response to what has been characterized as the "war in the woods" (Wilson, 1998; Frame et al., 2004), a protracted period in BC's history that saw environmentalists pitted against foresters and loggers and resulted in logging road closures and arrests on all sides of the issue. Although this study's focus is understanding forest value formation in BC, the results have implications at broader scales that straddle jurisdictions as conflicts over forest resources continue.

Literature Review

Reviews and critiques of social network analysis suggest its application is well suited to leisure studies because it permits the examination of social structure beyond typical groups, and can encompass broader, non-geographically-bounded communities of interest (Stokowski, 1990; Stokowski & Lee, 1991; Blackshaw & Long, 1998). There has also been recognition that recreation opportunity does not exist in a vacuum, and some authors have noted the role that leisure and recreation play in socialization and the creation of associational memberships, or weak ties (Stokowski, 1990; Putnam, 1995b; Hemingway, 1999). Manning (1999) has argued that "broad social relationships can facilitate and constrain recreation and leisure behavior" (p. 33), and suggests that a person's network range may be positively related to their diversity of recreation interests. However, actual applications of social network analysis to leisure and recreation studies have been few and far between. We begin with an examination of social network theory and its components. We continue with a review of social identity and its role in group membership and the adoption of values. Finally, we conclude with a discussion of values, particularly those associated with forests, and the relationship between value diversity and identity diversity.

Social Networks

The types of relationships that people have with one another play different roles in the creation and dispersal of social capital, in this case diverse forest values. Social networks also serve as the context in which we compare ourselves and our values to others. There are two basic types of social networks: bounded (whole groups) networks and personal (ego) networks. In bounded networks, all members of a social group and all of the ties that exist amongst them are examined. In personal networks, the focus is on an individual and all of the people with whom that person has ties, and in some analyses, the ties among those people (Scott, 2000). Knowing about how relationships are structured can improve one's understanding of social issues and problems. A social network approach permits an examination of the groups to which individuals belong. Social network analysis allows the unit of analysis to move beyond the level of the individual, thereby facilitating an examination of the social structures in which people are embedded. Social

capital, defined as a network phenomenon whereby the different social ties that people have provide different kinds of support and different types of influences, facilitates two types of action. On the one hand, Lin's (2001) status achievement model adopts the view that personal networks have instrumental outcomes (e.g., occupational status). On the other hand, understanding the structure of whole networks can produce expressive outcomes (Coleman, 1988; Putnam, 1995a, 1995b); examples of expressive outcomes include the production of norms, values, and trust. We seek to combine these two perspectives of social capital by linking the individual level of analysis to expressive outcomes. In other words, we are interested in uncovering individual expressive outcomes, or how people develop diverse forest values.

Social ties describe the type of relationship between two or more people. A distinction is commonly made between weak ties (of low emotional intensity) and strong ties (of high emotional intensity). The average North American has a network size of 1,400 ties (Erickson, 1996); however, most people have many more weak ties (acquaintances) than strong ties (family and friends). The people to whom we are strongly tied tend to know one another, and thus tend to circulate the same information. The people to whom we are weakly tied tend not to know one another; because of this tendency, and the fact that we have many more weak ties, weak ties are said to stretch further in social space (Granovetter, 1973). That is, those to whom we are weakly tied are more likely to be sources of novel information. Intuition suggests strong ties should generally be more influential than weak ties given that the people with whom we have strong ties are more motivated to help; strong ties are also more influential in terms of attitude and opinion formation through social comparisons (discussed below). However, Granovetter (1973) argued for the importance of weak ties because such ties are more likely to provide novel information. In this paper both strong and weak ties are examined. We leave it as an empirical question as to which is more influential in the formation of forest values and identity.

