SUSTAINABLE FOREST MANAGEMENT NETWORK
RÉSEAU DE GESTION DURABLE DES FORÊTS
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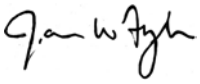
Foreword

The State of Knowledge program was launched by the Sustainable Forest Management Network (SFMN) to capture the knowledge and wisdom that had accumulated in publications and people over a decade of research. The goal was to create a foundation of current knowledge on which to build policy, practice and future research. The program supported groups of researchers, working with experts from SFMN partner organizations, to review literature and collect expert opinion about issues of importance to Canadian forest management. The priority topics for the program were suggested by the Network's partners in consultation with the research theme leaders. Each State of Knowledge team chose an approach appropriate to the topic. The projects involved a diversity of workshops, consultations, reviews of published and unpublished materials, synthesis and writing activities. The result is a suite of reports that we hope will inform new policy and practice and help direct future research.

The State of Knowledge program has been a clear demonstration of the challenges involved in producing a review that does justice to the published literature and captures the wisdom of experts to point to the future. We take this opportunity to acknowledge with gratitude the investment of time and talent by many researchers, authors, editors, reviewers and the publication production team in bringing the program to a successful conclusion.



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This State of Knowledge report would not have been possible without the collaboration of numerous individuals and organizations active in promoting collaboration between Aboriginal people and the forestry industry in Canada. In particular, we note the essential contributions of those who participated in a series of workshops and meetings organized as part of this project: in Quebec City in March 2008, in Ottawa in June 2008, in Saskatoon in January 2009 and in two e-seminars. The First Nations Forestry Program in Quebec and the Indigenous Land Management Institute at the University of Saskatchewan provided invaluable aid in organizing these workshops. We gratefully acknowledge funding from the Sustainable Forest Management Network, along with a significant contribution from the Canadian Forest Service, which provided office space and resources to support the project. Also essential to the success of this work were partner organizations, both those present when the project was developed and those who provided support along the way. Aboriginal partners included Treaty Eight First Nations of Alberta, the National Aboriginal Forestry Association, the Confederacy of Mainland Mi'kmaq (Nova Scotia), the Grand Council of the Cree / Cree Regional Authority, Eeyou Istchee (Quebec) and the First Nations of Quebec and Labrador Sustainable Development Institute. Partners and support from the forestry industry included: Daishowa-Marubeni International Ltd., Tolko Industries Ltd. and the Forest Products Association of Canada. Government contributors to the project included Natural Resources Canada, Government of Alberta, Government of Quebec and the New Brunswick Department of Natural Resources. Clearly our various host institutions all provided time and material support without which this team would not have been able to function. We also say a special thank you to Magdalena Burgess of McGill University for her sterling efforts in editing and improving this document. Finally, we wish to acknowledge the Aboriginal peoples who have been responsible for the forestlands of Canada for thousands of years and we hope that this report will contribute to maintaining their legacy.

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Executive Summary

Over the last decade, Canadian forest managers have begun to call upon various forms of Aboriginal land use and occupancy studies as a means of incorporating Aboriginal concerns in forestry planning. Such studies were originally an anthropological research technique, but have become an integral part of Aboriginal rights and title processes and are now being used to inform forest management as well.

Increasingly, such studies are being incorporated into government policies and forest certification processes, while also being seen by forest managers as a means of complying with legal obligations to consult Aboriginal peoples. As they become more common, these studies are also attracting more criticism: from forest managers who are concerned about getting accurate information for effective planning and from Aboriginal peoples who consider that their rights and culture are not being respected.

In this report we seek to clarify some of the uncertainty and questions around land use studies and to **consider how information about Aboriginal use and occupancy of lands can be better integrated into forest management.** The report is based on a review of nearly 100 studies and documented experiences of Aboriginal land use studies, supported by workshops bringing together researchers and practitioners representing Aboriginal peoples, forestry companies and governments.

In this report we use the term *Aboriginal land use and occupancy studies* (ALUOS) to include several different approaches to collecting information for use in forest management and planning or in other contexts. We summarize our conclusions concerning the use of ALUOS in forest management with several key ideas:

1) There are no "best practices" for using ALUOS for forest management. Although a variety of guides are available, methods and techniques have not been discussed and agreed upon by practitioners. Furthermore, few guides provide direction on how to effectively use an ALUOS in forest management and planning.

2) There are a variety of ways in which ALUOS can be used in forest management. Aboriginal communities, industries and others across Canada have sought to develop their own approaches to using ALUOS, finding ways to deal with issues such as goals, information types, confidentiality, access and decision-making. Use of an existing case as a model for a new situation requires adaptation to meet the needs and expectations of partners.

3) ALUOS are not a substitute for consultation and accommodation. ALUOS are increasingly being used as a means of consulting Aboriginal peoples about resource management activities. An ALUOS can provide valuable information, but Aboriginal interests, knowledge and uses of land are much more extensive than what can be represented on a map. An ALUOS may be part of a consultation process, but it is not suitable as a sole means of consultation or of identifying how to accommodate Aboriginal concerns.

4) ALUOS are only part of the picture. A simple map cannot document the full complexity of Aboriginal peoples' use, occupancy and knowledge of forestlands, and an ALUOS is only a partial representation of Aboriginal interests. Managers and policy-makers should avoid thinking of an ALUOS as simply another layer of information to be incorporated into a forest management plan. To be useful they need to be kept up-to-date.

5) Litigation, rights and title are issues in most ALUOS. Since the 1970s, ALUOS have been used in Canadian courts by Aboriginal peoples to demonstrate their rights or title to land. For an Aboriginal community, an ALUOS may be first a legal tool and only secondarily a source of information for use in forest management plans.

6) ALUOS are one option among others for Aboriginal-industry collaboration. Aboriginal peoples and forestry companies have a variety of options for developing collaborative relationships, and ALUOS are only one of these. Both parties should consider their needs and situation and choose forms of collaboration that are appropriate; these may (or may not) include undertaking an ALUOS.

7) ALUOS can contribute to building understanding and collaboration. An ALUOS can provide a wealth of information both for members of the Aboriginal community and for outsiders. Sharing information and participating in forest management through an ALUOS can help to build collaboration. However, conducting or using an ALUOS inappropriately can lead to a loss of confidence and trust.

1.0 Introduction

1.1 Issues and objectives

For over 30 years, Aboriginal peoples in Canada have documented the extent to which they have used traditional lands and resources both before and since European settlement. They have done so in part through studies of various forms. These have included traditional land use and occupancy studies that document the territorial range of Aboriginal communities, map biographies that record use of the land by one or more individuals (e.g., a parent or an elder), and resource use studies that quantify the amount of wildlife resources harvested from the land over a specific period of time.

Such work has required important commitments by Aboriginal communities, not least of which is the time and knowledge of elders. It has also benefited from significant financial and institutional support from governments and from businesses interested in natural resources.

In the forestry sector, managers, companies and government agencies are increasingly seeking to obtain information about Aboriginal land use and to integrate this into forest management and planning. Government policies, forest certification requirements, the protection of Aboriginal and treaty rights, consultation requirements and interest in better forest management all contribute to this expanding interest in traditional land use.

Collecting information and knowledge about land use by Aboriginal peoples and integrating it into forest management is not straightforward, however. Aboriginal peoples, while recognizing the benefits of the process, are increasingly concerned about the ways in which their knowledge is being used. Forestry companies and others who finance and support this work are concerned about ensuring access to the information and efficient ways of incorporating it into forest management and planning. Governments may see land use studies as a means of protecting Aboriginal interests in the land, but may also be apprehensive about the possible effect on their ability to control access to and use of Crown lands.

All those involved recognize that these studies have become an essential tool for Aboriginal peoples working to assert *a priori* claims to the lands they have long occupied and to create "spaces" in which they are able to negotiate new roles in land management. The use of such studies in forestland management is still evolving, however.

Despite the prominence of such studies, there has yet to be a comprehensive review of whether and how they have advanced the interests of Aboriginal peoples. Furthermore, there are numerous issues and problems that affect how – and how effectively – information about Aboriginal land use and occupancy is used in forestland management and planning. In this report we address some of these issues and seek to find ways forward for Aboriginal peoples, forest managers and policy-makers.

Objectives

The original objective of this report was to review best practices for development, integration and use of traditional land use mapping in forest management and planning, a research priority identified by the

Sustainable Forest Management Network. "Traditional land use mapping" is a term that can be understood in a variety of ways, as will be discussed in section 1.2. We adopted a broad view, considering various ways in which forest management can be informed by Aboriginal use and occupancy of land, rather than limiting our review strictly to mapping techniques.

In recent years, a number of "best practice" guides on land use mapping and related activities have been prepared by a variety of organizations. However, in a 2004 review of such documents, Peter Elias, a recognized expert in land use and occupancy studies, said that "*today there is no way of knowing which practices might be deemed 'best practices'*" (Elias 2004: v). Rather than prepare another similar document, we chose to focus on considering how information about Aboriginal land use can be better used in forest management. We also examined issues related to Aboriginal knowledge as pertains to forest management and planning.

Land use and occupancy studies and mapping are often associated with other types of arrangements between Aboriginal peoples and forestry companies or government agencies. Such arrangements include co-management agreements, consultation processes, joint business ventures, land claim settlement processes and legal proceedings, among others. We believe that a review of the place of land use studies in forest management must also address the context of relations with industry and government. Hence, we chose to integrate our investigations for the current report with those for a companion volume that examines broader issues of collaboration between Aboriginal peoples and the forestry industry (Wyatt et al. 2010).

The goal of this report is therefore to **consider how information about Aboriginal use and occupancy of lands can be better integrated into forest management.** We adopted several specific objectives:

- To establish a database of existing research and experience describing aspects of collaboration between forestry companies and Aboriginal groups;
- To analyze existing research to identify common experiences and lessons concerning mapping and studies in different situations;
- To consider how the effective use of maps and studies can be affected by methodology and context (e.g., the forest management context and arrangements with industry and governments);
- To identify implications for practitioners, policy-makers and researchers; and
- To disseminate the results of this work among the principal interested parties.

1.2 Terminology: words do matter!

A variety of terms have been used to in relation to Aboriginal knowledge, and to describe aspects of the collection and use of information about Aboriginal knowledge and use of forestlands. Although often confusing, these terms do carry important differences of meaning and intent.

Traditional ecological knowledge (TEK) is one of the longest standing terms, and is usually understood as *"a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment"* (Berkes et al. 2000: 1252).

Indigenous traditional knowledge (ITK) and **Aboriginal traditional knowledge** (ATK) represent a modification of the Berkes understanding of TEK, making this specific to knowledge held by Indigenous or Aboriginal peoples. An important corollary of this is that non-Indigenous peoples can also have **traditional knowledge** (TK) associated with the environment in which they live. However, Aboriginal peoples have specific rights based on historic occupancy and use that are not shared by non-Indigenous local residents.

Traditional land use and occupancy studies (TLUOS) have been described as *"interviewing the holders of traditional environmental knowledge (TEK), and plotting this combined knowledge about natural phenomena and the relation to land use on maps"* (Robinson and Ross 1997: 597). This term has been used principally for Aboriginal peoples. It emphasizes the link between **knowledge** about the environment and **use** of lands. In many cases, maps are used as a means of recording this information, along with recorded interviews, documents and even photos or videos.

A **traditional use study** (TUS), is "*a project that is designed to capture and record patterns of traditional use by Aboriginal communities*" (AAAND 2003: 3). Such studies may or may not involve mapping.

The term **traditional land use mapping**, as used by various provincial governments and others (e.g., by the SFMN in establishing this project), appears to involve mapping information from a TUS. It may or may not include information about occupancy (see below), or about other forms of Aboriginal knowledge.

A distinction can be made between "**use**", referring to activities undertaken in an area, and "**occupancy**", meaning rather the area that a group considers as its own (Tobias 2000). Recognizing this distinction helps resolve some issues related to "overlap" between Aboriginal groups and according to Tobias (2000: 3) "*negotiations based primarily on occupancy would be more constructive in reconciling First Nations' interests*".

Use of the term **"traditional"** has been criticized as implicitly excluding **contemporary** land use and occupancy by Aboriginal peoples; it reinforces an incorrect perception that Aboriginal individuals who use motor vehicles, computers or guns are no different from non-Aboriginal individuals. Aboriginal people adopt new technology and use it within their own systems of knowledge and ethics.

Mapping is an appropriate technique for locating specific sites, but broader **studies** are required to document how Aboriginal people use these sites, what activities are appropriate, whether the site has changed over time and to consider the importance of the site in a cultural context. Such mapping may include use of Geographical Information Systems (GIS) or other techniques.

Increasingly researchers are noting that traditional knowledge, land use and occupancy need to be considered in relation to the **cultural context**, socially accepted norms, and governance and management institutions (such as traditional ways of making decisions about land use and occupancy). Berkes et al. (2000) refer to integrating social and ecological practices.

All these terms are subject to some debate over scope, significance and relevance. It appears that there is no single English (or French) term that captures all of the different facets of Aboriginal knowledge and practice relating to use and occupancy of lands traditionally occupied by Aboriginal people.

BOX 1

Aboriginal land use and occupancy studies

In this report, we adopt the term "Aboriginal land use and occupancy studies" and the acronym, ALUOS. In adopting this term, we specifically note that:

- land use and occupancy are distinct but related ways of viewing an Aboriginal presence in an area;
- Aboriginal knowledge is not limited to the identification of sites or the use of specific resources but includes a wealth of information about how people interact with their environment;
- this knowledge implies social structures and institutions; and
- maps are not the only way of recording such information.

"Today, a full-blown land use and occupancy study includes a natural history, an oral and written history, a gazetteer of place names, an ethnography of use practices, a harvest study, a social history of land and resource economics, a study of traditional land and resource management practices, and plenty of maps – map biographies, traditional knowledge maps, maps of place names, and archaeological and heritage site maps. Altogether, a single study might compile several gigabytes of data and information."

(Elias 2004: 5)

BOX 2

How different forms of study contribute to understanding

Imagine that forest managers wish to integrate Aboriginal knowledge about woodland caribou into management activities. Different forms of study could provide different types of information.

A **land use map** could tell managers where members of an Aboriginal community have hunted caribou.

Aboriginal knowledge might tell managers where caribou live and breed, what they eat in different seasons and how populations have changed over the years.

A **socio-economic study** could provide the number of caribou killed by the community and estimate the value of meat and other products.

Documenting traditional institutions and customs could describe rules about who can kill a caribou, how they may do so respectfully and how to share the meat and products.

Policy analysis might describe the effects of government regulations and resource allocation upon caribou populations and hunting.

A **forest management plan** identifies a series of activities that could affect caribou populations, habits and habitats. A study might identify such impacts, and the plan should then be modified to protect caribou.

Forest managers may consider that undertaking all these studies will be too expensive for management planning purposes. Hence managers need to consider carefully their needs for information, their obligations and their relationships with Aboriginal communities. A land use map, or any other single study, will not provide all relevant information.

1.3 The changing roles of land use and occupancy studies

Aboriginal land use and occupancy studies have their origins in anthropological research, initially in the late nineteenth century and subsequently as new mapping and documentary techniques were developed in the 1970s. Their use expanded during the 1980s as Aboriginal peoples sought to obtain recognition of their rights through litigation. Courts have obliged Aboriginal claimants to demonstrate or prove their occupancy of land, and the land use and occupancy study has become an accepted way of doing so (Elias 2004).

More recently, land use research has found its way into resource management fields such as forestry, conservation and mining and oil and gas. Government policies and sustainable forest management guidelines now encourage mapping or studies as a means of documenting Aboriginal use of lands as a contribution to effective management (see section 2.3).

However, the response of researchers and Aboriginal peoples themselves has been more cautious. For instance Natcher (2001) considered the basis of land use research and identified a series of potential problems in its application in resource management. In particular, he emphasized that ALUOS should be only one of a number of tools used to include Aboriginal knowledge in the management process, and should never be used at the exclusion of knowledge holders themselves. Elias (2004) noted that land managers face a dilemma in relation to ALUOS: the studies contain valuable information, but using them primarily as a legal tool means that this information risks languishing unused. Tobias (2009) uses the term "lurking litigation" to refer to the possibility that an ALUOS may eventually be used in a legal process, resulting in a decision to keep such information confidential.

Appendix 1 gives an overview of the history and

changing roles of such studies.

