Using perceptual maps to communicate concepts of Sustainable Forest Management – Collaborative research with the Office of the Wet'suwet'en Nation in British Columbia

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ABSTRACT

This article discusses collaborative research with the Office of the Wet'suwet'en Nation on their traditional territories in north-central British Columbia, Canada, a forest-dependent region where contemporary and traditional forest resources management regimes overlap. In-depth personal interviews with the hereditary chiefs and concept mapping were used to identify social-ecological linkages in Wet'suwet'en culture to inform the development of culturally sensitive social criteria and indicators of sustainable forest management (SFM) in this region. The preliminary results demonstrate how the CatPac II software tool can be applied to identify key component concepts and linkages in local definitions of SFM, and translate large volumes of (oral) qualitative data into manageable information resources for forest managers and decision-makers.

Key words: social criteria and indicators, sustainable forest management, qualitative research, Wet'suwet'en

RÉSUMÉ

Cet article aborde la recherche réalisée en collaboration avec l'Office de la Nation Wet'suwet'en sur leurs territoires ances-traux du centre nord de la Colombie-Britannique, Canada, une région dépendante des forêts où les régimes actuels et traditionnels d'aménagement des ressources forestières se superposent. Des entrevues approfondies avec chacun des chefs héréditaires ainsi que la cartographie conceptuelle ont été utilisées pour identifier les liens socio-écologiques de la culture Wet'suwet'en dans le but d'élaborer des critères et des indicateurs sociaux culturellement sensibles de l'aménagement forestier durable (AFD) de cette région. Les résultats préliminaires indiquent comment le logiciel CatPacII peut être util-isé pour identifier les éléments essentiels des concepts et des liens pour ce qui est des définitions locales de l'AFD et pour traduire des volumes importants de données qualitatives (orales) sous forme de ressources gérables d'information pour les aménagistes forestiers et décideurs.

Mots clés : critères et indicateurs sociaux, aménagement forestier durable, recherche qualitative, Wet'suwet'en

Introduction

Sustainability is not a thing, but a social value or ideal, like justice, honour or truth (Wright 2002). When tackling the complex questions of social sustainability of sustainable forest management (SFM), remember that one must be able to measure a phenomenon in order to manage it (Beckley *et al.* 2002). While understanding of the socio-economic mechanisms governing ecosystem dynamics is essential to reducing the overall social cost of environmental problems, meaningful measures for the social aspects of SFM continue to elude forest managers, researchers, communities, Aboriginal groups and stakeholders alike (Scheffer *et al.* 2000).

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New disciplinary approaches and alliances in research have opened a window of opportunity for practical applications of social sciences in forest management. Sociology may provide a better understanding of the larger societal context of forestry and forest use to forest managers and policy makers (Beckley and Korber 1995). In the case of social indicators work in forest communities, Beckley *et al.* (2002) have suggested a move toward sociological traditions that look at the complex interactions between social and natural environments, or social-ecological linkages (Berkes and Folke 1998).

Using data from community-based qualitative research in forest-dependent communities, this paper explores the perceived impacts of forest management from the perspective of the hereditary government of the Wet'suwet'en people in north-central British Columbia (BC) Canada, and gives insight into Wet'suwet'en concepts and expectations of SFM.

Sustainable Forest Management (SFM)

Having evolved from the sustainable development paradigm, SFM is a term reflecting human and societal values and needs. Our ability to manage resources and achieve sustainability is not so much a scientific or technical challenge as one of addressing "people" issues including diverse cultures, interests, needs, priorities and visions (Cormick *et al.* 1996, Hall

2001). In many cases, SFM is effectively a problem of the shared use of ecosystems by various societal groups. In practice, the forces that drive societies do not naturally approach an optimum welfare situation when it comes to resource use; politics tend to distort the picture and regulating authorities usually respond to political pressure from industries and other influential stakeholders rather than seek the real social welfare optimum (Scheffer et al. 2000). Social network structure and culture (including phenomena like belief, attitude, ritual, and patterned activity widely shared by members of a social system) are key factors in determining the time needed to solve environmental issues, and warrant deeper insight into how they are linked to ecosystem dynamics (Berkes and Folke 1998).

