



**PROJECT REPORT**

# **A Review and Synthesis of Social Indicators for Sustainable Forest Management**

**Draft (In Review)**

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and J.L. Lewis

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## ABSTRACT

This paper reviews and synthesizes some of the main themes from the literature on social sustainability indicators for natural resource management. It addresses conceptual categories, issues, and limitations associated with the use of social indicators. The paper focuses on socio-cultural values and conditions associated with quality of life, public access to non-market benefits and resources, governance, and community stability, with particular reference to those indicators which are most influenced by forest management and relevant to common trade-offs in forest planning. Social indicators should be relevant, credible, measurable, cost-effective, and connected to forestry. They can be categorized as describing procedures and participatory processes (governance), social outcomes defined directly by experts, social outcomes represented through people's perceptions and levels of satisfaction, and capacity of the community and stakeholders in understanding sustainable forest management (SFM) and adapting to change. The paper illustrates how a selection of social indicators have been prescribed and used within various SFM systems of criteria and indicators (C&Is), operating at different scales from the international to the local in BC. A critical synthesis of these examples and the wider usage of social indicators shows that they are in general weakly developed relative to ecological and economic indicators; standard C&I systems often omit crucial social indicators, or include them without specific definitions or measurable benchmarks. Many systems do not describe actual social outcomes, but focus largely on processes to be followed, and in particular there is a deficiency in indicators which are measurable by engagement with affected populations or communities via elicited preferences and satisfaction surveys. This type of 'subjective' indicator, preferably developed in conjunction with the affected stakeholders, provide more grounded and meaningful indicators for communities than 'top-down' expert-based or statistical measures, although both kinds of indicator may be helpful in addressing the wide range of social issues affecting communities and/or influenced by forestry.

This review leads to recommendations for future research that examines the fundamental nature of social indicators and their underlying cause and effect relationships, and supports improved methods and tools for integrating social indicators into forest management and decision-making. Key research priorities include addressing gaps in our knowledge on the patterns and determinants of public and stakeholder perceptions, especially variation in acceptability of forest management practices, and exploring thresholds, targets, and interactions between indicators. The role of forestry in contributing to broader social indicators, such as sense of place and community cohesion, needs to be clarified. Research is needed that develops and tests cost-effective tools and processes usable by forest managers and others, for systematically eliciting preferences from stakeholders, increasing community understanding on SFM, and integrating social issues into forest planning and policy. Such techniques include various survey and ethnographic methods, scenario and trade-off analysis, participatory modelling and GIS, and 3D visualisation. Critical and emerging issues in forest management in BC where such research is particularly needed includes: the social impacts and perceptions of pest epidemics, fuel reduction and fire management, climate change, and variable retention harvesting; tourism development and cultural resource management; and early social indicator results from SFM implementation, First Nation co-management, and Community Forests.

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## 1 INTRODUCTION

The importance of the social sciences in forestry has received more acknowledgement in recent years due in part to the sustainable forestry certification movement and its market influence in seeking a 'social license' (Cashore *et al.* 2004). Despite their relatively recent application in forest management, social indicators have a considerable history. For several decades, practitioners from a wide range of professions have monitored the trends and conditions that support and characterize human communities and their interactions with the environment. The United Nations, for instance, has made a considerable investment in developing quality-of-life indices such as the human development index, for the monitoring of social, economic and environmental progress.

The objective of this paper is to summarize some of the main themes from the literature on social sustainability indicators applied to natural resource management, and to address in particular conceptual categories, issues, and limitations associated with the use of social indicators. This leads to recommendations for future research that will address the issues and problems that have been described.

The scope of social sustainability is potentially huge, with ill-defined outer boundaries, posing a challenge for any meaningful paper of short length. This paper addresses social indicators themselves, and attempts to keep them separate from those addressed in the accompanying paper on economic indicators, in order to avoid redundancy. The paper therefore focuses on socio-cultural values and conditions associated with quality of life, public access to non-market benefits and resources, governance, and community stability. The discussion on values focuses most directly on those influenced by forest management and relevant to common trade-offs in forest planning at regional and local levels, such as recreational, cultural, spiritual, and aesthetic values, though also discussing broader social conditions to which forestry may contribute. The special concerns surrounding indicators of aboriginal values equity, and governance are addressed briefly in this paper, but other references should be consulted for in depth treatment of this complex subject (e.g., Stevenson & Webb 2003). This paper does not address issues of legal rights or regulatory compliance (e.g., safety standards). Systems for applying social indicators are discussed here, but the paper does not attempt an exhaustive review of such systems, nor does it address the logistics and feasibility of their implementation.

## 2 CATEGORIES AND USE OF SOCIAL INDICATORS

Forests provide many values to our society going beyond basic needs (e.g., food, water, employment): issues such as cultural diversity and identity (of aboriginal and non-aboriginal people), community recreational opportunities, and sense of place contribute to the desirability and therefore viability of communities, as well as the potential for other resource uses such as tourism. Forestry may have many possible influences on social conditions, such as the safety of forest workers, visitors, and residents in areas prone to fire risk, flooding, or slope instability.

Notions of quality of life and human wellbeing are central to social sustainability: Prescott-Allen (2001) defines human wellbeing as “A condition in which all members of society are able to determine and meet their needs and have a large range of choices to meet their potential” (p. 5). However, the *Human Wellbeing Index* (Prescott-Allen 2001) was developed to measure quality of life at a global/international scale, containing ten elements of *Human Wellbeing*: health; population (in balance with the environment); household wealth; national wealth; knowledge (for innovation); culture (spiritual growth, self expression); freedom and governance (open decision-making processes); peace and order; household equity; and gender equity. While such overarching frameworks can help structure social indicators, at the forest management level there are a number of inherent characteristics of such indicators that can pose problems.

## 2.1 Inherent issues and problems with social indicators

Firstly, criteria and indicator frameworks for SFM have been developed at many levels and **scales**: international, national, regional, and local. As the scale of jurisdiction decreases, indicators of SFM move from the generic to the specific as they begin to address particular landscapes. While international and national frameworks typically address policy and governance concerns, regional and local frameworks can address the symptoms of and influences on social conditions that are more meaningful to individual communities. Social indicators data needs to be collected at a variety of appropriate scales (i.e., international, national, regional or local) or policy unit (e.g., district, municipality, Indian reserve, or park).

