LOCALLY DEFINED INDICATORS OF COMMUNITY SUSTAINABILITY IN THE PRINCE ALBERT MODEL FOREST

J. Parkins, J. Varghese, and R. Stedman

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ABSTRACT

Forest-based communities can be characterized in terms of their dependence on subsistence practices, park-based tourism, or traditional logging practices. In monitoring the sustainability of these communities, researchers have struggled to develop relevant indicators responsive to their unique social, economic, and environmental conditions. In this study we describe a method used to identify appropriate indicators of sustainability in three north-central Saskatchewan forest-based communities. To address the uniqueness of each locale, we employed a quality-of-life research framework to identify appropriate social indicators and then subjected these indicators to an evaluation framework. The latter framework provided criteria for ranking the indicators according to their general effectiveness and their relevance to important dimensions of sustainability. The findings emphasize the need for caution in asserting the utility of "one-size-fits-all" approaches to community sustainability. These communities defined progress toward sustainability, in terms of quality-of-life indicators, quite differently and therefore each requires a unique set of indicators to measure progress.

RÉSUMÉ

Les communautés forestières sont des entités sociales dont la survie dépend de pratiques de subsistance, d'activités touristiques dans des parcs ou d'exploitations forestières traditionnelles. Les chercheurs qui étudient la viabilité de ces communautés se sont efforcés de définir des indicateurs variant avec l'unique condition sociale, économique et environnementale de ces entités. Dans la présente étude, nous décrivons une méthode qui permet d'identifier des indicateurs de viabilité appropriés pour trois communautés forestières du centre-nord de la Saskatchewan. Pour tenir compte de l'unicité de chaque communauté, nous avons fait une recherche sur les éléments liés à la qualité de vie qui nous a permis d'identifier les indicateurs sociaux appropriés, puis nous avons évalué chacun de ces indicateurs. Cette évaluation nous a permis de définir des critères et ces critères ont été utilisés pour classer les indicateurs en fonction de leur efficacité générale et de leur rapport plus ou moins direct avec les aspects les plus importants de la viabilité. Les résultats montrent qu'il faut manier avec prudence le principe selon lequel un modèle de viabilité pourrait convenir à toutes les communautés. Les entités étudiées définissent en effet chacune différemment leurs progrès vers la viabilité, en fonction d'indicateurs spécifiques de la qualité de vie, et chacune de ces communautés nécessitent donc une série particulière d'indicateurs pour caractériser ses progrès accomplis.

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The views, statements, and conclusions expressed and the recommendations made in this report are entirely those of the author(s) and should not be construed as statements or conclusions of, or as expressing the opinions of the Canadian Forest Service, the Prince Albert Model Forest, or the partners/sponsors of the Prince Albert Model Forest. The exclusion of certain manufactured products does not necessarily imply disapproval nor does the mention of other products necessarily imply endorsement by the Canadian Forest Service, the Prince Albert Model Forest, or the partners/sponsors of the Prince Albert Model Forest.

EXECUTIVE SUMMARY

This report presents research related to indicators of community sustainability in three communities in the Prince Albert Model Forest (PAMF): Candle Lake, Montreal Lake, and Waskesiu Lake. The impetus for this project came from the PAMF Local Level Indicators Working Group, which is responsible for developing a range of criteria and indicators of sustainable forest management specific to the PAMF land base. The intent of our research was to assess local residents' priorities for what constituted important indicators of quality of life and to map a strategy for monitoring progress toward community sustainability. We also sought to discover whether locally defined priorities differed between communities and also whether they differed from conventional (not defined locally) indicators of sustainability, such as unemployment rates or education levels.

A social indicator was defined for this study as any social, economic, or environmental value that is crucial to achieving a desired condition. Research on social indicators of community sustainability has a long history, and there have been many debates about their content and proper approaches to their use. A fundamental question addressed in this research was the relative utility of conventional researcher-defined indicators and measures defined and assessed on the basis of local input.

The three study communities, although all dependent on the forest, differ in many respects. Candle Lake and Waskesiu Lake are visitor-oriented communities, and a high proportion of community members are seasonal residents (especially in Waskesiu Lake, where there are very few year-round residents). As retirement places, these communities are dominated by older residents, with relatively low unemployment but also low participation in the labor force. Montreal Lake, as a First Nations reserve, is composed almost entirely of year-round residents, has a much younger population, and has much higher unemployment.

Three tools were used to identify and select local-level indicators for the three communities. First, during workshops in each community, people discussed the quality-of-life issues most pertinent to their day-to-day lives and identified the indicators best representing those issues. These workshops generated lists of indicators of importance to each community.

Second, we used established criteria to evaluate the indicators generated through workshop discussions for their effectiveness and relevance to community sustainability. The assessment of effectiveness was based on a number of criteria including (but not limited to) understandability, relevance, reliability, and cost-effectiveness. Indicators were assessed for relevance to community sustainability on the basis of criteria identified by Hart (1999), including whether the indicator reflected a long-term view and whether it showed linkages between different elements of community life (e.g., economic well-being should not be achieved at the expense of environmental quality and vice versa).

Finally, items with relatively high scores for effectiveness and community sustainability were included in a survey sent to each of the three communities. The survey approach offered three main advantages over the workshop approach: an assessment of the representativeness of the workshop (i.e., whether the concerns raised by workshop participants reflected those of the community at large), a better idea of the relative priority for different indicators, and quantitative comparisons between communities. Each survey instrument asked respondents to rate the importance of up to 22 indicators, to assess their overall quality of life, and to provide basic sociodemographic information.

The survey was implemented differently in each community. Candle Lake and Waskesiu Lake respondents were selected randomly, through lists of voters and property owners. Montreal Lake respondents were selected through a "snowball sampling" process, whereby initial contacts provided names of additional people who might participate. A mail-out, mail-back procedure was used in Candle Lake and Waskesiu Lake; a drop-off and pick-up or mail-back procedure was used in Montreal Lake. Response rates were high, ranging from 68% to 90%. A total of 148 usable questionnaires were returned from the three study sites.

The indicators of community sustainability generated from this procedure are described below; much more detail is provided in the full report. As suspected, the communities differed strongly in terms of their priorities. (The indicators were sorted into groupings of similar items to permit more

in-depth analysis.) Candle Lake respondents especially emphasized indicators pertaining to sustaining nature around their community and did not emphasize economic concerns, such as the provision of jobs. Waskesiu Lake residents had similar priorities to those of Candle Lake residents. Each of these communities contrasted strongly with Montreal Lake, where respondents emphasized the provision of basic services, such as housing, health care, and food; community harmony; and maintenance of First Nations traditions. The sustainability of the natural world was given lower relative priority in Montreal Lake.

Regarding the overall assessments of quality of life, Montreal Lake showed more social cohesion (as indicated by important interpersonal relationships), but less satisfaction with job opportunities and services, as well as lower overall satisfaction with community life.

The findings from this study emphasize the need for caution in asserting the utility of "one-size-fits-all" approaches to community sustainability. The indicators identified through workshops and prioritized by means of the survey instrument differed between communities and also appeared to differ between residents of the same community (although the small sample sizes in this study made specifying these differences difficult).

The recommendations for future research of this nature in forest-based communities that emerged from the research were as follows: collect baseline data for the indicators identified as priority areas, monitor these indicators over time to determine whether and how well the community is progressing toward sustainability, collect baseline data for standard socioeconomic indicators such as employment, migration, poverty, and education and monitor change in these indicators periodically, invite community residents to become project leaders in future indicators work (successful social indicators work is a long-term undertaking, and the communities themselves must provide leadership), and when selecting indicators of community sustainability in future monitoring initiatives, subject potential indicators to the evaluation framework (Appendix 4), an exercise that will assist decision makers in determining if a chosen indicator will be effective and relevant to community sustainability.

INTRODUCTION

If indicator reports are to do more than take up shelf space, they need to address problems that people care about (Cobb and Rixford 1998).

This study was undertaken to identify social indicators of sustainability for three north-central Saskatchewan communities. The Resort Village of Candle Lake is a retirement and recreational community, Montreal Lake is a Cree Nation community, and Waskesiu Lake is a seasonal resort community located within Prince Albert National Park. All three communities are located within the Prince Albert Model Forest (PAMF), a nonprofit partnership of forest stakeholders committed to sustaining Saskatchewan's forests through research, education, and the equitable sharing of forest resources (Prince Albert Model Forest 2000). Among others, the PAMF partners include Prince Albert National Park, the Resort Village of Candle Lake, the Montreal Lake Cree Nation, both provincial and national governments, and a major forest licensee. The model forest is responsible for developing a range of criteria for and indicators of sustainable forest management that are specific to the PAMF land base; one such indicator is the sustainability of forest communities.

For policy makers, an accurate assessment of quality of life is necessary to answer several questions. Has the society progressed over time? Are the current policies achieving goals that match the ideals of the society? Have investments succeeded in bringing the desired outcomes?

The three communities in this study each have a unique relationship with the forest ecosystem, with different histories, different sociodemographic profiles, and different goals and aspirations for future sustainability. They strive for such sustainability but go about the task in different ways. As a result, effective strategies for monitoring progress toward this goal must reflect this variation and should include local residents in the indicator-selection process. Toward this end, we used a quality-of-life research framework focusing on human conditions within the context of a larger supporting forest ecosystem. Social indicators are defined for the purpose of this report as any social, economic, or environmental value identified by the community as crucial to achieving a desired condition or state. They are intended to yield a comprehensive and understandable picture of individual living conditions within a community (Vogel 1997). We have not restricted the discussion to a simple normative group of indicators such as employment rates or education attainment. Rather, we have considered a wide range of indicators relevant to human well-being in these locales.

This report is organized as follows. In the literature review, we discuss various definitions of social indicators and identify the relative strengths and weaknesses of objective and subjective indicators. We also summarize the quality-of-life research framework as it relates to community sustainability and identify recent trends in social indicators research pertaining to rural and forest-based communities. We then describe briefly the research setting and outline our research methods, specifically workshops, a framework for evaluating indicators, and community surveys. The results section outlines the indicators identified in community workshops and prioritized in the survey research. The discussion section expands on these results by suggesting measures and then ranking them in terms of their effectiveness and relevance to important aspects of community sustainability. We complete the report by making some recommendations for future social indicators research in forest-based communities.

Our hope is that these recommendations will not only be implemented in frameworks for monitoring progress toward sustainability at the landscape level, but will also be useful to the study communities themselves as a method for developing social indicators projects that are organized and implemented by community leaders.

Defining Social Indicators

Social indicators research has a long and rich history. For generations, a wide variety of professionals have monitored and reported the trends and conditions that most affect our lives and our environment. United Nations agencies have invested considerable resources in indicators of human progress, such as the human development index, and countries have monitored their social, economic, and environmental progress by means of measures such as crime rates, average family incomes, and pollution indexes. At the local level, community leaders have tracked specific conditions of interest, ranging from household density to subsistence moose harvest rates.