Network range is a measure of the number of ties a person has to different social locations, such as different social classes or occupations (Burt, 1980). Network diversity can have an effect upon network processes, such as the communication of ideas and values: the more diverse a person's network, the more diverse the types of information they are likely to receive and the broader the sets of values to which they will be exposed. Having ties to people from different walks of life implies an individual is more likely to have one-on-one interactions with a range of people that may provide varied information, opinions, and evaluations about, for example outdoor recreation issues and events. Further, the greater the number of different ties to diverse organizations, like outdoor recreation clubs, a person has, the greater the diversity of information that person will receive through other modes, such as newsletters. Erickson (1996) found that network diversity had an effect on a person's exposure to and knowledge of cultural genres (e.g., forms of culture like art, sports, or recreation pursuits). In an examination of the relationship between social networks and culture, Erickson (1996) noted that

"network variety is strongly linked to cultural variety; indeed, networks have more impact on culture than class does" (p. 218). Erickson concludes that the greater a person's network diversity, the greater their cultural diversity.[3]

Social networks in general, and network range in particular, also play roles in social comparison, as "network contacts also serve as channels for the diffusion of a wide range of customs, values, attitudes, standards, and the like" (Gartrell, 1987, p. 55). Social comparison refers to the idea that people learn about themselves (i.e., self-conception) by comparing themselves with others within their social circles (Gartrell, 1987). The network context is an important factor in determining the rate of information diffusion. Although weak ties are important for the diffusion of information, strong ties generally form the basis of social comparison, group attitudes, and influence. People will (first) compare themselves to people whom they know. Gartrell (1987) noted that, while social comparison can be a product of social networks, networks can act to constrain potential points of reference, as the number and range of strong ties are limited relative to weak ties.

To illustrate how network range is related to number of ties a person has, consider the following example. Person A knows six people who are members of a hunting club, five loggers, and four sawmill operators. Person B knows two professional artists, one recreation operator, two First Nations elders, two members of an outdoor recreation organization, and a school teacher. Although person A may know more people than does person B, the people whom person A knows represent fewer structural positions than do the people person B knows. Thus person B has greater network range than does person A.[4]

Thus, the range of one's social network can be expected to influence the diversity of one's values about forests. As diverse forest values may be considered a form of social capital, network range influences the degree of social capital a person possesses. Network range also influences the number and types of social comparisons a person can make. Further, social comparisons serve to inform a person's social identity. In sum, diverse forest values may be considered a form of social capital. The range of one's personal social network theoretically affects the diversity of one's values about forests. Further, network range structures the reference points that individuals have to make social comparisons about their identity; thus network diversity may also be associated with identity diversity.

Social Identity and Personal Identity

Identity refers to the process by which an individual distinguishes him/herself from others, in answering the reflexive question, "who am I?" (Hoult,

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[3]A more in-depth analysis of the relationship between social structure and "cultural capital" is provided by Bourdieu (1984).
[4]Additionally, the people that person A knows are all involved to some degree with forestry, or forest-related organizations, while person B knows people from more diverse backgrounds.

1977). Social identity refers to one's affiliation with a particular social group. In particular, identification refers to the process of conceiving of one's self as a group member (Hoult, 1977). A person's conception of self (or personal identity) is informed in part by their membership in social groups, interaction in social networks, and also by various personal attributes (Stryker, 2000).

Group membership often brings together people with similar attitudes and opinions. The emotional significance of association with like-minded individuals that membership in these social groups brings, reinforces a person's social identity (Tajfel, 1982), and also affects their concept of self (i.e., personal identity). Indeed, personal identities are usually shaped by multiple group affiliations (Styker, 2000).

Turner (1982) has argued that social identity "is the cognitive mechanism which makes group behavior possible" (p. 21). It is in the context of network-based interactions that social identity is formed (Collins, 1988, p. 214). The adoption of key values is part of the identity formation process. Collective identity

> . . .is a shorthand designation announcing a status—a set of attitudes, commitments, and rules for behavior—that those who assume the identity can be expected to subscribe to. . . . A collective identity is a public pronouncement of status, in the classic Weberian sense. (Friedman & McAdam, 1992, p. 157)

Certain values tend to be associated with particular identities. For example, artists may hold aesthetic values, environmentalists may prioritize ecological values, and First Nations may embrace particular cultural values; if a person is a member of multiple groups, his/her social identity will be a composite of all of the groups to which s/he has been exposed to and affiliated with.[5] In sum, the more diverse one's network, the more diverse one's social comparisons can be (Gartrell, 1987), and the more diverse one's personal identity becomes.