Secondly, the **arbitrary nature** of the separation between the three pillars of sustainability raises problems. Practitioners would like clear demarcations between indicators intended to measure ecological, economic and social phenomena. However, such boundaries reflect to a large extent the disciplinary and professional biases of the various disciplines. For instance, a sociologist may address suicide, marriage and divorce rates as proxy measures of life satisfaction, while an economist will develop measures of economic growth and household income to evaluate community well being. Public perceptions of forest management outcomes may address not only the social factors (e.g., community stability or recreational access), but also the other types of outcomes, particularly ecological sustainability; various surveys of public attitudes and opinions have shown the pre-eminence with the public of broader ecological or biophysical conditions (Robson *et al.* 2000; Tindall 2003; Sheppard and Meitner 2005). Quality of life is linked to, and dependent upon, a healthy environment (Prescott-Allen 2001). Aspects of consumptive uses of water supply (quality and quantity) are often near the top of the forest-related concerns for local residents in drier regions of BC (e.g., Sheppard and Meitner 2004). Is this an ecological, economic, or social problem? There is also often confusion between production of non-timber forest products (such as salal or medicinal plants) as an economic activity, and enjoyment or dependence on non-timber values as a social amenity, cultural tradition, or subsistence requirement.

A third issue is the range of social indicator types on a spectrum from **‘objective’** to **‘subjective’** Social indicators in the past have often constituted **‘objective’** measures such as demographic characteristics (e.g., gender, ethnic composition, etc.) taken from statistical

records on income, pollution, health and employment. However, increasingly sociologists have employed more ‘**subjective**’ indices such as community cohesion, social capital, and social alienation. These can be harder to define and measure (Nadeau *et al.* 1999) unless indirect, surrogate measures are used (e.g., divorce rates, youth out-migration, crime statistics, etc.). In either case, quantitative indicators are not necessarily ideal: social indicators are intended to reflect the quality of life in a community, and employment or unemployment statistics for forest dependent communities, for example, may say little about the quality of work such as long term stability, safety, advancement opportunities, training, and so on. It must be recognized that the full range of social values cannot ultimately be reduced to a simple list of quantifiable indicators, if they are to reflect what is ‘really’ happening within a community. In particular, the economic valuation of quality of life may distort and trivialize those things that people value such as clean air, traditional practices, or freedom (Prescott-Allen 2001).

A related issue is the fact that there are **many publics**, and many stakeholders, making determination of appropriate social indicators very complicated. First Nations issues are often treated separately in social indicator systems in Canada, due to recognised differences in the legal and governance context, but other sectors of society (urban versus rural, local versus global, etc.) also raise difficult problems of whose voice should be represented and how their values are to be measured. Where the more ‘subjective’ indicators (people’s perceptions or preferences) are examined, even within a community people hold differing opinions and have different needs, often expressed in terms of competing visions for the future of the same community. In addition to variation in views at a given point in time, perceptions are known to change over time with events and changing conditions.

Another problem with social indicators is the **multi-causal nature** of rural social problems. For instance, health problems in many First Nations communities can be attributed to disruptions to traditional subsistence lifestyles, activity levels, and diet; however, the extent to which this trend can be linked to industrial forest resource extraction, versus broader forces of acculturation or lifestyle choice, remains debatable. Those social conditions and indicators which forest managers can directly control or influence through management activities and policies represent a subset of the wide range of possible indicators. External and much broader factors may dictate community wellbeing, and their weight relative to forestry’s influence may not be clear. Even within forestry, distinctions can be made between social impacts of corporate or government-level strategies (e.g., closing of mills, introducing more shift work, altering tenure arrangements) and the social effects of forest management practices and tactical or operational planning under the direct control of forest managers.

## **2.2 Developing and assessing social indicators**

Much has been written on what constitutes a good indicator for SFM. The following is adapted from Bunnell (2000), von Mirbach (2000), Raison *et al.* (2001), and Prescott-Allen (2001), and addresses issues raised in the above discussion. Social indicators should be:

- a. Relevant:
  - Does the indicator tell us something *meaningful* about social conditions?
  - Is it *sensitive* to change, and will it show trends over time?
- b. Credible:
  - Is it *reliable* (relatively free of factors that introduce “noise”) when it comes to interpreting indicator measurements?
  - Is it *seen as valid* by affected communities or *grounded* in their cultural worldviews?
- c. Measurable:
  - Is the indicator *clearly defined and specific*?
  - Is it measurable at an *appropriate scale*, and with *sufficient accuracy* to be useful?
  - Is data for this indicator *available*?
- d. Cost-effective:
  - Is the cost of measuring this indicator *justified* by the value of the information it provides?
- e. Connected to forestry:
  - Is it *responsive* to management actions / practices?
  - Can future indicator levels be *forecasted* with reasonable accuracy for decision-making purposes?

### 2.3 A framework for categorizing social indicators for SFM

In keeping with ecological and economic indicators for SFM, sets of social indicators should include both procedural indicators (what needs to be done to sustain social values) and outcomes (what social conditions are expected or desired?). Process indicators can often be related to issues of governance and compliance with established procedures, while outcomes relate more to performance criteria and results-based forestry. Based on a review of the literature, Sheppard *et al.* (2003) proposed a working framework for categorizing procedural and outcome-based social indicators which is summarized and adapted next, with general reference to the criteria described above.

**Social process indicators:** These address issues of governance and communication with affected stakeholders and the public, which include the use of consultation, decision-making, and collaborative management processes (Sheppard and Achiam 2004). Such processes allow for consideration of social values and involvement of stakeholders and communities. The public involvement stages of such processes can be (and usually are) readily documented, and can be readily reviewed by the public, outside experts or certification auditors later. The stage of actual decision-making often does not involve the public directly in many processes, and may be less transparent. Procedural social indicators tend to be easier for forest managers to measure and document than ‘subjective’ social outcomes: the number of people attending meetings, for example, is much easier to document and quantify than the increase in awareness or satisfaction level resulting from those meetings. However, the process itself is important (Kruger 2001; Sheppard 2003), in combination with desired outcomes of that process (e.g., consensus, clear decisions, etc.).

**Direct social outcome indicators:** These address the state of key social values, resources or conditions associated with human security, social cohesion, equity, wellness and enjoyment, as estimated or measured directly via technical or scientific studies. These may draw on primary sources (e.g., specific studies) or secondary data (e.g., available demographics databases). Use of such indicators is often expert-based (sometimes called “top-down”), at least partly quantifiable, standardized, and to some extent verifiable by other experts using defined methodologies; examples include the ‘objective’ statistics on demographics or poverty levels described earlier (Nadeau *et al.* 1999), recreational opportunity evaluation (BCMofF 1998), risks and hazard assessment, and documenting community access to services. Some of these are relatively economical and straightforward to compile from existing data sources, and data points can be added as they become available from one year to the next for tracking trends.