At every level of analysis and for every indicator in use, researchers face similar issues and concerns. A basic problem is the definition of a social indicator. Some assert clear distinctions between social, economic, and environmental indicators (Canadian Council of Forest Ministers 1997). These delineations exist, in part, because researchers identify issues specific to their own academic disciplines. For instance, a biologist might emphasize biological diversity, a sociologist public involvement, and a forester careful logging. These emphases emerge from a disciplinary perspective and influence how we understand the problem of sustainable development and set priorities to effect change. The result is often a piecemeal approach that compartmentalizes knowledge and places the interests of local stakeholders toward the bottom of the priority list. Others are more inclined to use a broader definition of social indicators, one that encompasses specific variables such as employment rates or biodiversity measures (Cobb and Rixford 1998). Vogel (1997) stated that "social indicators are a parsimonious set of specific indices covering a broad range of social concerns. Their purpose is to yield a concrete, comprehensive picture of individual living conditions that can be easily understood by the general public." In the context of community sustainability, an indicator can be defined as a component that must be changed or a condition that must be achieved by specific activities or actions in order to claim that progress has been made toward a particular vision for that community (Flora et al. 1999).

All of these definitions provide ample scope for analysis of social, economic, and environmental variables related to the living conditions in forest-based communities.

Quality of Life and Community Sustainability

The union of quality-of-life research and social indicators research has a relatively short history, beginning in the late 1960s and early 1970s. This combined field of endeavor has taken a number of forms since then, attempting to deal with constant tensions between subjective and objective measures of human well-being and among scales of analysis such as nations, cities, and individual members of society.

Diener and Suh (1997) identified three broad approaches to determining quality of life. The first approach centers on characteristics of the "good life" that constitute commonly held beliefs or normative ideals within society. These ideals are based on religious, economic, or cultural principles, which might include helping those in need or increasing returns on investment. They are not based on subjective assessments of human well-being but on prescriptions for living that are generally endorsed by society. This approach to determining quality of life is most closely associated with the social indicators research tradition and provides the basis for such common objective indicators as gross domestic product and infant mortality rate. The second approach to determining quality of life comes more directly out of economic theory and is based on whether people can obtain the things they desire. "People select the best quality of life for themselves that is commensurate with their resources and their individual desires" (Diener and Suh 1997, page 190). Because this approach examines the choices people make to enhance their lives, it can be differentiated from the first approach on the basis that commonly held beliefs may vary considerably between regions of the country or even between residents of a single community. The third approach takes the level of analysis from the nation or community to the experience of individuals. "If a person experiences her life as good or desirable, it is assumed to be so" (Diener and Suh 1997, page 190). Here the focus is on intangible elements of the "good life" such as joy, contentment, and general satisfaction with life commensurate

with the subjective social indicators of the second approach (Stedman 1999).

Although each of these approaches to determining quality of life recognizes important dimensions of human well-being, all appear to lack any explicit reference to the issue of long-term sustainability. For instance, people may be able to acquire the things they desire, and therefore, in some objective sense, they may be able to establish a high quality of life. However, consistent with the notion of natural resource overshoot (Catton 1980) and the popularized concept of the ecological footprint (Wackernagel and Rees 1996), certain individuals or societies may be consuming or obtaining goods and services well beyond the global or regional ecological capacity to sustain such high levels of consumption. To deal with this sustainability question researchers are calling for an integration of social, economic, and environmental indicators of human well-being. Berger and Hodge (1998) have suggested that sustainability is a bridging concept that recognizes the need to pursue human and ecological well-being at the same time, thereby explicitly stating and dealing with this interdependence. Similarly, Michalos (1997) called for the integration of social, economic, and environmental indicators to tell a coherent story about the sustainability of human well-being. Some authors have gone so far as to suggest embedding the concept of the human ecosystem within the larger concept of ecosystem management (Machlis et al. 1997).

Hodge (1997) also reviewed existing frameworks for assessing progress toward sustainability and put forward his own framework, which included the larger ecosystem, the human subsystem, and the interactions between the two. In terms of this interaction, Hodge was interested in some basic questions: "how and to what extent human activities contribute to provision of basic needs and quality of life; how these activities are valued; how these actions stress or contribute to the ecosystem; and how successful we have been at meeting the goals and objectives of policies, regulations, and legislation" (Hodge 1997, page 85). Hodge also recommended three steps in assessing progress toward sustainability: developing a historical account of the people and the ecosystem and gaining a sense of the values under which the community operates, developing a database of indicators, and interpreting and assessing the frequently conflicting evidence arising from the first two steps. Those two steps fall within the quality-of-life and social indicators research tradition, and the third step—where judgments are made and conflicts identified between ecosystem capacities and underlying human values, goals, and aspirations—relates directly to the question of sustainability.

In an effort to bring the work of identifying values and selecting indicators under the rubric of sustainability research, and therefore to move from quality-of-life research to community sustainability research, we have drawn upon the work of social indicator specialists who provide a framework for understanding the linkages between social indicators and sustainability (Computer Research Laboratory for the Environment 1999; Flora et al. 1999; Hart 1999). Proceeding from the underlying principle that human communities are part of the natural ecosystem, these authors have suggested that social indicators can be evaluated on the extent to which they address certain sustainability concerns. Hart (1999) provided a checklist of 14 questions for evaluating the relevance of a given indicator to some basic sustainability concerns. For instance, does the indicator address the carrying capacity of local and external natural resources? Does the indicator provide a long-term view of the community? Does the indicator measure a link between the economy and the environment? With this evaluation framework, whereby locally defined indicators are subjected to a structured evaluation, it may be possible to move quality-of-life research into the realm of sustainability research by giving a higher priority to indicators that address sustainability concerns, while giving less credence to indicators that score lower in the evaluation framework.

In this study, we have employed the quality-of-life framework as an operational basis, but we fully embraced the need, identified by Hodge (1997), to place human activities within the larger ecosystem context. In doing so, we made considerable efforts to identify and prioritize social indicators that monitor the connection between social, environmental, and economic domains.

Addressing Local Concerns

Another challenge for social indicators researchers, especially those working at the community level, is to identify indicators that represent the needs, goals, and unique aspirations of a specific community. Identifying appropriate social indicators is even more difficult when different individuals express distinctively different visions for the same community. Whether it is a desire to see more tourism development or more local industrial

activity or to prevent development of any kind, social indicators projects are always faced with competing visions. For many researchers, this is a crucial issue:

> Variables are usually selected in an ad hoc fashion, constantly creating controversies among researchers as to which variables to choose and how they should be weighted. . . . How should the investigator proceed in selecting or weighting some social indicators over numerous others? . . . If we cannot agree on how to weight indicators, and there are tradeoffs between them, judging the quality of life based on multiple indicators is problematical. Adding to the confusion is the fact that different people inevitably give differential importance to various indicators (Diener and Suh 1997, page 197).

To some extent, researchers have found ways to address the problems associated with competing visions of progress. At the base of this solution is the idea that social indicators are socially constructed (Innes 1989). In other words, a suite of indicators can be developed to address directly the diverse range of interests within a community. This can be accomplished through a process in which residents help to define the indicators most appropriate for their community. The key here is to develop a process whereby "the variety of interests at stake are routinely and legitimately involved in the selection of criteria and indicators" (McCool, S.F.; Stankey, G. Representing the future. A framework for evaluating the utility of indicators in the search for sustainable forest management [unpublished manuscript]). Although this process may not overcome the problems that arise when residents hold deeply divided and incompatible visions for their community, a well-developed process of selecting social indicators involving a wide range of local interests is more likely to generate social indicators that will monitor progress toward important aspects of community sustainability. In this sense, a social indicator can be defined as any social, economic, or environmental indicator that is identified by society (i.e., socially constructed) as a factor in achieving a desired condition or state.

Choosing between Objective and Subjective Indicators

Another challenge for social indicators researchers is the debate over the relative value of objective and subjective indicators. Because social indicators must be measurable, most projects in this domain are dominated by objective indicators—products of accounting or record-keeping by agencies such as Statistics Canada. Prevalence of low income, level of education attainment, and average housing prices are common examples (Parkins and Beckley 2001). Subjective indicators are typically more difficult to measure and reflect more directly the input and needs of local residents. Kusel and Fortmann (1991) noted that conventional sociodemographic indicators of well-being can hide a great deal of inequality because they use average values and often ignore crucial elements of community well-being such as structural conditions and institutional arrangements, including capital and landownership. Ultimately, objective indicators may represent poorly the needs and interest of a community and can hide a great deal of variation. As an example, objective indicators of community well-being in some outport communities of Newfoundland showed considerable socioeconomic deficits compared with provincial or national averages, although subjective assessments of community well-being, such as social cohesion and general satisfaction with life, revealed better-than-average values (den Otter, M.; Beckley, T.M. "This is paradise": monitoring community sustainability in the Western Newfoundland Model Forest using subjective and objective approaches [unpublished manuscript]). This example suggests a place for subjective indicators in capturing quality-of-life dimensions that are not well served by objective indicators alone.

Subjective indicators have the advantages of relevance, reflexivity, and depth of understanding of the working of a particular rural community (Stedman 1999). They are more likely to address local interests and concerns, in that they emphasize people's perceptions of their own well-being and the factors that influence it. Questions about the subjective internal states of individuals—How would you rate your quality of life? What are the best aspects? What are the worst aspects?—provide important insight into individual well-being. Furthermore, these types of subjective statements can be measured and compared over time and between subgroups, which makes them amenable to inclusion within a balanced suite of measurable indicators pertaining to a specific community.

Lessons from the Past

Cobb and Rixford (1998) presented four useful lessons from the history of social indicators research that we have attempted to follow in developing appropriate social indicators for the PAMF communities.

1. An indicator expressed numerically is not necessarily a good indicator. What we are looking for when we express an indicator as a number is to understand something about quality. For instance, employment in forest-based companies as an indicator is limiting because it says little about the quality of work such as enjoyment, advancement opportunities, training, or safety.

2. Effective indicators must have a clear conceptual basis. There is a tendency to jump straight to data collection without first understanding what needs to be measured. We spent considerable time working on this particular lesson. In fact, this study was all about determining what needed to be measured in the three communities.

3. There is no such thing as a value-free indicator. In other words, all comprehensive indicators work is inherently political. There are trade-offs to be made between competing priorities, and every indicator carries with it a set of values about what is important and what needs to be preserved or enhanced.

4. Comprehensiveness may be the enemy of effectiveness. In more direct terms, a narrow list of indicators may be more effective than a more complete list. To address this concern, we placed higher priority on indicators that could serve as a proxy for more that one issue of concern. For instance, the use of local recreational facilities may be an indicator of physical fitness but it may also be an important indicator of social cohesion.

Rural and Forest-Based Social Indicators Research

Community sustainability research in forest-based communities was addressed as early as the 1940s. Kaufman and Kaufman (1946) studied the stability of timber-dependent communities in Montana during a period of fluctuating demand for timber and transience in remote communities, which caused researchers and policymakers to call for more steady employment in the timber industry. The Kaufmans identified specific strategies to promote stability in forest communities, including a stable timber harvest, public participation in determining forest policy, diversification of the local economy, adequate community leadership, and greater assistance to youth.

Many of the strategies identified by Kaufman and Kaufman (1946) are used today in promoting stable forest-based communities; however, more recently the study of forest-based communities has moved from issues of stability, where fiber supply and employment were the primary concerns, to issues of community adaptability, where responsiveness to changing local conditions is the primary focus. Responsiveness or resilience is a complex concept, especially at the community level. It touches on many areas within the control of local policymakers and decision makers. Kusel (1996) proposed a framework for assessing community capacity in forest-dependent communities. He included physical capital, such as schools, roads, and utilities; human capital, such as skills, education, experience, and the general abilities of residents; and social capital or community cohesion (the ability and willingness of residents to work together for common goals). Kusel's community capacity framework is useful because it places less emphasis on static social and economic conditions and more emphasis on a realistic understanding of community sustainability, within the context of a dynamic social and economic environment at a global scale.

