

CULTURAL KEYSTONE SPECIES IN OIL SANDS MINE RECLAMATION, FORT MCKAY, ALBERTA, CANADA

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ABSTRACT

Fort McMurray, Alberta, Canada is the centre of mining extraction of oil sands (bitumen) resources on a large scale - currently three mining operators produce approximately 1,000,000 bbl per day on a footprint of approximately 50,000 ha. Although Fort McMurray is the population centre associated with this development, the indigenous community of Fort McKay is at the epicenter of the existing mine developments. The residents of Fort McKay view human and environmental health as inextricably linked, and thus the effects of development and subsequent reclamation is experienced on both cultural and ecological levels. Fort McKay is actively engaged in working with the local mining companies on issues of mine reclamation design, but for these reclamation efforts to be meaningful to local people, they must take into consideration more than ecological functionality and address the linked social factors. One method of addressing linked social and ecological issues is through use of the Cultural Keystone Species (CKS) concept. CKS - salient plant or animal species with a defining influence on a particular culture – offer a culturally meaningful tether for communities with landscapes in transition. This paper will present results of the application of the Cultural Keystone Species (CKS) model in the community of Fort McKay as a mechanism to address social, ecological and spiritual values in regional mine-land reclamation. Through a literature review and extensive community interviews, five CKS were identified and used to focus discussions and ultimately recommendations for relevant land reclamation within Fort McKay traditional territory. This community-based collaborative project illuminated environmental, social and policy implications for local communities and industry partners.

Keywords: Indigenous, reclamation, Traditional Environmental Knowledge, culture

CULTURAL KEYSTONE SPECIES

The burgeoning field of ethnoecology has emerged as an excellent forum to explore the relationships between humans and the environment through an interdisciplinary lens. One approach useful to focus interdisciplinary research efforts in conservation and restoration arenas is to target species that are foundational to cultures, and at the same time offer meaningful ecological targets for landscapes requiring reclamation. These “Cultural Keystone Species” (CKS), are culturally salient species that shape the cultural identity of people in a major way, as reflected in the fundamental roles they have in diet, material, and/or spiritual practices (Garibaldi and Turner 2004). Keystone species may serve a crucial technological function, be an important medicine, hold high spiritual significance, and can often serve multiple functions.

For people who view human and environmental health as inextricably linked - such as the people of Fort McKay - development and subsequent reclamation is experienced on both cultural and ecological levels. Consequently, for reclamation efforts to be meaningful for local people they must take into consideration more than ecological functionality and address the linked social and spiritual factors; the CKS model offers a number of contributions towards this goal. The CKS model provides people with a culturally relevant compass to guide them as they engage in long-term reclamation and land use planning. Reclamation timeframes for mined areas can be extensive, more than 50 years in the case of some oil sands mines, resulting in a loss of access to some or all of this area until reclamation is complete. Through the intentional focus on returning healthy populations of key species to reclaimed areas, the CKS model reinforces the significance of these species to local people.

The CKS model provides a context for indigenous communities to use language and symbols that resonate with the community, thereby changing the existing reclamation structure from one that is externally imposed to one that is internally valid and meaningful. Furthermore, because the CKS model directs attention to a finite number of culturally salient and meaningful species, it is fiscally and logistically more manageable than approaches which attempt to address a comprehensive suite of species. Simultaneously, the reclamation or restoration of cultural keystone species and their habitats will support the reclamation of habitat for associated species. Finally, communities who identify with these keystone species have a strong desire to preserve or restore them, which favors project success, and this, in turn provides a way to bring people into the reclamation process. This paper describes the application of the CKS model in the community of Fort McKay, in Northern Alberta.

INITIATION AND GOALS OF THE FORT MCKAY TEK PROJECT

Bitumen (oil sand) extraction is presently having profound cultural, environmental and economic impacts on Indigenous communities of Northern Alberta. Cumulative land disturbance from active mines, approved mines and mines in the application process, total over 191,000 ha (Grant et al. 2008). At the heart of oil sands development lies the traditional territory of Fort McKay, a community comprised of Cree, Dene and Métis people (Figure 1). Not only is the footprint of today's oil sand development immense, but the pace of growth is increasing and with it there is a rising urgency to establish a meaningful collaborative approach that encompasses community concerns and values. However, conventional reclamation projects undertaken by most regional developers fall short of Fort McKay's reclamation goals. For example, one of the more difficult to address values is spirituality, a powerful element of land experience and knowledge for the people of Fort McKay. The ability to maintain spiritual connection to the land is a strong community motivator for participation in reclamation activities.