1.4 Legal and policy context

The expansion of ALUOS in Canada over the last thirty years is linked to their legal importance. Since Aboriginal and treaty rights were enshrined in the Canadian Constitution in 1982, the Supreme Court of Canada has ruled in a number of cases, defining Aboriginal rights and setting standards for proving these rights (see Appendix 2 and Wyatt et. al. 2010 for more detailed discussion). In Delgamuukw in 1997, the court stated that Aboriginal peoples must prove occupancy prior to European settlement, demonstrate continuity between present and pre-European occupancy and demonstrate occupancy through physical evidence on the ground, such as dwellings and regular use of resources, including the delineation of boundaries. For Aboriginal people, an ALUOS provides a means of documenting their territories and land use and so proving their rights.

In addition to the legal basis, a variety of policy factors (governmental and non-governmental) have contributed to the increased number of ALUOS conducted in Canada in recent years (see Appendix 3 for a more detailed discussion of policy drivers). These include:

- **Provincial policies**. Some provinces, such as Ontario, have legislative requirements for mapping Aboriginal land use – though First Nations don't necessarily see these as adequate. Other provinces, including British Columbia and Alberta, provide financial support to Aboriginal communities to undertake studies and to make this information available to other land users.
- **National policies.** The 2003 National Forest Strategy included the rights and participation of Aboriginal peoples as one of eight strategic themes and made a commitment to "incorporate traditional knowledge in managing lands and resources" (NFSC 2003).
- **Sustainable forestry certification.** Over the last decade, sustainable forest management certification has become increasingly important in Canadian forestry. The Forest Stewardship Council (FSC) standard uses the strongest language and indicators in relation to Aboriginal peoples.
- **The duty to consult and accommodate.** Judicial rulings have also established obligations upon governments and industry to consult with Aboriginal peoples concerning activities on their traditional lands. An ALUOS can be a part of such consultation, but is not necessarily sufficient to meet the judicial obligation.
- **Negotiations and land claims.** Many Aboriginal communities are engaged in long-running negotiations with governments to settle land claims, and ALUOS can help to demonstrate both historic occupancy and the existence of a special bond with the land. However, information collected for these reasons will not necessarily be available or appropriate for forest management purposes.

The nature and importance of these drivers can vary across provinces, between forestry companies and from situation to situation. They have implications for how ALUOS are carried out and how they are used.

1.5 Goals

Planning, undertaking and using an ALUOS will typically involve a number of different groups – Aboriginal peoples, forestry companies, government agencies, consultants and researchers. Each of these groups can have distinct goals for their participation. Hence, any project to integrate an ALUOS into forest management will require some agreement on what the objectives are and how these are to be achieved. Appendix 4 provides a discussion of principal goals of different parties, with a summary of these being provided in Table 1.

1.6 Review methods

The project involved four major activities:

- **Building a database** of experiences described in the scientific literature and in reports;
- **Comparing existing "best practice" guides** for undertaking and using ALUOS;
- **Analysis of selected literature** using a "metasynthesis" approach; and
- **Workshops** uniting practitioners, policy-makers and researchers.

Our sources included a broad range of published and "grey" literature, as well as personal experiences of workshop participants and others. We describe

Table 1. **Common goals for Aboriginal land use and occupancy studies**

Goals	Parties*
Improve forest management for sustainability	
• *Collect and preserve Aboriginal-related traditional ecological knowledge.*	Abor, Indust, Gov
• *Incorporate contextualized traditional knowledge into resource management.*	Abor, Indust, Gov
• *Promote Aboriginal participation in resource management and decision-making.*	Abor
Improve relationships between Aboriginal nations and other stakeholders.	Abor, Indust, Gov
Establish title and ancestral rights to land by demonstrating occupancy and use.	Abor
Empower Aboriginal communities	
• *Record and transfer knowledge and values within the community.*	Abor
• *Reinforce culture, recognize accomplishments and build confidence.*	Abor
Comply or demonstrate compliance with legislation and other obligations.	Indust, Gov
Undertake scientific research and training and/or provide consultancy services.	Research, consult

* Principal parties are: Aboriginal peoples (Abor), forestry industry (Indust), governments (Gov) and researchers and consultants.

our approach and methodology at some depth in Appendix 5.

2.0 Findings

2.1 "Best practices" for conducting an ALUOS

In recent years, a number of "best practice" guides on land use mapping and related activities have been prepared by a variety of organizations across Canada. In keeping with the original objective of this report, we reviewed nine different guides to identify similar themes in "best practices", as well as to identify important differences (see Appendix 6). However, these guides typically address how an ALUOS should be conducted, rather than how this information should be used in forest management. Furthermore, confidentiality around methods and studies means that there are no widely accepted "best practices" in the field (Elias 2004).

"... best practices in map biographies remain idiosyncratic."
(Elias 2004: 13)

"Indigenous peoples do not have the luxury of conducting land use and occupancy research for the fun of it."
(Tobias 2000: 24)

Conducting an ALUOS represents an important investment for an Aboriginal community, for government and for industry. Our review of different guides identified a variety of issues and challenges, both for conducting an ALUOS and for effective use of this information in forest management. These fall into three principal groups, highlighting a variety of questions:

- **Orientation of the study:** What are the objectives; how is the community involved; how to avoid mapping for a museum.
- **Technical matters:** What budgets and resources are available; are computerized mapping systems to be used; how are interviews to be conducted; who will collect and use the data.
- **Understanding the nature of the information:** How can confidential information be protected; how can the meaning and significance of information be communicated; who ensures that this information is used appropriately.

Effective use of ALUOS information in forestland management remains problematic and receives little attention in most of the guides analyzed. This is an important oversight if communities, government agencies and forestry companies wish to avoid simply making maps for the fun of it, with a commensurate waste of knowledge, resources, time and money. The following sections seek to consider how such information can be better used in forest management, recognizing that, as yet, there are no best practices.

2.2 Using Aboriginal land use information and knowledge in forest management: different models

Aboriginal peoples and other actors across Canada have developed a variety of approaches and models for using Aboriginal land use information and traditional knowledge in forest management. This variety reflects the diverse interests of individual communities, the different situations in which they operate, the partners with whom they are involved, and government policies that change between, or even within, provinces.

Thus a broad variety of approaches to using ALUOS (or other information sources[1]) is more the norm than is standardization. Nevertheless, it is useful to consider some broad models for using such information.

Map and share

Collecting and handing over information to a government, research or management agency is perhaps the longest standing and most entrenched approach. Some industry processes and government policy frameworks, such as that of Ontario (OMNR 2004), make an implicit assumption that Aboriginal people will collect and record the necessary information and provide maps and documentation to the management authority.

Consistent with this view, financial and technical support may be available to assist data collection, but little consideration is paid to management processes themselves.

Information hub or clearinghouse

An information hub, managed by a group of Aboriginal communities or by an independent organization, offers a means of maintaining Aboriginal control of information while facilitating industry consultation.

For instance, the Foothills Research Institute in Alberta (created as a Model Forest) has hired an Aboriginal consultant to provide a clearinghouse for land use information (Young 2009). Individual Aboriginal communities provide their own land use information to the consultant using a standardized process and system. Companies wishing to undertake industrial development (such as forestry, mining or oil and gas) submit the plans to the hub, which then compares these against the land use information provided by communities. If proposals might affect Aboriginal sites or uses, the company is advised to contact the concerned community for more detailed discussions.

Such an approach requires a standardized method of collecting and recording information. It also requires agreement about how certain types of development could affect Aboriginal values.

Bipartite negotiations

Many Aboriginal communities engage in negotiations with forest management authorities (whether government or industry), using an ALUOS to convince the manager to adopt certain plans and practices. Discussions are typically face-to-face, with the manager bringing maps of their proposed activities while Aboriginal representatives have maps of sites or values to be protected.

Such negotiations often focus on operational details of how to protect or maintain specific sites and what modifications can be made to industry practices. Examples include the Little Red River Cree Nation's 2009 agreement with Tolko Industries in Alberta (Webb et al. 2009), and the *Mesures d'harmonisation* process implemented by the Quebec government (see our companion report). Such an approach requires flexibility in government prescriptions and by managers who are required to modify common practices, often on a case-by-case basis.

Collaborative management planning

Aboriginal communities may use their knowledge and information to establish various forms of collaborative management planning, including co-management. A number of examples exist across the country, often arising from legal or political settlements, and an ALUOS is a common (but not essential) feature.

> *"Cree land users felt that they cannot be expected to detail such a complex system of knowledge to a foreigner who they see, at most, once or twice a year. They would rather enter into a system that recognizes their stewardship role about the land and values their body of knowledge. They expect that their voice will be heard because they have this knowledge."*
>
> The *Ndoho Istchee* Process (WCMF 2007: 31)

In the *Ndoho Istchee* process developed by the Waswanipi Cree, tallymen from each trapline are involved in planning forestry operations, contributing their knowledge of the land (Waswanipi Cree Model Forest [WCMF] 2007). In Labrador, the Innu Nation

[1] While our report focuses largely on ALUOS, other arrangements between Aboriginal peoples and the forestry industry can provide additional opportunities for information on Aboriginal land use (and Aboriginal perspectives) to be incorporated into forest management and planning.

and the provincial government jointly prepared an ecosystem-based management plan (Courtois et al. 2008). However, the experience of the Algonquin of Barriere Lake in Quebec has been less successful. They have been involved in a joint planning process with the federal and Quebec governments since the early 1990s, preparing extensive documentation of their knowledge and use of the land and making numerous propositions for management. Despite this, no joint management plan has yet been agreed upon while forestry companies continue to log in accordance with their own plans, with both the provincial and federal government dropping out of the negotiations at different points.

Aboriginal community-led planning

Finally, Aboriginal communities can maintain control of their knowledge, using it to prepare management plans that are then used as the basis of discussions and negotiations with industry or government. In effect, this reverses the usual direction of consultation, requiring governments and industry to identify how their activities could affect the uses and values indicated in the community plan.

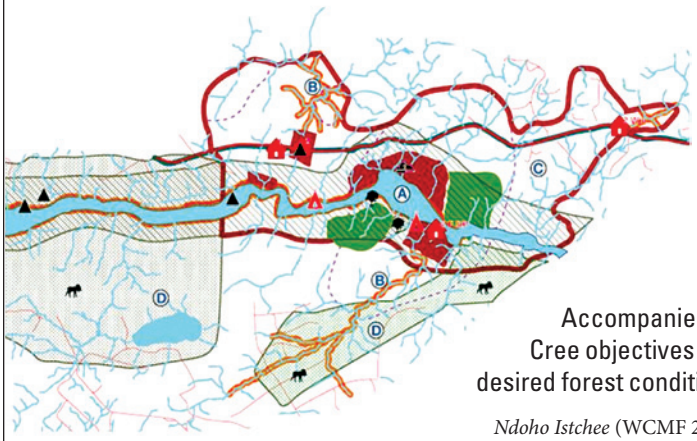
Heart Lake First Nation in Alberta aims to develop its own land use plan and present zoning proposals to the provincial government and to industry (Stevenson 2009). Similarly, the Pikangikum First Nation in Ontario, through the Whitefeather Forest Initiative, is developing its own approach to land management, based on the community's knowledge and values (Shearer 2009). This includes negotiating a land use strategy, an environmental assessment and forest management planning processes with the Province of Ontario.

Conclusions: different models, common issues

These different models for using information about Aboriginal land use and occupancy in forest management illustrate various ways of dealing with a common set of issues. Key points include the following:

- Each community has unique goals and capacities, and each will need to determine its own strategy for using an ALUOS.
- The types of information that is collected, and whether or not this information can be shared, will be determined by these goals. Site-specific information is easy to collect, and maps can be integrated into forest plans, but a deeper understanding of Aboriginal land use and values requires a more detailed study of the ecological and social contexts. Confidentiality of an ALUOS is of critical importance to many Aboriginal peoples, who may not be prepared to hand over this information to a third party, especially government or industry.

The Conservation Value Map: A planning support tool



Accompanied by Cree objectives and desired forest conditions

Ndoho Istchee (WCMF 2007)

Characteristics of a successful project

- Aboriginal leadership and ownership
- Continuity
- Capacity-building
- Usefulness and proper use
- Legal frameworks
- Buy-in of authorities and partners
- Availability of resources

Saganash and Pelletier at the Saskatoon workshop in January 2009

Figure 1. A planning map from "Ndoho Istchee" guidebook (Waswanipi Cree Model Forest 2007; used with permission), and characteristics of a successful project.

- Although all of the above forms could be described as consultation or participation, they represent quite different levels in relation to decision-making powers. The way in which an Aboriginal community decides to engage with non-Aboriginal land managers depends upon many factors, including land rights, forestry company interests, community capacity and policy and regulation.
- An ALUOS is only one possible form of Aboriginal engagement in forestry. Communities may choose to prepare an ALUOS because it complements their other activities or because partners are interested, not because it is inherently better than another approach.

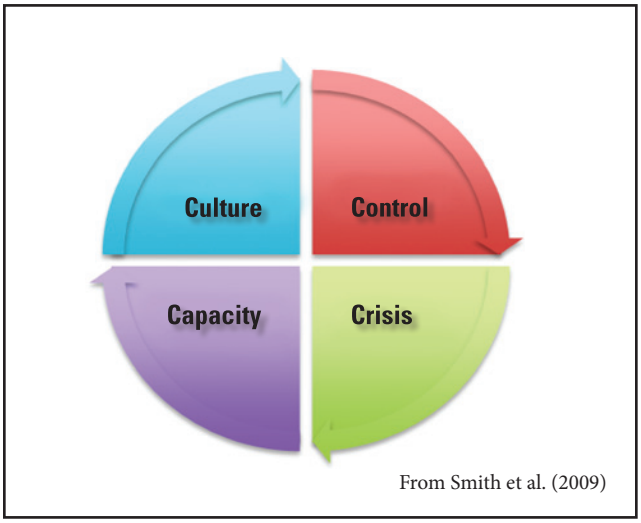


Figure 2. Use of Indigenous traditional knowledge: the 4 Cs analysis.

2.3 The 4 Cs framework for using Aboriginal knowledge

Our project collaborated with a team led by Dr. Peggy Smith examining the use of Indigenous traditional knowledge (ITK) in forest management. Based on a series of case studies, the team identified four themes that were subsequently used to organize and analyze experiences of ITK use. The four themes are: control, crisis, capacity and culture. These themes are also appropriate for considering the use of ALUOS in forest management and planning. The discussion presented here is drawn from the preliminary report and readers are advised to seek a final version of this report from Dr. Smith.

Control

Including "control" in the framework refers to authority and decision-making power in forest management and in collection of ITK. Specifically this includes:

- who owns the information,
- who controls use of and access to information, and
- who is in physical possession of the information.

Other aspects of control include:

- governance;
- legislation, policy and planning framework;
- protocols, such as for intellectual property rights;
- Aboriginal rights and title; and
- using ITK in forest management.

Capacity

In almost all cases, parties lack capacity to adequately conceptualize, plan and implement goals related to ITK in forest management. This applies to all parties – Aboriginal communities, government agencies and forestry companies.

Skilled staff who understand both forestry and Aboriginal knowledge and land use are essential. Also essential are financial and technical resources to collect information and relate this to forest management and planning.

Crisis

Various driving forces contribute to the use of ITK in forest management, both positively and negatively. These may originate externally to the community (e.g., court decisions) or internally within the community (e.g., research project). A crisis is not necessarily a conflict or negative action, but a point when difficult and important decisions are necessary. Hence a crisis may lead to increased application of ITK in forest management.

Culture

Culture refers to the accumulated knowledge and heritage of the Aboriginal people and the value systems expressed by individuals, communities and

organizations in their use of ITK. This context of culture affects ITK and ALUOS in forest management through:

- First Nations' protocols;
- policy and planning frameworks; and
- governance.

2.4 Challenges and considerations

Case studies, documented mapping projects, literature and guidebooks describe a range of problems and challenges associated with the use of ALUOS in forest management. Often the extent or significance of a problem depends upon the way in which the ALUOS is being used. Minor shortcomings can become critical barriers when an ALUOS is promoted as a solution to all land use problems for an Aboriginal community or if it is planned and implemented in an inappropriate way. If an ALUOS is to be successfully undertaken and then effectively incorporated into forest management, then these challenges need to be recognized and considered in planning processes.

We review here four main groups of issues identified by researchers and practitioners:

- practical and implementation issues;
- methodological issues;
- understanding, using and controlling information; and
- the meaning and use of knowledge.