With some notable exceptions (Kusel 1996; Beckley and Burkosky 1999; Parkins and Beckley 2001), very little of the contemporary social indicators literature has focused on rural or forest-based communities. By and large, published studies have addressed indicators germane to larger urban centers. Although the theoretical basis for conducting social indicators research is likely unaffected by the size of the community in question, certainly the issues involved and the methods of research may vary considerably. One main difference between social indicators projects in larger urban centers and those in smaller rural centers is proximity to the natural world. In fact, urban escapees to rural settings often talk about "getting back to nature" and having easier access to outdoor pursuits. As a result, rural projects are likely to reflect this sense of attachment to the surrounding natural landscape in which residents live. Another major difference between urban and rural social indicators projects is

the direct economic dependence of local residents on the natural resource base. This dependence is likely to emerge as a key factor in community sustainability. Finally, rural and urban studies differ in terms of the local human resources available to conduct the research. Some agencies have developed workbooks to assist communities in measuring change or community sustainability (Rasker et al. 1998; Flora et al. 1999), but human resources are still required to collect the information. The study reported here will assist PAMF communities in identifying appropriate social indicators, but at some point ongoing local support and involvement will be required from the communities themselves.

Choosing between National and Local Indicators

Within the forest sector, there is some debate over the relative utility of national and local indicators of community sustainability. The Canadian Council of Forest Ministers (Canadian Council of Forest Ministers 1997) has identified the sustainability of forest communities as a key component of sustainable forest management. In response, federal and provincial agencies and model forest associations have set out to measure community sustainability in various ways. For government agencies, the purpose of generating lists of indicators is to draw comparisons between different communities, and to develop responsive forest management and rural development policies. The Foothills Model Forest report (Parkins and Beckley 2001) is a case in point. It presents data that are easily measurable, available from Statistics Canada every 5 years, and comparable to those for other communities and to other provincial and national statistics. On the other hand, social indicators developed for the Foothills Model Forest report may serve poorly the goals and concerns of communities not involved in defining those indicators. The PAMF social indicators project covers three communities that, although existing within relatively close proximity, are vastly different in type of forest dependence, sociodemographic profile, and specific goals and aspirations. Although each of these communities can be classified as a forest-based community and can be included in national sustainability reports, imposing a standard suite of sustainability indicators on these communities might misrepresent the degree to which they are achieving sustainable forest management, might yield little insight for national policymakers, and could diminish further the contribution to community-level efforts at achieving sustainable forest management.

We maintain that this issue of national versus local indicators of community sustainability can be resolved by a combination of nationally available standard measures of sustainability, such as participation in the labor force and levels of education, and locally derived indicators that are specific to a single community. The social indicators may not always be comparable across communities, but they should be comparable within a single community. What is measured today should be measurable again at some point in the future. With this information, a community can determine if progress is being made toward community-defined goals. Some of these goals may be of national interest and others may be specific to the individual communities. With this approach, it is foreseeable that a unique suite of social indicators could be standardized for a particular type of forest dependence. For instance, a given timber-dependent community might have a set of indicators related to timber supply and timber sector employment that could be applicable to other timber-dependent communities. A subsistence-based community might have a set of indicators related to moose habitat and the intergenerational transfer of traditional knowledge, which would be applicable to other subsistence communities but not to timber-dependent communities. Such an approach might make national-level initiatives more responsive to different types of forest dependence and provide individual communities with information more relevant to their vision of a sustainable future.

RESEARCH SETTING

The forest-based communities described in this study (Table 1) are situated in north-central Saskatchewan (Fig. 1).

Located within Candle Lake Provincial Park, the Resort Village of Candle Lake is a quiet lakeside community of about 460 year-round residents. During the summer months, the population swells to approximately 2000, including seasonal residents

Table 1. Sociodemographic characteristics of study site communities

Community	Year-round population	Population <14 years (%)	Median family income ($)	Population $15 years with university degree(s) (%)	5-year migration rate (%)
Candle Lake	463	8	49 865	23	38
Waskesiu Lake	151	10	NA	36	21
Montreal Lake	659	45	18 368	11	18

Source: Statistics Canada (1998). Census of Canada 1996.
Note: NA = not available.

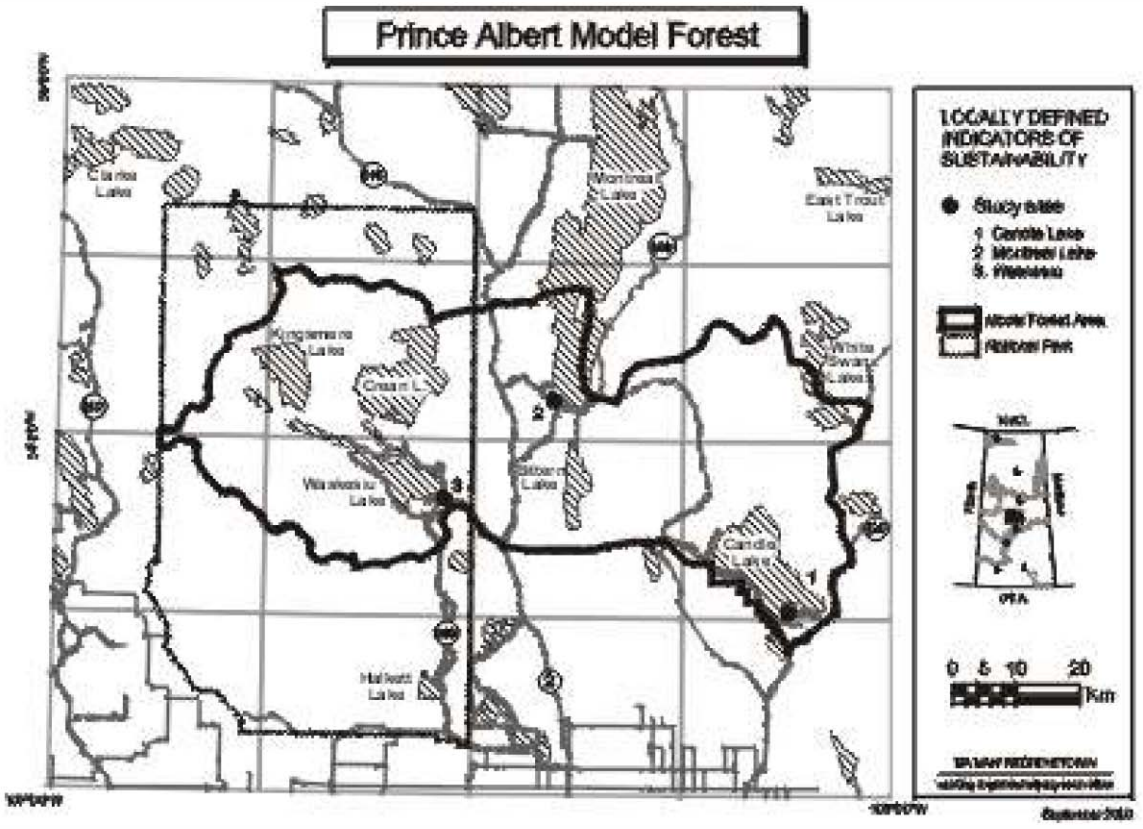

Figure 1. Prince Albert Model Forest and locations of study sites. Circled numbers identify highways.

who own summer cabins or reside in local campgrounds. A traveler to Candle Lake is greeted by a few restaurants, motels, and gas stations, a convenience store, and private residences distributed along the lakeshore. The community has grown recently with the influx of mostly retirement-age residents. Some families with children reside in Candle Lake, but school-age children are bused to neighboring communities, and a number of working residents commute 45 min south to the city of Prince Albert.

Although Waskesiu Lake is similar to Candle Lake, in that it provides services to seasonal residents, the former is predominantly, and to a much greater extent than the latter, a seasonal community, with approximately 150 year-round residents. This population is dwarfed by the summer population of thousands, who own small cabins or who camp around the town site to enjoy many local amenities, including hiking, canoeing, swimming, golf, and other nature-based activities. The town site itself offers attractions such as restaurants, motels, clothing and gift shops, parks, sandy beaches, and a cinema. Over the years, Waskesiu Lake has become a favorite holiday destination for many Saskatchewan residents, and their attachment to its unique history and architecture is strong. Economic expansion within the town is slow—not because of limited demand but because of a national park mandate to maintain the limited role of the community as a service facility for park visitors (thus limiting human impacts on the park ecosystem).

Montreal Lake is a Cree Nation of about 660 year-round residents. Unlike Candle Lake and Waskesiu Lake, it has a very young population, with a high proportion of residents under the age of 25 (Table 1). Services on the reserve include a new public school, health center, day-care center, band offices, and a small convenience store and restaurant. The band administration is struggling to cope with rapid population growth and the need for employment on and off the reserve. Most on-reserve jobs are found in band administration and government services. The band has joined forces with a local industrial partner to create some local jobs in the forest sector, but employment opportunities in industries based on natural resources are minimal.

Candle Lake, Montreal Lake, and Waskesiu Lake are nontraditional forest-dependent communities, yet they are located within the boreal forest and depend on the forest for lifestyle and nonindustrial forest uses.

RESEARCH METHODS

The methods used to identify and monitor social indicators of community sustainability are diverse, but they frequently fall within a range from top-down, expert-driven approaches to bottom-up, locally defined methods, the former apparently benefiting from knowledge about what works in other locales (and from readily available data) and the latter benefiting from a set of social indicators more directly associated with the community's goals and objectives. In this study, we took a locally defined approach to identifying social indicators of community sustainability. Toward this end, we employed a quality-of-life research method whereby residents identified aspects of their community that they considered key to quality of life. Beyond this process for identifying indicators, we also addressed the sustainability dimensions of social indicators research by subjecting the locally defined indicators to a sustainability evaluation framework.

Three tools were used to identify and select local-level indicators in this study: workshops, a framework for evaluating indicators, and surveys (Fig. 2). The workshops gave residents the opportunity to identify issues germane to community sustainability. From these workshops, a list of social indicators was identified, and the indicators were in turn subjected to an evaluation framework. Three criteria were used for the evaluation: effectiveness in terms of availability and reliability of data, relevance to issues of community sustainability (as defined by the literature, described earlier), and relative level of importance to the community. Indicators identified in the workshops that scored relatively high in the evaluation were included in a questionnaire administered to residents of the community. Because the residents played a role in identifying the relevant indicators, the questions on each survey were specific to a single community. The three tools used in identifying local-level indi-

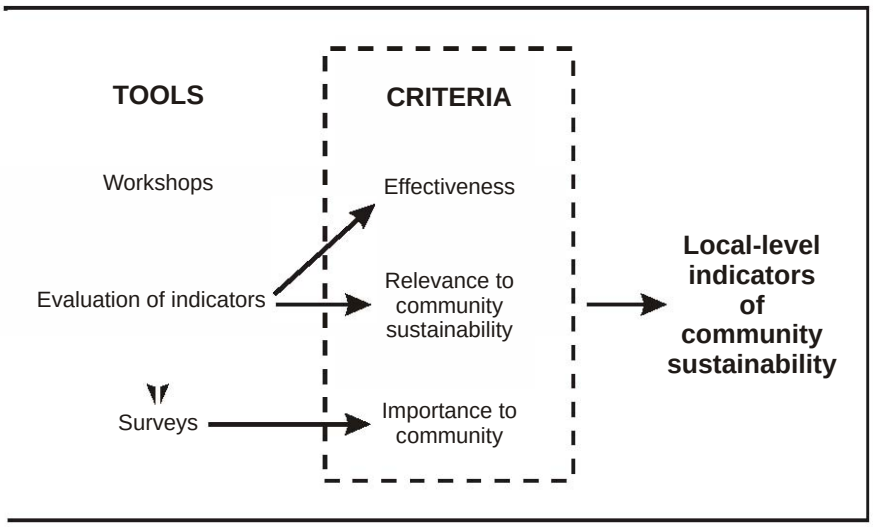

Figure 2. Selection process for local-level indicators.

cators of community sustainability are discussed in detail below.