**Perceptions or satisfaction indicators:** These address outcomes as expressed by people’s views on and evaluation of social conditions and forest management in particular. They usually requires engagement with stakeholders and/or the general public. Indicators can address opinions and concerns about both SFM procedures and outcomes: examples include levels of satisfaction with consultation processes or quality of recreational experiences. These results may differ from the technical assessment of the same indicators. These indicators speak to the core of the social license question; they address the issues of preference and satisfaction, and are often narrowed down to judgments of acceptability, although it is understood that acceptability can be influenced by many different factors (see for example Shindler *et al.* 2002). These indicators can be measured through social science instruments for preference elicitation such as user surveys and qualitative interview techniques, or through less reliable but pragmatic and cheaper methods such as recorded public comments or complaints, public advisory group (PAG) minutes, or practitioners’ observations.

**Capacity and knowledge indicators:** “indicators should recognize the importance of individual and community capabilities and functioning (*i.e.*, capacity)” (MacKendrick & Parkins 2004, p. 10). Such indicators measure outcomes in terms of both broad concepts such as social capital and community resilience in the face of changing conditions (Nadeau *et al.* 1999), and the state of people’s level of awareness and understanding of SFM and its consequences. Indicators of knowledge on SFM may be affected by the social learning undertaken as part of community involvement processes (Kruger 2001). These indicators can be measured formally through participant surveys (as above), or assessed more generally through observation of behaviour and capabilities of affected communities.

These categories can be used in conjunction with the criteria listed earlier to characterize, assess and compare specific social indicators, as suggested in Table 1 and discussed below.

**TABLE 1.** A conceptual framework for assessing social sustainability indicators.

	Relevant	Credible	Measurable	Cost-effective	Connected to forestry
Social process indicators					
Direct social outcome indicators					
Perceptions or satisfaction indicators					
Capacity and knowledge indicators					

Several other frameworks exist for assembling suites of social indicators at the local or higher levels, e.g., Quigley *et al.* (1996), Von Mirbach (2000), Prescott-Allen (2001), Parkins and Beckley (2001), Parkins *et al.* (2004), and indicators being developed for the Forest Resource Evaluation Programme (FREP) under the BC *Forests and Range Protection Act (FRPA)* (e.g., [http://www.for.gov.bc.ca/hfp/frep/2\\_recreation.html](http://www.for.gov.bc.ca/hfp/frep/2_recreation.html)) There have also been attempts to assemble indicators for First Nations communities and values, which tend to cut across the categories identified above, though with differing areas of emphasis. Lewis (2004), for example, identifies three broad domains or principles which appear in the literature on indigenous approaches to sustainable forest management and certification, as follows:

- Access: Forest management maintains or enhances fair access to resources and economic benefits, including intergenerational access (addressing issues of process/governance, equity, and direct outcomes).
- Co-operative Management: Concerned stakeholders have acknowledged rights and means to manage forests cooperatively and equitably (addressing process/governance and capacity).
- Social Well-Being: The health of indigenous forest users, their material and spiritual uses of the forest, and forest ecosystems is maintained (addressing direct outcomes and preferences).

The next section describes how some of the official or established systems of criteria and indicators (C&Is) apply social indicators in the context of certification or policy.

### 3 EXAMPLES OF SOCIAL INDICATORS USED IN C&I FRAMEWORKS

The purpose of this section is to illustrate how a selection of social indicators have been prescribed and used within various SFM frameworks or systems operating at different scales. This illustrates the types of indicators in common use, and briefly considers how the issues described above have been addressed in these systems and the adequacy of these approaches. Four values or general criteria/indicators have been selected to represent both procedural and

outcome-related social issues, and common forest management concerns in trade-offs among non-timber values in BC. The four social values considered are: public participation in decision-making, outdoor recreation, visual quality/aesthetics, and tourism. The first is primarily process-orientated, while the other three present both procedural and outcome indicators. In each case, we provide the general rationale for indicators of these values, and relate the indicators used in these systems to the assessment criteria described above.

This brief review also sheds light on the strengths and weaknesses of the social components of eleven criteria and indicator systems or standards examined, representing four levels of forest management jurisdiction. International frameworks reviewed include the Helsinki Process, the Montreal Process, the Forest Stewardship Council International certification standard, and the Pan-European Forest Certification framework. National frameworks include the Round Table of USA Report, the Sustainable Forestry Initiative (SFI), the Canadian Standards Association (CSA) framework, and the UK Forestry Standard. Regional frameworks include the Forest Stewardship Council's BC Standard, and the Forest Stewardship Council's Boreal Standard. Finally, the Canadian Forest Products (Canfor) SFM Framework, a local level framework, is examined to demonstrate how a specific application of a company SFM framework (with which the authors are familiar) addresses social values.

Table 2 summarizes the systems examined, and indicates the extent to which they provide procedural or outcome-based indicators in the four values considered.

### **3.1 Public Participation/Fair and Effective Decision-making**

Public participation has become a critical aspect of SFM (CCFM 2000; Hunt & Haider 2001; Sheppard & Achiam 2004). Indeed, most Canadian jurisdictions now routinely employ public participation in forest land-use planning, including BC, Nova Scotia, Ontario, Alberta, Quebec, and New Brunswick (CCFM 2000). Concepts, principles and methods for conducting public participation processes as a key component of governance are now becoming more widely understood (Beierle & Cayford 2002). Sheppard & Achiam (2004) review various attributes of effective participatory processes, including cost-effectiveness, a clear structure and roles in the decision-making process, inclusive representation of stakeholders, open communication and access, inclusion of participants in design of the process, neutrality of the process, and influence and accountability in decision-making.

However, several systems of C&Is (the Helsinki Process, FSC International Standard, and the Round Table of USA Report) do not address public participation explicitly. Within the Montreal Process Working Group's framework, it is a policy-level criterion that addresses opportunities for public involvement in policy- and decision-making, and for the transfer of information: "...an informed, aware and participatory public is indispensable to promoting the sustainable management of forests" (Montreal Process Working Group 1999, p. 2). Nonetheless, the criterion is fairly general and is not readily measurable. The SFI system in its ninth objective acknowledges that the availability of information is key to effective public participation and requires reporting, but no proactive engagement or performance evaluation is required, such as responding to specific information requests.