2.4.1 Practical issues

Access to financial, human and material resources

Although the basic idea of an ALUOS is simple (asking Aboriginal people where and how they use resources), a valid study requires significant efforts in skills, training, time, personnel, equipment, and especially in the contribution of elders or resource users (Natcher 2001). Communities typically require funding or material assistance from governments and/or industry to undertake an ALUOS and then to make this information available for management. Garvin et al. (2001) provide an example of a budget equivalent to $4 per km^2, but costs depend upon many factors and could be much higher.

Note that community members, rather than outside "experts", can conduct and implement an ALUOS with appropriate training, as emphasized by Tobias (2000).

A valid land use and occupancy study requires significant efforts in skills, training, time, personnel, equipment – and especially in the contribution of elders or resource users.

Trust and confidence of elders and the community

An ALUOS relies upon members of the community, especially elders and resource users, sharing their information and knowledge. A project that is not able to communicate and develop the trust of the community is unlikely to succeed, whether it is run by community members or by outsiders (Natcher 2001).

Computers and technology

GIS, computer mapping, satellite imaging, GPS, digital recording and a variety of other hi-tech tools are now widely used to facilitate the task of conducting an ALUOS and storing and accessing the information.

However, it is important to remember that the heart of an ALUOS is people, and determining how people use and have used lands. Technology can assist in attaining this objective, but should not overwhelm the human aspect. Unfortunately, financial assistance programs or industry or government technical support sometimes emphasize equipment and technology over collection techniques that are appropriate to elders or community members involved in the project.

"Technology can make it all too neat and structured. The 'fun' part is to show and enjoy what the computer misses because it isn't human."

Participant, Saskatoon workshop, January 2009

It is important to remember that the heart of an ALUOS is people, and determining how people use and have used lands. Technology can help in attaining this objective, but should not overwhelm the human aspect.

Barriers of language and mapping

Translation is an unavoidable element of some ALUOS work, as elders in many Aboriginal communities continue to use Indigenous languages while studies and reports are prepared in English or French (WCMF 2007). Translation is not straightforward as terms used by Aboriginal peoples to describe practices in the forest may have no equivalent in European languages, forcing translators to use words that do not carry exactly the same meaning (Wyatt 2004). Similarly, recording information on maps can lead to misrepresentation if informants are not familiar with maps, or with the symbols and scales used as part of an ALUOS.

2.4.2 Methodological issues in conducting and using ALUOS

Limitations of map biographies and memory ethnology

An ALUOS should generally be considered as a minimum indication of use and occupancy. An ALUOS is based on individuals' capacity to remember what activities they have undertaken and where over a period of years. Activities that were forgotten, or that informants were unwilling to share, will not be recorded. As such, there is always missing information (Thom and Washbrook 1997). Also, while maps and map biographies are a convincing way to illustrate the geographical extent of use and occupancy, they are limited in their ability to document and explain other information, such as the seasons in which the areas are used, the importance of the land uses for community members, ways in which land use has changed and so on.

"Asking a 70-year old hunter to mark all of his campsites is comparable to asking a 70-year old traveling salesman to list every gas station and hotel he has ever used."
(Thom and Washbrook 1997: 2-3)

Site-specific information is easy, other information is ignored

Forest managers have extensive experience in mapping forestlands, identifying features such as species composition, watercourses, roads and soil types. Based on their experience, they may be tempted to ask Aboriginal people to prepare a similar map of their values, showing historical sites, hunting areas, critical wildlife habitats and culturally important areas. Such a request would overlook information about why sites were historically important, how hunting was controlled in certain areas, what factors affected the use of particular habitats and how people are related to the land. Natcher (2001) notes that limited information leads to a view of Aboriginal land use as static and unrefined. If an ALUOS is to be effectively incorporated into forest management then managers need to take account of the wider implications of site-specific information.

"Many of these places can not simply be mapped and 'logged-around'."
(Thom and Washbrook 1997: 2-3)

Are "blank spaces" really unimportant?

Mapping areas that have been used and occupied by Aboriginal people, along with sites important for cultural, historical or wildlife reasons, typically creates a series of overlapping forms, lines and points (as in Figure 1). Where parts of the area are left uncovered by these markings, the "blank spaces" are often assumed to be "unused" or "unimportant" for Aboriginal peoples. However, this is not consistent with a holistic view of land and the environment that is common in Aboriginal cultures. Also, not all Aboriginal values can be shown on a map, and the importance of mapped sites can also be affected by their surroundings. "Blank spaces" on an ALUOS map do not necessarily represent areas that are available for development or exploitation without impact upon Aboriginal communities (Natcher 2001).

Changes in land use are overlooked

Map biographies tend to present a snapshot of how the land was used during a particular period, whether this is a ten-year interval or living memory. However, Aboriginal use and occupancy of forestland can be affected by a variety of factors, such as changing animal populations, forest fires, seasonal change, pressure from other groups, logging and mining activities and so on. Although interviews during an ALUOS could ask informants to describe changes, such practice appears to be rare. Hence ALUOS maps tend to emphasize a static view of Aboriginal use. Carlson (2009) suggests that recognizing these changes could provide useful information to current managers and even enable predictive modelling.

2.4.3 Understanding, using and controlling information

Relevance of ALUOS to non-Aboriginal managers

For many non-Aboriginal forest managers, information about Aboriginal use and knowledge may be seen as unscientific or of little relevance to forest management (Brubacher and McGregor 1998, MacKinnon et al. 2001). This can lead to minimal compliance with obligations or policies and the view that an ALUOS is an unfortunate necessity, but of little value. It is however useful to recall that the Clayoquot Sound Scientific Panel made the Nuu-chah-nulth vision of land a central element of their process (CSSP 1995, Lertzman and Vredenburg 2005). Aboriginal information can make an effective contribution to forest management. However, resource management professionals are likely to need better education and awareness about how to understand, use and respect this information, and to better understand and respect those who hold it.

Control of information about Aboriginal use and occupancy

Non-Aboriginal managers may view an ALUOS as simply another layer of information to be integrated into a GIS for planning, while Aboriginal peoples are concerned about maintaining ownership and control of their information and how it is used (Brubacher and McGregor 1998). Appropriate processes and institutions are needed (for instance co-management) to ensure that information is used and interpreted in ways that are acceptable to Aboriginal peoples, as stressed by Natcher (2001). It is important to be clear about who collects and controls information, who decides how it is used and who is responsible for monitoring and updating.

Recognition of Aboriginal rights and title

Many Aboriginal peoples are involved in battles to ensure recognition of their rights. Information about traditional land use and occupancy is an important tool in these battles. However, uncertainty over access to traditional lands and the absence of clear policy on the recognition of Aboriginal knowledge and rights can make it more difficult to undertake an ALUOS and to use the information in appropriate ways in forest management (MacKinnon et al. 2001). The possibility of using information in future legal action can also encourage a community to maintain secrecy around the possession and use of an ALUOS.

The duty to consult and accommodate, consultation processes, and ALUOS

The Supreme Court of Canada has established the need for governments (and private companies) to consult with Aboriginal peoples before undertaking activities that could impact upon their use or infringe their rights. "Consultation" is often understood in quite different ways by governments, industry and Aboriginal peoples, however.

Aboriginal people wish to ensure that such consultation is effective and meaningful and that it leads to accommodation of their interests (Lindsay and Smith 2001, Ross and Smith 2003). Industry and government, on the other hand, may feel that requesting, funding or using an ALUOS constitutes sufficient "consultation" to meet the requirements of the law.

Researchers such as Markey (2001) and Natcher (2001) argue that an ALUOS should not be seen as a means of complying with the duty to consult, but rather as one source of information among others. Our report on collaboration between Aboriginal peoples and the forestry industry (Wyatt et al. 2010) considers consultation in a wider context and situates ALUOS as one of a number of mechanisms that can contribute to improving relations between the two groups (see section 2.6 below).

Confidentiality

For Aboriginal people, information concerning their use and occupancy of the land, and their knowledge about it, may be considered confidential or privileged. This could occur for a variety of reasons: information may be sensitive (such as a sacred site), traditionally available only to certain people (such as the location of medicinal plants) or available only to those who have shown that they will use it in an appropriate manner (such as animal breeding sites).

> *"There is widespread dissatisfaction and frustration within government and industry regarding access to the results of the studies. This suggests that access to the results of the studies was not clarified at the beginning of the projects. Government and industry co-sponsored the projects with the belief that they would have ready access to the data."*
>
> (MacKinnon et al. 2001: 483)

Hence Aboriginal communities may prefer not to provide information during an ALUOS, or to keep collection details secret or to restrict access to collected information. For their part, forest managers, lacking access to some of the information or details about sources and collection techniques, may be justifiably concerned about the validity of basing forest management decisions on an ALUOS.

2.4.4 The meaning and use of knowledge

Aboriginal and scientific knowledge

Aboriginal knowledge and use of lands are based on Aboriginal values, beliefs and worldview, rather than on the scientific models and assumptions commonly accepted by professional forest managers (see Appendix 7). Combining different ways of understanding knowledge and knowing is difficult. Some researchers stress the difficulties of "integrating" Aboriginal knowledge into scientific management, preferring to speak of "blending" two worldviews (MacKinnon et al. 2001) or of parallel but complementary systems, illustrated by the two-row wampum (Stevenson 2005).

Maintaining the context of Aboriginal use and activities

Activities undertaken on forest lands by Aboriginal people cannot be isolated from their cultural context. This includes the values and the social systems of those who use the land. Mapping Aboriginal land use for application in management plans and attempting to integrate different types of knowledge risks destroying the value of this information and can harm relations between managers and Aboriginal peoples (Brubacher and McGregor 1998, MacKinnon et al. 2001).

Aboriginal participation in management may help to maintain the context of information about Aboriginal use and occupancy of forestlands, as may "action research", in which researchers partner with communities to promote social justice (Natcher 2001).

Dominance of existing forestry paradigms

Forest management in Canada is dominated by a forestry paradigm aimed at controlling and directing nature with the goal of producing wood fibre for industrial production (Burton et al. 2003, Wyatt 2004). For Aboriginal peoples, this approach to forestland may be inconsistent with their values and interests, and they may feel that their information should not be used within such a system (Brubacher and McGregor 1998).

Undertaking an ALUOS to permit harvesting and other activities to continue under existing forestry regimes may represent a "no-win" situation for Aboriginal peoples. In some cases, a community's participation in processes such as co-management or consultation can act against their own interests, serving instead to legitimate the existing management regimes (Feit and Beaulieu 2001, Nadasdy 1999).

In some cases, an ALUOS may represent a "no-win" situation for Aboriginal peoples, who may be giving up their information while losing influence on what happens in the forest.

2.5 A dynamic approach to using ALUOS

During our Saskatoon workshop, researchers and practitioners from Aboriginal communities and government agencies shared a variety of experiences, as well as insights and ideas on how ALUOS could be more effectively used in forest management (and indeed whether they should be used). This discussion was characterized by great variation in views, in practices for conducting land use studies, and in models for integrating ALUOS information into forest management.

Given this diversity, it is inappropriate to propose a single set of characteristics or processes for successful use of ALUOS. Instead, we identify a series of interrelated questions that Aboriginal communities and their partners should consider before starting a study (Figure 3). These relate to goals, information, participation, best practices and context. How a specific situation is positioned in relation to these will affect how an ALUOS should be planned and used.

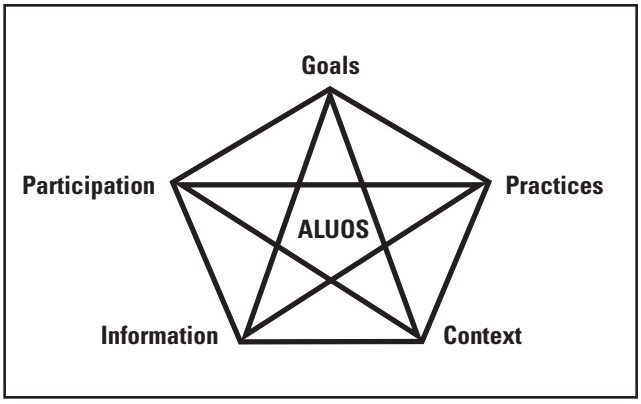


Figure 3 . Five aspects of ALUOS that affect implementation. These affect the way in which a land use study needs to be planned and conducted, and the contribution that it could make to forest management. Each also has an impact on the others. Hence, we represent them as an integrated system.

Goals: why study land use?

Each party in an ALUOS has its own goals (see section 1.5). Understanding the goal of a proposed project helps establish what information is needed and what methods will or should be used. A study aimed at improving forest management or building relations may imply a collaborative project with active involvement of an Aboriginal community, government and industry. A study by a company aimed simply at demonstrating compliance with regulations could result in a token effort with little interest by managers in using this information.

"Mapping is OK by itself but it doesn't ensure protection of values."

Participant, Saskatoon workshop

The goal also influences the forms and quality of information required. Litigation may require a research methodology that can be defended against expert witnesses called by opposing parties, while information gathered primarily for members of a community will be subjected to scrutiny and evaluation by elders.

The possibility that an ALUOS could be used in litigation may lead parties to adopt strategic behaviour such as favouring specific areas or withholding funding and support. Research methods and standards used for court battles may also result in information that is inappropriate for forest management planning or more expensive than necessary.

Information: what to collect and what to share?

Aboriginal knowledge about land use and occupancy is both extensive and complex. No single project or study is likely to be able to collect all available and relevant information. Choices must be made about what information to collect and how to do so, taking into account goals as well as the interests of people who hold knowledge.

Some information may not be intended or available for dissemination beyond the community. Aboriginal information is often subject to limitations on use and transfer. Site-specific information such as fish spawning sites or burial grounds may be considered too sensitive to be released to non-Aboriginal people. Other information relating to land use, or to history of the land and the people, may be passed on only to those who have demonstrated that the information will be used with respect.

"I appreciate the need to ensure to some degree that cultural information is kept confidential, but if the information is not made known, decisions will be made to move forward with approval of applications."

Participant, Saskatoon workshop

Land use study processes that are based on making information available may not be acceptable to communities that wish to keep information confidential. Conversely, not sharing information may result in Aboriginal interests being ignored while management decisions and actions go ahead.

Participation: is it worthwhile playing the game?

Although ALUOS are increasingly common, some people question whether these studies really serve the best interests of Aboriginal communities and their members. For instance, a study funded by the government or to provide information to forest managers may be viewed by government or industry as adequately fulfilling the "duty to consult". Managers may believe that there is no need for any further involvement of Aboriginal communities in forest management.

"Consultation is not a fax from industry to say that they are coming."

Participant, Saskatoon workshop

Producing an ALUOS requires significant investment by Aboriginal communities in money and time, especially for elders, leaders and negotiators, while obliging the community to present its culture and knowledge in terms that are understandable by non-Aboriginal managers or lawyers. Aboriginal peoples may therefore prefer to refuse to participate in an ALUOS, accepting the risk of having their interests overlooked by others. For industry and government, such a refusal could create difficulties in planning and for compliance with consultation requirements.

Aboriginal people need to consider the place of ALUOS as part of a strategy to achieve their long-term goals. For their part, governments and forestry companies should recognize that their expectations of consultation processes may not fit with an Aboriginal community's own strategy.

Practices: best for what and for whom?

A variety of ALUOS guides exist (Appendix 6). However, there are no generally accepted best practices, especially for using these studies in forestland management.

The diversity in practices, methods, goals and contexts means that studies should and can be adapted to the goals and characteristics of each project. However, this also creates difficulties in ensuring quality and consistency in ALUOS. This may be especially problematic where a study is used in legal processes, or where forest managers need to evaluate the reliability of information for use in a management plan.

"Goals for our community are layers of information whether it be scientific, cultural or government requirements. A tool every department could use for information storing. It would also be an excellent tool to share best practices with harvesting, a tool to store cultural information, stories, traditions."

Participant, Saskatoon workshop

Few existing guides consider how an ALUOS can be used in forest management, but the research literature identifies problems and issues such as different forms of knowledge, preferences for quantitative data, a bias towards site-specific information, and a range of legal and institutional considerations. Communities, managers and researchers across the country have developed a variety of models. Perhaps the best practice is to encourage parties to develop individual approaches to ALUOS adapted to their own situation and their own needs.

Context: how does an ALUOS relate to other options?