Workshops

The workshops provided to residents the opportunity to discuss quality-of-life issues in their communities and to recommend potential indicators of sustainability. Community leaders supplied the names of potential participants, who represented multiple interests within the community. Between 10 and 20 individuals were contacted in each community; 12 people from Candle Lake, 5 from Waskesiu Lake, and 5 residents of Montreal Lake participated.

Each workshop consisted of two segments. First, we presented a brief overview of social indicators-research and suggested broad indicator categories for potential consideration, such as employment, human capital, population, and the environment. In Montreal Lake, we employed a slightly different workshop format, encompassing material more relevant to Aboriginal communities. Some published information from the Department of Indian Affairs and Northern Development proved useful (Armstrong 1994), providing a framework based on traditional North American Aboriginal concepts such as the medicine wheel. Second, participants were invited to discuss issues key to the quality of life within their own communities. As a follow-up, summaries of each workshop were sent back to the participants, and additional comments were solicited. By documenting the issues and ideas discussed in these workshops, we developed social indicators to monitor local quality-of-life objectives. Specifically, for each general workshop theme that emerged, we attempted to simplify the concept by identifying an indicator, or a limited set of indicators, related to that theme. For instance, Montreal Lake residents talked about a strong social fabric as key to their quality of life. For this objective, we identified stable home life as the indicator.

Framework for Evaluating Indicators

Once the workshops were complete, the specific indicators and measures pertaining to quality-of-life objectives were organized according to themes such as economic development, local services, and natural amenities. The measures were then evaluated on the basis of an extensive framework, drawn from three sources: the sustainable community indicators of the Computer Research Laboratory for the Environment, University of Guelph, Guelph, Ontario (Computer Research Laboratory for the Environment 1999); the North Central Regional Center for Rural Development, Iowa State University, Ames, Iowa (Flora et al. 1999); and indicators of sustainability from Hart Environmental Data, Andover, Massachusetts (Hart 1999).

The evaluation framework was organized into two separate dimensions. First, independent of

their relevance to sustainability, the indicators were assessed on the basis of their general effectiveness as indicators, according to the following criteria:

- understandability (Do we know what the measure is telling us?)
- relevance (Does the measure relate directly to the indicator?)
- accessibility of data (Do the data exist and are they retrievable?)
- reliability of data (Is the source of the data trustworthy and scientifically valid?)
- cost of obtaining data (Will the ongoing costs be high or low?)
- temporal comparability of data (Is tracking these data over time meaningful?)
- sensitivity (How responsive is the measure to change?)
- cause or effect (Does the measure track cause or effect?).

Indicators were rated as having high, medium, or low effectiveness. For instance, the percentage of meat needs met through subsistence might be assessed as being understandable to the community, but the data might be relatively costly to obtain. Therefore, this indicator would be considered only moderately effective.

In addition to the effectiveness ratings, indicators were assessed on the basis of their relevance to sustainability. This assessment was adapted from Hart (1999) and included the following criteria:

- understandable to and usable by the community
- takes a long-term view of progress
- addresses economic, social, or biological diversity
- addresses intra- and intergenerational equity
- shows linkages between social, economic, and environmental factors
- monitors use of natural resources
- addresses state of ecosystem services
- addresses beauty and life-affirming qualities of nature
- addresses social, built, and financial capital
- does not come at the expense of other communities.

Every indicator identified in the community workshops was subjected to these tests of effectiveness and relevance to sustainability and assigned a total score. For instance, although local cell phone coverage was suggested as being key to quality of life in one community, cell phone usage did not have a high score as an indicator of sustainability. Furthermore, very few indicators had high scores for all criteria. Therefore, we aspired to develop a suite of indicators relevant to a single community and covering the range of sustainability criteria. Toward this end, the evaluation framework assisted in identifying gaps in indicators relevant to specific aspects of sustainability.

Community Surveys

After the identifying indicators of sustainability had been identified through workshops and correspondence with local residents, those with relatively high scores for effectiveness and relevance to sustainability were included in a short questionnaire administered to community members. Survey respondents assisted in prioritizing up to 22 indicators by answering questions according to a seven-point Likert-type scale, with a range from “not at all important” to “extremely important”. Each community survey had 14 items generated through workshops and 6 items from other sources: 2 standard social indicators (low unemployment and increasing employment income), and 4 items that had been generated through workshops in the other communities. Finally, each survey included 2 blank spaces in which respondents could add a preferred indicator that was not already listed. Respondents were also invited to answer some general questions about satisfaction with the community, related to personal relationships, the physical landscape, community services, and attachment to the community. These surveys afforded the opportunity to check that the concerns identified in the workshops were representative of each community, to gain a better idea of the relative priority of each indicator, and to directly compare the communities.

Two different sampling strategies were used. The Candle Lake survey was administered to both seasonal and year-round residents. We selected 38 seasonal residents at random from the land summary records database; of these, only 19 had usable addresses. Fifteen of the 19 returned their questionnaires, for a 79% response rate (Table 2). Year-round residents were selected at random from the voter registry. Thirty-six residents were contacted by phone and were asked if they would be willing to complete a survey mailed to their home address. All agreed, and 29 eventually returned their questionnaires, for an 81% response rate.

Table 2. Overview of survey implementation

Type of resident	Source	Source size	Sample	No. returned	Response rate (%)
Candle Lake					
Year-round	Voter registry	393	36	29	81
Seasonal	Land summary	~1200	19	15	79
Montreal Lake, on reserve	Snowball sample	659	51	46	90
Waskesiu Lake					
Year-round	Key informants	11	8	6	75
Seasonal	Cabin owners	450	76	52	68
Total		NA	190	148	78

Note: NA = not applicable.

The Montreal Lake survey was conducted primarily through a snowball sample (initiated at the band office), with a drop-off and pick-up or mail-in survey method. Forty-six questionnaires were received of a total of 51 distributed, for a 90% response rate (Table 2). Because the sampling method used in Montreal Lake was not random, community leaders and students were more likely to be encountered than were unemployed band members. However, the drop-off and pick-up method was chosen deliberately to allow for more personal contact with respondents (which in turn allowed us to convey more context and background to the study), to assist some respondents who, with English as a second language, might have struggled with some of the vocabulary in the questionnaire, and, to allow us to survey the opinion leaders within the community, who represented wide-ranging interests from health to education and economic development.

In Waskesiu Lake, a nonrandom sample of year-round residents, obtained from a key informant, was contacted by phone and asked if they would like to participate in the study. Eight residents were contacted, all of whom agreed to be surveyed, and 6 returned their surveys. Although this sample is very small, the year-round population of Waskesiu Lake is also very low. A random sample of seasonal residents was also selected from a list of cabin owners in Waskesiu. A total of 76 names were randomly selected from this list. All of these individuals were sent a cover letter and questionnaire, and a reminder letter and second survey 1 week later. A total of 52 questionnaires was returned, for a response rate of 68%.

RESULTS

Community Sociodemographic Profiles

We were interested in the degree of similarity among the three communities with respect to the sociodemographic characteristics of the survey respondents (Table 3).

The sociodemographic makeup of the three communities varied widely. In particular, Montreal Lake differed greatly from the other two communities: respondents were younger and more likely to be female than those from the other communities, and a higher percentage of respondents were year-round residents and working full-time. Given the low average age of Montreal Lake respondents, they had spent a high proportion (75% on average) of their lives in Montreal Lake. Candle Lake and Waskesiu Lake, as recreational communities, had very different sociodemographic characteristics. Respondents from these communities were older, more likely to be male, and more likely to be retired. Although these two communities were quite similar demographically, they differed in several

Table 3. Sociodemographic profile of survey respondents

Characteristic	Candle Lake	Montreal Lake	Waskesiu Lake
No. of respondents	44	46	58
Average age (years)	54.7	34.2	55.2
Average no. of years in community	12.0	25.5	29.4
Year-round residence (no. and %)	29 (66)	35 (76)	6 (10)
Participation in labor force (no. and %)	23 (52)	28 (60)	33 (57)
Full-time employment (no. and %)	12 (27)	21 (46)	18 (32)
Unemployment (no. and %)	0 (0)	3 (7)	0 (0)
Retired (no. and %)	19 (43)	4 (9)	24 (41)

important respects. Almost no one (about 10% of respondents), lived year-round in Waskesiu Lake, whereas 66% of Candle Lake respondents labeled themselves as year-round residents. Reflecting the lengthy history of Waskesiu Lake as a resort community, respondents from this community indicated more long-term behavioral loyalty to place, with an average of 29.4 years spent in the community, versus 12.0 years for residents of Candle Lake.

Comparing Statistics Canada community profile data (Statistics Canada 1998) with our respondent profiles allowed us to assess the representativeness of our survey sampling procedure, to determine how similar respondents were to all residents. This analysis was done only for Candle Lake and Montreal Lake; Waskesiu Lake has too few permanent residents to support the collection of these data, and our sampling strategy emphasized seasonal residents (who are not reported in the census profiles). Data for respondents from Candle Lake and Montreal Lake were compared with the Statistics Canada data for sex, age, and employment status. Candle Lake respondents represented the community well in terms of average age (dominated by those 45–74 years of age); sex (residents and respondents were both likely to be male), participation in the labor force (just over 50% participation in each instance), and unemployment rates (low in each case). Because we used a snowball sample rather than a random sample in Montreal Lake, our respondents did not represent this community as well as was the case for Candle Lake: they were disproportionately likely to be female (63% versus 47% for the community as a whole), older (nearly half of Montreal Lake residents were younger than age 15), more likely to be in the labor force (60% versus 50%), and far less likely to be unemployed (6% versus 32%). In short, our snowball sample probably represented community leaders, rather than the typical community resident. The implications of this discrepancy will be addressed in the discussion section.

Priorities and Categories

As described in the methods section, respondents from each of the three communities were asked to indicate what elements they thought contributed most strongly to quality of life in their community. Each survey contained 20 specified indicators (14 items generated through workshops in the community, 2 “standard items” from the literature, and 4 items that had been generated through workshops in the other two communities) and two blank spaces for alternative items. One of the goals of our research was to evaluate not only the most salient indicators for each community, but also whether the indicators particular to a community were more important than those that were not. Responses to survey statements (as identified in the community workshops) and priorities for each community are presented below.

Candle Lake

Table 4 summarizes responses to the 20 specified indicators of quality of life for Candle Lake. The mean values in this table represent the average importance of the indicator on a seven-point scale (1 = not at all important and 7 = extremely important). The survey statements are ordered from most important to least important. The main characteristics of this column is the high average score for most of the items: 9 of the 20 items had an average of over 6.0 on the seven-point scale, and 17 of the 20 averaged at least 5.0. Therefore, respondents agreed that nearly all of these indicators were important to quality of life in Candle Lake.

