Canadian Aboriginal Communities and the Joint Oil Sands Monitoring Project (JOSM): Enhancing Engagement through Knowledge Co-Production

Natural Sciences and Engineering Research Council (NSERC) CREATE IACPES Policy Project

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Effective stakeholder engagement is critical to the relevance, credibility, and successful implementation and operation of the monitoring program (Government of Canada, Office of the Auditor General of Canada, 2014).

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Executive Summary

Environmental policy decisions and associated monitoring projects used to inform them are challenging because they deal with "contested environmental issues". There is often no single obviously "correct" solution but rather different possible courses of action that can significantly affect outcomes (Pielke Jr., 2007). The different interests among the various parties shape their views of what "correct" should be (Int. 1). Scientific information is needed to understand the consequences of different possible courses of action.

Environmental monitoring is difficult due to the inherent complexity of the environment, which exhibits strong variability in space and time. The difficulty is even in greater when monitoring regions with long-term environmental impacts from significant industrial activity because it requires a large amount of resources (equipment, time, expertise) to accurately understand the state of the environment and likely future impacts.

The Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring (JOSM) Project was initiated by the federal government and began in 2012 with the goal to achieving an improved characterization of the state of the environment in the oil sands area and an enhanced understanding of cumulative effects and environmental change, including future impacts. JOSM also aimed to "provide assurance of environmentally responsible development of the oil resource" (Environment Canada, 2012). JOSM engaged with Aboriginal communities in the oil sands region in order to fulfill the Crown's constitutional duty to consult and accommodate Aboriginal input.

The JOSM project was developed based on the goals of inclusion of Aboriginal Traditional Knowledge (TEK), establishment of appropriate mechanisms to integrate advice from Aboriginal people, and the development of effective working relationships with Aboriginal communities and organisations. Although it was not an explicit goal or objective, Environment Canada also acknowledged the value of TEK and its role as complimentary to western science. Despite efforts to engage Aboriginal communities who are affected by oil sand activities, this overall objective was not fully achieved. Multiple Aboriginal communities withdrew from participation of JOSM before the end of the process in 2015.

The three major objectives of this report include:

1. Describing processes of knowledge co-production between government and Indigenous communities in environmental monitoring projects and monitoring associated with Environmental Assessment (EA) processes, focusing on communities affected by significant and long-term industrial pollution using JOSM as a case study.
2. Evaluating the success of JOSM's processes in achieving knowledge co-production between government, researchers and First Nations communities based on information gathered from Aboriginal community members, researchers and administrators involved with the monitoring project, and a review of government documents.
3. Identifying recommendations that aim to enhance engagement with Aboriginal communities for future and current government environmental monitoring projects.

Data were collected from two sources and analyzed. Semi-structured, key informant interviews were conducted with a federal government researcher, two government policy makers (one provincial level and one federal level), and a knowledge co-production scholar. Due to the lack of availability of Indigenous community members that were involved in JOSM, secondary data were collected in order to analyze JOSM as a case study. The key issues concerning the success of engagement of Aboriginal communities in knowledge co-production and environmental monitoring were identified.

Overall, JOSM's processes were moderately successful in achieving knowledge co-production between government, researchers, and First Nations communities. There were multiple JOSM objectives that fit under a framework of co-production and multiple processes of engagement implemented. However, successful co-production and JOSM objectives were not fully achieved due to insufficient community capacity support, development of appropriate engagement processes based on community input in a timely manner, organised collection and incorporation of TEK into projects, opportunities for active Aboriginal participation in activities, implementation of Aboriginal input into project design and engagement strategies and an apparent lack of effective response to Aboriginal concerns.

Aboriginal communities appeared to have had insufficient opportunities to shape the monitoring design and implementation beyond a few individual cases. This may be related to the lack of concrete, transparent strategy for collecting, documenting and addressing Aboriginal input. Some training and direct participation did occur in collaboration with a number of Aboriginal communities. However, for both engagement and eliciting of TEK, there appear not to have been a consistent, mutually agreed-upon plan for facilitating opportunities for direct access to shaping and involvement in monitoring activities for all communities involved.

Major current engagement challenges include: a lack of specific legal definition of what constitutes sufficient accommodation and consultation under difference scenarios; mismatches between Aboriginal and government goals for monitoring project outcomes; mistrust of government and science research based on troubled historical Aboriginal-Government and Aboriginal-Western Science relationships in Canada; insufficient Aboriginal community capacity to conduct monitoring or participate in monitoring projects; the potentially large range of needs, cultures and values between different communities involved and challenges associated with achieving balance between reaping economic benefits (local to National) from Western Canada resources while mitigating negative environmental impacts.