An ALUOS is a source of information that can contribute to attaining various goals of Aboriginal peoples and/or their partners. However, an ALUOS alone will not achieve recognition of Aboriginal title, create employment, change forest management or ensure the survival of culture and values.

"First, we have to talk with governments about how to do consultation with Aboriginal communities, not just political leaders, so that Aboriginal knowledge and practices for land management and sustainability are given opportunity to have equal footing with current Western approaches and concepts of land management."

Participant, Saskatoon workshop

An ALUOS should be considered as part of a wider collection of activities, processes and tools that can help develop Aboriginal engagement in forestlands. A variety of approaches are available (see section 2.6). The choice of options will depend upon the context – the opportunities that exist for an Aboriginal community and their partners in a specific situation. Aboriginal peoples and other actors need to consider their overall goals as well as the characteristics of their own situation in order to decide how an ALUOS can be effective in a wider strategy.

2.6 ALUOS in the context of relationships and collaboration

Much of the literature describing the use of ALUOS across Canada presents these experiences in particular contexts: co-management, management practices, certification, consultation, policy and, of course, Aboriginal rights and title. A recurrent message is that each ALUOS occurs within a particular context, and that the details of this context will affect both the way

in which the ALUOS is conducted and the effectiveness with which the information can be used.

Collaboration:

"the pooling of appreciations and/or tangible resources, e.g., information, money, labour, etc., by two or more stakeholders to solve a set of problems which neither can solve individually"

Gray (1985: 912), cited in Selin and Chavez (1995)

Aboriginal peoples and the forestry collaborate in a multitude of ways, as discussed in our companion report (Wyatt et al. 2010). As shown in Figure 4, these can be grouped under several main approaches. An ALUOS can be used in conjunction with many of these arrangements. An ALUOS can also be considered a form of collaboration in and of itself, helping to develop relationships and understanding between the parties involved.

As summarized in section 2.4, there are many challenges associated with the effective use of ALUOS in forestland management and planning. These difficulties are exacerbated if an ALUOS is seen as a single tool that should respond to a multitude of needs or interests.

Difficulties can be reduced if an ALUOS is used in conjunction with other arrangements. Our collaboration framework presents a range of options, enabling Aboriginal peoples, company managers and governments to choose one or more arrangements to meet their needs and the particular characteristics of each situation.

Relationships between Aboriginal peoples and forestry companies are not static. They are subject to numerous changes in interests, government policy, capacity, economic conjunctures, judicial situations and so on. Options that are appropriate for one community or one company at a certain time may not be appropriate elsewhere. Importantly, collaborative arrangements need to be built, not simply copied from another situation.

Aboriginal peoples and forestry companies should start with collaborative arrangements that suit their needs, situation and capacity. They can move on to other types of arrangements as the relationship develops and as their interests change. Figure 5 presents a model of the process of developing collaborative arrangements, which is explained in greater detail in our companion report.

An ALUOS is a tool that may be useful in communicating ideas and information about the use of forestlands. However, goals and interests must be negotiated and institutions or processes must be established so that this information is used appropriately and effectively. Successful use of an ALUOS in forest management and planning can provide a range of desired outcomes and can help build mutual confidence, trust and respect. On the other hand, an ALUOS that is not used in a manner that responds to the interests of both parties is likely to harm long-term relationships and collaboration.

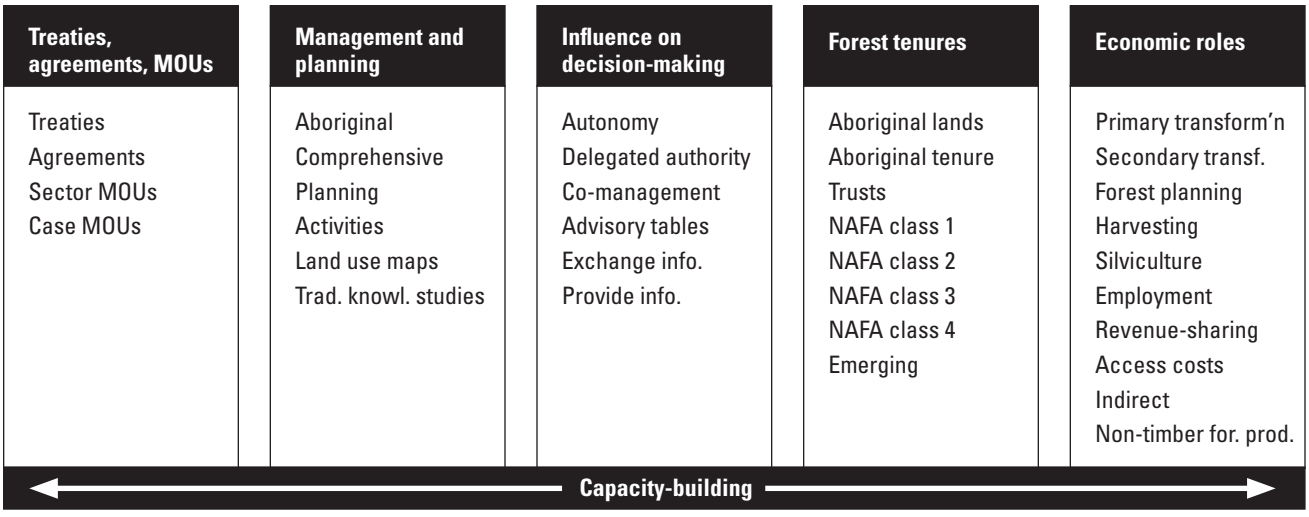


Figure 4 . Different forms of collaboration: a framework. From Wyatt et al. 2010; see source for details.

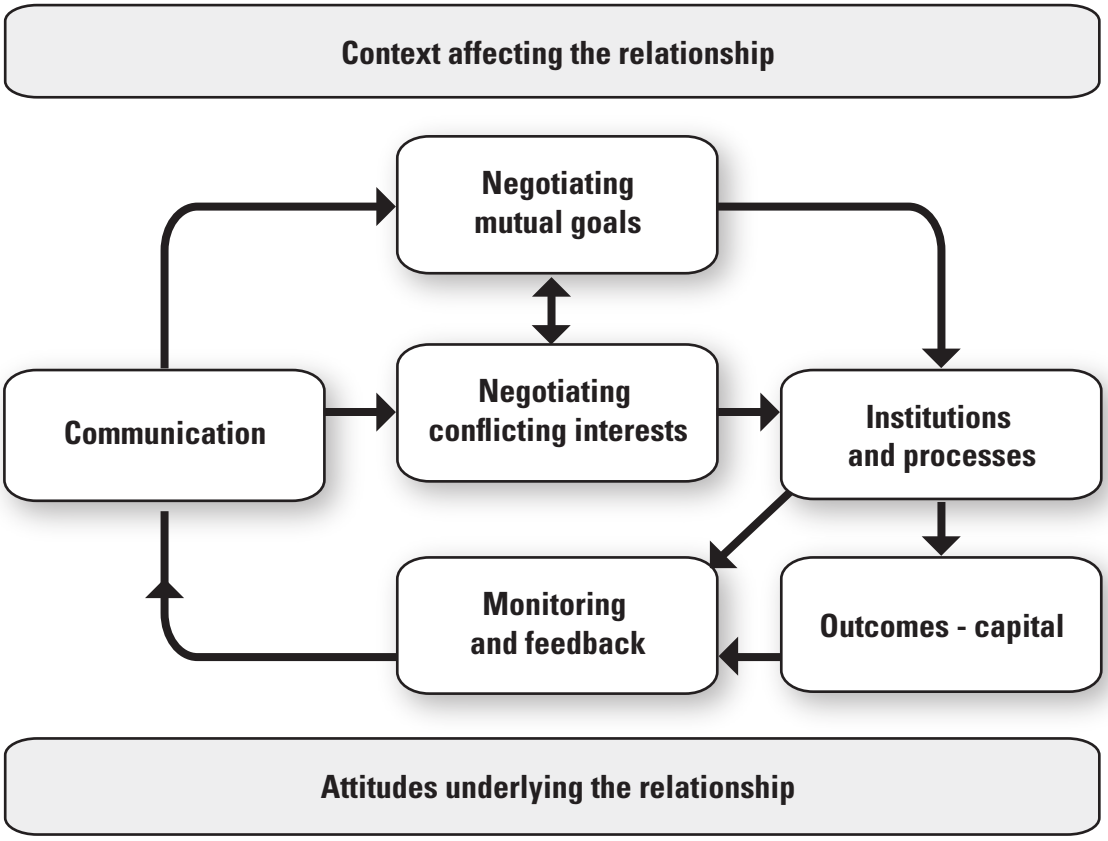


Figure 5. A process model for building collaboration. Adapted from Wyatt et al. 2010.

3.0 Implications and recommendations

3.1 Implications for Aboriginal leadership

Aboriginal people in leadership positions clearly have a critical role in deciding whether or not an Aboriginal land use and occupancy study should be conducted by a community and how the information should be used. In this context, leadership includes not only the elected officials such as chiefs and councillors, but also the elders and community members whose knowledge will be at the centre of the study.

Make strategic choices about ALUOS

Conducting an ALUOS may be an essential part of litigation for Aboriginal rights and title, but such a study is not automatically appropriate in the context of forest management and planning. Leaders should consider goals, information, participation, practices and context, as presented in section 2.5.

Establish clear goals for ALUOS

A community could have various goals for conducting an ALUOS: litigation, informing forest management, teaching the youth, and so on. Other parties, whether these are from industry, government, or even researchers, are likely to have their own goals. Leaders need to be clear about what they are expecting to achieve through the ALUOS, especially if external funding or support programs are pushing them towards other goals.

Consider other forms of collaboration with industry (if this is a goal)

Aboriginal peoples have a variety of options for developing collaboration with forestry companies, if this is one of their goals, and these are presented in our companion report (Wyatt et al. 2010). As most communities have limited time, capacity and financial and technical resources, leaders will usually need to make choices about the forms of collaboration in which they can afford to engage. Whether or not an ALUOS is an appropriate choice is likely to depend upon the needs, priorities and capacity of the community, as well as upon the opportunities offered by industry partners and by government policy. Leaders should ensure that choices are consistent with the community's vision for the future.

3.2 Implications for forestry industry managers

Managers in the forestry industry are increasingly being called upon to support Aboriginal land use and occupancy studies and to integrate this information within forest management and planning processes. This is often problematic as forestry training has rarely equipped forest managers to understand the nature and importance of land use and occupancy for Aboriginal peoples, and as there are no agreed upon best practices for using this information in management. Hence managers are often obliged to find their own way in supporting and using ALUOS.

ALUOS is not a substitute for consultation and accommodation

Most importantly, forest managers need to recognize that an ALUOS, by itself, is not a substitute for adequate consultation processes with Aboriginal peoples and communities. An ALUOS can provide useful information, but can not document the full range of interests and concerns of Aboriginal people about forest management. Community interests and goals are rarely the same as those of the industry, and more extensive consultation is needed to understand these differences, to agree on future actions and to accommodate Aboriginal concerns.

ALUOS can be an effective way of learning about Aboriginal peoples

An ALUOS can be an effective means of educating forestry industry managers and staff about the way in which Aboriginal peoples use forestlands. This can help build better relations and contribute to avoiding problems that are caused by ignorance about Aboriginal activities.

ALUOS is one collaboration option among others

Conducting and using an ALUOS is one of many ways in which forestry industry managers and Aboriginal peoples may collaborate. The variety of options for collaboration enables managers and Aboriginal communities to choose approaches that best respond to local needs. Providing funds and/or technical support for undertaking an ALUOS is likely to be appreciated by an Aboriginal community and can contribute to creating other opportunities for collaboration.

Recognize the conditions and limitations in using an ALUOS

For Aboriginal peoples, an ALUOS is not simply another layer of information to be included in a GIS. It is a partial description of their relationship with the land and a repository of knowledge that is critical to the survival of their culture. Aboriginal peoples are typically concerned about access and control of this information, and industry managers need to be aware that information is unlikely to be simply handed over for use by industry planners. These issues will be even more important if litigation is being considered or if rights and title are being negotiated.

3.3 Implications for governments and policy-makers

Governments have a critical role to play in the future of Aboriginal land use and occupancy studies. The increasing popularity of ALUOS over the last thirty years is largely due to their importance in litigation and negotiation concerning Aboriginal rights and title, processes for which federal and provincial governments carry most responsibility. Government policies and programs have also established directions for conducting ALUOS and for the use of information in forest management (under provincial jurisdiction). Furthermore, governments establish the policy frameworks that facilitate or hinder various forms of collaboration between Aboriginal peoples and forestry companies.

Clarity is needed around Aboriginal rights and title

Uncertainty over Aboriginal rights and title is an important driver of ALUOS, but also contributes to some of this information being unavailable to forest managers. Resolution of longstanding Aboriginal demands for recognition of their rights could enable ALUOS to become more available for forest management purposes, and could facilitate more collaborative relationships between Aboriginal peoples and governments. Resolution of conflict over rights could also alleviate the secrecy that surrounds many ALUOS projects, enabling practitioners to agree upon best practices for the field.

ALUOS is not a substitute for consultation and accommodation

Most importantly, government agencies need to recognize that an ALUOS, by itself, is not a substitute for adequate consultation

processes with Aboriginal peoples and communities. Both industry and Aboriginal participants in this project were vocal in expressing a perception that federal and provincial governments need to do more to establish adequate consultation with Aboriginal communities. An ALUOS can provide useful information, but does not permit discussion of the full range of interests of Aboriginal people, nor the identification of means of accommodating their concerns.

Availability of resources for promoting collaboration

Capacity and resources for ALUOS are a problem in many Aboriginal communities, while forestry companies and government agencies also typically lack staff with skills for collaboration with Aboriginal people.

ALUOS is one collaboration option among others

An ALUOS is one of a number of possible collaborative arrangements for governments, forestry companies and Aboriginal peoples. However, government programs often focus on a single model or a specific policy initiative, such as an ALUOS, ignoring others. Instead, government policy should be flexible, encouraging Aboriginal peoples to engage in forestland management in different ways, depending upon the needs and interests of the community and other partners.

3.4 Implications for researchers and consultants

Researchers and consultant practitioners have been particularly responsible for the development of techniques and for the application of Aboriginal land use and occupancy studies. However, methodological development has occurred mainly in the social sciences, whereas the application of ALUOS in forest management now involves researchers and practitioners who have been trained in the natural sciences and who are less familiar with the strengths and weaknesses of this technique.

ALUOS are (so far) primarily a social science tool

ALUOS were developed and have proven utility as an anthropological research technique, where researchers are familiar with the strengths and limitations of social science techniques. ALUOS have also proved their worth in litigation, in demonstrating the extent of Aboriginal occupancy of land and rights.

ALUOS are unproven as a resource management tool

ALUOS are increasingly being used in management of forests and other resources, and the information is potentially valuable in adapting management to both social and ecological needs. Although a number of successful examples exist, research has not yet established what is necessary for the successful use of ALUOS in forest management planning.

Open discussion is essential to improve ALUOS methodology

The advancement of methodology in ALUOS has been hampered by the confidentiality associated with many projects. Improvement in techniques and methods will be possible only if researchers and consultants are able to compare and evaluate different ALUOS experiences.

4.0 Conclusions

In preparing this State of Knowledge report, our goal was to review research and experience and consider how information about Aboriginal use and occupancy of lands can be better integrated into forest management. Aboriginal land use and occupancy studies (ALUOS) may be more than 100 years old in Canada, but their use in forest management covers little more than a decade. Aboriginal peoples, researchers, government agencies and forestry companies are still trying to find effective ways of integrating this information into forestry practice.

Discussion and experience can be grouped around two main themes:
- the techniques of ALUOS, as presented in a number of "how to" guides, and
- analysis of the context within which an ALUOS occurs and the information is used.

In this report we address both themes. We consider the context of ALUOS as part of a broad view of collaboration between forestry companies and Aboriginal peoples – a theme that is treated in a separate State of Knowledge report (Wyatt et al. 2010). Based on our review, we articulate the State of Knowledge concerning the use of Aboriginal land use and occupancy studies in forest management around seven key ideas.

There are no "best practices" in ALUOS for forest management …

A number of guides have been produced to assist Aboriginal communities, researchers, managers and others to undertake ALUOS. However, a lack of open discussion around methodology means that these guides represent particular views on appropriate techniques, rather than best practices agreed upon by the majority of practitioners.[2] Techniques for applying or integrating information from an ALUOS in forest management and planning are usually absent from these guides (with some important exceptions). Researchers and practitioners have identified a variety of issues that can cause problems in undertaking or using an ALUOS, and that can, in the worst cases, render the information unusable.