Table 4. Prioritized indicators for Candle Lake

Survey statement	Mean score[a]	Points (and overall rank)[b]	Domain
Restrictions that minimize water pollution	6.7	42 (1)	Natural amenities
Peace and quiet	6.2	38 (2)	Natural amenities
Fair and equitable property tax rates	6.8	36 (3)	Services
Food, health care, and education available within the community	5.7	22 (4)	Services
Public involvement in local decision making	6.2	16 (5)	Sense of community
Maintaining wildlife populations	6.6	14	Natural amenities
Access to nature	6.4	14	Natural amenities
Existence of wilderness in the local area	6.3	13	Natural amenities
Ability to maintain community services[c]	6.2	10	Services
Maintaining a natural forest landscape undisturbed by humans[c]	5.7	10	Natural amenities
Maintaining and fostering vacationer economy	5.5	5	Recreational place
Enforcement of recreational regulations	6.2	4	Recreational place
A sense of belonging to the community	5.9	4	Sense of community
A family-oriented community[c]	5.9	3	Sense of community
Employment in natural resource industries (e.g., forestry)[c]	4.8	3	Economics
Availability of local recreational opportunities	5.9	2	Recreational place
Low unemployment[d]	5.2	2	Economics
Encouraging the development of Candle Lake as an arts community	4.4	1	Recreational place
Increasing employment incomes[d]	4.3	1	Economics
Fostering community-wide events	5.3	0	Sense of community

[a] On a seven-point scale, where 1 = not at all important and 7 = extremely important.

[b] Sum of ranking of three most important items by each respondent, where most important item received three points, second most important item received two points, and third most important item received one point.

The high importance of all items presented problems for determining priorities. However, we anticipated this lack of differentiation and asked respondents to indicate which three indicators were most important to quality of life. We assigned a point system whereby the most important item was given three points, the second most important item was given two points, and the third most important item was given one point. The results of this analysis (presented in the points column) differentiate much better between items.

Restrictions that minimize water pollution constituted the most important indicator, with a total of 42 points, peace and quiet was the next most important, with a total of 38 points, and fair and equitable property tax rates was third, with a total of 36 points. A number of items had high scores with respect to average importance on the seven-point scale but were given lower priority. Among these were maintaining wildlife populations, access to nature, existence of wilderness in the local area, and enforcement of recreational regulations. The six items that were generated through other communities' workshops or that were standard social indicators were hypothesized to be less important than indicators generated through local community input. For Candle Lake, this assumption appeared to hold true: none of the top-ranked items were generated from outside the community.

The domain is the functional grouping to which the indicator was assigned. This classification allowed us to compare the importance of groups of similar items. These groups were composed of indicators that correlated highly with each other. The degree to which these indicators represented reliable groupings is indicated by the alpha score (Table 5) (reliability scores of 0.60 or higher are usually considered adequate for considering a series of items as constituting a single domain of meaning). The domains are ranked in Table 5 by the average score of the individual indicators in them.

Grouping the indicators into categories of similar items makes the dominant trends more easily observed. Specifically, the importance to Candle Lake residents of sustaining natural amenities is

Table 5. Reliability of indicator categories for Candle Lake

Domain	No. of items	Alpha score	Mean indicator score
Natural amenities	6	0.745	6.32
Services	3	0.591	6.23
Sense of community	4	0.765	5.83
Recreational place	4	0.696	5.50
Economics	3	0.817	4.77

obvious. Because the list of indicators was generated by the community itself, the sheer number of indicators in the natural amenities category also demonstrates its importance. Also obvious is that economic considerations such as job provision and incomes are not as important to Candle Lake respondents (three of the four lowest ranked items were in the economics category). Less dramatically, the maintenance of services (without being overly taxed for them) also appears quite important to Candle Lake residents.

Montreal Lake

The same procedure was followed for Montreal Lake (Table 6). Even more than those from Candle Lake, Montreal Lake respondents indicated that all of the items were important to their quality of life. All 20 of the specified indicators averaged at least 5.0 on the seven-point scale, and 15 of the 20 items averaged at least 6.0. For this community, the relative rank was a more useful representation of the relative importance of the items; therefore, the indicators in Table 6 are ranked according to the points column rather than the mean score. As for Candle Lake, these two methods of evaluating the importance of indicators yielded widely divergent results. For example, access to nature scored 6.6 (the second highest average of the 20 indicators), but scored no points in the prioritization exercise.

Seven of the indicators scored at least 20 points in the prioritization exercise—residents' physical, mental, and spiritual health; the availability of

Table 6. Prioritized indicators for Montreal Lake

Survey statement	Mean score[a]	Points[b]	Domain
Physical, mental, and spiritual health of residents	6.5	43	Community harmony
Availability of band housing	6.4	24	Services
Increasing employment incomes[c]	6.4	22	Economics
Stable homes and families	6.4	22	Community harmony
Food, health care, and education available within the community	6.8	21	Services
Access to traditional knowledge	6.5	20	Cree tradition
Number of residents who speak Cree	6.1	20	Cree tradition
Low unemployment[c]	6.0	17	Economics
Wages that meet basic needs	6.2	11	Economics
Peace and quiet[d]	5.8	9	Natural amenities
Access to wild game meat such as moose	6.2	6	Cree tradition
A sense of belonging to the community	6.6	6	Community harmony
A family-oriented community[d]	6.4	5	Community harmony
Maintaining wildlife populations[d]	6.4	5	Natural amenities
Employment in forest or oil and gas industry	5.4	5	Economics
Ability to maintain community services[d]	6.6	3	Services
Involvement of off-reserve band members in community life	5.9	3	Community harmony
Access to public transportation	5.8	0	Services
Freedom from unwanted outside interference	5.2	0	Cree tradition
Access to nature	6.6	0	Natural amenities

[a] On a seven-point scale, where 1 = not at all important and 7 = extremely important.
[b]

Table 7. Reliability of indicator categories for Montreal Lake

Domain	No. of items	Alpha score	Mean indicator score
Services	4	0.601	6.40
Community harmony	5	0.633	6.36
Natural amenities	3	0.510	6.27
Cree tradition	4	0.634	6.00
Economics	4	0.622	6.00

band housing; increasing employment incomes; stable homes and families; food, health care, and education available within the community; access to traditional knowledge; and the number of residents who speak Cree. The reliability and mean scores of each of the indicator domains for Montreal Lake is shown in Table 7.

All indicator domains were well-represented among the most important indicators for this community, except natural amenities: none of the items in this domain scored among the top 9 in priority. Examination of the mean scores suggests that it is not that nature is unimportant to the community, but rather that other immediate needs, such as provision of services and economic concerns, take precedence. Given this interpretation, the importance of maintaining Cree traditions is particularly significant.

Finally, Montreal Lake was better defined by indicators generated from outside the community than was Candle Lake. In this sense, conventional indicators of community sustainability, especially those addressing economic concerns such as income or employment levels may better serve as proxy indicators for Montreal Lake than for Candle Lake.

If you are living in an urban area, you have to take a weekend off to travel to wilderness. Living in Montreal Lake your backyard is the forest.

You feel well balanced, and you have to feel peace at heart, you have to be able to sleep. . . . And if you don't have those things, sleeplessness, anxiety, all those other negative things start setting in its place.

Waskesiu Lake

Waskesiu Lake respondents were more discerning than the other communities in the elements that they considered extremely important. Only half of the 20 items scored at least 6.0 on the seven-point scale. Of the most important priorities, five indicators scored at least 30 points: keeping park fees affordable, maintaining wildlife populations, peace and quiet, maintaining native plant and animal species in the local areas, and a community where I feel personally safe. Indicators relating to the natural environment (as well as national park access) were easily the most important suite: the top four in terms of points (and five of the top six) were related to access to a high-quality natural environment. In contrast, the three economic variables were among the lowest-ranked items, reflecting the lack of importance of economic (job-related) considerations among community members (Table 8).

Categorizing the indicators was more problematic than for the other two communities: several items (indicated with "NA" in the domain column in Table 8) did not group into reliable categories. The reliable categories are shown in Table 9.

Quality-of-Life Assessments

Respondents in each community were also asked to indicate their overall satisfaction with life in their community. We assessed satisfaction through several dimensions: personal relationships, the physical environment, employment opportunities, services, and community cohesion. Each of these satisfaction domains was represented by a single question, to be answered on a seven-point scale (1 = strongly disagree, 7 = strongly agree) (Table 10).

A one-way analysis of variance was used to explore significant differences between communities on each of the satisfaction measures. Candle Lake and Waskesiu Lake had very similar community satisfaction profiles (no differences on any of the variables), but Montreal Lake stood out as significantly different from the other two communities on several of the measures. The importance of personal relationships was higher in Montreal Lake than in the other two communities, but satisfaction

Table 8. Prioritized indicators for Waskesiu Lake

Survey statement	Mean score[a]	Points[b]	Domain
Keeping park fees affordable	6.6 (2)	72	NA
Maintaining wildlife populations[c]	6.0	47	Natural amenities
Peace and quiet[c]	6.2	41	Natural amenities
Maintaining native plant and animal species in the local area	6.3	37	Natural amenities
A community where I feel personally safe	6.8 (1)	33	Community harmony
Restrictions that minimize water pollution	6.5 (3)	28	Natural amenities
Making sure that seasonal residents have a voice in local decision making	6.3 (4)	28	NA
A family-oriented community	6.3 (5)	26	Community harmony
High level of outdoor recreation among seasonal and year-round residents	5.8	13	NA
A sense of belonging to the community	5.6	10	Community harmony
Food, health care, and education available within the community[c]	5.1	7	Services
Ability to maintain community services	6.0	6	Services
Maintaining aesthetics of town architecture	5.8	5	Aesthetics
Minimizing auto traffic	5.4	4	Aesthetics
Existence of wilderness outside the park	6.1	3	Natural amenities
Availability of goods from the local region	5.0	1	Services
Low unemployment[d]	4.4	1	Economics
Employment in natural resource industries[c]	3.0	0	Economics
Involvement in local community organizations	4.9	0	NA
Increasing employment incomes[d]	3.5	0	Economics

[a] On a seven-point scale, where 1 = not at all important and 7 = extremely important.

[b] Sum of ranking of three most important items by each respondent, where most important item received three points, second most important item received two points, and third most important item received one point.

[c] Item taken from other community workshops.

[d] Standard social indicator.

Table 9. Reliability of indicator categories for Waskesiu Lake

Domain	No. of items	Alpha score	Mean indicator score
Natural amenities	5	0.804	6.22
Community harmony	3	0.506	6.23
Aesthetics	2	0.422	5.60
Services	3	0.614	5.37
Economics	3	0.786	3.63

with job opportunities and with the availability of services was significantly lower in Montreal Lake. There were no differences in feelings of connectedness to the land and water between the three communities nor in the degree to which respondents felt part of the community.

Several items tapped satisfaction with place as an overall attitude toward quality of life in the community. Again, the three communities were compared by means of one-way analysis of variance (Tables 11 and 12). Table 11 illustrates differences in overall satisfaction between the three communities: in contrast to previous constructs, this variable was measured on a six-point scale, poor (1) to perfect (6).