The results illustrated that although some of the initial JOSM objectives had been achieved, meaningful engagement of Aboriginal communities would necessitate improved processes. Specific recommendations for further action include: 1) the development of a Western Canada framework for engagement of Aboriginal communities during environmental monitoring based on input from Aboriginal communities that will be affected with automatic designation of time and funding for adaptation of the framework to the local cultural context(s); 2) increased integration and collaboration between departments and ministries within government in order to more effectively address environmental issues and community concerns that cross traditional discipline boundaries and to reduce repeated work and increase timeliness of response to issues; 3) Aboriginal engagement training for government representatives and government scientists involved in monitoring based on how Aboriginal communities would like to be engaged and 4) restructuring of monitoring projects with a focus on

building community capacity and community trust through development of long-term, mutual relationships. In general, engagement and use of knowledge co-production could be improved by increased coordination, timeliness and appropriateness of communication with communities. Increasing community capacity through the provision of resources and skills training is also essential.

The major contribution of this report is the identification of recommendations for improved processes of engagement that could result in positive impacts for local communities including increased likelihood of ability to shape methods of engagement during EA projects; capacity building through supported, active participation in monitoring projects; protection of treaty rights and of ecosystem and community health and the reduction of time and resources wasted on inappropriate or ineffective engagement processes that do not effectively address the communities' major concerns.

Introduction

Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring (JOSM) Project

JOSM's goal was "an improved characterization of the state of the environment in the oil sands area and an enhanced understanding of cumulative effects and environmental change, including future impacts […]" (Environment Canada, 2012). JOSM also aimed to establish how governments would establish a monitoring program for the oil sands to "provide assurance of environmentally responsible development of the oil resource" (Ibid). The project was implemented in phases over three years (2012-2015).

The Canadian and Alberta governments stated in the second annual JOSM report (2014) that JOSM is committed to "the delivery of a monitoring program based on the principles of inclusion of Traditional Ecological Knowledge (TEK) and the establishment of appropriate mechanisms to incorporate advice from Aboriginal peoples" (Environment Canada, 2014). JOSM's overall objective included inclusion of and engagement with Aboriginal communities. Despite this intent, all five participant First Nations bands involved in JOSM withdrew from the project during 2013 and 2014. Only the Metis locals in Fort Chipewyan, Conklin and Fort McMurray remained in JOSM as of May 2, 2014 (McDermott, 2014b). These bands included the Athabasca Chipewyan First Nation, Mikisew Cree First Nation, the Fort McKay First Nation, the Fort McMurray First Nation and the Chipewyan Prairie Dene First Nation (Ibid). JOSM conducted some knowledge co-production processes (e.g., multi-stakeholder forums and First Nations citizens monitoring training) (Environment Canada, 2014). However, the First Nations communities that withdrew expressed frustration over a lack of organization in being engaged in project design and decision-making processes, poor communication by JOSM and that JOSM was not meaningfully or effectively incorporating their traditional knowledge and Treaty Rights into its monitoring activities (Lapine, 2014; Lapine & King, 2014; McDermott, 2014a; McDermott, 2014b; Narine, 2014; The Canadian Press, 2014; & Wohlberg, 2014).

Environmental Assessment

This report also contributes to the discussions surrounding the review of the federal environmental assessment (EA) processes associated with the Canadian Environmental Assessment Act,

2012 (CEAA 2012), launched by the Government of Canada and led by the Minster of Environment and Climate Change in 2017. An Expert Panel established by the Minister of Environment and Climate Change will review the EA processes and develop recommendations for the Minister. The Expert Panel receives advice from a Multi-Interest Advisory Committee comprised of Indigenous organizations, industry and environmental groups. The goal of the review is to "develop new, fair processes that are robust, incorporate scientific evidence, protect our environment, respect the rights of Indigenous peoples, and support economic growth." The purpose of the review is also to rebuild public trust in environmental assessment processes (Government of Canada, 2016a & 2016b).

An environmental assessment is a planning and decision-making tool with the objectives of minimizing or avoiding adverse environmental effects before they occur and incorporating environmental factors into decision making. The EA process identifies the potential adverse environmental impacts of proposed projects (e.g., pipelines, oil upgrading plant, etc.) before they are launched. An EA also proposes strategies to mitigate the adverse environmental impacts and identifies whether the impacts will be insignificant following implementation of mitigation strategies. A follow-up program aims to verify the accuracy of the EA and the effectiveness of the mitigation strategies. Other factors considered during a Federal EA are public comments, purpose of the project, alternative ways to execute the project, results of relevant regional studies, and environmental changes due to the project. Within 45 day of posting a notice of a project the agency decides whether an EA is required based on consideration of factors including project description, potential for causing adverse environmental impacts and public comments (Canadian Environmental Assessment Agency, 2012).

The purposes of the CEAA 2012 that could be enhanced by the recommendations in this report are to:

- Promote communication and cooperation with Aboriginal peoples;
- Ensure that opportunities are provided for meaningful public participation;
- Promote cooperation and coordination between federal and provincial governments;
- Ensure that environmental assessments are completed in a timely manner;
- Encourage further studies of the cumulative effects of physical activities in a region and the consideration of the study results in environmental assessments. (Ibid)

It is important to note that engagement of Indigenous communities by industry during an EA is likely to have different barriers and complexities in comparison to large-scale, government-led undertakings such as JOSM. This difference is also due to the different relationships between Indigenous peoples and Industry relative to Indigenous peoples and the Crown (government). This report focuses on Indigenous-Government relations more so than on Indigenous-Industry relations. However, final recommendations are intended to be applicable to both types of monitoring processes.