… but there are various examples for using ALUOS in forest management

Even if there are no "best practices", Aboriginal communities, industries and others are attempting to find ways to make information from ALUOS available to forest managers; several examples are presented in section 2.2.

All approaches must find ways of dealing with issues such as the goals of the community and its partners, the type of information that is collected and made available, the confidentiality of information, documentation, storage of and access to information, and the opportunity for Aboriginal people to contribute to decision-making. Each process for undertaking and using an ALUOS reflects the needs of a specific situation. Use of existing processes as examples for other situations requires that they be modified to meet the expectations of new partners.

[2] "Chief Kerry's Moose" by Terry Tobias (2000) is acknowledged as being a particularly useful guide for map biographies; an expanded volume has just been published (Tobias 2010).

ALUOS is not a substitute for consultation

ALUOS are increasingly being used within the context of consultations between Aboriginal peoples and governments or resource exploitation industries. Several provincial government policies require the completion of an ALUOS as a part of forest management planning. They are also promoted by sustainable forestry certification and criteria and indicators.

An ALUOS can certainly provide much important information that could help forest managers to take account of social and ecological values of a forest landscape. However, Aboriginal interests and concerns about forest management, and their knowledge and uses of the land, are much more extensive than the information that can be represented on a map or in an ALUOS. An ALUOS is not suitable as the sole, or even primary, means of consulting Aboriginal peoples about forest management and planning.

ALUOS is only part of the picture

For Aboriginal peoples, land use, occupancy and knowledge are all linked to their culture and to a holistic view of the environment. A typical land use map is unable to document this complexity and is only a partial representation of Aboriginal interests in forestlands.

Forestry company managers who view an ALUOS as simply another layer of information to be incorporated into a forest management plan overlook the cultural importance attached to the information by the Aboriginal community. An ALUOS that is used in an inappropriate way may contribute to increasing tension between Aboriginal peoples and the forestry industry, rather than to building relations.

Litigation, rights and title are issues in most ALUOS

Although ALUOS had their origins in anthropological research, the expansion of the field across Canada over the last thirty years has been largely due to litigation and legal processes around Aboriginal rights and title. ALUOS have been found to be an effective method for demonstrating Aboriginal occupancy of land as a means of establishing rights and title. This creates a situation where Aboriginal communities may view an ALUOS first as a confidential resource that could be used as part of a current or eventual legal strategy, and only secondarily as information to be shared with forest managers as part of a process to protect their activities and uses of the land.

ALUOS is one option among others for Aboriginal-industry collaboration

Our companion report presents a variety of options for promoting collaboration between Aboriginal peoples and the forestry industry (Figure 4), and situates ALUOS among these. While multiple approaches to collaboration may seem confusing, they enable partners to choose different forms according to their needs.

An ALUOS is unlikely to meet all the expectations of both a forestry company and an Aboriginal community, but other forms of collaborative arrangement could complement the ALUOS enabling the parties to attain their respective goals. Recognizing and encouraging multiple forms of collaboration requires that governments adopt policies that are flexible, rather than being oriented towards the promotion of a single tool.

ALUOS can contribute to building understanding and collaboration

An ALUOS can provide a wealth of information both for members of the Aboriginal community and for outsiders. Within communities, ALUOS have contributed to saving knowledge, to teaching youth and to building pride and empowerment. In forestry companies, ALUOS can provide a greater understanding of Aboriginal people and their relationship with the land.

Our companion report emphasizes the importance of building collaborative relationships between Aboriginal peoples and forestry companies, and provides a process model identifying how arrangements can develop (see Figure 5). Sharing information and participating in forest management through an ALUOS can help to build other forms of collaboration. However, inappropriate implementation or use of an ALUOS could lead to a loss of confidence and trust.

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Appendices

Appendix 1 Historical overview of land use and occupancy studies

The first studies

Aboriginal land use and occupancy studies in Canada are generally considered to have arisen in the 1970s, especially with work among the Cree of Fort George (Weinstein 1976) and the Inuit (Freeman 1976). However, their beginnings can be traced to the traditions of Boas (1888) who recognized that the recording of locally used place names could articulate the link between Aboriginal culture and the landscapes that they used and occupied. Shortly afterwards, Mauss (1905) described seasonal variation in the life of the Inuit (Eskimos), linking lifestyles to group and individual practices, seasons and resource use. Speck (1915), a student of Boas, recorded the ethnographic details of northern Algonquian hunting territories, leading to an interest in recording hunting territories and debating whether or not these were a form of "private property". Although this work was initially of purely academic interest, it was subsequently realized that such studies could support Aboriginal claims that they were dispossessed occupants.

The Inuit Land Use and Occupancy Project (Freeman 1976), undertaken in preparation for comprehensive land claim settlements, established the basic model of land use mapping that is still used today (Robinson and Ross 1997). This is based on the "map biography", in which respondents are asked to locate and map harvesting or related land use activities during their adult lives (i.e., hunting, fishing, gathering) as well as other important elements such as burial sites, travel routes, and spiritual locations. Community land use patterns are then aggregated by map categories, with outer areas representing boundaries and high density areas representing the spatial intensity of community land use.

This approach was subsequently used in Labrador (Brice-Bennett 1977), and has since become a standard method in Canada, in part due to straightforward documentation, visually effective maps and a perception of scientific validity (Usher et al. 1992). However, map biographies also suffer from limitations, particularly as it is impossible to recall, record and map *all* information about land use and maps are inappropriate for documenting explanations of why or how land is used (Thom and Washbrook 1997).

At the same time as the Inuit work, other research used similar techniques to link land uses and the contribution of these to subsistence economies. The Fort George Resource Use and Subsistence Economy Study (Weinstein 1976) determined the spatial distribution of harvesting activities of roughly 1500 community residents covering a geographical area of approximately 60,000 square km. Harvesting data were then used to determine equivalent values for commercial foodstuffs, thereby estimating the economic effects of a proposed hydroelectric project. Difficulties associated with this approach include a failure to fully account for variability and seasonality of wildlife resources or for historical changes in land use and residency by Aboriginal groups. In a later review of his own work, Weinstein (1993: 13) observed that the geographic extent of Cree land use was at an all time low when the study was undertaken in the mid-1970s.

Another variant has also been used to combine local land use patterns with proposed or existing industrial activity in order to assess the spatial aspects of conflict on traditional lands (e.g., Brody 1981). A map biography,

consistent with Freeman, is linked to the mapping of competing resource development and recreational harvesting activities (Weinstein 1993). This method was originally developed by the Union of British Columbia Indian Chiefs and is particularly useful for a spatial demonstration of the effects of industrial development upon subsistence activities.

From their origins in anthropological research, land use studies became increasingly common during the 1980s as Aboriginal peoples sought to obtain recognition of their rights through litigation. Courts have obliged Aboriginal claimants to demonstrate or prove their occupancy of land, and the land use and occupancy study has become an accepted way of doing so (Elias 2004).

Applications to resource management (e.g., forestry) - uses and limitations

More recently, land use research has found its way into resource management fields such as forestry, conservation and mining and oil and gas. Government policies and sustainable forest management guidelines now encourage mapping or studies as a means of documenting Aboriginal use of lands as a contribution to effective management (see section 2.3).

However, the response of researchers has been more cautious. Natcher (2001) considered the basis of land use research, identifying a series of potential problems in its application in resource management. In particular, he emphasized that ALUOS should be only one of a number of tools used to include Aboriginal knowledge in the management process and should never be used at the exclusion of knowledge holders themselves.

Karjala and Dewhurst (2003) went beyond simply mapping land use and sought to involve Aboriginal communities in developing alternative management scenarios. A different direction has been established by Berkes and colleagues (e.g., Armitage et al. 2007, Berkes and Folke 1998) who emphasize the social context of Aboriginal knowledge and land use, arguing that understanding the link between social and ecological systems is necessary to maintain and promote sustainability and resilience.

Varied purposes and outcomes

ALUOS have now become common in Canada. Elias (2004: 62) estimated that more than one hundred studies had been completed across Canada at a cost of over $ 100 million, while Tobias (2009) suggested that this could be as high as one billion dollars. However, many studies are undertaken under terms of strict confidentiality as Aboriginal communities and their advisors prepare for negotiations or litigation over land rights. Cheveau et al. (2008) noted a relative paucity of published studies of traditional ecological knowledge in forestry in Canada, and called for greater diffusion in accessible papers. Elias (2004: 62) summarized the dilemma for land managers stating that "*land use and occupancy studies could provide information managers need*" but that "*so long as … studies are primarily a legal tool, they and the wealth of cultural information they contain will languish*".

Robinson and Ross (1997) attribute the willingness of Aboriginal peoples to document land use knowledge to their ongoing struggle to gain respect, equity, and empowerment in the land management process. Documenting this knowledge can lead to increased self-respect and self-reliance. However, while the social and political influence of cartographic representation as a means of community empowerment has been well documented, land use studies in themselves may not be enough to ensure the protection of Aboriginal rights to the land (Natcher 2001). While such research represents a positive step towards articulating the rights and land use needs of Aboriginal communities, empowerment requires that Aboriginal communities can express their concerns and aspirations within institutional frameworks that recognize their rights as users.

Appendix 2 Legal context for Aboriginal land use and occupancy studies

Proving Aboriginal title and rights

Since Aboriginal and treaty rights were enshrined in the Canadian Constitution in 1982, the Supreme Court of Canada has developed a number of cases that outline what it takes to prove Aboriginal rights. These rights may exist in the form of "aboriginal title", a unique form of land ownership that differs from pure private property, or as rights based on use and defined in negotiated agreements with the Crown, either historic treaties or modern day land claims.

Whatever the purpose, the onus has been on Aboriginal peoples to prove their land use and occupancy (McNeill 1999). To do this requires compiling evidence that can be held up to expert scrutiny in order to support whatever legal or resource management claims are being made. Many of these claims involve compensation or accommodation, or the development of arguments to transform land management or operational practices, so there is much at stake. Since the Inuit Project (Freeman 1976), delineating and explaining Aboriginal ownership and use of land has been an important objective of many ALUOS.

With Supreme Court of Canada cases defining Aboriginal rights in the 1990s and 2000s, standards for proof of Aboriginal rights were set out. In Delgamuukw in 1997, the court stated that Aboriginal peoples must prove occupancy prior to European settlement, demonstrate continuity between present and pre-European occupancy and demonstrate exclusive occupancy through physical evidence on the ground, such as dwellings and regular use of resources, including the delineation of boundaries. As well, Aboriginal people must demonstrate that the use and occupancy of their defined territory was governed by forms of customary law (Thom 2001). Interviewing community members and mapping land use became the main form of proof.

In Delgamuukw (1997), the judge described the determination of occupancy:

"by reference to the activities that have taken place on the land and the uses to which the land has been put by the particular group. If lands are so occupied, there will exist a special bond between the group and the land in question such that the land will be part of the definition of the group's distinctive culture."

In the Marshall and Bernard cases (2005), the Supreme Court emphasized the importance of the cultural connection:

"Therefore, anyone considering the degree of occupation sufficient to establish title must be mindful that aboriginal title is ultimately premised upon the notion that the specific land or territory at issue was of central significance to the aboriginal group's culture. Occupation should be proved by evidence not of regular and intensive use of the land but of the tradition and culture of the group that connect it with the land."

The duty to consult and accommodate

Through a series of rulings, notably Delgamuukw (1997), Taku River Tlingit (2004) and Haida (2004), the Supreme Court of Canada has clarified that Aboriginal rights impose upon governments the duty to consult and accommodate Aboriginal peoples before development occurs that could adversely affect Aboriginal rights. This obligation is triggered when the Crown knows of the existence of a potential Aboriginal right or title and when proposed activities (such as forest management) could affect these rights. This can include Aboriginal use of lands not covered by specific treaties or land claims settlements. Infringements of Aboriginal and treaty rights are allowed in law, but they must be justified, for instance by a valid legislative objective.

Under the duty to consult and accommodate, consultation is understood to include providing communities with a meaningful role in the decision-making process. Within this context, an ALUOS could be seen as a means for government agencies and forestry companies to demonstrate that consultation has occurred. However, consultation processes must also, if the extent of the potential infringement of rights is significant, involve accommodation. This would usually include taking steps to avoid harm and minimize the infringement of rights. This requires other mechanisms to effectively integrate Aboriginal concerns into forest management.

It is important to note, however, that an ALUOS is unlikely to completely fulfill the obligations created by the duty to consult and accommodate. Aboriginal rights and interests are much broader than the information that would usually be collected in an ALUOS. Importantly, consultation is understood to include providing communities with a meaningful role in the decision-making process. Furthermore, the SCC has repeatedly stated that the outcome of the duty to consult should be reconciliation which can be achieved through negotiations. Reconciliation requires the Crown to change its plans or policies in order to accommodate Aboriginal concerns.

The roles of Aboriginal land use and occupancy studies

With Aboriginal people holding the burden of proof to support claims for Aboriginal rights, many have turned to ALUOS as a means of documenting their territories and land use. Integrally tied to this has been the exploration of Aboriginal customary law which supports traditions of land use.

Unfortunately, ALUOS are not always used in ways consistent with customary law or with control by Aboriginal communities. For example, a government-funded ALUOS could result in a Natural Resources department obtaining copies of Aboriginal land use maps, which are then used to facilitate resource development decisions with no further consultation with Aboriginal peoples.

The use of ALUOS as evidence in land claims has also required the development of methods that will hold up to legal and scientific scrutiny. Although Delgamuukw (1997) affirmed the use of oral testimony for Aboriginal societies that did not have written records, the courts still scrutinize this information closely and require confirmation in the form of written records and archaeological evidence (Thom 2001). In Tsilhqot'in Nation *v*. British Columbia (2007) the judge laid out his criteria for assessing oral evidence: how oral history is preserved; how that history is transmitted from one generation to the next; how the truth of oral history is protected; who is entitled to learn and pass on the history; and if there are people who are more trusted than others to remember and transmit this history. The judge also set out guidelines for judging the reliability of witnesses called to convey oral history (PIP 2009).

Thom and Washbrook (1997) also note the impact of requirements for legal evidence when planning an ALUOS. While a study may be intended for use in negotiations and in resource co-management, Aboriginal peoples may revert to litigation if these processes break down. Therefore:

"research methods should follow the standards of the law of evidence in the pursuit of data integrity, and research strategies should aim to meet the tests that courts have applied to aboriginal claims to rights and title cases"

(Thom and Washbrook 1997: 5).

Many Crown processes for documenting Aboriginal land use in resource management, such as those of Ontario, have not prescribed standards that will hold up in a court of law. The need for such standards has led to the popularity of several guidebooks on conducting ALUOS (see section 2.1 and Appendix 6).

Whatever their challenges, ALUOS have the potential to provide legal evidence for claims based on Aboriginal and treaty rights. They also have the potential to inform resource development and management practices that will protect traditional land uses.

Who owns the knowledge?

Finally, ALUOS also trigger issues around the ownership of and access to Indigenous knowledge. As a result, information-sharing agreements or protocols that address intellectual property rights have become a necessary part of sharing the information gathered through ALUOS.

Appendix 3 Policy drivers for Aboriginal land use and occupancy studies

The growing number of traditional land use and occupancy studies conducted in Canada in recent decades is partly a response to the legal issues identified earlier (section 1.4 and Appendix 2), but also to several other policy factors, both governmental and non-governmental. These can vary across provinces, between forestry companies and from situation to situation, and so each ALUOS should be considered independently, within its own unique context.

Provincial policy

Some provinces have developed specific requirements for mapping Aboriginal land use as a part of their policies and processes for either forest planning or for relations with Aboriginal communities. For example, the Ontario Forest Management Planning Manual obliges forest managers to prepare an Aboriginal Background Information Report and an Aboriginal values map as a part of consultation processes (OMNR 2004). Management plans must also include information on how identified values have been protected. However, it is important to note that many First Nations in Ontario do not accept this process as responding adequately to their rights. In British Columbia and Alberta, provincial governments have established programs to encourage and support Aboriginal communities in conducting land use mapping with the view to using this information to facilitate resource management and planning (Elias 2004). In other provinces, such as New Brunswick and Nova Scotia, governments do not require either government forestry agencies or private forestry companies to engage in ALUOS.