To address ecological and social processes of land reclamation, the Fort McKay Industry Relations Corporation (IRC) initiated the *Fort McKay-Albian Sands Energy TEK Project: Traditional Environmental Knowledge in Land Reclamation* (TEK project). In this paper, the Fort McKay example is used to explore the utility of the CKS model in the context of community-based land use planning. The CKS model was found to be an effective approach to translate cultural information in a manner understandable to western scientists, to help community members to connect to the landscape in transition, and to promote good use of fiscal and logistical resources. However, the scale of reclamation

that will be taking place on Fort McKay’s traditional lands makes some community-based recommendations difficult to implement. As well, spirituality - an important component of the CKS model - proved challenging to address.

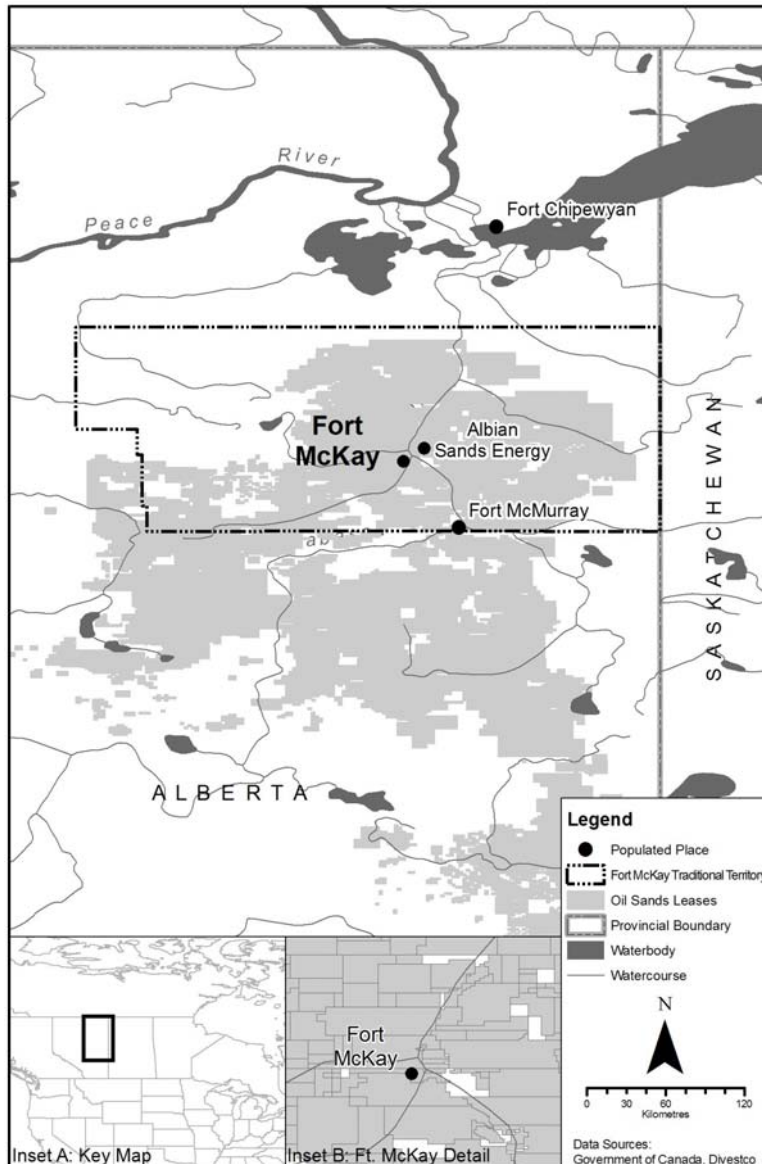


Figure 1: Community of Fort McKay located in northeastern Alberta. The dotted box represents Fort McKay’s traditional territory and the shaded area represents oil sands lease sites.

THE CULTURAL KEYSTONE SPECIES MODEL

Researchers have explored the relevance of keystone species roles in the food chain, implications of bottom-up versus top-down system effects on keystone designation, and the classification of highly interactive yet abundant species (see Kotliar 2000; Menge and Freidenburg 2001; Paine 1966, 1969; Power et al. 1996; Soulé et al. 2003). As will be discussed in the next section, the CKS model is a

separate concept from ecological keystone species (*sensu* Paine 1966, 1969) but holds metaphorical congruity with it. The CKS model is not intended as an expansion of the original definition but rather as a social model informed and influenced by ecological theory.

Throughout the world, people strongly identify with plants and animal species on which they depend for cultural and economic reasons. These species, CKS, comprise more than food or sources of raw materials. They permeate a culture's stories, spiritual practices, and language and daily practice. They are often associated with resource management activities that inform social practice, environmental philosophies, cultural history, and art (Moller et al. 2004). Just as ecologists have long recognized that some species, by virtue of the key roles they play in the overall structure and functioning of an ecosystem are essential to its integrity, certain plants and animals feature prominently in language, ceremonies, and narratives of Indigenous peoples.