A key aspect of the present argument is that network-based processes lead to the development of social identity (Tindall, 2002), and in part, to the formation of forest values. Communication about group symbols and ideology is a key mediating process between network structure, and identity formation (Collins, 1988). A complementary theoretical explanation for the linkages between network structure, communication, and identity can be found in the symbolic interaction literature. Reflected appraisal refers to the notion that a person's sense of self is influenced by their perceptions of how others view them (see Rosenberg, 1981).

To continue with our example from the present case, person A knows more people than does person B, and can make a larger number of social comparisons; however, person B knows people from a greater variety of struc-

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[5]Though Stryker (2000) also notes that identities tend to be organized in a hierarchy, and that particular identities may have more or less salience depending upon the social context, such as the relationships and interactions an individual might have.

tural positions and has a more diverse network than does person A, and may be exposed to a greater variety of attitudes, beliefs, and behaviors. Based on the diversity of social comparisons that both persons A and B can make, person B will have a greater diversity of outdoor and natural resource identities than person A. Further, the greater the number of social comparisons a person can make with diverse groups, the greater the number and diversity of values that person may hold.

One might assert that this argument appears on the surface to be potentially tautological, and thus H3 is true by definition. We do not believe this to be the case. Values and identities are relatively autonomous phenomena. People can belong to a particular group without adopting all of the values that tend to be associated with that group. For instance, masculinity tends to be associated with forestry in general, and logging in particular. Yet one can be a forester or logger without embracing masculine values or culture. Similarly, one can embrace particular values without having any corresponding group affiliation. For instance, ecological scientists tend to think that ecological values such biodiversity are important. But one need not be a scientist in order to embrace the value of biodiversity. Similarly, one can be a member of a group without necessarily identifying with it. For instance, many individuals are members of unions, but do not necessarily incorporate union identity within their personal identity, or social identities. Thus, ultimately the associations we examine in these analyses are empirically open ended. They are not true by definition.

Values

As noted above, values are culturally and emotionally informed beliefs about desirable and appropriate standards for judging appropriate actions and goals (Tindall, 2003). Forest values are those beliefs that "represent an individual's orientation toward forests" (McFarlane & Boxall, 2000, p. 651). Values are influenced by a number of factors, including a person's structural position as a result of the social comparisons they make, and subsequently the information that they receive through their social ties. It is possible that network range could have direct or indirect effects on value diversity. The diversity of a person's social ties can be associated with the variation of information they receive, which can influence cognitive processes such as identity formation. If network range is associated with diversity of social comparison opportunities, which in turn has an effect on a person's identity diversity, it follows that diverse identities may result in a diversity of values. However, it is also possible that network range has direct effects on value diversity, as the type and content of information a person receives may be a direct result of the number and strength of their social ties.

To conclude our example of the role that network diversity has on identities, consider how identity diversity may affect value diversity. Recall that person A knows 15 people from three related structural positions and person B knows eight people from five diverse structural positions. Person B's net-

work range and diversity of outdoor and natural resource identities are greater than person A's due to the diversity of his/her social ties. Similarly, if values are associated with identities, we might expect that person B would have more diverse values than person A. In forest land-use planning processes that seek to plan and manage multiple and diverse values, network diversity and social identity become important considerations in selecting the stakeholders to be included in deliberations. Person B may be better suited to address the management of multiple forest values than person A, though the perspectives that both bring to the table can compliment one another. As only a limited number of people can be directly involved in effective decision-making (a practical consideration), involving people that have diverse identities should represent a broader range of forest values.