Evidence-Based Decision-Making

Policy decisions about the energy industry in the Alberta oil sands and similar regions affected by long-term, significant environmental pollution emissions are particularly difficult due to the number of potentially conflicting factors that must be considered. These factors can include economic drivers, greenhouse gas emission targets, public values, environmental scientific data and, the legal and ethical

requirements of the government. This report focuses on the engagement of Aboriginal communities who may be impacted by the results of the environmental monitoring process. These communities are likely affected by the results because these data are (ideally) used by policy makers to inform policy decisions. These data are especially important when using an evidence-based decision-making (EBDM) approach that is becoming increasingly acknowledged to improve policy outcomes.

EDBM utilises "objective" research results as evidence to target and better understand issues in order to shape policies that deliver effective outcomes while minimising unwanted consequences (Policy Horizons Canada, 2013). Monitoring data can also be used to quantify pollution emission rates to validate industry emission inventory reports. These data can also identify problem areas and potential solutions, which can contribute to ensuring industry air quality compliance. Resulting policy decisions and industrial compliance can determine land use, industry business practices and pollutant emission levels, which potentially impact community and ecosystem health, community capacity, and treaty rights.

The Liberal government has committed to rebuilding "its capacity to deliver on evidence-based decision-making" (Liberal Party of Canada, 2015). In EBDM policy processes, how environmental monitoring is conducted (e.g., level of Indigenous and citizen involvement) impacts not only the scientific results but also the relationships between governments and Indigenous communities. Improving community engagement using knowledge of co-production principles during environmental monitoring has the potential to improve policy outcomes on projects. This results in supporting the Crown fulfilling its legal duties towards Aboriginal peoples more effectively by addressing Aboriginal concerns, building capacity in Aboriginal communities, and improving public trust and acceptance of policy outcomes.

Report Goals

The two main goals of this report are to provide: 1) recommendations about how to improve Indigenous engagement processes associated with environmental monitoring, and 2) an introduction to this topic or issue for those who are unfamiliar with EA or science policy in general (e.g., other STEM graduate students) in providing a context for the recommendations.

Research Objectives

4. Describe processes of knowledge co-production between government and Indigenous communities in environmental monitoring projects, focusing on communities affected by industrial pollution using JOSM as a case study.
5. Evaluate the success of JOSM's processes in achieving knowledge co-production between government, researchers and First Nations communities based on information gathered from Aboriginal community members, researchers and administrators involved with the monitoring project, and a review of government documents.
6. Identify recommendations that aim to enhance engagement with Aboriginal communities for future and current government environmental monitoring projects.

Research Questions

Research questions applied to analysis of the JOSM case study are:

1. What goals, objectives and specific involvement (processes or activities) of First Nations participants were stated or intended by the government monitoring projects from a knowledge co-production framework?
2. To what extent did/do the government monitoring structures and processes achieve these intended involvement(s)/goals?
3. How could these structures/processes have been more effective in terms of achieving the objectives of knowledge co-production?
4. What are the major barriers to knowledge co-production as identified by key informants?
5. What are recommendations to Minister of Environment and Climate Change and Environment Canada for continuing and future air quality monitoring projects and related EA processes with respect to improved co-production with Aboriginal communities?

Research Methods

Data were collected from two sources. Semi-structured, key informant interviews were conducted with a federal government researcher, two government policy makers (one provincial level and one federal level), and a knowledge co-production scholar. Interview data are cited throughout using the form (Int. #). Due to the lack of availability of Indigenous community members that were involved in JOSM, secondary data were collected in order to analyse JOSM as a case study. These included letters from representatives of Aboriginal communities who withdrew from JOSM, The Mikisew Cree First Nation (MCFN) and the Athabasca Chipewyan First Nation (ACFN), as well as reports by JOSM and the 2014 Fall Report of the Commissioner of the Environment and Sustainable Development, and various news articles about JOSM. A limitation of this project is lack of direct Indigenous community input. However, the hope is that this report may inform or inspire a more comprehensive project.

The two letters from the MCFN and ACFN communities are ideal for analysis of the JOSM engagement processes because these communities participated in JOSM but later withdrew, citing issues such as lack of inclusion of traditional knowledge and differences between their community goals and JOSM's goals for the monitoring process (Lepine & King, 2014). The two communities stated that the "MCFN and ACFN sincerely wanted to be involved in JOSM and to include TK so that a truer picture of environmental decline in the Peace Athabasca Delta could be articulated and then mitigated" (Ibid).

Statements by Aboriginal community members in this report may differ from the views of other communities or views at other dates. In order to minimize bias based on the limited primary material, attempts were made to focus on Aboriginal concerns, priorities or values surrounding JOSM that appeared to be internally consistent from multiple secondary sources such as the letters, the Commissioner's report and news articles.