In short, we need to start with communities and think about how forests contribute as a means to sustaining them (Beckley et al. 2002). Social sciences and the courts have moved toward acceptance of oral histories as viable sources for understanding and interpreting the past and many academic disciplines (including anthropology, political sciences, Native Studies and law) have begun to explore the value of oral histories. The Wet'suwet'en hereditary chiefs were co-defendants in the Supreme Court of Canada's 1997 *Delgamuukw*[2] decision, which made significant pronouncements about the utility of Aboriginal oral histories by stating that oral histories of Aboriginal people were to be given consideration and weight equal to other forms of evidence (Calliou 2004). The importance of traditional ecological knowledge and wisdom (TEKW) to the Wet'suwet'en people — and the Aboriginal community in general — cannot be overemphasized (Mills 1994). As demonstrated by *Delgamuukw* (1997), the testimony of elders can help Aboriginal communities assert their rights in courts or in claims negotiations for Aboriginal and treaty rights and their knowledge can be used to re-write history with an Aboriginal perspective (Calliou 2004).

In the context of SFM and environmental monitoring, problems slowing the development and implementation of effective social measures are two-fold: monitoring tends to emphasize tools for analyzing social impacts without giving sufficient attention to impact identification, and the desired direction or trends against which social criteria and indicators (C&I) are to be evaluated are often not identified (Dietz 1987, Beckley et al. 2002). When working with Aboriginal communities, it is possible that we may find this information (or aspects thereof) embedded in TEKW and other cultural institutions.

The Case Study

Encompassing 22 000 km[2] in the Bulkley River Valley in BC's north interior, the *Yinta* (Wet'suwet'en traditional territory) represents a millennia-old Aboriginal system of tenure connecting the Office of the Wet'suwet'en First Nation[3] with the land and its subsistence resources. Archaeological evidence verifies at least 6000 years of human habitation in the area. The Wet'suwet'en *kungax* (oral tradition) suggests an even

longer timeline of up to 10 000 years and anthropologists suggest that the hereditary names of the ranked chiefs are among the oldest continually held titles of any society on earth (Mills 1994, Glavin 1998).

The Wet'suwet'en are from the linguistic Athapaskan family and maintain the traditional hereditary system of government and practices, including the traditional feast system of *bat'lats*, more commonly known as the potlatch. Within their matrilineal Clan system[4], Wet'suwet'en society is divided into a series of corporate *Yikhs* (Houses or family groups) that own or care for a series of *biyi'n* (House territories): named tracts or estates and other resources sites, particularly salmon fishing sites. Each House is headed by a Chief who is responsible for both the welfare of his/her people and the stewardship of land and resources on their respective territories (Johnson 1998).

Wet'suwet'en land tenure is more than simply a form of joint property vested in descent groups. It is a social frame of reference that includes the lands, the waters and the other non-human entities that live on them. These territories are supported by a vast network of traditional trails, historical routes for migration between the House territories and centrally-located summer fishing sites, and economic trade with other First Nations from the Pacific coast and beyond. In order to protect their access rights during the period of contact, the Wet'suwet'en legally registered the traditional boundaries of their 35 House territories as individual traplines with the provincial government in the mid-1860s. However, they continue to conceive of these traplines as multi-purpose territories yielding a variety of resources for subsistence and wealth (Johnson 1998).

There is a long history of timber harvesting in the region, originally associated with railroad development in the area. Today, the sparsely populated landscape of mountains, streams, lakes, forest and farmland is a matrix of overlapping resource management uses including timber harvesting, mining, fisheries, agricultural and range development, settlement (including government Indian reserves), outdoor recreation and tourism (BVCRB 1998). Social aspects of sustainability are a planning priority in north-central BC. This region is one of the province's most forest-dependent regions and is currently experiencing above-average unemployment rates, rationalization of the forest industry, and a mountain pine beetle (MPB) (*Dendroctonus ponderosae*) epidemic. A sample of monitoring activities addressing social measures include the Town of Smithers' Quality of Life Index (community indicators), the Bulkley, Lakes and Morice Land and Resource Management Plans (LRMPs: regional plans with community resilience objectives), and various forest industry Sustainable Forest Management Plans (SFMPs: forest management plans with social C&I). The Wet'suwet'en are also developing their own C&I for SFM and Territorial Stewardship to monitor planning and development on the *Yinta*, as part of the Wet'suwet'en Territorial Stewardship Plan.