Methods

Sample

Five criteria were used to develop a province-wide quota sample: forest region, community, gender, employment sector, and relationship to the forest in terms of occupation or organizational affiliation. The respondents varied in their occupational/organizational affiliation (and hence their relationship to the forest) by the categories identified in Figure 3. The first stage of data collection consisted of face-to-face interviews that lasted an average of one and one half hours each ($n = 302$). A sample of interviews was subjected to qualitative analysis methods to inform the development of a closed-ended mail-out questionnaire. The resultant questionnaire was twenty-seven pages, divided into ten sections and contained questions on range of forest values. The length and depth of questionnaire provided valuable contextual data. The second stage of the data collection consisted of a mailed self-

1. Artists/writers
2. Community representatives
3. Educators
4. Government environment & parks
5. First Nations
6. Forest Industry
7. Ministry of Forests managers & employees
8. Environmental organizations
9. Recreation groups
10. Scientists
11. Tourism/recreation operators
12. Trappers/ranchers
13. Unions

Figure 3. Groups identified for sampling purposes.

administered questionnaire.[6] The response rate for the mail-out questionnaire was 61%; it is likely that the length of the questionnaire limited the rate of return, although this is a reasonable return rate when compared to recent survey research.[7] The results reported here focus on a subset of the questions asked in the mail-out questionnaire.

Measures

Network diversity. To measure the diversity of respondents' personal networks, a social position generator, similar to that developed by Lin et al. (2001) and Erickson (1996), was employed (Appendix A). In this analysis, we focused on the range of weak and strong ties that respondents had to selected structural positions. Forty-five structural positions (occupations and organizational affiliations) were identified that had relatively unique relationships to the outdoors and natural resources. Respondents were presented with this list of positions and asked to indicate what relationship (if any) they had associated with each position: acquaintances, close friends, and/or relatives. A score of one was assigned to each position that had an acquaintance association, and a separate score of one was assigned to each position that had either a close friend or relative association; otherwise a score of zero was assigned. Range of weak ties was measured by summing all of the acquaintance scores: the greater the number of acquaintances, the greater the diversity of weak ties. Range of strong ties was measured by summing all of the close friend/relative scores; the greater the number of close friends or relatives, the greater the diversity of strong ties. The maximum possible score for both types of position association was 45.

Identity diversity. In another section of the questionnaire, respondents were presented with a list of 23 cultural items related to the outdoors and natural resources and asked to indicate whether the item was important for Canadian culture and identity, and their own identity (Appendix B). In the present analysis, we focus only on those items that were important to respondents' own identities. Examples of the cultural items included wilder-

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[6]The primary objective of the study was to identify concerns about forest management, and to develop a questionnaire to measure values, attitudes, and concerns pertaining to forest characteristics and forest management. The interview data were collected, in part, to assist in the creation of the self-administered questionnaire. The analysis reported here is one of several different analyses that have been undertaken using the data from the self-administered questionnaire (see also, Tindall 2001, 2003).

[7]The response rate of 61% corresponds with a completed N of 178 respondents, and a target sample of 291 individuals. To further clarify this calculation, 9 individuals from the interview phase were not included in the target sample for the self-administered questionnaire phase because they were not originally asked by interviewers if they would be willing to participate in the second phase of the study. Further, two of the individuals in the interview phase died before the self-administered questionnaire phase was undertaken. In sum, 11 individuals from the first phase were not included, and thus the target N for the sample for the self-administered questionnaire phase of the study was comprised of 291 individuals, not 302.

ness, wildlife, scenic beauty, outdoor recreation, and visual art of wilderness landscapes and of wildlife. A score of one was assigned to each item that was important to respondents' own identities, otherwise a score of zero was assigned. Identity diversity was measured by summing the scores for the 23 items. The greater the number of items that were identified as being important to a person's identity, the greater that person's diversity of outdoor and natural resource identity.

Diversity of forest values. Respondents rated the importance of 79 value indicators that were related to forestry on scales of 1-4 (from not important to extremely important). Conceptual analysis (e.g., identifying conceptually similar items) and statistical data reduction techniques (factor analysis, reliability analysis) were employed to create nine indices of abstract forest values: recreation and outdoor experiences, aesthetic values, community sustainability, cultural values, economic values, work values, science and education values, ecological/environmental values, and equity values. See Tindall (2003) for a list of the indicators for these nine indices. These nine abstract value indices were then summed together to form the diversity of forest values index, which had a maximum possible score of 36: a higher value indicated a higher degree of diversity of values.