Land use mapping and forest planning in Ontario

"Specifically, the report will contain: …

(c) an Aboriginal values map which identifies the locations of natural resource features, land uses and values which are used by, or of importance to, those Aboriginal communities. In particular, the following features, land uses and values will be mapped:

- *(i) areas of significance to local Aboriginal communities, such as areas used for traditional or recreational activities;*
- *(ii) boundaries of trapline management areas of those Aboriginal communities (i.e., all registered trapline areas associated with individual Aboriginal communities);*
- *(iii) Reserves and Aboriginal communities;*
- *(iv) areas that have been identified as being required as Reserve lands or for economic or capital development projects of those Aboriginal communities;*
- *(v) areas used by those Aboriginal communities for fuelwood or building materials;*
- *(vi) sites of local archaeological, historical, religious and cultural heritage significance to those Aboriginal communities, including Aboriginal cemeteries, spirit sites and burial sites; and*
- *(vii) areas of archaeological potential as a result of Aboriginal involvement in the archaeological predictive modelling."*

OMNR 2004: A-135-136

National policies

Although provinces have constitutional authority over natural resources, federal government roles include Aboriginal issues and coordination of provincial efforts. Intergovernmental collaboration has led to several initiatives concerning sustainable forestry across Canada. The Canadian Council of Forest Ministers has published guidelines which include the "*Extent to which forest management planning takes into account the protection of unique or significant Aboriginal social, cultural or spiritual sites*" as an indicator of the sustainability of forest management (CCFM 2003). The 2003 National Forest Strategy includes the rights and participation of Aboriginal peoples as one of eight strategic themes (NFSC 2003). Although land use studies and mapping are not specifically mentioned, the strategy includes commitments to "incorporate traditional knowledge in managing lands and resources" and to developing institutional arrangements that give effect to "land claim settlements, treaties and formal agreements on forest resource use and management". In contrast, the most recent version of the strategy avoids discussion of Aboriginal and treaty rights and identifies only two priorities (transforming the forest sector and climate change), making only minor mention of historical Aboriginal relationships with forests and their potential role in the forest economy (CCFM 2008).

Sustainable forestry certification

Over the last decade, sustainable forest management certification has become increasingly important in Canadian forestry. Managers have a choice of three principal voluntary standards, but requirements concerning Aboriginal land use vary widely (Collier et al. 2002). The Forest Stewardship Council (FSC) standard uses the strongest language in relation to Aboriginal peoples, requiring that management respect Aboriginal rights and providing several clear indicators for this. The Canadian Standards Association (CSA) standard requires consultation with Aboriginal communities, while the Sustainable Forestry Initiative (SFI) standard simply obliges managers to confer with Indigenous peoples.

FSC Canadian Boreal Standard, Indicator 3.3.1

"The applicant supports the efforts of the affected Indigenous communities to conduct land use studies and mapping which result in an Indigenous areas of concern protection agreement, addressing information sharing, protection, mitigation and/or compensation, and confidentiality measures for Indigenous traditional values and uses.

Verifiers:

Elements that may indicate the applicants support for land use studies include:

- *Written plan on Indigenous land use and values and supporting maps;*
- *Evidence of financial support to conduct land use studies and mapping;*
- *Evidence of the implementation of the Indigenous areas of concern protection agreement including evidence of change in forestry operations, if pertinent, to protect Indigenous land uses and/or sites;*
- *Satisfaction of the Indigenous communities or an appropriate body (such as an Elders committee) with plan implementation and values protection;*
- *Evidence that values and sites outlined in plan are being protected;*
- *Evidence of negotiations with hunters, trappers and other Indigenous individuals who are land users, that is endorsed by the Indigenous communities;*
- *Evidence of mediation to the satisfaction of the Indigenous communities; and*
- *Records of workshops conducted in which mutual learning on cultural perspectives occurs."*

(FSC 2004: 43)

The duty to consult and accommodate

A series of decisions by the Supreme Court of Canada has established the duty to consult and accommodate (see Appendix 2). This duty obliges both government agencies and forestry companies to consult with Aboriginal peoples concerning the effect of proposed activities on their traditional lands and rights.

Within this context, an ALUOS may be seen as a means for government agencies and forestry companies to demonstrate that consultation has occurred. An ALUOS can certainly provide important and useful information to managers, but the interests, expectations and rights of Aboriginal peoples are usually more extensive than the sorts of information that can be indicated on a land use map (Natcher 2001).

> *"While land use research represents a positive step towards articulating the rights and land use needs of Aboriginal communities, as demonstrated by the Gitxsan, such measures cannot be used in isolation of other mechanisms, namely the direct involvement of communities themselves."*
>
> (Natcher 2001: 120)

Negotiations, land claims and litigation

An ALUOS can be a tool for demonstrating not just occupancy and use of forests, but also the existence of a special bond between Aboriginal people and the land. Proving this is an important step in establishing Aboriginal rights and/or Aboriginal title (depending upon the situation) or as a part of negotiation processes with federal and provincial governments (see Appendix 2).

However, using an ALUOS in court requires that the methodology and conclusions meet the standards of legal evidence and can be defended against criticism by hostile witnesses (Thom and Washbrook 1997). Hence an ALUOS undertaken for forest certification or as part of a consultation process may not be sufficient to prove Aboriginal occupancy or a "special bond" in a court of law.

Terry Tobias uses the term "lurking litigation" to refer to the possibility that an ALUOS may eventually be used in a legal process (Tobias 2009). As a result, some current studies conducted by Aboriginal communities are kept confidential, thereby allowing the community to reserve its options for possible litigation in the future. Information collected for the purposes of negotiation, land claims and litigation will not necessarily be available or appropriate for forest management purposes.

Appendix 4 Goals for Aboriginal land use and occupancy studies

Groups involved in ALUOS, whether they are Aboriginal, industry, government, researchers or consultants, can have a variety of goals for their participation (see the review prepared by Kopra and Stevenson 2007). A review of a number of studies in Alberta (Robinson and Ross 1997) identified three objectives:

- Collect and preserve traditional knowledge;
- Incorporate contextualized traditional knowledge into resource management; and
- Promote Aboriginal participation in resource management and decision-making.

Robinson and Ross found that representatives from forestry companies and government appeared to share the first two objectives, but did not consider the third to be a priority. They also concluded that the first objective, collecting and preserving traditional knowledge, was easier to achieve than the other two. This was attributed to the lack of consensus between the parties concerning the ways in which this information should be used in planning and management.

Undertaking an ALUOS can also help an Aboriginal community protect and encourage its own traditions. This is particularly important as ALUOS are increasingly being planned and undertaken by members of communities themselves, with non-Aboriginal individuals remaining only in training or support roles (Tobias 2000). Horvath et al. (2001) examined the ALUOS conducted by the Dene Tha' of northwest Alberta, identifying several positive impacts of the study within the community:

- the compilation of cultural information;
- discussions fostered by the process;
- greater awareness of the need to maintain Dene Tha' culture and traditional land uses;
- pride of community members and the recognition of the value and the amount of knowledge held within the community.

The community's relations with others also improved as partners became more aware of both the Dene Tha' Nation and the way that they traditionally used the land. The study "*served as a catalyst for increased communication and consultation with industry and government*" (Horvath et al. 2001). The study also contributed to empowering the community by developing skills, recognizing accomplishments and building confidence and knowledge.

An ALUOS can also help to emphasize the importance of the "bush economy" by illustrating the importance of subsistence and revenue-supplementing activities such as hunting, fishing, fruit-picking or trapping (Robinson and Ross 1997). Such an objective will generally require more than simply mapping land use, instead involving more detailed studies of the extent of activities and their contribution to livelihoods and well-being (see, for example, Chapters 1-4 in Natcher 2008). Furthermore, as noted in section 1.4, an ALUOS can be a critical part of land claims and negotiations.

As presented in section 1.4, government agencies and forestry companies also use ALUOS as a means of complying with obligations, both legislative and voluntary mechanisms such as forest certification (Collier et al. 2002, Thom and Washbrook 1997). Financial, technical or material support to an Aboriginal community that wishes to undertake a study can also help to build relations between two groups, while providing non-Aboriginal forest managers with a better understanding of Aboriginal interests and concerns. Government and industry interests in collecting and identifying traditional land use information reflect the assumption that this information will help to improve forest management or to make it more sustainable (CCFM 2003).

Finally, academic research has long been an important characteristic of ALUOS and we note that graduate student training and research continues to be an important part of many ALUOS projects. The growing demand for ALUOS in Canada, coupled with the expertise required to undertake these, has also enabled a number of consultants to specialize in training and in planning and carrying out such studies.

Table 1 (Section 1.5) provides a summary of various goals, indicating the differing interests of individual parties. Many ALUOS projects involve non-Aboriginal partners who may contribute financial and technical support while "on-the-ground" activities are undertaken by community members. While it is unlikely that goals will be the same for all participants, a joint study will require some agreement on what the objectives are and how these are to be achieved.

Appendix 5 Review methods

Analyzing and synthesizing knowledge and experience related to traditional land use mapping and studies and their use in forest management across Canada requires a rigorous methodology for reviewing, selecting and analyzing material. Material includes academic studies, informal reports and personal experiences and covers not only mapping itself, but related arrangements such as consultation processes, economic partnerships, governance and policy initiatives. The project unfolded in four major activities:

- identifying and documenting the varied experiences described in the literature and in practice (scientific publications, grey literature, case studies, etc.);
- comparing existing "best practice" guides for undertaking land use studies and for using this information in forest management;
- a metasynthesis of selected literature through appraisals, interpretation and re-interpretation; and
- a series of workshops uniting practitioners, policy-makers and researchers.

This methodology is presented in summary form below, with additional details in our companion State of Knowledge report (Wyatt et al. 2010).

Identifying and reviewing published and empirical experience

The initial step of the approach was to collect and review existing case studies, documents and project descriptions, particularly targeting information about what was done, who was involved, the results obtained and the lessons learned. Additionally, an inventory of collaborative experiences in Aboriginal communities across Canada was prepared.

The primary source of information for the first stage of this project was a **database** of more than 250 published articles and reports describing various initiatives relating to collaborative approaches involving Aboriginal peoples and forestry companies. Nearly 100 cases specifically concerned mapping and studying Aboriginal land use and knowledge about forest lands. The database served to list experiences by province and territory, codify descriptive and analytic information about each case, facilitate access to information, and, finally, enable analysis of these cases, particularly in relation to the importance of themes and codes.

An **inventory** of experience in individual Aboriginal communities, served to "ground-truth" the database. It determined the extent of mapping and other arrangements and ensured that no potentially important forms of collaboration were overlooked simply because they had not been the subject of formal studies. This inventory included 482 communities across Canada and a variety of collaborative arrangements in addition to mapping and land use studies. Methods and results are presented in greater detail in our companion report (Wyatt et al. 2010), but it is inevitable that this inventory is incomplete and that the real extent of activity is almost certainly higher.

Comparing existing "best practice" guides

See Appendix 6.

Metasynthesis of published literature

See Appendix 7.

Workshops and participation by practitioners

A workshop with researchers and practitioners (from Aboriginal communities, forestry industry and government agencies) was held in Saskatoon in January 2009 to consider the role of land use mapping in forest management and its relation to other forms of collaboration. Other workshops and focus group discussions were held in Ottawa, Moncton, Québec and Edmonton. Webinars were also used on three occasions to present preliminary analyses and to seek comments and contributions from participants across Canada. Through these activities, field experts and practitioners were often able to contribute insights and understanding that were not contained in documents while also transferring experience from one situation to another and from one person to another.

Collaboration with a review of Indigenous traditional knowledge

Work on this State of Knowledge report was linked to another project, led by team member Dr. Peggy Smith, reviewing the use of Indigenous traditional knowledge (ITK) in forest management in Canada and financed by the BC Forest Science Program. Both projects undertook a review of the literature, but Dr. Smith conducted more detailed analysis of case studies (particularly in British Columbia) and considered the application of ITK, whether or not this involved mapping. Collaboration between the two projects included sharing of databanks, literature and some case study work and participation in workshops. Preliminary results of Dr. Smith's contribute to this report (section 2.3).

Appendix 6 A comparative analysis of "best practice" guides

Over the last decade, a number of different "guides" have been produced, proposing methods, techniques and tools for collecting and recording information about Aboriginal use and occupancy of traditional lands. For this report we chose to analyze and compare a variety of existing guides for collecting and recording information about Aboriginal use and occupancy of traditional lands, rather than to prepare another set of "best practices". We also note that leading specialists such as Terry Tobias (2009) and Peter Elias (2004) consider that confidentiality around methods and studies means that there are no widely accepted "best practices" in the field. In 2004, Elias (2004) considered that "Chief Kerry's Moose" (Tobias 2000) set the standard in mapping. Tobias released a revised and expanded guide (Tobias 2010) while this report was in the final stages of publication, but the new volume has not been included in this review.

The nine guides (Table 2) selected for this review represented a variety of sources and styles. Selected guides were produced since 2000, described specific methods (as opposed to policies or scientific articles), directly addressed Aboriginal use of forestlands and were easily available, either on the internet or as volumes in print. The guides fall into two main categories:

- guides that discuss methods for studying, researching, mapping and analyzing data about land use and occupancy (Guides A-F) and
- guides that suggest methods for integrating traditional knowledge or Aboriginal values into processes such as environmental assessment and forestry management and planning (Guides B-D, G-I).

We compared their aims and target audiences, and to what extent they addressed particular aspects of land use studies (e.g., Table 3). We discuss some aspects briefly below, for instance:

- For whom and by whom are these guides written?
- Why conduct land use and occupancy studies?
- Practices, tools and methods for mapping and studies;
- Possible challenges in recording land use; and
- Interpreting and using information.

1 For whom and by whom are these guides written?

Early ALUOS work was mainly anthropological in origin, using techniques familiar to those in the social sciences. However, ALUOS are increasingly being used by those who are not social scientists. Accordingly, most of the guides included in this review (Guides A-F) have been written for members of Aboriginal communities or for researchers, lawyers, and planners working with them.

Other forestland stakeholders are also targeted. For example foresters or those conducting environmental assessments are addressed in Guides G-I. Guides C and D are indirectly addressed to a variety of actors in Cree territory. The documents related to environmental assessments (EAs) target two distinct publics: communities (to help them effectively participate in EA processes, Guide B) and individuals conducting EA (to help them integrate Indigenous knowledge into the process, Guide H). In the larger sense, certain documents also claim to also address the general public.

Many guides have been written by provincial or federal ministries or related organizations. Others have been developed by Indigenous groups or leaders, often in collaboration with researchers, or by multidisciplinary groups.

Table 2. List of guides analyzed

Code	Title	Author(s), sponsoring organization(s), date
A	Chief Kerry's Moose - A Guidebook to Land Use and Occupancy Mapping, Research Design and Data Collection	T. Tobias, Union of BC Indian Chiefs and Ecotrust Canada, 2000
B	First Nations Environmental Assessment Toolkit	First Nations Environmental Assessment Technical Working Group (FNEATWG), 2005
C	Ndoho Istchee: An Innovative Approach to Aboriginal Participation in Forest Management Planning	Waswanipi Cree Model Forest (WCMF), 2007
D	Enhancing Cree Participation by Improving the Forest Management Planning Process	M. Pelletier, Waswanipi Cree Model Forest, 2002
E	A Guide to Conducting a Traditional Knowledge and Land Use Study	T. Garvin, S. Nelson, E. Ellehoj and B. Redmond, Natural Resources Canada, 2001
F	Best Practices Handbook for Traditional Use Studies	Government of Alberta, Aboriginal Affairs and Northern Development (AAAND), 2003
G	British Columbia Archaeological Resource Management Handbook for Foresters	Government of British Columbia, Archaeological Branch, 2007
H	Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment	Mackenzie Valley Environmental Impact Review Board (MVEIRB), 2005
I	Forest Management Guide for Cultural Heritage Values	Government of Ontario, Ministry of Natural Resources (OMNR), 2007

2 Why conduct land use and occupancy studies?

These studies are useful because they generally provide a single source of information that is valid, organized and can be communicated. This information gives a portrait of

- the land,
- the diverse resources found there, and
- the ways in which these have been, and continue to be, used by Aboriginal people.

As well as details on physical aspects of the land and its use, they may include information (mapped or otherwise) on values and other cultural aspects of land use.