Conceptual Background: Co-production of Knowledge

There has been increasing recognition that the complex nature of environmental issues requires the development of new methods more suited to investigating the potential impacts of climate change and resource development on both natural environments and human communities. In addition, addressing complex environmental problems requires the development of effective policies that are informed by a range of perspectives (Lawrence & Depres, 2004).

Since the 1970s, the emerging field of knowledge co-production has been presented as a promising approach from which to examine complex problems involving both academic and non-academic perspectives and priorities. Knowledge co-production is characterized by: a) its ability to address "research problems…that are defined from complex and heterogeneous domains", b) its focus on a "context-specific negotiation of knowledge", c) a process that "includes the practical reasoning of individuals" based on their own context, and d) its intention to produce action to address real-world problems. In summary, it is an approach that "involves mutual understanding, interaction, and respect, as well as the recognition that each party brings something important to the discussion" (Ibid). For these reasons, it is an approach that is well suited to processes involving interactions between Western (scientific, government) and Indigenous Knowledge systems.

Co-production processes promote the reduction of three chronic policy-making challenges: poor public trust in technical work, lack of opportunities for citizen empowerment and access to reliable data (Douglas, 2005). Co-production processes, when generating evidence for policy, can decrease public distrust since citizen involvement allows assurance that their values were used to shape the project, lending greater democratic legitimacy to the decision (Douglas, 2005). Citizen input can be valuable to not only in monitoring projects but also for technical assessments and scientific analysis. Citizens can help to better frame the problem that will be addressed. This includes ensuring that the appropriate range of issues and potential solutions are being considered, and that the scope of the analysis be appropriate. Citizens can also provide key knowledge of local conditions, practices and histories that could be essential to the researchers for understanding the context and targeting optimal methods and project goals. As stated by the Athabasca Chipewyan First Nation and Mikisew Cree First Nation, in the Alberta oil sands they have "unique perspectives, knowledge and experience to contribute" and have the "combined knowledge of hundreds of generation's worth of knowledge about the study area" (Lepine & King, 2014).

Citizens can contribute values that shape the analyses. This includes deciding on what levels or types of uncertainties are deemed acceptable and what assumptions will be used to frame the analyses. Traditionally, these values are not available to the public and only the "experts" make these judgements. Citizen input provides guidance to judgements, strengthens analysis and improves citizenry trust in the validity of study results. While it may at first seem counterintuitive that analyses could be strengthened by citizen involvement, including participants with different expertise and backgrounds can help identify, challenge and solve problematic decisions (e.g., methods of sampling and analysis). A diverse range of players also likely requires more thought to justify decisions that may result in much better methods (Douglas, 2005).

Background

Indigenous Peoples in Canada

Understanding the relationship between Indigenous Peoples and settlers contributes to the significance of this report. Due to the limited scope of this project, this issue will be addressed only briefly but greater details may be found in a thesis by Isaac (2015) and publications cited therein.

The lands inhabited by Indigenous peoples were "claimed" by the earliest European settlers. Early treaties appeared generous but were only "giving back" land that was traditionally used by Indigenous peoples and often later broken or degraded. Land claim disputes between the Canadian government and Aboriginal groups continue to the present day with 50 accepted claims in Ontario alone. Since 2003, 18 agreements have been reached in Ontario (Government of Ontario, 2013).

Indigenous peoples have been seriously mistreated by settlers (Isaac, 2015). Mistreatment includes the Canadian Indian Act of 1876 that aimed to destroy the tribal system and assimilate Indigenous people. This act resulted in residential schools that forced Aboriginal children from their homes and forbade them from learning about their culture. Mortality rates in residential schools were 24 percent and "physical and sexual abuse was widespread" (Ibid). Seven years ago, the Government of Canada apologised for the Indian residential school system. In 2015, Prime Minister Trudeau stated that the liberal government has a plan "to move towards a nation-to-nation relationship based on recognition, rights, respect, cooperation, and partnership" and that "a total renewal of the relationship between Canada and Indigenous peoples" is needed. One step on this journey of reconciliation is the ongoing national inquiry into missing and murdered Indigenous women and girls. The Prime Minister has recognised that the reconciliation process must be a partnership with Indigenous communities and other parties, going "beyond the scope of the Commission's recommendations" (Trudeau, 2015).

Indigenous Peoples and Science Research

The issues surrounding research and Aboriginal peoples in Canada are complicated by the troubling history of Indigenous peoples being "used as unwitting and unwilling experimental subjects" (Isaac, 2015). This includes experimentation on children in the residential school program, rarely without what would now be considered sufficient informed consent. Even recently there has been mistreatment in North America scientific studies. Researchers from Arizona State University used blood collected from the Havasupai people to determine why the Havasupai people had higher rates of diabetes to also study their genetic history without their consent. This history provides some explanation of mistrust, which is a major barrier to engagement as discussed later in this report. Research involving Canadian Aboriginal peoples has been largely structured and conducted by non-Aboriginal researchers thereby lacking representation by the cultures participating in the research.