THE CULTURAL CONTEXT OF RECLAMATION

The CKS model draws us closer to the meaningful inclusion of traditional ecological knowledge in reclamation desired by people of Fort McKay by addressing a more holistic suite of values, inclusive of social and ecological considerations. Culturally valued wetlands cover roughly half of the pre-disturbed landscape in the region. The areas are invaluable as reliable sources for water, travel corridors, medicine, material and food, and are inhabited by animals and plants, which make these areas historically and currently of high value both socially and ecologically within Fort McKay's traditional territory (Figure 1). Over time, hunting, trapping and land use patterns have adapted to take advantage of increased trade opportunities (Athabasca Chipewyan First Nation 2003).

Substantial oil sands mining began in the area in 1964. Presently there are 13 operating or proposed oil sands projects (mines and SAG-D) within an approximately 50 kilometer radius of Fort McKay (Alberta Energy 2008). In many instances, impacts are so extensive that the known cultural landscape no longer exists. As a result, people will have to participate in developing a connection with their "new" landscape as it undergoes continual transformations. Community members continually emphasize the necessity of reclamation practices that ensure healthy sustainable populations of culturally important species to maintain their cultural heritage - now and for future generations.

METHODS

Five primary steps were involved in determining which species held the greatest cultural importance within the Fort McKay community and thus could be classified as CKS. First, informal conversations with community members and Fort McKay IRC staff allowed researchers to build trust with community members while also identifying a preliminary set of CKS that would be verified in later stages of the project. Next, Fort McKay IRC staff selected 14 elders to participate in semi-structured interviews with elders representing Dene, Cree and Métis people, to validate the preliminary CKS and explore underlying importance and current relevance of those and other species. These interviews ensured that current values drove the identification of CKS. Concurrently while conducting interviews, the third step was completed,

by reviewing published and unpublished reference material for documentation of species of significance to the community (Garibaldi 2006).

Once interviews and literature reviews were complete, the preliminary list was assessed (and ultimately an expanded list) of cultural keystone species using an Index of Identified Cultural Influence (ICI) (Garibaldi and Turner 2004). The ICI employs a series of questions to identify potential CKS regarding intensity and variation of use, persistence in memory, symbolism within narratives or ceremony and the degree to which it is irreplaceable by similar native species. The ICI was modified from its original form to ensure relevance to the Fort McKay cultural context. As a final step, evaluation all of the information gathered during interviews, literature reviews and the ICI evaluation process was conducted and a final list of CKSs proposed which were verified with all project participants to ensure correct interpretation and accurate application of information. As the ICI is a quantitative research tool, not an absolute determiner of a CKS, the final validation of species with community members is essential.

RESULTS AND DISCUSSION: THE CKS OF FORT MCKAY AND IMPLICATIONS FOR RECLAMATION

As a result of interviews, the literature review and the use of the ICI, the final list of CKS was developed and is comprised of moose (*Alces alces*), mountain cranberry (*Vaccinium vitis-idaea* L.), bog cranberry (*Oxycoccus oxycoccus* (L.) MacM.), lowbush cranberry (*Viburnum edule* (Michx.) Raf.), blueberry (*Vaccinium myrtilloides* Michx., *V. uliginosum* L. and *V. caespitosum* (Michx.)), ratroot (*Acorus americanus* (Raf.) Raf.), and beaver (*Castor canadensis*).

The TEK Project has influenced the way both the community and Albian Sands engage with reclamation. Lessons learned from this process will help direct and inform how Fort McKay participates in reclamation activities on other portions of their traditional territory while offering guidance to other regional developers for addressing cultural values in reclamation on their leases. Further, the findings from this project offer insight for reclamation with other communities. Four key “successes” and two challenges were identified from this process.

Project Successes

Both Albian Sands staff and Fort McKay community members have indicated that focusing on CKS has facilitated more meaningful on-going communication. For each of the regional operating developers the Fort McKay IRC has established an Elder Advisory Group comprised of 8-10 elders whose trap lines overlap or are adjacent to the lease sites. The Elder Advisory Group for Albian Sands annually selects a CKS as a focus for meeting discussions and company reclamation research for the year. If the Advisory Group has an interest in a unique aspect of CKS reclamation, such as water quality and availability, the meetings will target that interest. During meetings and field visits Albian Sands discusses what is being done to address a particular aspect of reclamation for the CKS. Advisory Group members provide feedback on the reclamation as it occurs, and this act ultimately fosters a new relationship with these reclaimed areas.

One of the key advantages of the CKS model is its effectiveness at translating cultural landscape information in a way that is understandable to Western researchers, an often difficult and confusing task (Agrawal 1995; Huntington 2000; Nadasdy 2003). Spending more time focusing on species relevant to community members has encouraged sharing of traditional knowledge with direct implications for reclamation. For example, Project interviews revealed that many Fort McKay community members recognize two forms of ratroot, one preferred, and each with different growing conditions. Albian Sands staff discussed this finding with community members and has recently initiated research on ratroot morphology and associated growing conditions. Ultimately, reclamation will be focused on the preferred form of this species.