Before starting such a study, it is important to identify the objectives, the information that will be needed, and the purpose for which it will be used (Guide A). Information about land use and occupancy can prevent conflicts, yet it can also create them (Guide E). These studies are often perceived as a mechanism to construct relationships

between Aboriginal communities and other stakeholders on the land (Guides B-E). Furthermore, studies are very useful for transmitting knowledge within the community and to its future generations, and can serve as educational material (Guides A-B, E-F). Such studies can also prove traditional occupancy of a territory; they can thus be a tool to support Aboriginal title, land claims and political negotiations (Guides A, E-F).

"The only way you can prove physical occupation is by telling the court, "I was here, I have a house here, I have a trapline here, hunt small game over here ..." All these are markers of occupancy, and the only way to prove occupancy is by having a map that sets out the evidence in terms the people across the negotiating table, or a judge, will understand and accept."

David C. Nahwegahbow, in Tobias 2000

Mapping values, land use, traditional occupancy and knowledge has many advantages. It organizes and standardizes data, illustrates relations between different territorial elements, helps identify sensitive zones, offers an understandable language for foresters and other stakeholders, and can be a tool for forest management and planning (Guides A, C-F).

Also, legislation may oblige stakeholders to integrate Aboriginal knowledge and values in land management (e.g., in forestry) or in environmental assessment. Certain guides have been created to offer a precise method for facilitating this work (Guides G-I).

3 Practices, tools and methods for ALUOS

Guides typically propose practices and tools for undertaking studies. Table 3 summarizes the broad range of these practices and tools. This range is discussed below under the following broad areas:

- employees and work plan,
- interviews and data collection,
- mapping, and
- considering the quality of data.

The guides also describe possible challenges encountered in recording land use. These include communication with the community, sharing and protecting information, budget, avoiding "museum-type" mapping, data interpretation, and using information in land management (see next section).

Employees and work plan

Many guides mention the need to engage people with specific skills, such as experts in social science methods, coordinators, consultants, mapping technicians, interviewers and interpreters (Guides A-B, E-I). Employing members of the target community can facilitate both the work and access to information, while external staff may bring other particular skills and knowledge. Some guides define the role and skills related to each position or task (Guides A, E-G, I), distributing these among a team. In addition, many documents stress the importance of having a clear work plan with a schedule and budget (Guides A-B, D-I).

Interviews and data collection

Many of the analyzed guides propose a map biography approach which involves conducting interviews, either individually or in groups, to collect data on traditional knowledge, land use and occupancy (Guides A-F, H-I). Some guides discuss the characteristics of people that should be interviewed, appropriate timing and places for conducting interviews, and the types of questions to ask (Guides A-C, E-F). Many documents underline the importance of confidentiality and/or informed consent (Guides A-C, F, H). A very small number of guides allude to factors such as testing interview frameworks in advance (Guide A) or offering compensation in exchange for an interview (Guide E). For many guides, another way to find information is to use pre-existing documents (Guides B, D-G, I).

Table 3. **Comparison of guides**

Steps and considerations in ALUOS guides	Guide analyzed[1, 2] A Tobias	B FNEAWG	C WCMF	D Pelletier	E Garvin	F AAAND	G BC	H MVEIRB	I OMNR
Defining land use, occupancy and traditional knowledge	X (p.1)	X (p.7.2)	–	–	X (p.1)	–	X (p.3)	X (p.6)	X (p.4)
Defining goals of studies/projects	X (p.vii)	X (p.1.1)	X (p.51)	X (p.2)	X (p.1)	X (p.13)	X (p.2)	X (p.7)	X (p.vi)
To have the support of/to be in connection with the community	X (p.4)	X (p.7.14)	X (p.5)	X (p.2)	X (p.6)	X (p.16)	–	X (p.13)	O (p.13-14)
Making or suggesting a work plan	X (p.33)	X (p.7.15)	–	–	X (p.8)	X (p.11)	X (p.6)	O (p.7)	O (p.13)
Making a budget	O (p.9)	X (p.7.15)	X (p.131)	–	X (p.12)	X (p.20)	–	–	O (p.vii)
Hiring	X (p.26)	O (p.7.22)	–	–	X (p.10)	X (p.15)	O (p.7)	–	O (p.28)
Relative requirements of each position	X (p.27)	–	–	–	X (p.10)	X (p.19)	O (p.7)	–	O (p.28)
Hints for economizing	–	–	X (p.59)	–	–	X (p.45)	–	–	–
Interviewing	X (p.5)	X (p.7.14)	X (p.58)	O (p.16)	X (p.18)	X (p.34)	–	O (p.8)	O (p.13-14)
Using pre-existing data	–	X (p.7.11)	–	O (p.16)	X (p.3)	O (p.37)	X (p.6)	–	X (p.18)
Developing the interview outlines; examples of outlines	X (p.37)	–	X (p.67)	_	X (p.21)	X (p.84)	_	–	–
Compensating participants in exchange for interviews	–	–	–	–	X (p.31)	_	_	–	–
Who should be interviewed?	X (p.34)	X (p.7.16)	X (p.58)	O (p.16)	X (p.19)	O (p.35)	–	–	–
Informed consent and participant confidentiality	X (p.39)	O (p.7.14)	X (p.58)	–	–	X (p.35)	–	X (p.9)	–
Mapping and using data	X (p.1)	X (p.7.15)	X (p.89)	X (p.23)	X (p.32)	X (p.40)	O (p.5)	–	O (p.35)
Ensuring data quality	X (p.21)	X (p.9.11)	–	–	X (p.35)	X (p.72)	–	–	–
Mapping with a Geographic Information System	X (p.7)	X (p.7.15)	X (p.104)	X (p.23)	X (p.33)	X (p.41)	–	–	–
Mapping by hand	–	–	–	–	X (p.34)	X (p.45)	–	–	–
Translating interviews, information and/or results	X (p.6)	–	–	–	–	–	–	X (p.25)	O (p. 14)

continued from previous page

Steps and considerations in ALUOS guides	Guide analyzed[1, 2] A Tobias	B FNEAWG	C WCMF	D Pelletier	E Garvin	F AAAND	G BC	H MVEIRB	I OMNR
Keeping traditional knowledge in its context	–	–	–	–	–	–	–	X (p.12)	O (p. 14)
Validating the data and results with the community	X (p.9)	X (p.7.23)	X (p.72)	X (p.17)	X (p.35)	–	–	X (p.26)	–
Controlling access to information	X (p.22)	X (p.7.9)	X (p.77)	–	X p.41)	X (p.55)	–	–	–
Linking Indigenous and Western knowledge	–	–	X (p.82)	O (p.18)	–	–	–	X (p.24)	–
Avoiding museum-type cartography	X (p.22)	–	–	–	–	–	–	–	–

[1] A Tobias (2000) – Chief Kerry's Moose - A Guidebook to Land Use and Occupancy Mapping, Research Design and Data Collection
B FNEAWG (2005) – First Nations Environmental Assessment Toolkit
C WCMF (2007) – Ndoho Istchee: An Innovative Approach to Aboriginal Participation in Forest Management Planning
D Pelletier (2002) – Enhancing Cree Participation by Improving the Forest Management Planning Process
E Garvin et al. (2001) – A Guide to Conducting a Traditional Knowledge and Land Use Study
F AAAND (2003)– Best Practices Handbook for Traditional Use Studies
G BC (2007) – British Columbia Archaeological Resource Management Handbook for Foresters
H MVEIRB (2005) – Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment
I OMNR (2007) – Forest Management Guide for Cultural Heritage Values
(For author details, see Table 2.)

[2] X = Detailed information, O = Partial information, – = No information.
Page numbers are provided as a single indication of where to find this information; more may also be found on subsequent pages.

Mapping

Mapping is a tool that is often mentioned in these guides (Guides A-G, I), mainly due to the multiple advantages associated with its use (as noted in "2" above). The use of computerized geographic information systems (GIS) and global positioning systems (GPS) seem to be greatly appreciated (Guides A-F). Some documents (Guides E and F) also briefly describe the advantages of manual cartography, such as lower costs.

There are many advantages to using a computerized system:
- effective data conservation (but see below);
- standardized data (making it easier to compare maps);
- easy integration of data into management plans;
- production of more detailed maps;
- exchange of information exchange (such as by internet);
- modification and manipulation at different scales; and
- facilitation of new data entry.

GIS format allow many kinds of information to be represented spatially, particularly through the use of layers representing different value sets within the landscape. Thus, for example, specific layers can represent economic, spiritual, or education aspects of "use" and "value".

Conversely, problems associated with GIS use include lack of community capacity to operate GIS systems, failure to provide for long-term storage of data resulting in loss of information, and lack of funds to purchase software and hardware.

Regardless of the methods employed, communities need to maintain repositories of such information so that they are not lost or unavailable for use and for updating. This is, unfortunately, a common problem.

Considering the quality of data

Several guides stress the importance of ensuring that the quality of data collected in the study meets the appropriate standards (Guides A-B, E-F). ALUOS that do not ensure the quality of the data risk problems with effective application, follow-up and monitoring. They also risk loss of confidence in the agency that undertakes the work. Finally, inadequate quality can risk wasting the time and effort contributed by elders and other informants. Guide A considers quality in the greatest detail, identifying five principles for measuring quality: reliability, validity, accuracy, representativeness and consensus.

"The importance of having quality map data can hardly be overstated. If you take shortcuts and are sloppy with the design and implementation of your land use and occupancy data collection, do not count on getting to your desired destination."
(Tobias 2000: 21)

It is important to note however, that **quality is not absolute, but rather needs to be considered in relation to the goals of the study**. Documenting land use to support negotiations or litigation will require data and conclusions that can stand up to criticism from experts engaged by opposing interests, while studies used in collaborative management may require data that can effectively support planning and decision-making.

4 Possible challenges in recording land use

The guides describe a number of possible challenges in recording land use, including:
- communication with the community,
- sharing and protecting information,
- budget,

- avoiding "museum-type" mapping,
- data interpretation, and
- using information in land management.

Communication with the community

Communication, and having a close relationship with the community, are noted as essential in almost all guides (Guides A-F, H-I). Cooperation is needed to identify key participants and informants for the project and to facilitate input from other members of the community. Community members are usually called upon to validate the results of the project, whether through discussions, public dissemination, panels or other methods (Guides A-E, H).

Language may be an issue in a community if members, notably elders, are uncomfortable speaking in either English or French. It may be necessary to translate an interview so that it is available to both study organizers, community members and others (Guides A, H, I). In such a case, it would also be appropriate to translate documents and results produced by the project into the language of the community for the information of members.

Sharing and protecting information

Information collected and recorded in an ALUOS will not always be available for sharing or for transmission to other people (Guides A-C, E-F). The community may prefer not to disclose certain data such as knowledge of medicinal plants or productive berry or hunting locations.

It is important to imagine how information could be used and how results could circulate. This will help prevent information being used in ways that are contrary or detrimental to the community or its values (Guide A). Some guides state the importance of specifying what information can be shared and with whom this may take place.

> *"Some of this information is very sensitive, however, and your community may not be willing to release it unconditionally. Areas are sensitive because they may be used for ceremonies, or people are concerned about theft. In many ways, this is similar to confidential information held by oil and gas companies or any other organisation."*
>
> (Garvin et al. 2001: 41)

Some propose establishing a clear protocol or agreement on information-sharing (Guide F). One possible approach is to make a detailed map for the community and another map, without confidential information, for transmission to government agencies or industries (Guide C).

Budget

The importance of making a budget is discussed by many documents (Guides A-C, E-F, I). Few guides estimate the potential costs of a project, except for Guide E, which provides an example of a mapping study on an area of 39,000 km^2 with a total cost of $160,000.

A project's largest expenditures are often the employment of personnel and buying and using computerized systems. Some guides suggest ways of reducing costs. Suggestions include taking notes during interviews to avoid the need for subsequent transcription (Guide C), or preparing maps by hand, for later transferral to a computerized system if more funds become available.

Avoiding "museum-type" mapping

Guide A advises against a "museum-type" approach to mapping. An ALUOS should be part of a wider strategy to achieve the community's goals. When communities are asked to invest time, knowledge and resources in a project, they expect to achieve concrete results. The "museum-type" map or study records only some of the information, even though this may have been carefully collected.

For example, a mapping project that documents logging areas, roads, camps, spiritual sites and place names is still incomplete. First, this map omits many things that may also be important, such as fishing sites, wildlife corridors, landscape values or ecological importance. Second, "white spaces" on maps may be interpreted by industry or government as having no specific value to Indigenous people, and therefore as available for logging or mining without further consultation. Conversely, a map can become rapidly saturated if all available information is shown.

Therefore, it is necessary to target a certain number of key elements that are linked together. Information such a customs, local institutions, and traditional knowledge often cannot be represented on a map and should be included in accompanying texts and explicative documents.

Finally, it should be noted that land and land use change. Thus maps compiled at a given point in time, being static, should be considered as incomplete snapshots and should be seen as works-in-progress.

5 Interpreting and using information

Data interpretation

Certain guides note the need to recognize the significance of the information collected for Aboriginal informants and to avoid losing meaning through analysis and interpretation. For example, it is important to keep traditional knowledge in its context, because this fosters proper understanding of the transmitted information (Guides H and I). This is important both when conducting an ALUOS (when gathering and recording information) and when using information from an ALUOS in a particular context.

"For example, traditional knowledge holders may identify a link in certain years between the poor physical condition of caribou in summer and increases in recruitment of young–of–the–year trout. In this case, the link between the two could be due to an increased abundance of larval mosquitoes and black flies that are (a) consumed by juvenile trout and (b) developed into biting adults which swarm caribou. However, if the caribou–trout link is broken up in a report (i.e. if condition changes/population changes are reported separately by species) the link between the changes may not be clear enough for reviewers to determine the cause."

(MVEIRB 2005: 12)

Losing track of the context of information recorded on a map or in a document may lead to the loss of potentially useful information and insights. Similarly, Guide I notes the need for vigilance when using an interpreter so that the values present in an Aboriginal language are not lost in the translation.

Some guides discuss the combination or integration of Aboriginal and scientific knowledge (Guides C, D and H). Such integration can contribute to developing a series of common conservation values that can eventually be applied across the territory (Guides C and D).

However, different forms of knowledge may also be contradictory or incompatible. In such cases, one guide suggests considering the foundations of the different knowledge and how each arrived at its conclusions:

"When there is a difference in impact predictions provided by parties to the environmental assessment, the Review Board shall investigate the knowledge and experience on which these predictions are based, and find out how the parties involved came to their conclusions."

(MVEIRB 2005: 24)

Using information in land management

Many guides suggest that ALUOS can be useful for forest management planning, environmental assessment and other natural resource management activities. However, the guides are often reticent to propose a way of integrating this information in forestland management. This may be in recognition of differences between situations, notably due to legislative requirements and policies in various regions and provinces.

> *"For what political processes or framework agreements do you anticipate using the maps? How do you design the work to be effective in those contexts, while keeping your next move in mind? How do you minimize the ability of others to use your own research against your interests? [...] Indigenous peoples do not have the luxury of doing land use and occupancy research for the fun of it. Communities want their work to meet concrete practical needs."*
>
> (Tobias 2000: 22-24)

For example, Guide B notes the advantages of presenting recommendations for including Aboriginal knowledge during environmental assessments and similar processes, but does not suggest strategies to ensure that Aboriginal knowledge is truly considered. Guide A stresses the need to consider the political processes or the negotiations in which the information is likely to be used.

Exceptionally, Guides C and D provide an example, a method by which Cree tallymen from each trapline are involved in planning forestry operations (noted in "collaborative management planning" in section 2.2)

Guides G, H, and I adopt a different perspective, describing how Aboriginal "variables" can be identified and mapped. Forestland managers and those involved in environmental assessment can then decide how to best protect these values.

6 Differences between the guides

It is notable that Guides G-I, aimed mainly at non-Aboriginal stakeholders and concerned with involving Aboriginal communities in various processes, are somewhat different from the other guides. For example, whereas all other guides address the question of relations with the community, Guide G does not. Interviews appear to be the preferred method of data collection, except for Guides G and l. Finally, Guides G and I do not mention the use of GIS, perhaps because the authors consider this to be so common that it does not need to be discussed.