Rationale and Research Questions

To investigate Wet'suwet'en concepts of social sustainability, the following research questions were used: What are the

[2]Delgamuukw vs. British Columbia [1998] 1 C.N.L.R. 14.
[3]The contemporary official name of the First Nation, representing approximately 5000 individuals living both on and off reserve. Hereinafter referred to as "the Wet'suwet'en."

[4]There are five Wet'suwet'en Clans: Likhsilyu (Small Frog), C'ilhts'ëkhyu (Big Frog), Gidimt'en (Wolf), Likhts'amisyu (Fireweed) and Tsayu (Beaver).

visions for SFM? What are the perceived impacts of forest management? What are the expected benefits regarding SFM?

Methods

Semi-standardized interviews using open-ended questions were conducted in the case study area over July to October of 2004 and April 2005. In collaboration with the Wet'suwet'en, the current House (*Yikh*) Chiefs were identified as the initial purposive sample[5]. Their customary role as stewards of the land and people — and the fact that several of the hereditary chiefs were also recognized as elders and/or spiritual leaders within the Wet'suwet'en community, and many had also participated in the landmark *Delgamuukw* (1997) court case[6] — made them a natural selection for key informants (Mills 1994). As per local research protocol, subjects were invited to recommend other potential subjects at the end of every interview[7], leading to additional interviews with (sub) Wing Chiefs involved in lands and resources management on the territory, such as the Wet'suwet'en Fisheries. Altogether, seventeen in-depth personal interviews were conducted with hereditary chiefs in offices, cafes and homes all over the territories, with the assistance of Wet'suwet'en translators where necessary. Interviews lasted from one to over four hours, depending on the subject (longer interviews were conducted in multiple sittings) and were recorded on audiotape and manually transcribed. In several cases, the hereditary chiefs also used the interviews as an opportunity to share their stories and TEKW with House members, family and/or Wet'suwet'en youth.

In addition to a classical content analysis, the transcripts were analyzed using CatPac II concept mapping software (Woelfel 1974). CatPac II uses an artificial neural network (ANN) to analyze text to identify frequencies and clustering of recurring concepts and has been used for qualitative research across a wide range of disciplines such as policy, business, sociology, and forest management (Cana and Hennessy 1989, Colfer *et al.* 1996, Schmidt 1998, Woelfel 1998). A major benefit of this method is that it does not require pre-coding. This allows themes and concepts to emerge from the data and reduces bias in the analysis.

The CatPac analysis was also applied to a compiled list of 731 documented issues and concerns[8] regarding forest management on the Wet'suwet'en traditional territories. This procedure made it possible to represent the attitudes and beliefs of the Wet'suwet'en chiefs about the impacts of forest management on their territories as a holistic "picture" or map in a three dimensional graph or space. In this "Galileo space,"

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[5]In a purposive sample, the researcher non-randomly selects interviewees who best meet the purposes of the study (Babbie 2001). In this case study, the sub-sample of hereditary Chiefs is also a complete sample.

[6]In which it was determined that Aboriginal rights and title had not been extinguished by the Crown, and oral histories were accepted as evidence for the first time in the history of the Supreme Court of Canada.

[7]This technique is also known more formally as snowball sampling (Neuman 2003, Minichiello et al. 1995).