The Government of Canada has stated that:

> *"The approaches used have not generally reflected Aboriginal world views, and the research has not necessarily benefited Aboriginal peoples or communities. As a result, Aboriginal peoples continue to regard research, particularly research originating outside their communities, with a certain apprehension or mistrust" (Government of Canada, 2015).*

This does not suggest that all Aboriginal individuals mistrust scientists and, among those who do, they do not necessarily mistrust all people in science. However, the historical relationships, often exploitative, have not created a trusting relationship. Trust is an essential component for the success of both science and policy (Whyte et al., 2010). This will be discussed in greater detail in this report.

Research involving Aboriginal peoples is changing, including increasing contributions by First Nations, Inuit and Metis scholars to research as academics and community researchers. Communities have

greater knowledge of the risks and benefits surrounding research. The Tri-Council Policy Statement on Ethical Conduct for Research Involving Indigenous Peoples of Canada provides an ethical framework for research that aims to ensure, as much as possible, respectful research relationships and encourages engagement between research parties (Government of Canada, I. A. P. on R. E., 2016).

The Prime Minister's recent statements on the government's commitment to "renewed nation-to-nation relationship between Canada and Indigenous peoples, one based on respect and partnership give hope for improved reconciliation with Indigenous peoples and an era of meaningful action. This includes listening to "Indigenous voices on environmental matters", which hopefully extends to how environmental research is conducted (Trudeau, 2015).

The Crown's Constitutional Duty to Consult and Accommodate

The full context of Aboriginal engagement includes a discussion of the special constitutional status of Aboriginal peoples in Canada. The Crown's fiduciary obligations toward Aboriginal peoples have implications for design and implementation of government policy surrounding issues that impact Aboriginal interests (Hurley, 2002). Aboriginal individuals in Canada also have a special constitutional status based upon the fact that:

> *"when Europeans arrived in North America, aboriginal peoples were already here, living in communities on the land, and participating in distinctive cultures as they had done for centuries. It is this fact, and this fact above all others, which separates aboriginal peoples from all other minority groups in Canadian society and which mandates their special legal, and now constitutional status" (Morellato, 2014).*

The Crown's constitutional Duty to Consult, and where appropriate accommodate, potential impacts on Aboriginal and treaty rights arises from the obligation of the Crown to respect, uphold and protect Aboriginal or treaty rights (*Constitution Act, 1982*). For example, the Crown has an obligation to setup a process of consultation with Aboriginal groups before a given resource is allocated for development and the allocation must reflect the prior interest of the Aboriginal right-holder. Priority means "something less than exclusivity but which nonetheless gives priority to the aboriginal right" (Morellato, 2014). This Duty to Consult and accommodate remains even if the Aboriginal title has not been proven in a court of law, wherever established or potential rights may exist. It is important to note that this law does not give Indigenous peoples immunity from government regulation but it does require the Crown "to bear the burden of justifying any legislation which has some negative impact on any aboriginal right protected under section 35(1)". While the Crown may delegate some procedural aspects of consultation to industrial partners, the consequences of these interactions that affect Aboriginal interests remains the sole legal responsibility of the Crown (Ibid).

Consultation is a component of good governance and helps to develop sound policies and make decisions. The federal government states that

> *"Through consultation, the Crown seeks to strengthen relationships and partnerships with Aboriginal peoples and thereby achieve reconciliation objectives. In addition to pursuing policy objectives, the federal government consults with Aboriginal peoples for legal reasons. Canada*

> *has statutory, contractual and common law obligations to consult with Aboriginal groups. The process leading to a decision on whether to consult includes a consideration of all of these factors and their interplay" (Government of Canada; Indigenous and Northern Affairs, 2011).*

Knowledge co-production could be an indispensable tool for government when executing its Duty because it is a process that can foster and maintain collaborative partnerships between government and communities. For example, there are strong parallels between co-production principles and the description of consultation by the New Zealand Ministry of Justice's "Guide for Consultation with Maori" (1997), which could be used to inform the practices in Canada.

> *"Consultation is not just a process of exchanging information. It also entails testing and being prepared to amend policy proposals in the light of information received, and providing feedback. Consultation therefore becomes a process which should ensure both parties are better informed" (New Zealand Ministry of Justice, 1997).*

This Crown Duty is a fundamental social justice matter with serious legal obligations (Morellato, 2014). These legal responsibilities "seriously impact not only fundamental constitutional rights but, also, the very health and well-being of hundreds of thousands of women, men and children living in Canada" (Ibid). Whether or not and how this responsibility is upheld affects the cultural identity of current and future generations of Aboriginal individuals within Canada. These legal principles must be implemented in a respectful and collaborative manner but "too often there is a large difference between the principles affirmed in case law and the reality of life for Canada's Aboriginal people." While the law continues to be updated, "Crown policy and decision-making processes have not kept pace" (Ibid). The landmark court cases analysed in Morellato (2014) direct that treaty peoples and First Nations be incorporated into the decision-making process engaged in by Crown officials in all decisions which impact their rights.