**TABLE 2.** Selected social criteria and indicators in 11 forest certification or standards programs.

Level	Source of C&IS	Public Participation/fair & Effective Decision-making		Outdoor Recreation		Visual Quality/Aesthetics		Tourism	
		C&IS Mentioned	Outcomes* Explicitly Addressed	C&IS Mentioned	Outcomes Explicitly Addressed	C&IS Mentioned	Outcomes Explicitly Addressed	C&IS Mentioned	Outcomes Explicitly Addressed
International	Helsinki Process	No	No	No	No	No	No	No	No
	Montreal Process	Yes	No	Yes	Yes	Generally	No	Yes	No
	FSC International	No	No	No	No	No	No	No	No
	Pan-European Forest Certification	Yes	No	Yes	No	Yes	No	No	No
National	Round Table of USA Report	No	No	No	No	No	No	No	No
	Sustainable Forestry Initiative	Yes	No	Yes	No	Yes	Largely procedural, fairly specific.	No	No
	CSA	Yes	Yes	Partly	No	No	No	No	No
	UK Forestry Standard	Yes	No	Yes	Largely procedural.	Yes	Partly, but general.	No	No
Regional	FSC BC	Yes	Partly	Partly	No	Partly	No	No	Partly – as an example.
	FSC Boreal	Yes	Partly: measures not identified	Yes	Partly	Yes	No	No	No
Private/Local	Canfor SFM Framework (CSA)	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Total: 11 programs		No: 3 Yes: 8 Partly: 0	No: 7 Yes: 2 Partly: 2	No: 3 Yes: 6 Partly: 2	No: 8 Yes: 1 Partly: 2	No: 6 Yes: 5 Partly: 2	No: 9 Yes: 1 Partly: 2	No: 10 Yes: 1 Partly: 0	No: 10 Yes: 0 Partly: 1

\*WHILE PUBLIC PARTICIPATION IS PRIMARILY A PROCESS INDICATOR, PERFORMANCE OUTCOMES CAN BE MEASURED FOR SUCH PROCESSES IN TERMS OF PARTICIPANT SATISFACTION, ATTAINMENT OF CONSENSUS, ETC.

Similarly, SFI's tenth objective of conducting outreach and suggesting the use of focus groups makes no mention of whether meaningful opportunities for public participation or influence on decision-making are provided (SFI 2002). The PEFC framework (Ministerial Conference on the Protection of Forests in Europe 2002) vaguely addresses public participation as it only requires that policies for public awareness and participation be drafted. Although the UK Forestry Commission (2004) incorporates public participation into their framework for SFM, their treatment of public participation is vague, seeking enhanced opportunities for increased awareness and community involvement. The sole indicator suggests that "consultations and involvement of communities are reasonably accommodated, especially in relation to work opportunities"; yet use of the term "accommodation" is ambiguous and appears to fall short of a clear and meaningful role in decision-making.

Public participation is prominent in the latest CSA framework and is framed as a critical component (CSA 2003). The public is involved in the development of indicators, targets and thresholds, often through representatives on public advisory committees. This requirement is largely due to the high degree of public ownership of Canadian forests, and the public right to play a role in determining planning outcomes on public land. CSA (2003) has defined effective public participation as accommodating "the public's wide range of knowledge, different interests, and varying levels of involvement with regard to SFM, as well as its differing cultural and economic ties to the forest" (p. 12). The CSA framework is oriented towards consensus in the decision-making process, through the examples of decision-making processes which it refers to repeatedly. Adherents to the CSA framework must demonstrate that their public participation process is designed and functioning to the satisfaction of planning participants (CSA 2003). The importance of public participation has also been captured in the FSC's Boreal and BC standards. In the Boreal Standard, local publics are to be accorded meaningful opportunities for participation in the development of management strategies and the management plan as well as monitoring; however, "meaningful" is not defined which hampers measurement. A broad and balanced range of public interests must be openly sought (FSC Canada Working Group 2004), yet the desired outcome of this process is not stated. The FSC BC Standard is less specific, but does call for a plan for ongoing public participation; within this framework it is considered to be a major failure if the rights and interests of directly affected people are not identified and incorporated into a management plan (FSC Canada Working Group – BC Regional Initiative, 2003). The Canfor SFM (2004) framework addresses public participation in two indicators, each supported by five measures with associated outcomes where appropriate.

As shown in Table 2, many of these systems weakly circumscribe the nature, depth, and desired outcomes of public participation. The CSA, regional FSC, and CANFOR system appear to provide useful precedents for more meaningful participation indicators.

### **3.2 Outdoor recreation**

Opportunities for, and participation in, non-commercial outdoor recreation on Crown land outside of parks and protected areas make beneficial contributions to social conditions. In 1996, 82.2% of British Columbians participated in a nature-related activity (Federal-Provincial-Territorial Task Force on the Importance of Nature to Canadians 1999), and almost

half of these engaged in outdoor recreation in natural areas. This *Nature Survey* concluded that nature-based outdoor recreation had the potential to increase by 150%, and that recreational fishing and hunting had the potential to double (Federal-Provincial-Territorial Task Force on the Importance of Nature to Canadians 1999). The survey was employed to provide information about recreation use for early versions of the CCFM SFM criteria and indicator framework (which in turn informed the development of the CSA framework). However, recreation as an indicator has been difficult to measure, as it is often not a market value and user fees do not fully account for it (CCFM 2000).

The Helsinki Process, the FSC International Standard, and the Round Table of USA Report do not address outdoor recreation explicitly. Recreation is addressed in three indicators of the Montreal Process (1999). Under the first criterion, Conservation of Biological Diversity, indicator 1.1c incorporates recreation through use of the World Conservation Union (IUCN) guidelines for protected areas framework, which includes recreation in its Category 2 protected areas (IUCN 1994); however, this is tangential and largely procedural. The sixth criterion recognizes recreation and defines three specific indicators to evaluate the area and percent of forest land managed for recreation, number and type of facilities available for recreation, and the number of visitors as a proportion of the population and forest area. Under the Legal, Institutional and Economic Framework for Forest Conservation and Sustainable Management criterion, recreation is to be included in forest planning assessment and policy review as a forest value.