[8]The 731 Issues and Concerns were identified by the Office of the Wet'suwet'en Hereditary Chiefs (OWHC) Lands and Resources Department through more than 100 personal interviews and field visits with their hereditary chiefs between 1998 and 2001.
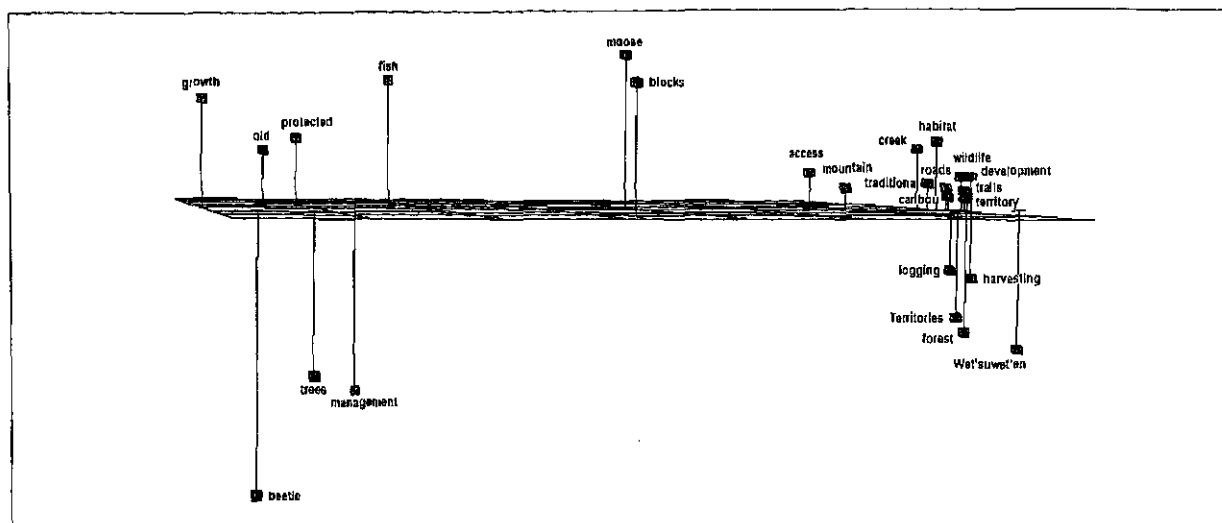
associated concepts are found close together and unrelated concepts are far apart from each other. Multiple attitudes and beliefs can be pictured simultaneously and we can view how they are interrelated. Colfer *et al.* (1996) have suggested that capturing and communicating such indirect or unexpressed consequences of forest management in this manner may improve our awareness and management of human involvement in the forest.

A collaborative review of the preliminary results indicates that they effectively capture and link important cultural concepts of SFM to territorial stewardship. Wet'suwet'en resource managers see great advantage in the graphic data presentation for articulating their work on territorial stewardship to the hereditary chiefs and members of the community at large. Perhaps more importantly, this tool may help broach cultural barriers to communication and participation posed by the written and technical nature of contemporary forest management and planning processes for a community whose elders and TEKW experts have variable levels of fluency in English as a written language.

Emerging from the Research: Concept Linkages

Fig. 1 and 2 present the CatPac plots. Fig. 1 shows the cognitive (or perceptual) map of the issues and concerns of the Wet'suwet'en hereditary chiefs regarding the impacts of forest management on their traditional territories. Although the conceptual map can only represent three of the 25 dimensions analyzed in this multidimensional space, it does provide an appealing visual representation of the approximate thinking of the Wet'suwet'en hereditary chiefs about forests and other natural resources on their traditional territories. As some of the clusters include several tightly related concepts, a two dimensional plot is displayed in Fig. 2 to allow for the relationships between clusters and the component concepts to be more easily identified. The results show a concept map with distinct clusters in each of quadrants I-IV. Based on the component concepts, we can identify four general categories of concern: Forest Harvesting; Forest Health; Tenures, Trails & Access; and Protecting Use Values. Some of these quadrants also contain subgroupings which are explained in more detail below.

Quadrant I: Forest Harvesting

This category contains the concepts "Wet'suwet'en", "territories", "forest", "harvesting" and "logging." "Forest" appears as an intermediary concept linking two sub-groupings: "Wet'suwet'en" and "territories", and "harvesting" and "logging." For the Wet'suwet'en, the forest is the contextual concept linking the Nation to their traditional territories. The impact of harvesting and logging activities are viewed at the scale of the entire, larger "territories," and across all of the traplines.