Definition and Types of Accommodation

First Nations have worked "to gain some measure of control over resource development on their traditional territories". The Supreme Court's definition of the government's "Duty to Consult and accommodate" with Indigenous peoples before proceeding with development on their lands arose from two 2004 Supreme Court decisions, Haida and Taku.

The court set precedent about the Duty to Consult and accommodate by requiring:

> "that governments and, implicitly, companies consult with affected Aboriginal communities before proceeding with development activities. The consultations were expected to produce appropriate accommodation, including compensation for the disruption of wildfire, lifestyles or the land" (Morellato, 2014).

Under the emerging corporate social responsibility policy some companies had already been engaging with and making agreements with Indigenous companies even before requirements by the courts. This was also based on "[…] the slowly emerging realization that stronger relations with First Nations could improve business operations and profitability" (Coates, 2016).

Accommodation can vary greatly from paying compensation to minimizing infringement or granting greater access to resources. Similarly, the circumstances of each determine the nature and scope of the Duty to Consult but will, in the majority, be significantly beyond "mere consultation". However, a major complication of this process is what "consultation" means and how it should be best executed. The Supreme Court of Canada has suggested that it ranges from "mere consultation" (e.g., notification of intended activity on traditional lands given to First Nations) to full consent of a First Nation before the government takes any action. The latter could be relevant, for example, in cases when the provinces enact fishing and hunting policies that directly relate to aboriginal lands. However, the law has yet to provide exact clarity on when consent is required. In-between the two ends of the spectrum stated above, consultation would involve joint decision-making (Morellato, 2014). Co-production practices could be beneficial because they provide frameworks that inherently create opportunities to make decisions in a joint-manner.

Due to the inexact nature of the legal descriptions the nature and format of consultation or accommodation measures on specific projects, decisions made by Crown entities should be informed by the ongoing effort of reconciliation between the Crown and Indigenous Peoples. Particularly, these decisions impact the ongoing "relations" or "relationship" between the Crown and Aboriginal peoples in a manner in keeping with the honor of the Crown and the objective of reconciliation (Ibid).

> *"The historical relationship between the Crown and Aboriginal peoples, requires that statutory and constitutional provisions protecting the interests of Aboriginal peoples must be given a generous and liberal interpretation. If there is any doubt or ambiguity with regard to what falls within the scope of s.35, it must be resolved in favour of Aboriginal peoples" (Ibid).*

However, standards of what behavior will uphold "the honour of the Crown" under different situations has not yet been clarified (Hurley, 2002).

Further, the Court also outlined minimum standards for accommodating treaty rights resulting from the decisions on numerous cases, including that:

- The Crown is obliged to inform itself of the impact of a proposed project on the treaty nation in question;
- The Crown must communicate its findings to the affected treaty nation;
- The Crown must (in good faith) attempt to substantially address the concerns of the treaty nations;
- The Crown cannot act unilaterally;
- Administrative inconvenience does not excuse lack of meaningful consultation;
- The Crown must solicit and listen carefully to the expressed concerns and attempt to minimise the adverse impact on the treaty interest;
- The concerns of the treaty nation must be seriously considered by the Crown and whenever possible, demonstrably integrated into the proposed plan of action (Morellato, 2014);

If the Crown fails to demonstrate an intention of "substantially addressing [Aboriginal] concerns… through a meaningful process of consultation", the courts may overturn resource or policy decisions. When there are potential infringements of rights, Aboriginal peoples are advised to clearly describe their claims, focusing on evidence in support of Aboriginal rights and how those rights are allegedly infringed upon [Haida Nation v. British Columbia (Minister of Forests), 2004] (Morellato, 2014). However, as will be discussed later, this could place a significant practical burden on the communities involved because obtaining or generating "evidence" can be extremely difficult, time consuming and/or costly (see section on "capacity" issues below). For example, if scientific data on certain pollutants in ambient air would be the best evidence of an infringement, even with access to the required equipment for data collection, interpretation of technical results may require expertise and training that are unavailable within the community. In these cases, knowledge co-production is extremely important as it has the potential to connect communities with the scientific tools, expertise and resources required to ensure Crown responsibilities are being fulfilled with the added potential benefit of improving researchers' ability to target the most important research issues in the local environment.

Reconciliation is an ongoing process and there is a real need for "ongoing consultation and accommodation of treaty rights". Significant positive change has been made though changes of the law from Supreme Court of Canada case rulings and that effect is trickling down to everyday local interactions (Ibid). However, the processes of consultation and accommodation could be improved, including through adoption of co-production principles.

United Nations Declaration on the Rights of Indigenous Peoples

The UN General Assembly passed the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) in 2007. It was endorsed by Canada in 2010, raising "the stakes" surrounding resource development involving Indigenous lands. Key components in UNDRIP include stating the right of Indigenous peoples to express their "free, prior, and informed consent," including on the approval of resource projects on their traditional territories. Prime Minister Stephen Harper's government endorsement expressed the view that UNDRIP is an "aspirational" document instead of a legally-binding document that could challenge current Canadian law and practices. Many Aboriginal groups were dissatisfied with this approach (Int. 4).