The authorship of guides appears to contribute to these differences. Guides A-D were written by or for Aboriginal organizations; the remainder were written by government agencies. These two groups have very different objectives, and it appears likely that these could colour the materials and techniques addressed in the guides. Governments are probably more interested in conforming to their regulatory requirements, possibly adopting a minimalist approach to Aboriginal and treaty rights. In contrast, Aboriginal communities may be fighting for access to their lands and resources, interpreting their rights within their own cultural, historical and political perspectives.

7 Comparison of guides: conclusions

The issues and challenges identified in this comparative analysis of guides fall into three main groups; we list here our conclusions regarding their treatment in the different guides:

- **Orientation** of study: reasons for conducting the project, communication with the community, the need to avoid museum-type cartography, etc. While there are some differences, all of the guides propose similar orientations and reasons for studying Aboriginal land use.
- **Technical concerns:** budgets, use of computerized mapping systems, processes for interviewing and data collection, employee recruitment and so on. The various guides complement each other, presenting a range of practices and techniques that could be used effectively in the field.

- Understanding the **nature of information held by Aboriginal people:** respecting confidential information, recognizing its meaning, and ensuring that it is used appropriately. Some guides (D, G-I) pay less attention to these questions than do the others. We note that the guides aimed particularly at Aboriginal peoples pay particular attention to the nature of information, while other guides appear less interested in this aspect.

In a deeper analysis, it would be interesting to understand why certain themes are not considered in some guides, why certain types of author address some issues more than others and how these guides are related to other documents such as legislation or policy.

Finally, it is useful to remember the following advice from Guide A:

"Indigenous peoples do not have the luxury of conducting land use and occupancy research for the fun of it."

(Tobias 2000)

The preparation of maps or studies of the occupancy and use of forestland represents an important investment for an Aboriginal community, for government and for industry. Effective use of this information in forestland management often remains problematic, however, and yet receives little attention in most of the guides analyzed. This is an important oversight if communities, government agencies and forestry companies wish to avoid simply making maps for the fun of it.

Appendix 7 Rethinking land use mapping: metasynthesis and lessons learned

Metasynthesis is a relatively recent research technique that is used to re-evaluate existing theory, particularly by reviewing a range of previously conducted studies. It helps to "push the level of theory" (Schreiber et al. 1997) by clarifying concepts and patterns in the data as well as by refining existing states of knowledge (Finfgeld 2003). Typically (Beierle and Cayford 2002, Bondas and Hall 2007, Padgee et al. 2006), a metasynthesis involves :

- identifying existing documented studies;
- selecting a subset of these based on criteria such as complete information, method, and research questions;
- analyzing the principal conclusions as well as the context and details of the study;
- and finally synthesizing with a conceptual framework that encompasses the diversity of studies .

More than simply a literature review or the sum of parts, a metasynthesis can offer new understanding of findings from individual studies, developing new explanations by analyzing and then synthesizing results.

We conducted a metasynthesis jointly for the current report and our companion report on collaboration and the forestry industry (Wyatt et al. 2010); the latter presents methodology in more detail. Our database comprises over 250 published articles, research reports and other documents describing various projects and initiatives over more than thirty years. Nearly 100 cases specifically concerned mapping and studying Aboriginal land use and knowledge about forest lands.

We selected and analyzed several studies that identified prospects and problems in harmonizing Indigenous knowledge and scientific knowledge. Published literature analyzing the experiences of the Little Red River Cree, the Yukon First Nations, the Dene Tha', and the Prince Albert Grand Council all consider the issues of the application of Aboriginal knowledge and land use information in forestry (Hiebert and Van Rees 1998, Horvath et al. 2001, Natcher and Davis 2007, Natcher and Hickey 2002). These were linked to theoretical discussions by Aikenhead and Ogawa (2007), Berkes et al. (2000), Davidson-Hunt and Berkes (2003).

1 "Wisdom in action" and "Planning the destination"

It is increasingly accepted that contemporary management of and decision-making for forestlands requires the use of both scientific knowledge and traditional knowledge held by Aboriginal peoples. However, the foundations of these two types of knowledge are quite different (Aikenhead and Ogawa 2007). This can result in conflicting approaches to the use and management of natural resources (Berkes et al. 2000).

Traditions of Aboriginal knowledge are often expressed in terms of "living in nature". They represent a relationship among people, knowledge and the environment, while also including spiritual aspects (Cajete 2000). Scientific knowledge recognizes that such traditions may exist, but considers them as subjective and beyond the

scope of science. Forest science usually concerns itself with "how the forest works", not "how it is", examining objects, causes and effects rather than the people involved (Aikenhead and Ogawa 2007).

Indigenous knowledge is often described in terms that reflect a journey, rather than a static set of data. "The process of generating or learning Indigenous ways of living in nature is coming to know" according to Cajete (2000) while Peat (1994) uses "coming to knowing". Aikenhead and Ogawa (2007) use the term "wisdom in action" for Indigenous ways of living in nature. In contrast, Western scientists and technicians often plan with specific destinations in mind, without appreciating the "twists and turns" of an informative learning journey. The difference between "wisdom in action" and "planning the destination" can serve as an illustration of the basic problem of integrating information about Aboriginal land use into forest management.

BOX 3

The Dene Tha' First Nation's Traditional Land Use and Occupancy Study (TLUOS)

The experience of the Dene Tha' First Nation (DTFN) of northwestern Alberta provides a useful story-line to present and discuss issues related to land use mapping and Aboriginal and scientific knowledge. The Dene Tha' experience with documenting their land use and Indigenous knowledge began in 1995, culminating in the publication of their Traditional Land Use and Occupation Study (TLUOS[1]) in a book containing maps, stories and photographs (DTFN 1997). The TLUOS provides information to protect cultural heritage sites and contribute to management processes, but does not publicize the location of important sites.

Reflecting on their experience with the TLUOS, the Dene Tha' identified a series of goals and impacts, grouped in three main themes (Horvath et al. 2001):

- Impacts within the community: maintaining culture, increasing traditional land uses and identifying important sites;
- Impacts on relationships with outsiders: educating outsiders, protecting traditional sites and uses and improving communication;
- Empowerment: although not one of the original goals, the TLUOS helped the community develop skills and knowledge and increased pride and confidence.

The TLUOS used a map biography approach to gather information by interviewing elders and others about Aboriginal wildlife management systems and the seasonal round of activities, as well as site-specific information. Stories were connected to places, protocols of respect were re-established in the community and discussion about traditional practices was promoted between elders and youth (Horvath et al. 2001).

The TLUOS invites outsiders to learn Dene Tha' knowledge and empowers the Dene Tha' to open up dialogue with industry. Community goals or "destinations", such as Aboriginal rights and title, are stated and supported throughout the TLUOS documents.

Using this information, the Dene Tha' were able to institute a more comprehensive consultation process with industry and government. The Dene Tha' want extractive industries to explain their development plans to the community and to seek feedback. They envisaged a learning approach where both parties collaborate to select the best development scenarios (Horvath et al. 2001).

However, like any land use study, the TLUOS remains only a partial representation of knowledge held by the community and a document that could be subject to misinterpretation by outsiders. A TLUOS is not a substitute for negotiations or understanding and experience of land use.

[1] We use here the term used in the study itself, i.e., Traditional Land Use and Occupancy Study or TLUOS.

2 Recognizing differences between Aboriginal and scientific knowledge

Differences in using and communicating knowledge

Aboriginal knowledge is anchored in both traditional occupancy of a landscape and in the ongoing practice of activities. Forest management can have important impacts on both knowledge and uses. Consultation and accommodation may seek to minimize negative impacts, but different understandings of knowledge – and of ways to communicate it – can affect the process.

Translating information from Aboriginal informants through consultations into management plans and implementation risks losing the value and context of this knowledge (Horvath et al. 2001). Purpose and timing of consultations are also issues. The Dene Tha' consider that they have traditional knowledge that is valuable to resource managers. They note that consultations must occur early in the planning process, so that cross-cultural learning can occur and visions can be shared (Horvath et al. 2001). However, they consider that consultations with industry and government often occur too late for their full consideration.

Furthermore, consultation questions are typically focused on mitigating impacts rather than on comparing other scenarios or developing long-term shared visions. Such a concentration on short-term plans may actually make it more difficult to work on long-term issues of regional and community development (Davidson-Hunt and Berkes 2003).

Other conflicts occur due to a lack of protection for natural resources, especially when forestry operations alter or destroy traditional non-timber uses of the forest. This can be exacerbated when there is a perception that industry proponents lack interest in supporting restoration of degraded areas (Horvath et al. 2001).

For Aboriginal peoples, knowledge is usually shared through the spoken rather than the written word, taking place face-to-face, often with community involvement.

Government agencies and forestry companies focus on written proposals and plans, and so may fail to understand or to follow Aboriginal protocols of listening and respect.

Building trust between Aboriginal people, government and industry is slow, and is subject to breakdown. For Aboriginal peoples, knowledge is usually shared through the spoken rather than the written word, taking place face-to-face, often with community involvement. In contrast, government agencies and forestry companies focus on written proposals and plans, and so may fail to understand or to follow Aboriginal protocols of listening and respect. Trying to transfer oral Indigenous knowledge into written documents means that much of the importance and context will be lost (Nadasdy 2003). Although some mistakes can be made and corrected, dishonest and disrespectful relations are especially harmful (Hiebert and Van Rees 1998, Horvath et al. 2001).

Differences in knowledge systems

Indigenous knowledge and Western science are distinct ways of knowing nature.[4] Recognizing the separate foundations and reflections of these ways helps us to understand the differences and the potential conflicts (e.g. Johnson 1992).

[4] In the scientific literature, the term « epistomology » refers to the "theory of knowledge" and the way that people (and cultures) organize and conceptualize information.

In Aboriginal knowledge systems there is typically a reciprocal relationship between people and the environment in which they live (Cajete 2000). For Cajete, Aboriginal knowledge teaches that people make the place and the place makes them, and that the landscape reflects the spirit. In contrast, science and scientific professions aim to make knowledge objective, removing qualitative, human and spiritual attributes, and emphasizing facts and demonstrated relationships. This may be particularly prevalent in professions such as forestry, where managers seek to control or manipulate nature.

Indigenous knowledge is often characterized as experiential, participatory, process-oriented and ultimately spiritual, while scientific knowledge is conceptual, expert-driven, product-oriented, and ultimately intellectual (Aikenhead and Ogawa 2007). As a result, non-Aboriginal managers are often bewildered (or alarmed) by Aboriginal protocols of respect for "unmeasurable entities". At the same time, Aboriginal knowledge-keepers and professionals may be bewildered (or alarmed) by the lack of humility and sensitivity on the part of scientists or resource management professionals.

There are also differences in how knowledge is obtained or learned. For the Dene Tha', for instance, knowledge, practices and beliefs are all passed on from elders to youth through stories and practices. As the people use this knowledge, it can be adapted to changing environments and new opportunities. In science, gaining knowledge about nature is a process of eradicating mystery by examining phenomena (often in isolation) and the testing assumptions about these using quantifiable observations. This method has proved powerful in advancing understanding and technology, but the approach has also historically ignored the relationships of individuals, societies and cultures within ecosystems (Aikenhead and Ogawa 2007, Berkes et al. 2000). In addition, judgements about scientific orthodoxy make it difficult to change from one scientific paradigm for another (Kuhn 1970).

3 Finding points of contact between Aboriginal and scientific knowledge

It is important to recognize that the opposition between Aboriginal and scientific knowledge systems and worldviews is not absolute. Pluralistic approaches are being increasingly advocated, accepting Aboriginal knowledge and learning and encouraging a variety of practices, information sources and models. Landmark decisions by the Clayoquot Sound Scientific Panel in 1995 and by the Supreme Court in 1997 in the Delgamuukw case established that forest management needs to incorporate Aboriginal knowledge.

Some points in common

A starting point for harmonizing Western and Indigenous knowledge is already available where empirical approaches are similar. In fact, a number of contemporary Western approaches to resource management are similar to Indigenous practices (Berkes et al. 2000). These include:

- monitoring resource abundance and change in ecosystems,
- protection of certain species at vulnerable life history stages,
- protection of critical habitats,
- temporal or seasonal restrictions on hunting,
- management of landscape patchiness,
- managing ecological processes at multiple scales,
- watershed-based management,
- nurturing sources of ecosystem renewal, and
- responding to and managing pulses or surprises.

Similarities here suggest that quantitative regional science can complement qualitative local knowledge to enhance understanding of changes in complex systems. This in turn facilitates adapation and supporting sustainability and resilience in both human and "natural" systems.

Adaptive management

There are also parallels between Aboriginal ways of living and modern concepts of "adaptive management". Adaptive management is an iterative learning process where management activities themselves are viewed as the primary tools for experimentation (Holling 1978, Walters 1986).[5] Both adaptive management and Aboriginal ways of knowing involve constant revision of empirical knowledge to steer toward sustainable management of natural resources, seeking to avoid ecological disturbances that threaten communities' social and economic interests (Berkes et al. 2000, Davidson-Hunt and Berkes 2003).

Characteristics such as observing results, testing against other knowledge and exchanging findings apply to both Aboriginal knowledge and adaptive management, whether knowledge holders are Indigenous elders, professional managers or research scientists. More recently, the use of the term "Adaptive co-management" seeks to emphasize the place for local knowledge and community institutions (Olsson et al. 2004). This appears to be approaching the ideal of "wisdom in action".

Challenges

Although these, and other, parallels and points of contact exist, it is also important not to minimize the conflicts and barriers outlined elsewhere in this report. Fundamental differences make it difficult to combine or integrate these forms of knowledge. An ALUOS can support management by providing information, but a single document or map is insufficient for recording Aboriginal knowledge about and use of forestlands. Instead, an ALUOS should be seen as an ongoing part of an adaptive management process (Aikenhead and Ogawa 2007, Horvath et al. 2001).

4 Wisdom in action towards destinations: is it possible?

ALUOS and maps of important sites have become common tools in forestland management, perceived as a way to make Aboriginal knowledge available to professional forest managers. But Aboriginal and industry goals are not usually the same. Furthermore, scientific and Aboriginal forms of knowledge have different foundations and protocols for explaining, validating and sharing knowledge. If Indigenous knowledge is "wisdom in action", can it be reconciled with a Western approach to "planning the destination"?

Western science has an impressive capacity to categorize and analyze, to identify variables, to demonstrate cause and effect, and to replace mystery with fact. For its part, Indigenous knowledge emphasizes the local and the observable. It also incorporates values and the relations between people and the environment of which they are part.

Contemporary resource management appears to need both sets of attributes. Concepts such as biodiversity, ecosystem management and environmental stewardship reflect Aboriginal views on respect, responsibility and reciprocity between people and the environment. This is the integration of social and ecological processes that is proposed by Berkes et al. (2000).

There are different ways of knowing nature, and a plurality of truths creates both a richer and more meaningful truth and a greater opportunity for explanation (Aikenhead and Ogawa 2007).

Forest management needs insights from both science and Aboriginal knowledge – although the difficulties in bringing together these two approaches cannot be ignored.

[5] Holling (1978) initially used the term "adaptive environmental assessment and management" to reflect the integration of ecological and social processes.

There are different ways of knowing nature, and a plurality of truths creates a richer and more meaningful truth and a greater opportunity for explanation (Aikenhead and Ogawa 2007). This is a central realization. This is not a contest between Western science and Aboriginal traditional knowledge. Rather, forest management requires insights from both science and Aboriginal knowledge.

However, the difficulties involved in bringing these two approaches together cannot be ignored. Aboriginal knowledge and uses of the land cannot simply be written down or mapped, and then used in a forest management plan. To do so is to remove the values, rules and institutions that ensure appropriate use of such knowledge. It also strips away critical links to other information.

Respecting both "wisdom in action" and "planning the destination" should perhaps be considered as "wisdom in action towards destinations". Establishing appropriate destinations for forestlands cannot be left to either scientific or Aboriginal knowledge alone.

Choosing destinations, and ways to reach these, will probably take the form of adaptive plans determined jointly by Aboriginal peoples and science professionals. These are unlikely to be static plans. They are more likely to be iterative learning processes that will be able to adapt to changing circumstances.

ALUOS and maps should go beyond just recording what has been done on the land. They should also provide opportunities for creating new destinations for forestlands and for building relationships and understanding between Aboriginal peoples and forest managers. Making effective use of an ALUOS is forest management will almost certainly require additional processes and arrangements to foster collaboration between Aboriginal peoples and forestry companies. An ALUOS is an important tool, but other efforts are needed if this wisdom is to contribute to reaching desired destinations.

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