Overall, respondents were satisfied with the condition of their communities. As might be expected, given their lower satisfaction with some community attributes (jobs and services), Montreal Lake respondents showed significantly lower average levels of overall community satisfaction than either Candle Lake or Waskesiu Lake respondents. The difference between Candle Lake and Waskesiu Lake also approached significance (p = 0.08). It was also interesting to observe differences in distribution—Candle Lake was very much an "average" place—no one rated it as poor, fair, or a perfect. In contrast, some respondents in both Waskesiu Lake and Montreal Lake rated their communities as poor or fair and some rated them as

Table 10. Satisfaction with community attributes

Survey statement	Mean score[a] (and % who strongly agree) Candle Lake	Montreal Lake	Waskesiu Lake	*p* value
Important personal relationships	5.67 (37)	6.36 (72)	5.77 (52)	<0.05
Connected to the land and water	6.09 (46)	5.87 (57)	6.29 (62)	NS
Satisfied with job opportunities	4.93 (17)	3.08 (11)	5.10 (20)	<0.05
Satisfied with availability of services	4.84 (9)	3.97 (13)	5.29 (29)	<0.05
Definitely part of the community	5.73 (32)	5.83 (57)	5.68 (44)	NS

[a] On a seven-point scale, where 1 = strongly disagree and 7 = strongly agree.

Note: NS = not significant.

Table 11. Overall satisfaction with community

Rating (score)	% of respondents Candle Lake	Montreal Lake	Waskesiu Lake
Poor or fair (1 or 2)	0	37	3
Good (3)	23	24	8
Very good (4)	50	24	41
Excellent (5)	27	7	40
Perfect (6)	0	9	8
Mean score[a]	4.0	3.2	4.4

[a] $p < 0.05$.

Table 12. Overall identification with community

Survey statement	Mean score[a] (and % who strongly agree) Candle Lake	Montreal Lake	Waskesiu Lake
My community is an important part of who I am[b]	5.7 (36)	6.1 (63)	6.3 (64)

[a] On a seven-point scale, where 1 = strongly disagree and 7 = strongly agree.

[b] $p < 0.05$.

perfect, despite the low overall average rating for Montreal Lake.

Personal identification with (attachment to) one's community, although positively related to satisfaction (bivariate correlation = 0.325, $p < 0.001$) showed a very different relationship among the communities than satisfaction (Table 12).

Although Candle Lake and Waskesiu Lake respondents were significantly more satisfied with their communities than were Montreal Lake respondents, this relationship was not observed for personal identification with the community. Waskesiu Lake and Montreal Lake respondents each more strongly identified with their community than did Candle Lake respondents. The relationships can be summarized thus: Montreal Lake residents were not satisfied with their community, but it is very important to them, whereas the reverse was true for Candle Lake; only Waskesiu Lake respondents gave high scores to both measures.

DISCUSSION

The purpose of this section is to bring together unique community characteristics and the workshop and survey findings described earlier and to recommend a suite of social indicators for each study site. In addition to prioritizing social indicators according to the survey results from each community, we recommend specific measures and potential data sources for them. In some cases, these measures relate directly to the indicator in question, whereas in other cases, the measure serves only as a proxy or a measurable substitute for an indicator that might be more complex and difficult to monitor directly. In addition, most indicators can be measured with more than one variable. In this section, we provide at least one example in which the selected indicator is measured and that measure's effectiveness and its ability to address important aspects of sustainability are then assessed. These recommended indicators and measures are discussed in detail in the sections that follow. A complete list of the locally defined indicators and the rankings for all three communities is provided in Appendix 4 (back sleeve).

Tourism is what keeps them [businesses] viable and lowers the stress on not having enough money to pay the staff and the bills. Also the viability of hiring "good staff".

Locally Defined Indicators

Candle Lake

Candle Lake presented a number of unique challenges and opportunities in determining locally defined indicators of community sustainability. First, a large proportion of Candle Lake residents were retired with incomes from pensions or investments. This age profile resulted in higher priority for services catering to seniors, such as recreation and health care, and lower priority for more traditional indicators such as economic development. Second, the community was bifurcated between year-round and seasonal interests because of its stable and growing year-round population and its large seasonal population. Therefore, the vision for a sustainable future may be quite different for these two groups of residents. For instance, year-round residents may desire additional services such as a school and a pharmacy, whereas seasonal residents may desire more visitor-oriented services such as restaurants and gift shops. Third, Candle Lake is a forest-dependent community, but, aside from a few residents who work in the forest industry and live in Candle Lake as a bedroom community, it is not dependent on extractive industries but instead is concerned with optimizing nontimber benefits.

The results from this study reflect these community characteristics. Table 13 lists the locally defined social indicators for Candle Lake. Survey statements are presented according to respondent priorities (from highest to lowest). Relative priorities were determined by points assigned and sustainability and effectiveness ranking. Matched to each statement is an indicator and a potential measure of that indicator. As described in the methods section, the effectiveness ranking assesses the measure on factors such as availability and reliability of data and meaningfulness of tracking data over the long term. The sustainability ranking assesses the effectiveness of the measure at addressing key issues related to community sustainability, such as carrying capacity, linkages between the environment and society, and whether the measure addresses equity issues. For instance, fair and equitable property tax rates was identified as a high-priority item by survey respondents. An indicator of tax rates is the rate of local taxation, and a potential measure is the mill rate as a proportion of the provincial average. This measure is ranked high in effectiveness because this kind of information is readily available and reliable, and it makes sense to track these data over time. It is ranked low as a measure of sustainability, however, because it does not address key sustainability issues.

Table 14 provides potential sources of data and reporting methods for social indicators in Candle Lake. In this table, we have also included a column for community goals, which were identified by workshop participants and confirmed by survey respondents. For instance, one goal for Candle Lake is to enhance recreational activity. An indicator for this goal is local recreational activity, and the proposed measure is number of local recreational events. The source of these data is local, from recreational organizations or the town office, and the

Table 13. Locally defined social indicators for Candle Lake

Survey statement, by priority[a]	Indicator	Measure	Effectiveness[b]	Sustainability[c]
Very high				
Fair and equitable property tax rates	Rate of local taxation	Mill rate as a proportion of provincial average	High	Low
Restrictions that minimize water pollution	Well water	Well-water contamination levels	Medium	Medium
High				
Public involvement in local decision making	Public involvement	Attendance at public town-planning meetings	High	Medium
Maintaining wildlife populations	Wildlife populations	Songbird count	High	Medium
Access to nature	Access to nature	Use of recreational trails in proportion to optimal levels	High	Medium
Existence of wilderness in the local area	Natural forest landscape	Proportion of landscape altered by human use	High	Medium
Enforcement of recreational regulations	Enforcement of recreational regulations	Perception of trail abuse by local residents	Medium	Low
Peace and quiet	Noise pollution	Noise complaints per year	Low	Low
Medium				
Availability of local recreational opportunities	Local recreational activity	Number of local recreational opportunities	High	High
Fostering community-wide events	Community-wide events	Number and type of community-wide events	Medium	Medium
Maintaining and fostering vacationer economy	Vacationer economy	Proportion of visitor contribution to local business revenue	Medium	Medium
Food, health care, and education available within the community	Local services	Number and type of local service outlets	Medium	Medium
A sense of belonging to the community	Community cohesion	Proportion of residents who indicate strong sense of friendship with neighbors	Low	Low
Low				
Encouraging the development of Candle Lake as an arts community	Arts community	Attendance at arts events	Low	Medium

Table 14. Potential data sources and reporting methods for Candle Lake social indicators

Community goal	Indicator	Measure	Data source	Method
Provision of basic services	Rate of local taxation	Mill rate as a proportion of provincial average	Provincial records	Local rate divided by provincial average
Preservation of natural surroundings	Well water	Well-water contamination levels	Selected well sites	Levels and type of contamination
Appropriate economic development	Public involvement	Attendance at public town-planning meetings	Local count	Attendance at meetings (and demographic profile)
Preservation of natural surroundings	Wildlife populations	Songbird count	Local count	Total number, by species
Enhancement of recreational activity	Access to nature	Use of recreational trails in proportion to optimal levels	GIS maps of trail system	Kilometres of trail used as proportion of optimal levels
Preservation of natural surroundings	Natural forest landscape	Proportion of landscape altered by human use	GIS maps of human use	Area used by humans as a proportion of total area
Enhancement of recreational activity	Enforcement of recreational regulations	Perception of trail abuse by local residents	Local survey	Percent of respondents who perceive trail abuse
Preservation of natural surroundings	Noise pollution	Noise complaints per year	Local count	Total number reported annually
Enhancement of recreational activity	Local recreational activity	Number of local recreational events	Local count	Number and type of opportunities offered annually
Community cooperation	Community-wide events	Number and type of community-wide events	Local count	Annual number of events
Provision of basic services	Vacationer economy	Proportion of visitor contribution to local business revenue	Local business	Visitor revenue as proportion of total revenue
Provision of basic services	Local services	Number and type of local service outlets	Local count	Total number, by type
Community cooperation	Community cohesion	Proportion of residents who indicate strong sense of friendship with neighbors	Local survey	Percent of respondents who indicate strong sense of friendship

method of reporting is the number and type of local recreational opportunities offered annually.

In this section, we have grouped indicators into constellations according to workshop and survey results, and we further elaborate on the community goals and their associated indicators and measures.

Preservation of natural surroundings

This community goal resonated loudly with Candle Lake residents. Workshop participants identified four indicators that address the preservation of natural surroundings and consistently ranked them high in order of importance. Well water is highly relevant to the community because municipal water is not available. Selected well sites might be a good source of data where levels and type of contamination could be measured. To address the natural forest landscape indicator, we recommend a geographic information system (GIS) as the data source. The equipment and expertise are likely not available within the community, so the assistance of model forest or local forest industry personnel would be required.

We had a Canada Day celebration where the whole community got together...Everybody in the community worked together to make it hap-

Provision of basic services

Residents identified a range of issues related to basic services. The highest priority for survey participants was local taxation. This issue appeared to center on mill rates for resort villages compared with mill rates for other rural centers. Other issues identified in the workshops included local cell phone access and the provision of municipal water. Also, residents expressed the need for basic year-round health services. As an indicator of basic services, the vacationer economy was included here, because residents appreciated that current town services are supported in large measure by visitors and seasonal residents.

Appropriate economic development

Under this goal we identified only one indicator, public involvement. The basic assumption was that "appropriate development" is a relative term: what might be appropriate for one resident might not be appropriate for another. As a result, we believe that decisions about future growth and expansion are best made with the participation of local residents who are interested in and informed about the future of their community. We recommend tracking total attendance at public meetings and recording basic information about those attending, such as age, sex, and employment status. This measure ranks high in effectiveness and medium in addressing issues of sustainability. Other potential indicators of appropriate economic development might include the extent to which any future development contributes to the goals of Candle Lake, such as provision of basic services, preservation of natural surroundings, and enhancement of recreational activity.

Enhancement of recreational activity

This community goal provided an interesting counterpoint to the goal of preserving natural surroundings. Together, they speak to the broadly held view among Candle Lake residents that humans can use the local environment for certain recreational purposes while preserving the environment. Doing so involves trade-offs between protection and human use. The indicators of enhanced recreational activity included both outdoor and indoor recreational pursuits. In terms of regulation enforcement, they speak to a concern for responsible use of the environment and the potential impacts of some recreational uses on quality of life.

Community cooperation

During our Candle Lake workshops, residents described recent successes with community-wide events such as the Canada Day parade. Such events may not appear to have relevance as indicators of community sustainability, but they foster social capital (the willingness and ability of residents to work together for community-defined goals) and community cohesion (the feeling of belonging to the community). As such, these events are well worth monitoring as stimuli for social networking within the community and as exercises for potential future events. We recommend tracking attendance, as well as the demographic characteristics of the participants, in particular, sex and age. Tracking social networks would be another proxy for community cooperation, although it would be ranked low in effectiveness and in measuring key aspects of community sustainability.