Upon his election, Prime Minister Justin Trudeau indicated his party's unqualified support for UNDRIP in 2015, echoed in similar comments by Alberta NDP leader Rachel Notley before the 2015 provincial election. The Government of Canada made a formal commitment to implementing UNDRIP when addressing the Permanent Forum on Indigenous Issues at the United Nations in May 2016 (Fontaine, 2016).

Interpretations of UNDRIP vary in Canada. Some Indigenous leaders view it as Canadian law and believe that the concept of "free, prior and informed consent" gives Indigenous communities a veto over resource development. For example, Inuit Tapiriit Kanatami President Natan Obed has stated that "It [UNDRIP] isn't a list of principles. They are rights and they are affirmed, normative rights, within international law and within nation states" (Gregoire, 2017). Others believe that UNDRIP is still

"aspirational" and "does not convey specific legal rights and authority over development". As of June 2016 the Government of Canada had not yet defined what form implementation of UNDRIP would take but Indigenous and Northern Affairs Minister Carolyn Bennett indicated "that she believes the country's commitment to the "Duty to Consult and Accommodate" meets the requirement to respect the Indigenous right to 'free, prior, and informed consent'" (Coates, 2016).

In September 2016, Justice Minister Jody Wilson-Raybould addressed First Nations leaders and cabinet ministers in Vancouver, B.C., stating that the implementation must take into account "specific and constitutional and legal contexts in Canada as well as the wishes of aboriginal groups" and therefore cannot be incorporated "word-for-word" into Canadian law. Wilson-Raybould also stated that "the hard and sometimes painful truth is that many of our current realities do not align with the standards of the United Nations declaration, and as such they must be systemically and coherently dismantled" (The Canadian Press, 2016). As of February, 2017 UNDRIP principles have been incorporated into the terms of reference of the Environmental Review Process, the National Energy Board and the inquiry into the Missing and Murdered Indigenous Women and Girls, according to Ian McLeod, media relations senior advisor to the Department of Justice Canada. The debate over how UNDRIP should be interpreted and implemented continues. However, First Nations "believe their rights and influence have expanded greatly under UNDRIP, giving them an effective veto over major resource developments, including pipeline construction" (Coates, 2016).

Ethical and Social Justice Issues

In addition to the special constitutional status of Aboriginal peoples, there are ethical and social justice considerations surrounding consultation and engagement with Aboriginal peoples. An unresolved ethical question is whether small populations should be put at risk of reduced health for the economic greater good? This question is relevant in cases where industrial activity that economically benefits the province and/or nation emits pollutants that harm (or potentially harm) Indigenous communities. Douglas (2005) states that debate continues about:

> "[…], whether we have rights to be free of health risks or whether some risks can be imposed on all for the greater good, whether gaining some degree of economic benefit is worth losing some degree of health for humans or ecosystems, and further which is worse for human health: reduced wealth or increased chemical exposure".

A key topic of this report is that, at a minimum, affected citizens should have some input into the science projects that measure the effects of industrial activities to determine if they are being harmed and in what way (Douglas, 2005). However, until the above questions are resolved, better processes need to be developed that allow these citizens to help direct the way science is interpreted and used to contribute to making policy decisions. These processes must also allow scientists to better understand the value concerns of citizens. An example of improved processes was the redefinition of risk analysis by the 1996 U.S. National Research Council in *Understanding Risk.* Risk characterization was changed from separating as much as possible the expert risk assessment from citizen involvement with risk management into an 'analytic-deliberative process' where there is potential for roles for citizens as well as scientific experts. The new process provides support for public involvement throughout the assessment processes (Douglas, 2005).

The importance of including values in science, especially citizen values, may at first appear counterintuitive. But while science is often seen as value-free, scientists may hold subjective opinions and must make decisions at many stages during the scientific process and therefore science must be influenced by their values. Examples include deciding on which methodology will be used to address the problem since there is not always a single or obviously optimal choice, how to treat unexpected or outlying results, what data will be considered unreliable, how to interpret data and sample location or size. Science projects are not judgment free (Douglas ,2005). There may be even more value choices in environmental monitoring science (versus laboratory studies); choices about where, when and how data is collected, which could significantly change the results and conclusions.

In contrast to highly controlled laboratory studies, environmental conditions can be extremely heterogeneous where there are many potentially confounding uncontrollable variables. Factors such as pollution concentrations can have strong variability in space and time. For example, if air quality monitoring stations only include instruments capable of measuring near surface pollution enhancements at a limited number of locations, pollution enhancements transported by wind and topography to other locations or spatially elevated pollution such as from smoke stacks would not be captured by the study. In this case, the conclusions about the potential impact of air pollution on downwind communities could be significantly underestimated. Therefore, for environmental monitoring, even the choice of number, location and instrumental capabilities of monitoring sites can be value-laden. These choices may have an impact, neither objective nor trivial, upon the results of the study and therefore the policies that will affect local communities. Environmental monitoring studies should include the values of the communities who will be impacted by the policy decisions that are influenced by the science data produced. Otherwise, a minority elite are allowed to "impose their values on the general populace", which is not acceptable for any democracy (Douglas, 2005).