Analysis

As a first step in testing the hypotheses, zero order correlations amongst the key independent variables and dependent variables were analyzed. Next, in order to more rigorously test the hypotheses by controlling for third variables, multiple regression models were employed to examine the relationship amongst the key independent variables (diversity of weak ties, diversity of strong ties, identity diversity) and the main dependent variables (identity diversity, diversity of forest values). Finally, to pursue implications of this research for the composition of forest land-use planning processes, t-tests of differences in means were undertaken to examine differences between forestry sector respondents and non-forestry sector respondents.

Results

Table 1 provides the zero order correlations amongst the key independent and dependent variables. Table 1 reveals that range of strong ties had positive significant correlations with both diversity of outdoor and natural resource identities and diversity of forest values. Range of weak ties had a significant positive zero order correlation with identity diversity. Identity diversity had a significant positive zero order correlation with diversity of forest values. Thus, at the zero order level, when range of strong ties is used as an indicator of network diversity, we find support for hypotheses one and two; and when diversity of weak ties is used as an indicator of network diversity, we find support only for hypotheses one. Finally, the positive significant relationship between identity diversity and diversity of forest values supports hypothesis three.

TABLE 1
Zero Order Correlations amongst Key Independent and Dependent Variables

	Range of weak ties	Range of strong ties	Identity diversity	Diversity of forest values
Range of weak ties	—			
Range of strong ties	.43***	—		
Identity diversity	.17*	.25***	—	
Diversity of forest values	−.02	.14*	.28***	—

*$p \leq 0.05$. **$p \leq 0.01$. ***$p \leq 0.005$.

Table 2 presents a multiple regression model explaining identity diversity. Standardized regression coefficients are provided. The main independent variables in this model are range of weak ties and range of strong ties. Gender, years of education, income, employment in the forestry sector, and metropolitan residency are included as control variables. This model provides support for hypothesis one when range of strong ties is used as an indicator of network diversity. The greater the diversity of one's strong ties, the more diverse one's identity. However, range of weak ties did not have a significant effect on identity diversity. Metropolitan residence was the only control variable that had a significant effect on identity diversity: metropolitan residents had a lower diversity of outdoor and natural resource identities than people living outside metropolitan areas.

Table 3 presents a multiple regression model explaining diversity of forest values. As above, standardized regression coefficients are provided. In this model, range of weak ties, range of strong ties, and identity diversity, are

TABLE 2
Standardized Regression Coefficients for Multiple Regression Analysis Predicting Identity Diversity (Indicators of Identities Related to the Outdoors and Natural Resources)

Variable	Coefficient
Gender	.00
Years of education	−.15
Income	.01
Metropolitan resident (yes = 1)	−.19*
Employed in forestry sector	.05
Range of weak ties	.04
Range of strong ties	.21*
R^2	.12**
n	157

*$p \leq 0.05$. **$p \leq 0.01$.

TABLE 3
Standardized Regression Coefficients for multiple regression analysis predicting Diversity of Forest Values Index

Variable	Coefficient
Gender	-.07
Years of education	-.01
Income	-.16
Metropolitan resident (yes = 1)	.26**
Employed in forestry sector	-.19*
Range of weak ties	.00
Range of strong ties	-.07
Identity diversity	.36**
R^2	.28**
n	124

*$p \leq 0.05$. **$p \leq 0.005$.

included as independent variables to predict value diversity. This model also controlled for gender, years of education, income, employment in the forestry sector, and metropolitan residency. Table 3 shows that neither range of strong ties nor range of weak ties had a significant effect on diversity of forest values. However, diversity of identities has a substantial positive significant effect on diversity of forest values. Of the control variables used in the equation, metropolitan residency and sector of employment had significant effects. Metropolitan residents had more diverse forest values than did non-metropolitan residents. People employed in the forestry sector had less diverse forest values than people not employed in the forestry sector. These results provide support for the third hypothesis, that the more diverse people's identities are, the more diverse their values will be.

Table 4 presents the means for network range, identity diversity and forest value diversity and t-tests comparing those in the forestry sector with non-forestry sector respondents[8] for these variables. The results demonstrate that non-foresters had significantly higher scores for range of strong ties and forest value diversity than foresters. There were no significant differences between the groups for range of weak ties or identity diversity. Implications of this final result are discussed below.