Summary

On the whole, the suite of indicators selected for Candle Lake encompasses the criteria for community sustainability indicators and, with the exception of just a few indicators, can be monitored periodically by local individuals or associations. Locally defined social indicators for Candle Lake appeared to correspond with the recent history, demographic profile, and geographic location of the community (surrounded by a provincial park). With a growing population of mostly retirees and a prime location for outdoor recreational pursuits, it is not surprising that Candle Lake residents identified nature preservation, local services, and recreation as primary domains of interest. The list of indicators in Table 13 clearly converges with these interests. Moreover, a close examination of the 12 criteria for indicators of community sustainability (Appendix 4), shows that, collectively, the indicators chosen by Candle Lake address every criterion. However, only one indicator, well water, addresses ecosystem services. Other indicators that might address this criterion include air pollution and soil erosion, but these issues were not raised by residents as key factors contributing to the quality of life in Candle Lake. This is not to say that ecosystem services are not considered important. It is more likely that they are simply taken for granted in smaller centers, something that is not such a luxury in other locales.

There should be a strong emphasis on the economics of the community. There is much development that can occur if it is properly researched and developed.

Montreal Lake

Montreal Lake has a very different sociodemographic profile and very different community priorities from those of Candle Lake. The most dramatic difference, of course, is that Montreal Lake is a reserve, and the population is nearly all First Nation. Residents were also much younger, with a high percentage not yet of working age. Therefore, aggregate participation in the labor force was relatively low. Among those participating in the labor force, unemployment was much higher than in the other two communities. In addition, the availability of some goods and services, such as basic groceries and durable goods, appeared to be low. The community emphatically does not cater to visitors or would-be recreationists; in addition to the lack of availability of goods and services for residents, there are no accommodations for visitors (hotels or motels), and despite its location on a large lake, there is no developed boat access or beach facilities.

There was no potential conflict between seasonal and year-round residents (as there was in Candle Lake); the community is cohesive in this sense, and the vision for what constitutes sustainability is widely shared. Montreal Lake residents gave very high priority to far more of the survey indicator statements than Candle Lake residents did—these indicators are more crucial to quality of life and, quite simply, it is likely that more improvements to quality of life can be made in Montreal Lake. Reflecting the young age structure (families with young children) and the lack of goods and services, the highest priorities centered on meeting basic needs—availability of services, family, and community cohesion. In the same vein, the provision of jobs that would allow basic living standards to be met was likely important as well. Finally, we suspected that recognition and preservation of Cree traditions (sustainability of culture) were be of high priority as well.

These community characteristics are reflected in the survey results. Table 15 presents the prioritized survey statements, the indicator each represents, an example measure of the indicator, and effectiveness and sustainability rankings. Table 16 describes the sources of data and methods by which they might be collected.

Individual well-being: physical, mental, and spiritual health of residents

Individual well-being was easily the highest priority of Montreal Lake respondents, not surprisingly, given that it is an encompassing measure of individual health. Although its sustainability ranking is only moderate because it does not include (for example) environmental sustainability, this indicator is potentially quite effective, as data can easily be collected and monitored at the local level (e.g., through records at the local health care center).

Availability of housing, food, and education

Also of high priority were basic services, which indicates their objective absence in the Montreal Lake community. Their ranking on the sustainability scale is moderate and their effectiveness high, for the same reasons as described above. Data

Table 15. Locally defined social indicators for Montreal Lake

Survey statement, by priority[a]	Indicator	Measure	Effectiveness[b]	Sustainability[c]
Very high				
Physical, mental, and spiritual health of residents	Physical, mental, and spiritual health of residents	Multiple: for physical, number of children born underweight, blood pressure; for mental, number of cases at health care center	High	Medium
Availability of band housing	Availability of appropriate housing	Waiting time for subsidized housing	High	Medium
Food, health care, and education available within the community	Access to basic services	Availability of educational programs, health care centers, food	High	Medium
Access to traditional knowledge	Access to traditional knowledge	Number of traditional ceremonies	High	Medium
Number of residents who speak Cree	Opportunities to retain language	Number of residents who speak Cree	High	Low
Stable homes and families	Stable home life	Proportion of homes where community services intervene	Medium	Low
High				
Access to wild game meat such as moose	Subsistence lifestyle	Percent of meat needs met through subsistence	Medium	High
Access to nature	Access to nature	Perceived connection to nature—daily life tied to outdoor activity	Medium	Medium
Wages that meet basic needs	Economic well-being	Prevalence of low-income residents	Medium	Medium
A sense of belonging to the community	Community cohesion	Percent (type) feeling they can rely on others	Medium	Medium
Medium				
Employment in the forest or oil and gas industry	Job opportunities in resource sector	Percent of employable population employed in natural resource sectors	High	High
Involvement of off-reserve band members in community life	Openness and access to off-reserve members	Perception of connectedness to reserve among different social groups	Medium	Medium
Access to public transportation	Availability of affordable transport	Cost and frequency of bus service to Prince Albert	Medium	Medium
Freedom from unwanted outside interference	Security (protection from outside forces)	Number of childhood interventions from outside the community	Medium	Medium

Table 16. Potential data sources and reporting methods for Montreal Lake social indicators

Community goal	Indicator	Measure	Data source	Method
Individual well-being	Physical, mental, and spiritual health of residents	Multiple: for physical, number of children born underweight, blood pressure; for mental, number of cases at health care center	Local count	Gather data from community health care center
Access to services to meet basic needs	Availability of appropriate housing	Waiting time for subsidized housing	Local count	Tabulate records from waiting lists for housing
Access to services to meet basic needs	Access to basic services	Availability of educational programs, health care centers, food	Local count	Document existing services, identify gaps
Strong social fabric	Access to traditional knowledge	Number of traditional ceremonies	Local count	Track number of events over time
Strong social fabric	Stable home life	Proportion of homes where community services intervene	Local count	Draw from existing records
Cultural sustainability	Opportunities to retain language	Number of residents who speak Cree	Local count or survey	Determine number of children taking language classes
Cultural sustainability	Subsistence lifestyle	Percent of meat needs met through subsistence	Local survey	Determine food consumption
Cultural sustainability	Access to nature	Perceived connection to nature—daily life tied to outdoor activity	Local survey	Determine behaviors and attitudes
Economic well-being	Economic well-being	Prevalence of low-income residents	Census data or local count	5-year intervals or draw from reserve records
Strong social fabric	Community cohesion	Percent (type) feeling they can rely on others	Local survey	Monitor social networks
Economic well-being	Job opportunities in resource sector	Percent of employable population employed in natural resource sectors	Local count	Resource jobs as proportion of total jobs (from existing records)
Strong social fabric	Openness and access to off-reserve members	Perception of connectedness to reserve among different social groups	Survey off-reserve	Monitor social networks, attitudes
Access to services to meet basic needs	Availability of affordable transport	Cost and frequency of bus service to Prince Albert	Local count	Document existing and historical availability

can be tabulated locally from existing records on, for example, waiting time for subsidized housing and percentage of children receiving formal education at different ages.

Cultural sustainability: language, ceremony, food, and nature

Montreal Lake community members valued their status as First Nations people and considered very important the associated traditions (including language and maintenance of subsistence lifestyles). They also identified aspects relating to the natural world in terms of cultural sustainability. Potential measures in this domain span a range of scores on the sustainability and effectiveness scales: traditional knowledge, language, and access to wild game are highly effective but run the gamut from low to high on the sustainability scale (e.g., sustaining a language may not by itself result in the sustaining of a community). The community would probably need to devise a survey of residents to assess the degree to which these measures were achieved, rather than being able to rely on existing records.

Waskesiu is increasingly a place for wealthy people to come and holiday. When the park first started it was supposed to be a place for the average person.

Waskesiu Lake Resident.

We feel protected here, from the everyday things of life and that has even carried through, instead of just spending weekends and weeks here, I'm spending the whole summer here.

Waskesiu Lake Resident.

Strong social fabric: stability and cohesion

A fourth area highly valued in Montreal Lake was the sustainability of community: the preservation of homes and families and the degree to which individuals felt connected to their community. This was clearly an important aspect of life in Montreal Lake, as respondents reported high overall levels of identification with community and involvement in social networks. The measures for this area are of only medium effectiveness, primarily because of the time and money required to collect data on these community attributes. The sustainability rating of these measures is from medium to low, primarily because they address only one relatively narrow component of community sustainability, the social dimension.

Economic well-being

Given the high unemployment rates in Montreal Lake, residents gave surprisingly low priority to employment (including jobs in traditional natural resource industries). However, our sample was biased toward employed residents. A more representative sample might have revealed higher priorities for employment-related indicators. Although we deemed the overall jobs measure to be only moderately sustainable and effective, the measure of employment in resource sectors over time was considered both highly relevant to sustainability concerns and highly effective, as it better addresses the relationship between economics and the environment.

Summary

The priorities for indicators in Montreal Lake matched well its status as a First Nations reserve with a young population attempting to live all aspects of everyday life in the community. In contrast, Candle Lake and Waskesiu Lake (as seasonal and recreation communities) are primarily places to escape from the concerns of everyday life. Therefore, in Montreal Lake much more emphasis was placed on basic services such as education, health care, and food and their contribution to individual well-being. Similarly, high priority was placed on stability in home life. The emphasis on maintenance of Cree ways of life, including food, language, and other traditional aspects of First Nations culture, befits the special status of this community as a reserve. Economic well-being, at least as characterized by indicators related to employment, was of lower priority, which suggests that the lack of employment opportunities (for example) may be compensated through other aspects of the community, such as those described above. With regard to Hart's (1999) three categories of sustainability (economic, social, and environmental), Montreal Lake appeared to emphasize the social domain. Environmental sustainability was particularly neglected as a priority within this community: having access to nature was deemed important, but primarily within the context of such a connection being an integral part of the Cree way of life. The preservation of the natural environment around Montreal Lake was not by itself a high priority for community residents.

Table 17. Locally defined social indicators for Waskesiu Lake

Survey statement, by priority[a]	Indicator	Measure	Effectiveness[b]	Sustainability[c]
Very high				
Keeping park fees affordable	Accessibility for the poor to community and national park	Inflation rate of national park entrance fees in relation to national inflation rate	High	Medium
A community where I feel personally safe	Perception of personal safety	Proportion of residents who feel safe	Medium	Medium
Making sure that seasonal residents have a voice in local decision making	Adaptability of policies to accommodate an increasingly transient population	Number of policies that have changed to accommodate the changing population	Low	Low
High				
Restrictions that minimize water pollution	Water quality and quantity	Water quality index	High	Medium
Maintaining native plant and animal species in local area	Intact wilderness base	Percentage of park preserved relative to percentage “built-up”	Medium	High
Existence of wilderness outside the park	Ecosystem fragmentation	Percentage of intact land base surrounding the park	Medium	High
A family-oriented community	Family-oriented atmosphere	Number of family-oriented events	Medium	Medium
Ability to maintain community services	Ability to maintain community services	Number and type of local service outlets	Medium	Medium
Medium				
Maintaining aesthetics of town architecture	Aesthetic appeal	Percent of buildings that fit within aesthetic ambiance (architectural motif) of the PANP	High	Medium
Minimizing auto traffic	Pedestrian-friendly streets	Proportion of maintained walkways and trails in relation to streets	Medium	Medium
High level of outdoor recreation among seasonal and year-round residents	Common pursuit of outdoor recreational activities	Percent of population involved in cross-country skiing	Medium	Medium
A sense of belonging to the community	Communication between “segments” of PANP population	Diversity of attendance at public meetings	Medium	Medium
Low				
Availability of goods from the local region	Level of isolation or linkage with outside communities	Number of local products in grocery store	High	High
Involvement in local community organizations	Support for and involvement in community activities	Number of active WADRA members	Medium	Medium

[a] Survey priority was determined by mean scores and points assigned to each survey statement.