> *For all the industries, they control a lot. The government controls a lot of different territories out there. And meanwhile we're left out of that; we're kind of left out in the dark there. We seem to have to fight or work hard to get a little bit of work and not even.*
>
> (CHIEF SAMOOH, PERSONAL COMMUNICATION)

Fig. 1. Conceptual map of forest management issues and concerns on Wet'suwet'en traditional territories (3D plot).
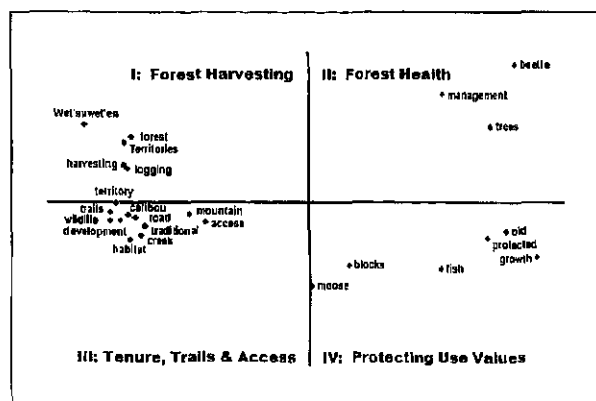

Fig. 2. Conceptual map of forest management issues and concerns on Wet'suwet'en traditional territories (2D plot).

> *Parks took all our territory. Forestry took all our land away, they stripped it. Now, when I talk about the territory today, I go out there, I cannot get nothing [sic]. I can't make money on my territory.*
> (CHIEF WOOS, PERSONAL COMMUNICATION)

The interviews also suggest that this concept quadrant includes issues to do with employment opportunities and a desire to see economic benefits from logging returned to the Wet'suwet'en people through employment in the harvesting and silviculture activities on their lands:

> *I'd like to see the government give us more opportunities and more licence to harvest the wood ourselves, manage it. They have to realize that First Nations got [sic] to get involved too and they want [sic] we want work as well.*
> (CHIEF SAMOOH, PERSONAL COMMUNICATION)

Quadrant II: Forest Health

This distinct grouping of "beetles," "management" and "trees" identifies Wet'suwet'en concerns about the MPB forest health epidemic. The MPB outbreak has driven large increases in the annual allowable cut (AAC) throughout BC and an accelerated rate of timber harvesting in the Bulkley Valley in recent years (Pacific Analytics Ltd. *et al.* 2003), with consequent impacts on the Wet'suwet'en traditional territories. The occurrence of "management" in this cluster speaks to the Wet'suwet'en perception that the current approach to this epidemic (essentially treatment by clearcut harvesting to remove large areas of beetle outbreak) has not resulted in the MPB problem coming under any form of "management" or control. It is interesting to note that these concepts are linked with "trees" rather than "forest"; this is a reflection of Wet'suwet'en interest in seeing beetle management focused on affected trees and treated through smaller-scale harvesting.

> *They've got a mountain pine beetle problem that's really affecting our territory. That's a big concern. It just seems to get worse and worse. All these bugs are infecting our trees and the big companies are coming in there, they're just wiping out everything, as much as they can, as quick as they can. And the government is kind of push [sic] them towards getting the fibre before the quality goes down because of the beetles.*
> (CHIEF SAMOOH, PERSONAL COMMUNICATION)

Quadrant III: Tenure, Trails and Access

This quadrant contains three interrelated clusters or subgroups. The two smaller subgroups identify linked concerns associated with "creek" and "habitat," and "mountain" and "access." These subgroups are then linked to the most tightly associated concepts in the cluster: "traditional," "trail," "caribou," "road," "wildlife," "territory," and "development." As a whole, this quadrant captures the concerns of the hereditary

chiefs regarding their traditional trails system throughout the territories, which are still used to traverse the lands and access wildlife and other resources for subsistence purposes. The primary impact on this trail system is the development of forest roads, which temporarily increase access for industry, other stakeholders, and the Wet'suwet'en, at the cost of increased risk to habitat. Interviews with the hereditary chiefs suggest that deactivation of these forestry roads is perhaps an even bigger concern than road development:

> They deactivate it and we can't get to use the land the way they [sic] want to use it because they've already ruined our trails, the ones we used before that logging road. Then after, when they put in the logging road, they deactivate it; and they told us they're going to leave the road open for us, for each person that use the territory. And they're not doing that.
> (CHIEF WIGETIMISKOL, PERSONAL COMMUNICATION)

Since many of these roads are located and built immediately on top of the traditional trails, once the forestry roads are deactivated, the living history of the traditional trail network system on the landscape is lost and access to the territories for subsistence use is reduced beyond levels existing prior to forest development.