Discussion and Conclusion

The pattern of results suggests network range has a direct effect on the diversity of outdoor and natural resource identities. In doing so, it provides

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[8]For this analysis, members of the forestry sector included Ministry of Forests (i.e., government) employees and those employed in private sector forestry; all other respondents were classified as members of the non-forestry sector.

TABLE 4
Mean Differences of Key Regression Model Variables

Measure	n	Mean	SD	t	df
Range of weak ties				0.03	172
Forestry sector	44	10.07	3.50		
Non-forestry sector	130	10.08	2.87		
Range of strong ties				2.73**	172
Forestry sector	44	5.30	2.52		
Non-forestry sector	130	6.65	2.93		
Identity diversity				−0.90	166
Forestry sector	44	13.25	4.10		
Non-forestry sector	124	12.62	3.92		
Value diversity				3.36**	138
Forestry sector	35	24.71	2.74		
Non-forestry sector	105	26.67	3.07		

**$p \leq 0.01$.

support for the first hypothesis that the more diverse people's personal networks are, in terms of their ties to people from different occupations/organizations, the more diverse their identities will be. Meanwhile, identity diversity had a direct effect on the diversity of forest values, thereby providing support for the third hypothesis. However, the analyses do not support the second hypothesis, that network range has a direct effect on forest value diversity. Instead the relationship between network range and the diversity of forest values appears to be indirectly mediated by the diversity of a person's outdoor and natural resource identities (Figure 4).

Although not explicitly addressed in the literature, these findings also suggest the range of strong ties is relatively more important than the range of weak ties in explaining the formation of diverse identities and diverse forest values, particularly through the effects of strong ties on the diversity of outdoor and natural resource identities. This finding is important when one considers that non-foresters had a higher diversity of strong ties, and might partly explain why non-foresters had significantly more diverse forest values than foresters do. Although one might expect that the range of weak ties would have an influence on the diversity of identities and values, as these ties tend to expose people to more diverse types of information (Granovetter,
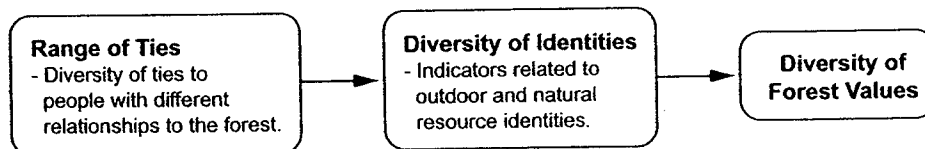
Figure 4. Revised model explaining the relationship between range of ties, diversity of identities and diversity of forest values.

1973), it makes sense that the range of strong ties plays an more important role in influencing the diversity of values and identities, for the people closest to us have the greatest influence on us.

Although public participation has played an increasingly important and visible role in forest land-use planning, there is still the perception that foresters have a dominant role in the decision-making process. This discrepancy begs the question, whose values are being represented, those of foresters or those of the public? Given the recognition that forested landscapes provide multiple benefits to society, and multiple values must be explicitly addressed in forest land-use planning, it is important for planning decisions to be informed by diverse sets of outdoor and natural resource identities and forest values. This research underscores the importance of incorporating non-foresters into forest planning processes, given that foresters have a relatively limited diversity of forest values. A direct benefit of increased public participation is that new perspectives about forest values can be brought to planning table discussions, which can help to bring a diversity of opinions to the decision-making process; perhaps, too, foresters will be able to increase their value diversity through meeting with diverse stakeholders.

That metropolitan residency had a positive effect on value diversity and a negative effect on identity diversity requires some clarification. The list of value indicators associated with forests presented to respondents were relatively abstract (e.g., intergenerational equity).[9] One explanation for metropolitan residents having more diverse values is they are more liberal in their views and more likely to embrace post-materialist values, perhaps as a result of higher levels of education and exposure to more diverse social groups. Pinard (1971) has suggested that urban residents have more cosmopolitan values and attitudes—and our result is consistent with this observation. Conversely, the identity items in the questionnaire were more specific to the outdoors and natural resources; these identity indicators would be relatively more relevant and common to rural residents and people involved in resource industries. Thus, it makes sense that metropolitan residents would score lower for this measure. The manner in which "cosmopolitan" values and outdoor and natural resource identities are incorporated in forest land-use planning is an important consideration, especially in the composition of planning tables that include pubic stakeholder groups, for there may be tension between how rural communities believe their local forested landscapes should be managed and the needs and beliefs of the dispersed communities of interest, like recreation participants.