The PEFC framework (Ministerial Conference on the Protection of Forests in Europe 2002) addresses recreation in two indicators. Recreation access is framed as a quantitative indicator wherein area of forest is measured to provide an indication of intensity of use, though specific recreation access outcomes are not addressed. Assessing policies for the provision of recreation is the second indicator, but lacks measures of the effectiveness of the policies. The SFI framework incorporates recreation into its first objective of socially sound practices as three supporting indicators; these indicators are largely procedural and do not address implementation and monitoring of the indicator. The first indicator, providing opportunities for recreation that are “consistent with their forest management objectives” may not be valid or credible since it is contingent on whatever planning process has been undertaken, which may not even address key recreation objectives. The second, providing accessibility to staff, is unclear in how it is relevant to recreation opportunities. The third, maintaining recreation access “as appropriate” to significant and special places, recognizes the importance of place to recreation quality,” but is vague and again contingent on unstated definition of “appropriateness” (SFI 2002). The UK Forestry Commission (2004) does not frame recreation as an economic value as many frameworks do, but in the context of community and culture. The UK Forestry Commission recognizes that recreation plays an important role in forested landscapes and calls for recreation opportunities and access to be enhanced, but the indicators are poorly defined and largely procedural.

The CSA framework (2003) incorporates outdoor recreation into its vision of sustainable forest management under its Timber and Non-Timber Benefits element. This element advocates the management of a mix of both timber and non-timber benefits as a necessary

component of sustainable forest management. Outdoor recreation is framed generally as an economic amenity, but desired recreation outcomes are not specifically addressed. Although recreation was explicitly addressed in the CCFM's 2000 SFM framework, specific mention was surprisingly dropped in the 2003 framework (CCFM 2000; 2003). A consequence of no longer addressing recreation is that CCFM and CSA no longer have clear links to the sixth criterion (i.e. 6.2a, b, and c) of the Montreal Process which addresses recreation (CCFM, 2004b). Outdoor recreation is a consideration in three of the FSC Boreal Standard's principles for sustainable forest management and includes access management and providing remote areas for recreation; recreation is explicitly addressed as both a cultural value and resource, in terms of management objectives, strategies, inventorying resources, and in the monitoring of impacts to recreation opportunities (Forest Stewardship Council Canada Working Group 2004); however, desired outcomes are not clearly stated. In the FSC BC Standard, although recreation is mentioned as one of the values supported by forests that are central to the BC way of life, it is only included tangentially in the seventh principle where adherents are directed to describe recreation resources and supporting inventories (FSC Canada Working Group – BC Regional Initiative 2003). This is again procedural only, and while measurable, fails to be directly relevant to sustaining recreation outcomes and values or showing how these might be connected to forest management actions. One of the indicators of the Canfor SFM (2004) framework calls for the enhancement of resources and opportunities for recreation, and here the indicator is supported by six quantifiable measures that can at least be compared against an existing baseline condition. These measures include the inventory of area forest (ha) managed primarily for specific recreation activities, kilometers of recreation access routes maintained, and the degree of recreationists' satisfaction for a range of recreation activities.

As summarized in Table 2, many systems of indicators omit recreation explicitly or are vaguely defined and primarily procedural; some include specific quantifiable outcomes, but even here, many of these systems fail to address relevant outcomes as perceived by resource users, e.g., quality of experience. Of the certification systems, the Boreal FSC system appears to provide the most meaningful indicators for further consideration.

### **3.3 Visual quality and aesthetics**

Aesthetics and visual quality are important to the economy, quality of life, and identity of regions such as British Columbia, but also make contributions to other social values, such as recreation and tourism. This section is adapted from reviews of how aesthetics is addressed under various C&IS systems, by Burley (2001) and Sheppard *et al.*, (2004).

The Helsinki Process, the FSC International Standard, and the Round Table of USA Report do not address visual quality or aesthetics. Aesthetics is addressed tangentially in a procedural indicator of the Montreal Process (1999). Under the first criterion, Conservation of Biological Diversity, indicator 1.1c incorporates aesthetics through use of the World Conservation Union (IUCN) guidelines for protected areas framework, which includes aesthetics in protected areas categories three and five (IUCN 1994); however, outcomes are not identified. The SFI system addresses aesthetics through 25 indicators, some of which are quite specific, referring to maximum clearcut sizes and green-up requirements, and specifying desired methods of visual resource management, but nearly all indicators are procedural (SFI 2002). The UK Forestry

Standard (2004) provides the strongest framework for addressing visual quality and aesthetics; under the forest management unit indicators, there must be evidence that landscape principles of forest design are used, and aesthetic values are to be maintained and improved as a management consideration; while the Standard is specific on visual resource priorities, e.g., sites within designed landscapes of heritage importance and areas of highly valued character, the targets and desired condition are vague. Aesthetics is addressed in both the FSC Boreal Standard (2004) and the BC Standard (FSC BC Regional Initiative 2003) as part of their monitoring and assessment principle, wherein the impacts of forest management on “cultural values and resources” (which includes high aesthetic value areas) are to be monitored, but outcome-based indicators are not provided. Canfor’s SFM framework (2004) is specific to measurable satisfaction outcomes, stating that visual quality of the harvested landbase is to be acceptable to a broad range of stakeholders, and is supported by three landscape measures that are quantifiable and explicit.

Overall, many systems of indicators omit visual quality explicitly or are vaguely defined and primarily procedural (Table 2); even those which are specific or suggest desired outcomes fail to link strongly with existing visual resource inventory systems or address visual quality as perceived by users. The SFI, UK Forestry Standard, and CANFOR systems appear to provide the more meaningful indicators on visual quality.

### **3.4 Tourism**

Generally, tourism is poorly addressed (if at all) in the eleven frameworks examined here. The Montreal Process (1999) addresses tourism in the context of recreation in the sixth criterion, yet the three indicators are indistinguishable from the recreation indicators. Although tourism and recreation are not explicitly addressed in the CSA (2003) framework, ecotourism is included as a non-timber benefit and is framed in economic terms. The FSC BC Standard (Forest Stewardship Council Canada Working Group 2004) addresses tourism as a social cost to be taken into account in forest management, and is also framed in economic terms. The remaining eight frameworks do not addressors explicitly (Table 2). Despite its importance to the economy of parts of Canada such as BC, its increasing potential as a high-value forest product and pillar of community sustainability, and the potential conflicts between the timber values and tourism development, this topic represents a large gap in the development of social indicators for SFM (Beckley 2000). Visitor-based, provider-based, or dependent community-based satisfaction outcomes appear to be completely lacking.