> They're just going ahead and cutting these trees down where the elders used to walk; they made [sic] blazed their trail. It's just like taking away their spirit, taking away the culture, their living.
> (CHIEF SAMOOH, PERSONAL COMMUNICATION)

> You can't even recognize it, you can't even see the trail, all these trucks and everything. I went walking one day three years ago. I couldn't find the trail where we used to walk. It'd all been wrecked.
> (CHIEF NEDIBIS, PERSONAL COMMUNICATION)

Quadrant IV: Protection and Use Values
The final quadrant of the map includes a group of more loosely linked concepts, namely: "old," "growth," "protected," "fish," "moose" and "blocks." "Old," "growth" and "protected" are the most closely linked concepts in this quadrant, but are also associated with consumptive uses: "fish" (in this case, salmon) and "moose." Interview data supports these linkages and outlines Wet'suwet'en concerns that logging "blocks" have impact on "moose" and "fish" habitat. Both moose (*Alces alces*) and salmon (*Oncorhynchus spp.*) are important subsistence food sources for the Wet'suwet'en people:

> The animals are starting to move further and further back, pushed back in the mountains because they're overcutting and clearcutting. People don't realize it. People don't see that this is why we're trying to protect some sensitive areas in the territories.
> (CHIEF SAMOOH, PERSONAL COMMUNICATION)

In face of rapid harvesting to control the MPB, the hereditary chiefs are increasingly concerned that the remaining "old" "growth" on the territories be "protected," particularly as this in many cases provides wildlife and fisheries habitat for species that are important to the Nation for both cultural and subsistence purposes.

> Forest value is protecting the sensitive areas...like hunting for our food: like for moose, bear, beaver. The marsh. Keeping the marsh trees, forest around the marsh, forest around the trees for salmon to keep the water cool. I would like to see a lot more selective logging to protect our wildlife.
> (CHIEF SAMOOH, PERSONAL COMMUNICATION)

However, this grouping may also represent the belief held by many hereditary chiefs that the "old" ways of logging, prior to the industrial forestry of the 1970s — dispersed, selective logging across the landscape by small portable sawmills — "protected" the forest and ensured ongoing forest cover for wildlife habitat and "growth" of trees for continued harvest by natural regeneration.

These concepts have been identified as fundamental components of Wet'suwet'en perspectives on SFM and territorial stewardship, and the causal links are being elaborated through classical content analysis of the interview transcripts. Preliminary results emerging from analysis of the interview transcripts complement the CatPac summary analysis and are being used to refine these concepts and linkages and critique existing social C&I of SFM.

Conclusions
Although the use of qualitative data sources such as personal interviews and oral histories seems a daunting task to many, this analysis shows that in fact it need not be laborious and can help contribute valuable information to forest management and planning processes. The application of text analysis and concept mapping to text-based qualitative interview transcripts means that no information contained in the data need be lost and in fact, that latent information may also be uncovered (Woelfel and Stoyanoff 1993).

The use of concept mapping also demonstrates the potential for linguistic and sociological traditions of comparing narratives within and across cultures, and treating text as a window into human experience, to help articulate social and cultural aspects of SFM at the community level (Bernard and Ryan 1998). The advantages of the CatPac tool include a fully graphic and visual presentation of the results, which can assist the Wet'suwet'en, forest managers and other stakeholders in articulating their respective representations, interpretations and systems of belief regarding SFM with each other and improve communication in their work towards expressing and monitoring a common culture of sustainability in the local context.

The social and cultural impacts of forest management identified by the Wet'suwet'en hereditary chiefs involve something perhaps best described as threats to their living history on the land, where governance, legitimate authority, and cultural institutions interface with geographical and biological features. Identifying these linkages between social and ecological systems is key to creating culturally sensitive measures of social sustainability and will contribute to a critical evaluation of social C&I in the case study. A collaborative review of these

preliminary results indicates they are a reasonable reflection of Wet'suwet'en perspectives on forest management in their traditional territories, and they are now being used in the development of the Wet'suwet'en Territorial Stewardship Plan. This approach is already helping to build understanding of the social-ecological linkages in the Wet'suwet'en traditional territories, which will allow us to identify knowledge gaps regarding the cultural sensitivity of social C&I of SFM in the case study region.

Acknowledgements

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