These findings highlight the role of social structure in affecting identities and values. One implication of both this research and the increase in public participation in natural resource decision-making is that knowing about the characteristics of social-psychological and social structural variables

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[9]Rights of future generations (i.e., intergenerational equity) is one indicator of the broader general social value of equity values.

can be useful for identifying stakeholder representatives. In this sense, such information could help to inform the composition of (sub-)regional planning tables and public advisory committees. Representing the diversity of outdoor and natural resource identities is an important consideration when addressing the planning and management of diverse forest values. Having a decision-making team that has a broad cross-section of stakeholders, and people with diverse interests and values is crucial. No one group (e.g., foresters or technocrats) can adequately, or appropriately, meet the standard or expectation of addressing multiple values.

Recreation planning frameworks, like the Limits of Acceptable Change, the Visitor Activity Management Process, Visitor Impact Management, and Visitor Experience and Resource Protection are well suited to addressing and resolving ecological and recreation carrying capacity issues in wilderness areas or designated recreation areas like parks. While the reconciliation of recreation visitor behavior and ecological impacts in parks and protected areas is an important and difficult management issue, it is a relatively bounded problem. On the other hand, recreation activities (e.g., hunting, motorized activities) that occur outside of wilderness areas and designated recreation areas often have to compete with broader commercial and industrial interests in addition to addressing ecological impact considerations. The management of forested landscapes to meet these multiple values is a complex task that can have far-reaching consequences, especially when the views and beliefs of a broader public (both local and more distant and dispersed publics) are represented in discussions. But long-term efficiencies could be realized as future conflicts may be reduced, given that diverse interests, identities and values have been considered.

If diverse values is a form of social capital, the degree that network range leads to diverse recreation interests (identities) requires further examination, especially in the context of land-use planning. Are diverse recreation identities associated with diverse values as diverse as outdoor and natural resource identities appear to be? For example, within the context of recreation specialization (Bryan, 1977; Scott & Schafer, 2001), do recreation generalists hold more diverse values than recreation specialists? If this is the case, and recreation generalists are less likely to belong to outdoors clubs (McIntyre & Pigram, 1992; McFarlane, 1994), how can generalists be identified and incorporated into forest management decision- making? Resolving these issues can help to inform the constitution of recreation planning tables and the identification of recreation representatives for (sub-)regional forest land-use planning tables, and would contribute to an understanding of the influences of social structures on recreation behaviors. The role of recreation as a forest stakeholder group is an important one. Outdoor recreation serves a valuable social function; it provides opportunities for the strengthening of social ties and the development of new ones, which is important for civil society, both through pursuit of the activities themselves and through outdoor recreation clubs and organizations. Outdoor recreation is a public good as it acts as an interface through which the public can interact with forested

landscapes. Ensuring that outdoor recreation values are represented at planning tables by outdoor recreation participants helps to ensure the continued existence of outdoor recreation opportunities. Recreation participants and organizations must be encouraged to participate in forest land-use planning to represent their particular needs, beliefs and goals, but also to contribute to bringing diverse perspectives to planning discussions.

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Appendix A
Position generator

Instruction given to respondents: "We're interested in the characteristics of your 'personal community' and whether you know people in certain kinds of occupations and industries, and people with affiliation in certain types of organization. . . Do you know anyone in the following areas? Would you classify yourself in any of the following areas?"