### **3.5 Summary of system approaches to social indicators**

At the international level, we may expect indicators to be broader and less relevant to specific community or resource outcomes. The role of forests in providing long-term well being of local populations is recognized in the Montreal Process and some of its criteria, but not explicitly in the Helsinki Process. The FSC International Standard is largely procedural, focusing on the development and implementation of management plans, and establishing a structure to inform national and regional level standards. The International Standard identifies broad principles and criteria for SFM, but public participation, recreation, visual quality, and tourism are not mentioned; the focus instead is on social rights, environment, and sustainable economics. The fourth and fifth principles in this framework seek to enhance economic and

social well-being, and call for the efficient use of forests to provide economic viability and social benefits (Forest Stewardship Council General Assembly 2004).

The FSC Boreal and BC Standards are somewhat more specific about social values than the International Standard but remain largely procedural. The BC Standard is strong on workers safety and rights, but provides little guidance on quality of life benefits, and is more heavily weighted to ecological indicators. In contrast, the UK Forestry Standard gives amenity and cultural values a higher profile than any of the Canadian systems (Burley 2001). The SFI framework consists of largely procedural social indicators, but is quite comprehensive in scope. In this framework, visual quality is prominent, but the treatment of recreation is more weakly incorporated into socially sound practices and significant places as supporting indicators. The Round Table of USA Report does not address social values.

The latest CSA framework is especially strong in the area of public participation, relative to all other official systems examined, setting targets for inclusion of the public in various aspects of sustainability assessment and decision-making. However, surprisingly, recreation, visual quality and tourism are not explicitly addressed. Like the SFI, CSA enables forestry companies to develop their own certification standard on a case-by-case basis, thereby not presenting a consistent minimum standard. Although local stakeholder processes may be well defined through PAGs, they are commonly heavily influenced by the company (Parkins 2002), and they may or may not be effective in defining meaningful and measurable social indicators and therefore in protecting a wide range of social values or improving management (Forests and the European Union Resource Network 2004).

## **4 A CRITICAL SYNTHESIS**

### **4.1 Problems and gaps in the use of social indicators**

It is widely recognized that social C&Is have until recently been given less weight than ecological and economic C&Is (Haynes, 2005), and, for reasons which are discussed further below, the state of our knowledge on social indicators is weak (Burley, 2001). With the recent exception of procedures for public involvement in forestry (e.g., Hislop and Twery, 2001; Sheppard and Achiam, 2001), there is seldom comprehensive or detailed guidance available on using social objectives, measures, and methods. As Burley (2001, p.97) argues, “for some criteria, no good quantitative indicators have yet been developed, particularly for social benefits.” In several frameworks for SFM indicators, it remains common to find social indicators that are few in number, incomplete, and often vague or largely meaningless. Many social indicators employ permissive terms like “taking into account” that are not specific, measurable, or substantive.

Social values are commonly framed and measured in economic terms (Nadeau et al., 1999), reflecting cultural conventions of the ‘good life’ as material standard-of-living and using standard objective indices of community well being such as gross domestic product (Diener & Suh, 1997). Even where there is legitimate overlap with economic-related values (e.g., employment), the treatment of non-timber values often falls short, exacerbated by poor data availability. Economic diversity (i.e. reducing reliance on timber economy) is an important

and desired community trait, yet tourism values associated with the forest, for example, are not explicitly addressed in many SFM frameworks. Also, many SFM approaches can be criticized for framing social indicators without an appropriate background on the community or stakeholder values being addressed. Top-down indicators established by experts or resource managers are seldom grounded in the experience of the affected communities and stakeholders, and may represent a last minute 'add-on' to pre-existing lists of C&Is or longstanding forest management objectives. Ultimately, the development of locally relevant criteria and indicators for both indigenous and non-native communities needs to follow a 'bottom-up' approach, with scientific and management experts facilitating their development. MacKendrick & Parkins (2004) suggest that if social outcomes are to be meaningfully addressed, it is better first to identify desired social outcomes and associated measures, and then frame the criteria and indicators to match the desired outcomes. Similarly, rather than focusing on forest sustainability with the assumption that social values will follow, a preferred approach might be to identify the needs of social sustainability and then determine how the context of forest management may affect it (Beckley 2000).

Social indicators as commonly used are often of the procedural type (Table 1), rather than measuring salient outcomes. This is to be expected in areas of governance and public involvement, and the CSA system in particular stands out as setting a generally high and effective standard in this area. In a review of indicators used by the Canadian Model Forest Network (Sheppard 2003, citing von Mirbach 2000), 46% of 134 social indicators were of the procedural type. Of the remaining 54% relating to social outcomes of forest management, the majority (39% of the total) were measured directly by experts, e.g., number of well-maintained recreation sites. Only 2% dealt explicitly with people's satisfaction with the SFM process or outcomes. Measures of satisfaction with SFM outcomes are still rare in certification and management systems, and largely missing from the basic international agreements. This leaves forest managers vulnerable to disconnects between positive sustainability results measured on the ground and negative public opinion (Sheppard, 2003). Expert judgments of social conditions such as visual quality (Daniel and Vining 1983, Kaplan *et al.* 1998) can depart markedly from public perceptions, raising questions about the appropriate role of standard resource inventory data on social issues (such as visual quality objectives) where these exist (Sheppard *et al.* 2004). It is therefore advisable that social indicator sets represent all of the four categories identified in Table 1, including both procedural and various types of outcome indicators. The use of satisfaction indicators, however, should not be interpreted as endorsing complete consensus as the necessary criterion of success; work is needed on what constitutes appropriate thresholds of consensus.

In a review of C&Is for First Nations, Lewis (2004) concludes that 'universal' C&I frameworks that are adapted by experts and applied across geographically and culturally distinct aboriginal communities tend to be technocratic or academic in origin, production and economic oriented, expert-driven as opposed to locally generated, and too generalized to be readily applied to local conditions. Sheppard *et al.* (2004) have proposed four possible reasons for the weak representation of more 'subjective' indicators such as aesthetics in indicator frameworks: there seems to be a cultural bias among professionals and scientists to favour hard, easily quantifiable values; there is a general lack of social science training; the

omission of people with strong or broad social science backgrounds from certification efforts, scientific panels, and agency staff; and an absence of substantive public input in SFM framework development. If 'subjective' issues are not codified in an indicator which is grounded in the community context, assessed social outcomes may be based on an individual's tastes or bias rather than scientifically determined public preferences (Sheppard *et al.* 2004). Clearly defined outcomes and expectations in indicators are more likely to result in consistent interpretations and measurement.