Table 18. Potential data sources and reporting methods for Waskesiu Lake social indicators

Community goal	Indicator	Measure	Data source	Method
Maintain a diverse human population	Accessibility for the poor to community and national park	Inflation rate of national park entrance fees in relation to national inflation rate	Parks Canada	Inflation rate of national park entrance fees divided by national inflation rate (track once annually)
Perceived safety (property and personal)	Perception of personal safety	Proportion of residents who feel safe	Local survey	Respondents who feel personally safe
Maintain a diverse human population	Adaptability of policies to accommodate an increasingly transient population	Number of policies that have changed to accommodate the changing population	Chamber of Commerce, WADRA	Number of changes annually
Pride in the environment	Water quality and quantity	Water quality index	Selected lake and well sites	Levels and type of contamination
Pride in the environment	Biodiversity (flora and fauna)	Number of native birds in annual bird counts	Local count	Total number, by species
Pride in the environment	Intact wilderness base	Percentage of park preserved relative to percentage “built-up”	GIS maps of land base	Area of built-up land versus area of preserved land
Pride in the environment	Ecosystem fragmentation	Percentage of intact land base surrounding the park	GIS maps of land base	Area of intact land versus area of fragmented land
Perceived safety (property and personal)	Family-oriented atmosphere	Number of family-oriented events	Local count	Number of events annually
Maintain a diverse human population	Ability to maintain community services	Number and type of local service outlets	Local count	Total no. of service outlets
Pride in the environment	Aesthetic appeal	Percent of buildings that fit within aesthetic ambiance (architectural motif) of the PANP	Local count	Number of buildings with consistent architectural motif as proportion of total number of buildings
Pride in the environment	Pedestrian-friendly streets	Proportion of maintained walkways and trails in relation to streets	Local count	Kilometres of maintained walkways and trails in relation to kilometres of streets
Pride in the environment	Common pursuit of outdoor recreational activities	Percent of population involved in cross-country skiing	Local count	Number who ski as proportion of population
Maintain a diverse human population	Communication between “segments” of PANP population	Diversity of attendance at public meetings	Local count	Attendance per meeting (and demographic profile)
Regional integration	Level of isolation or linkage with outside communities	Number of local products in grocery store	Local business	Track local products annually

Waskesiu Lake

A large proportion of Waskesiu Lake residents are seasonal. Therefore, most have a limited need for such services as a school or year-round health facilities. As in Candle Lake, there is a great demand for visitor-oriented services. Although Waskesiu Lake is a forest-dependent community, it relies upon nontimber benefits rather than timber extraction. Results from this study reflect these community characteristics. Table 17 lists the locally defined social indicators for Waskesiu Lake, and Table 18 provides potential data sources and reporting methods for those indicators.

Pride in the environment

The importance of environmental integrity is evident from the number of related indicators in Table 18. From water quality to aesthetic quality, residents appeared to understand and embrace the privileges and responsibilities associated with living within the boundaries of a national park. As a result, the priority for the survey statements associated with these indicators was medium to very high. Similarly, the effectiveness and relevance to community sustainability of these measures ranked medium to high because of the implicit linkages between economy, society, and the environment. These measures can be monitored through local counts, local surveys, and GIS maps of the land base.

Maintain diverse human population

The desire to maintain a diverse human population was echoed through five survey statements, four of which were ranked medium to very high. The general goal here is to maintain the community not solely as a place for summer vacation but as a viable community with services and activities for local residents, and social and economic linkages with other communities throughout the region. Monitoring would involve local counts of service outlets and recreational events.

Perceived safety

Perceived safety, followed closely by a family-oriented atmosphere, was regarded as a high priority for Waskesiu Lake residents. These two certainly interrelate, as high perceived safety fuels the family-oriented atmosphere and vice versa. Workshop participants did caution that the perception of safety did not necessarily translate into higher actual safety, but they felt that perceived safety did contribute to a high quality of life within the community. These indicators can be monitored through a survey gauging perceived personal safety and a local count of the number of family-oriented events. Generally speaking, these measures are ranked as moderately effective and address community sustainability moderately well.

Summary

As a suite, the locally defined social indicators for Waskesiu Lake were consistent with the demographic profile and geographic location of the community, within the boundaries of a national park. With a high number of seasonal residents and a vacationer population destined for outdoor enjoyment, it is not surprising that Waskesiu Lake residents identified this particular set of community goals. On the whole, the suite of indicators selected for Waskesiu comprised all of the criteria for community sustainability indicators and, with the exception of two, can be monitored periodically by local individuals or businesses. Although overall a strong consideration of environmental factors was found, somewhat surprisingly, only 3 and 4 of the 14 indicators specifically address the carrying capacity of ecosystem services and natural resources, respectively (*see* Appendix 4). This shortcoming may need to be addressed in future social indicators work.

RECOMMENDATIONS

In this study, we set out to identify locally defined indicators of sustainability for three PAMF communities: Candle Lake, Montreal Lake, and Waskesiu Lake. Residents of these communities participated in workshops and surveys to identify and prioritize social indicators that would assist both the PAMF and the communities themselves in monitoring their progress toward a sustainable future. We subjected all measures of community sustainability to an evaluation framework, which allowed us to identify 14 social indicators per community to address the complexity of sustainability concerns in each locale.

As a local-level initiative, the 14 indicators can be considered in concert with a standard suite of

socioeconomic indicators addressing fundamental sustainability issues such as employment, education, and poverty. Together, local-level indicators and standard socioeconomic indicators can constitute a powerful tool for community leaders and policy makers concerned with the sustainability of forest-based communities in Canada. Generally speaking, the findings of this study emphasize the need for caution in prescribing one set of social indicators for all forest-based communities. What these PAMF communities have in common is their location within the boreal forest of Saskatchewan. Beyond this shared ecosystem, they are as diverse as the people who reside in them. Moreover, they define progress toward sustainability, as indicated by their definitions of quality of life, quite differently. By acknowledging these differences and identifying local-level social indicators of sustainability, we can do these communities a service, assisting them to measure progress in directions that they have identified as priorities.

Below is a series of recommendations emerging from the literature on social indicators research in forest-based communities and from the specific findings of this study.

1. Locally defined indicators: Develop baseline data for the locally defined indicators identified in this study. As stated in the report, the method of evaluating the effectiveness of each measure and the relevance of each measure to community sustainability are somewhat subjective, but the continued involvement of local residents in this process will improve attempts to measure progress toward community goals and improve the data sources available.

2. Monitoring progress toward sustainability: After establishing baseline data, monitor these locally defined indicators periodically. Indicators can be "adopted" by individuals and organizations within the community or by model forest partners, and a long-term reporting framework can be established.

3. Community involvement: Invite community residents to participate as active project leaders in long-term social indicators work. Experience from social indicators projects indicates that such work is successful only if local residents are involved from the start. This study involved local residents to the extent possible, given available time and resources, but future work, confirming indicator priorities and identifying a monitoring strategy, likely will be most successful if communities take on the challenge as their own.

4. Standard socioeconomic indicators: Develop a suite of standard socioeconomic indicators of sustainability for each community. This information is readily available from Statistics Canada, reported in 5-year intervals. Parkins and Beckley (2001) provide a template for reporting these data and, once the template is in place, updating and analysis is fairly straightforward. Furthermore, a Model Forest Network web site (Canadian Model Forest Program 2000) reports a suite of socioeconomic indicators for model forest communities across Canada. This web site may be a valuable resource for the PAMF or for community leaders interested in developing a monitoring framework for local-level indicators.

5. Evaluation framework: Communities can progress toward unsustainable social, economic, and environmental conditions without realizing the consequences of their actions, because they are monitoring inappropriate indicators. The evaluation framework used in this study clearly shows that some indicators are better measures of community sustainability than others. If forest-based communities wish to choose their own indicators, subjecting them to an evaluation framework may help to avoid indicators that are ineffective and irrelevant to crucial aspects of sustainability.

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moderately sustainable and effective, the measure of employment in resource sectors over time was considered both highly relevant to sustainability concerns and highly effective, as it better addresses the relationship between economics and the environment.

Summary

The priorities for indicators in Montreal Lake matched well its status as a First Nations reserve with a young population attempting to live all aspects of everyday life in the community. In contrast, Candle Lake and Waskesiu Lake (as seasonal and recreation communities) are primarily places to escape from the concerns of everyday life. Therefore, in Montreal Lake much more emphasis was placed on basic services such as education, health care, and food and their contribution to individual well-being. Similarly, high priority was placed on stability in home life. The emphasis on maintenance of Cree ways of life, including food, language, and other traditional aspects of First Nations culture, befits the special status of this community as a reserve. Economic well-being, at least as characterized by indicators related to employment, was of lower priority, which suggests that the lack of employment opportunities (for example) may be compensated through other aspects of the community, such as those described above. With regard to Hart's (1999) three categories of sustainability (economic, social, and environmental), Montreal Lake appeared to emphasize the social domain. Environmental sustainability was particularly neglected as a priority within this community: having access to nature was deemed important, but primarily within the context of such a connection being an integral part of the Cree way of life. The preservation of the natural environment around Montreal Lake was not by itself a high priority for community residents.

Waskesiu is increasingly a place for wealthy people to come and holiday. When the park first started it was supposed to be a place for the average person.

Waskesiu Lake Resident.

We feel protected here, from the everyday things of life and that has even carried through, instead of just spending weekends and weeks here, I'm spending the whole summer here.

Waskesiu Lake Resident.

Waskesiu Lake

A large proportion of Waskesiu Lake residents are seasonal. Therefore, most have a limited need for such services as a school or year-round health facilities. As in Candle Lake, there is a great demand for visitor-oriented services. Although Waskesiu Lake is a forest-dependent community, it relies upon nontimber benefits rather than timber extraction. Results from this study reflect these community characteristics. Table 17 lists the locally defined social indicators for Waskesiu Lake, and Table 18 provides potential data sources and reporting methods for those indicators.

Pride in the environment

The importance of environmental integrity is evident from the number of related indicators in Table 18. From water quality to aesthetic quality, residents appeared to understand and embrace the privileges and responsibilities associated with living within the boundaries of a national park. As a result, the priority for the survey statements associated with these indicators was medium to very high. Similarly, the effectiveness and relevance to community sustainability of these measures ranked medium to high because of the implicit linkages between economy, society, and the environment. These measures can be monitored through local counts, local surveys, and GIS maps of the land base.

Maintain diverse human population

The desire to maintain a diverse human population was echoed through five survey statements, four of which were ranked medium to very high. The general goal here is to maintain the community not solely as a place for summer vacation but as a viable community with services and activities for local residents, and social and economic linkages with other communities throughout the region. Monitoring would involve local counts of service outlets and recreational events.

Perceived safety

Perceived safety, followed closely by a family-oriented atmosphere, was regarded as a high priority for Waskesiu Lake residents. These two certainly interrelate, as high perceived safety fuels the family-oriented atmosphere and vice versa. Workshop participants did caution that the perception of safety did not necessarily translate into higher actual safety, but they felt that perceived

safety did contribute to a high quality of life within the community. These indicators can be monitored through a survey