CKS have offered a relatable linkage that people can visualize and discuss between the current state of the developed landscape and the long-term goals for the land following reclamation. Lengthy reclamation timelines confound the difficulty of people to maintain (or form) connections with areas that are undergoing reclamation. Even with progressive reclamation (reclaiming mined areas “as-you-go”), the evidence and benefits of reclaimed sites is beyond the lifetime of many people in the community. While the CKS model does not ameliorate the longevity of the process, it does offer a culturally relevant linkage to the transitioning landscape. For example, reclaiming moose habitat begins with terrain shaping and soil placement, actions that, when observed, do not resemble moose habitat on undisturbed sites. It has been difficult for community members to relate to the disturbed land and see how this will ultimately become familiar habitat. At present, community members are brought to these sites where a dialogue is initiated between the community and industry. Industry explains the process of reclamation and how it will result in habitat for a CKS (e.g., moose) and community members are invited to share their perspectives on requirements for moose habitat. As a result of this on-site dialogue, community members influence the execution of the reclamation process.

Another outcome of targeting CKS in the reclamation process is a more effective use of fiscal and logistical resources while encouraging culturally relevant reclamation. Not only are the key plant species included in reclamation design, but ecologically associated species for the CKS are also included. For example, Fort McKay has shared the importance of species such as red willow (*Cornus stolonifera* Michx.) for moose browse and Albian Sands includes this species, among others, in their reclamation design. As well, opportunities now exist for Fort McKay community members to be involved in collecting local seeds for eventual planting in reclaimed areas.

Project Challenges

Two key challenges became apparent when using the CKS model as an approach for reclamation of Fort McKay traditional lands. First, the scale of oil sands disturbance and subsequent reclamation is so immense that some community recommendations for reclaiming CKS habitat may be impractical. For example, a suggestion by some elders to relocate, rather than replant, certain CKS may be feasible for a couple of acres. However, the scale of oil sands mine leases is thousands of hectares – too large of an area for such labor-intensive techniques. Further confounding the issue is the survivability of salvaged plants prior to replanting and a lack of available (reclaimed) space to transplant them to in a timely

manner, while the seeds and seedlings are still viable. So while the CKS model does still offer benefits for reclamation on a large scale, there are challenges that may be best addressed on a situational basis.

Second, one of the most elusive goals of the project was to address spirituality in the process of reclamation. Spirituality is a component of CKS, but challenging to address. People's spirituality does not exist in a locatable place, but rather in experience and physical movement on the land. Therefore, identifying locations or mechanisms to engage in continual renewal of cultural practices on the land is essential for cultural sustainability. Due to the scale of disturbance on Fort McKay's traditional territory, maintaining sites for continuous cultural connection is quite difficult. In response, the Fort McKay IRC has initiated a process to select locations for protection from development and will work with companies (and the government) to implement the recommendations. So while the discussions involving CKS reinforced the significance of spirituality in the community, what is required for its support is availability of spatial locations for people to maintain cultural practices while development occurs.

CONCLUSION

The research approach selected for this project was in response to clear directives given by Fort McKay community members to address reclamation efforts in a manner meaningful for the community, taking into consideration ecological functionality and linked social and spiritual factors. The emphasis on these aspects of culture within Fort McKay permits community members to share information they feel is valuable, in their own terms, and in their own language.

Based on the Fort McKay TEK project, the following recommendations for the application of the CKS model in other cultural and ecological settings are made. First, allocate appropriate time and resources for a collaborative adaptive process with participating communities. Understanding the unique context of the community will support a stronger more effective course of action. As with other community-based research, perhaps the best indicator of the utility of this model is the responses from the community members themselves. This process not only was initiated by the community, it engaged community members and was directed by existing cultural values.

Second, emphasize the concept of process in social-ecological reclamation. Just as restoring the structure and function of land to a targeted end-use requires a long-term commitment to a process (e.g., monitoring, evaluation, corrective measures) so too does the supporting of social mechanisms - community engagement - in reclamation. Success is then viewed as a series of actions that positively affect the trajectory of a long-term goal. In the case of Fort McKay, many findings of the project that have been implemented will be reviewed and evaluated for their long-term effectiveness. They will subsequently be further supported, modified if necessary or expanded upon as more discussion takes place. Re-engagement with the landscape is a practice and use of the CKS model is an aid to support that process.

The CKS model presented here is based on the assumption that reclamation, restoration and related actions must occur in a collaborative arena between affected communities and regional developers. This involves an honest willingness to explore community values and draws on the insight and experience of all individuals with connection to the landscape. The CKS provides one model for accomplishing this goal.

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