Development of sociocultural indicators should recognize in forest resources the importance of the cultural, normative, and symbolic elements as well as the physical and economic bases of social sustainability, for both aboriginal and non-native communities. There are significant inter and intra-cultural perceptions of the environment that guide both action and definitions of socially acceptable forest management. Resource managers should take these localized and culturally relevant indicators into consideration (Tindall 2001; Lewis 2004), along with externally derived, 'scientific' indicators. This allows examination of the choices that individuals make to enhance their lives, rather than relying on aggregated higher level statistical patterns. How people define the 'good life' varies considerably within regions, and even among individuals in a community, and the most appropriate approach to measuring life satisfaction may be to determine whether individuals can obtain the things that they desire from life (Diener & Suh 1997). Methods available to achieve this have been in use for decades by ethnographers and others, and include a variety of qualitative and quantitative techniques such as in-depth, semi-structured interviews, analysis of oral histories and community narratives, and more recently, photo-elicitation, GIS mapping, and visualisation to prompt dialogue (Lewis 2000). The cost-effectiveness of these intensive methods, alone or in combination with more standard tools such as surveys and focus groups, has yet to be established in routine SFM practice, however. Generally, we may expect the costs and complexity of forest management and certification to go up with in-depth social measurement methods, but there may be considerable offsetting beneficial impacts, such as improved awareness of community sensitivities (avoiding unforeseen delays and costs), increased social learning on forest management, and improved community relations through increased communication and just listening.

The difficulty associated with trying to develop locally driven contextualized indicators is primarily a function of finding data sources that accurately reflect local conditions and community values. There is a trade-off between validated, stable and comprehensive data at larger geographic scales (region, province, nation, or higher) where dealing with internal variability is a major issue, and data that is less reliable and more idiosyncratic at smaller levels of analysis (municipalities, census tracts and postal codes), where the localized nature of the data means that it more accurately reflects local conditions (Tindall 2005). Other problems with using local indicators of satisfaction or other outcomes include the risk of deliberate bias in responses from community participants, or simply the inaccuracies of self reporting methods (Schwartz 1999).

The expert-driven methods also have their limitations. General/standardized or top-down indicators may not provide information of interest to particular communities, may not relate

well to forest management activities, and often refer exclusively to variables where there is available data, rather than on more meaningful characteristics (Tindall 2005). Kusel & Fortman (1991) have noted that conventional expert-driven socio-demographic indicators of community well-being can hide considerable inequality because they are based on aggregated or average values. Forest communities are comprised of diverse populations who may or may not benefit equally from access to forest wealth. For instance, in many rural BC communities, particularly those with large First Nations populations, there is a fairly wide gap between the 'haves' and 'have nots.' It is not uncommon to see a strongly bimodal distribution of income in rural communities. It is also often unclear how pre-existing socio-economic information such as census data should be interpreted in terms of sufficient or even desirable levels of an indicator value, such as health or social cohesion: when do changes in these conditions become critical? Standardized indicators do permit researchers to make comparisons easily between communities and over time.

Methods identifying indicators that are less reliant on objective, statistically based indices but are predicated more on subjective, locally based surveys (ie. "bottom-up indicators) have the advantages of relevance and credibility to the community, since they increase the depth of the manager's or researcher's understanding of a particular community (Parkins and Beckley 2001). They are more likely to address local concerns and interests, in that they emphasize people's perceptions of their own well-being and the factors that influence it. They can be reapplied within the same community by means of regular surveys, which makes them amenable to statistical comparisons as well as providing a vital tool for measuring shifts in community values and circumstances over time. Such methods also measure the diversity of people who make use of the forests across the province – different ethnic groups, different lifestyles, urban and rural residents, etc. Recognition of the diversity of cultural needs and experiential knowledge and skills within communities is important pragmatically and ethically if social acceptability for management decisions is to be gained. One disadvantage of locally-derived or customized indicators is that they can make it difficult to compare across communities or to track community indicators at an aggregated level.

In developing sets of indicators, most current SFM frameworks attempt to structure indicators into watertight compartments and ignore vital linkages between ecological sustainability and quality-of-life, for example, with weak mechanism for handling interactions between indicators. An effective suite of indicators may not necessarily be the most exhaustive; it may be better to use a narrower list of indicators recognizing that each indicator may cover off one or more variables. For instance, dependence on a 'country food' diet in a First Nations community may be an indicator of community health, as well as social cohesion and the stability of traditions and customs. Clearly, there is an important role for expertise in social sciences and related disciplines, working alongside forest managers, in defining cost-effective suites of key indicators and methods to contextualize them through engagement with communities. It is also apparent, as referenced in the CSA system, that the public should have a role in setting indicators: any pre-existing set of indicators should be treated as a baseline template for further discussion and adaptations through an iterative local process.

Finally, the question of the role of forestry in determining broader characteristics of community wellbeing is not yet clear, with major implications for what indicators are most useful to managers and the role of other agencies and policy-makers. There is considerable debate on the cause and effect relationships at work here, for example in the connections between local timber production and community wellbeing (e.g., Parkins et al. 2004). Weaknesses in co-ordinated planning on private and Crown land in BC, between regional districts and the provincial government, for example, raises difficult questions on the relative impact of forest management on rural quality of life.

## 4.2 Research needs

Given the above review of social indicators and the short time over which social issues have been studied in forestry (relative to silvicultural, ecological, and economic factors), it would seem that what we don't know is much greater than what we know, and therefore there are a multitude of research needs. Prioritizing these for western Canada at this time should be guided by the following considerations:

- Fundamental research on social issues which would complete or synthesize prior studies and provide a strong platform on which to develop guidelines for practice and further research over the long-term.
- Immediate opportunities to learn from already-funded ongoing activities or programs that will not be afforded in a few years' time, e.g., current attempts to implement SFM frameworks in communities across BC, which are not generally being well-documented or analyzed systematically for the information of others.
- Relevance to urgent or rapidly emerging themes and issues in forest management which involve social dimensions (described below),
- Applicability of research and methods used in other countries and regions of Canada, which may be adapted and readily transferable to BC.

In fact, there are a number of areas where considerable relevant research has been conducted and primarily needs extension to potential users in industry, government, and communities: notably, general public participation methods and ethnographic/cultural research methods. There are also areas such as trade-off analysis methods in other fields, backcountry user expectations in the US, and sense of place analysis methods generally that need to be adapted and tested in a forestry context (see below). There is also a considerable amount of social science research in the pipeline, which should begin to fill some gaps in knowledge over the next 2-5 years. Prominent loci for such ongoing research in Western Canada include:

- Canadian Forest Service, Edmonton, with a research program in community sustainability and participatory methods.
- The Sustainable Forest Management Network, Edmonton, which supports collaborative research with First Nations communities and other partners, and which is sponsoring an ongoing study on defining social sustainability.