Type of Occupation or Organization	Type of Relationship			
	Acquaintance	Close Friend	Relative	Myself
Professional Artist (visual arts such as painting and photography)	☐	☐	☐	☐
Professional Writer	☐	☐	☐	☐
Sculptor or Weaver	☐	☐	☐	☐
Local Politician	☐	☐	☐	☐
Member of a Community Forest Organization	☐	☐	☐	☐
Member of the Chamber of Commerce	☐	☐	☐	☐
Member of a Forest Industry Organization	☐	☐	☐	☐
Member of a Local Environmental Group	☐	☐	☐	☐
Member of a regional, National, or International Environmental Group	☐	☐	☐	☐
School Teacher (Primary or Secondary)	☐	☐	☐	☐
Outdoor Educator	☐	☐	☐	☐
College or University Teacher	☐	☐	☐	☐
Elected Chief of a First Nation Band or a Hereditary First nation Chief	☐	☐	☐	☐
Member of a First nation Band Council or a Tribal Council	☐	☐	☐	☐
First nation Elder	☐	☐	☐	☐
Administrative or Business Representative for a First nation Band or Tribal Council	☐	☐	☐	☐
BC Ministry of Forests Manager or Employee	☐	☐	☐	☐
Private Sector Forestry Consultant	☐	☐	☐	☐
Forestry Sector Manager or Worker Involved in Harvesting (*e.g.* logger)	☐	☐	☐	☐
Saw Mill Manager or Pulp Mill or Fine Paper Mill Manager or Worker	☐	☐	☐	☐

Type of Occupation or Organization	Type of Relationship			
	Acquaintance	Close Friend	Relative	Myself
Pulp Mill or Fine Paper Mill Manager or Worker	☐	☐	☐	☐
Managers or Workers Involved in value Added/Remanufacturing Wood Products (*e.g.* building wood furniture)	☐	☐	☐	☐
Reforestation/Silviculture Manager or Worker	☐	☐	☐	☐
Non-traditional Forestry (*e.g.* horse logging) manager or Worker	☐	☐	☐	☐
Manager or Employee of a Federal Park/ Manager or Employee of Parks Canada (Dept. of Canadian Heritage)	☐	☐	☐	☐
Manager or Employee of a Local Park	☐	☐	☐	☐
BC Ministry of Environment Manager or Employee	☐	☐	☐	☐
Scientist Specializing in Plants and Trees	☐	☐	☐	☐
Scientist Specializing in Animals (*e.g.* wildlife)	☐	☐	☐	☐
Scientist Specializing in Water or Soil	☐	☐	☐	☐
Scientist Specializing in Ecology	☐	☐	☐	☐
Member of a Mountain Climbing Club	☐	☐	☐	☐
Member of an Outdoor Recreation Organization	☐	☐	☐	☐
Member of a Hunting Organization	☐	☐	☐	☐
Member of an Angling Organization	☐	☐	☐	☐
Member of a Birding or Naturalist Organization	☐	☐	☐	☐
Member of a Local Hiking Group	☐	☐	☐	☐
Tourism Worker	☐	☐	☐	☐
Recreation Operator	☐	☐	☐	☐
Guide (Tourism/Recreation)	☐	☐	☐	☐
Outfitter (Tourism/Recreation)	☐	☐	☐	☐
Union Representative (Forest Industry Sector)	☐	☐	☐	☐
Union Member (Forest Sector)	☐	☐	☐	☐
Trapper	☐	☐	☐	☐
Rancher	☐	☐	☐	☐

Appendix B
Indicators of Identity

Respondents were presented with a list of cultural items and asked to indicate (1) which items related to Canadian culture and identity, and (2) which items related to their own identity. We only examined personal identities in this paper. Below is the list of the indicators of identity that people responded to.

- Wilderness
- Forests
- Wildlife
- Salmon
- Mountains
- Scenic beauty
- Working in the woods
- Outdoor recreation
- The forest industry
- Logging
- Hunting
- Fishing
- Ranching
- Mining
- Forestry

- Environmentalism
- Visual art of wilderness landscapes and of wildlife (e.g., paintings of the Group of Seven; Wildlife photography)
- First Nations' art (e.g., totem poles, masks, baskets, paintings)
- First Nations' traditional beliefs and way of life (e.g. use of traditional medicines, reliance on hunting & fishing for food)
- Urban lifestyle (e.g., living in large city)
- Rural lifestyle (e.g., living in small communities)
- Traditional logging lifestyle (e.g., living in a forestry community)
- Living in balance with nature