- BC Ministry of Forests visual resource management program in Victoria, focusing on visual perceptions of forestry.
- Universities with multi-disciplinary forest management, sociology, and anthropology researchers, such as Malaspina University-College, Simon Fraser University's Resource and Environmental Management Program, UBC's Forest Resource Management Department, UNBC, and University of Victoria. Social research underway at these facilities includes integrated resource management, multi-criteria modelling and scenario analysis, cultural anthropology, social surveys, aesthetics and landscape planning, recreation inventory and modelling, landscape visualization, and public participation.
- Various forest companies implementing SFM systems and/or supporting research which can involve public surveys, Public Advisory Groups, and planning processes, (e.g., CANFOR, TEMBEC, TOLKO, Weldwood among others).

The following priorities for further research on social indicators are organized into two main clusters of topics and a set of cross-cutting research theme areas of significance to forest actors in BC. The clusters are addressed first, and comprise:

- Fundamental research questions that examine the nature of social indicators and their underlying cause and effect relationships, which should contribute to a deeper and broader understanding of key social issues and theory
- Pragmatic research that support the development, testing, and implementation of methods and tools for integrating social indicators into forest management and decision-making.

## I. Fundamental research questions

Many of these apply most strongly to social outcomes, particularly preference and satisfaction measures, and community capacity, with an emphasis on understanding the salience, validity and reliability of social indicators, as follows:

1. Characterizing the **diversity and patterns of key characteristics, values, attitudes and perceptions** among communities and stakeholders that go beyond assumed polarities between environmentalists versus timber interests: examples include determining the commonalities among multiple stakeholders, local versus urban preferences, and shifts in perception over time. Generally, there is very little documented about the current state and direction of social indicator trends (e.g., on social cohesion and how it relates to forestry), or relationships between local, regional, and global acceptability for various forest resource trade-offs. This work would support the robustness and transferability of indicators in various settings.
2. Identifying **determinants of attitudes towards acceptability** of forest management practices, including the role of knowledge and how it is delivered (e.g., via the media, social networks, government programs, and collaborative learning processes). This

research should include both perception research experiments to pin down cause and effect relationships under controlled conditions, and validation with real-world case studies.

3. Establishing **subsets of general/standardized indicators relevant to forest management**, for comparison across communities but where data is collected at the local level (Tindall 2005); in BC, the role of standard *FRPA* social values (recreation, visual and cultural) should be examined in this light. The choice of indicators should also illuminate the **cause and effect relationships between forestry and broader social indicators**, such as community cohesion, sense of place, and spiritual values.
4. Establishing a scientific basis for **thresholds and desired levels in key social indicators**, e.g., the *FRPA* social values (recreation, visual quality, cultural resources) and broader indicators of community capacity and wellbeing, so that these can be translated into meaningful targets for indicators.
5. Exploring the **interactions between and among social and other indicators**, including acceptability of trade-offs over time within current stakeholders' lifetimes and across generations.

## II. Pragmatic research priorities

These primarily involve developing and testing cost-effective methods and tools for forest managers and other actors, with an emphasis on participatory methods and preference elicitation, where there has been little prior experience in the forestry sector. The need here is to demonstrate the utility of processes and techniques in practice, e.g., assessing the efficacy of procedural indicators (e.g., public consultation). Priorities include:

1. Developing **participatory methods for defining** more meaningful, contextual and 'subjective' indicators for social outcomes that relate to forest management activities; to **inventorying** those outcomes in measurable terms; and **identifying thresholds** in preferences and acceptability levels among stakeholders.
2. Develop methods to **weigh the perceived importance of indicators**, identify real (versus assumed) **trade-offs**, and evaluate appropriate trade-off decisions.
3. Develop and test promising **new tools and associated participatory processes** for integrating social indicators into decision-making, such as perception testing, multi-criteria scenario analysis, choice experiments (Haider *et al.* 1998), participatory GIS, participatory modelling (Mendoza and Prabhu 2005), landscape visualization (e.g., Sheppard and Meitner 2005), and community 'charettes'. Do these tools live up to their promise in helping to measure 'subjective' preferences or to envision long-term forest futures after beetle infestation or under climate change?
4. Longitudinal assessment of what works in social indicator systems, and what is useful in practice, through **"fly-on-the-wall" case studies** in participatory SFM, co-management with First Nations, and community forests. It would be particularly

valuable to determine what methods can be used reliably without advanced social science expertise.

5. Low-cost techniques for **participatory monitoring** of indicators, with documentation of benefits and risks in terms of community relations and scientific credibility.

Social indicator research is particularly needed to address currently critical issues and emerging themes in forest management in BC. These would include the following:

- Perceptions of the mountain pine beetle epidemic and management response, with attention to desired or alternative visions of the future of the post-attack forest;
- Acceptability of prescribed burning and fuel reduction/fire management strategies, with reference to the role of information provided to the affected wildland-interface communities, as has been widely studied in the US.
- Perceptions and understanding of climate change impacts, mitigation, and vulnerability of the forest industry and resource dependent communities.
- The future of variable retention harvesting systems, where early evidence suggests increased levels of public acceptability with some partial cutting systems, just as industry's commitment to such methods is in doubt. Researchers are close to defining public acceptability thresholds and relationships to perceived sustainability or stewardship with these new forest practices, but there is a need for improved visual indicators and modelling to more reliably and cost-effectively identify thresholds for acceptable harvesting plans.
- Developing indicators to help balance tourism and timber production; this would include grappling with defining back-country or roadless area values, an increasingly important economic resource in BC.
- Analysis and documentation of cultural heritage values and sense of place indicators associated with community cohesion and affected by forest management practices, among First Nations and other communities.

It is hoped that such research might lead to more effective, meaningful, and contextual social indicators. In order to increase public acceptance of forest management decisions, both scientists and managers need an improved understanding of how to manage for the appropriate values. Improved knowledge of this type would reduce risks to global market factors and local forest management operations, and promote trust and credibility among the various stakeholders. The recent move by various forest companies, First Nations, and community forests towards initial implementation of social indicators as part of SFM C&I systems in Canada heralds the next wave of experimentation and learning in this rapidly developing field.

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