A Case-Study: Co-Production Related Issues and the JOSM Aboriginal Engagement

The Joint oil sands Monitoring project in the Alberta oil sands provides a case-study for the examination of engagement processes of Aboriginal peoples in environmental monitoring activities in regions impacted by significant, long-term industrial pollutant emissions. JOSM consisted of enhanced monitoring activities during 2012 to 2015. The JOSM implementation plan aimed to integrate monitoring arrangements into a single, government-led program under the joint management of the Federal Government of Canada and the Alberta government. The intended result was "an improved characterization of the state of the environment in the oil sands area and an enhanced understanding of cumulative effects and environmental change" (Environment Canada, 2012). Analyses of key documents resulted in the identification of the degree of success and ongoing challenges in knowledge co-production.

Disconnects between JOSM and Aboriginal Communities' Goals

Engagement of First Nations in the Western Canada Energy sector appears to have two seemingly contradictory scenarios: 1) First Nation resistance to industry in the form of protesters opposing projects

and challenging construction (e.g., Kinder Morgan Pipeline), and 2) economic engagement, that is, employment of thousands of Aboriginal people in the industry, hundreds of Indigenous-owned service and supply companies, long but "typically successful negotiations of impact and benefit agreements with Indigenous companies". While positive outcomes have occurred, such as increased Indigenous entrepreneurship and empowerment of First Nation communities through financial and engagement agreements, there are also numerous "flashpoints" and conflicts between Aboriginal communities, companies and governments around petroleum extraction and development. Thus, the Canadian energy sector is both an important opportunity for reconciliation and positive collaboration between First Nations and other Canadians but also a zone of conflict between First Nations and national desires for "sustained economic development and national prosperity" (Coates, 2016).

The MCFN and ACFN communities perceived the Alberta government's goal for JOSM as wanting assurance for Canadian and Foreign investors that the Alberta oil sands were being developed responsibly and sustainably. The goal stated on the JOSM website is to "ensure this important national resource [Alberta oil sands region] is developed in a responsible way" (Environment Canada, 2013). In contrast, the project goal for the MCFN and ACFN was "to determine the cause of the extensive decline in the environmental quality over decades and other severe impacts to treaty rights, including cultural and spiritual aspects of those rights and to determine whether First Nations health is at risk from oil sands contamination to air, water and other traditional resources" (Lepine & King, 2014). One of the reasons cited by Aboriginal communities (MCFN and ACFN) for withdrawal included remaining "at odds" over the purpose of the monitoring project.

Insufficient Incorporation of Aboriginal Traditional Knowledge (TEK)

Environment Canada acknowledged that TEK is a recognized knowledge system complementary to western science that can provide significant context to science endeavours and enhance efficiency of monitoring processes. The department also acknowledged that engaging Aboriginal communities and consideration of TEK increases legitimacy of monitoring processes by addressing the views, concerns and priorities of these communities. A major concern for some Aboriginal communities was the lack of progress in incorporating TEK into Joint Plan monitoring (Office of the Auditor General of Canada, 2014).

The ACFN and MCFN letter stated that there was "no co-ordinated government effort to gather Traditional Knowledge (TK) at a local or regional scale, or to train Aboriginal people, nor to include Aboriginals in sample collection" (Lepine & King, 2014). The letter further stated that "JOSM does not meaningfully or effectively incorporate First Nations, our Traditional Knowledge, our Treaty Rights or our concerns." The inclusion of TEK in JOSM was described as a "token gesture" (Lepine & King, 2014). According to the JOSM 2013-2014 report some training and inclusion of Aboriginal people in monitoring activities did occur and will be described later in more detail.

In the Commissioner's report, examination of incorporation of TEK into 2013-2014 work plans found limited integration into the monitoring projects. Only 3 of 38 monitoring projects incorporated TEK. One example of inclusion was the selection of monitoring sites by a First Nation community. The Commissioner's report suggested that Environment Canada had not yet met its commitment to incorporate TEK into its monitoring projects. The report also stated that in the absence of a mutually

agreed upon process to integrate TEK input from Aboriginal communities, “opportunities will continue to be missed”. Recommendations in the report to Environment Canada included working with Aboriginal communities to create an approach for engagement and TEK inclusion and a strategy for integration of monitoring results across air, water and biodiversity sectors.

In response to the recommendations, Environment Canada agreed and stated that the department had revised their Aboriginal engagement process based on the initial engagement experiences and feedback from Aboriginal communities. The proposed updated processes aimed to increase Aboriginal influence on determining monitoring objectives and to provide funding for Aboriginal participation and engagement. It also proposed creating more opportunities “for the identification and effective inclusion of Traditional Ecological Knowledge in monitoring”. In May and June 2014 the revised process was presented to Aboriginal representatives (Office of the Auditor General of Canada, 2014). However, based on the Lepine letter dated from October 20, 2014, some communities continued to have significant concerns about the meaningful inclusion of TEK even with the updated engagement processes.

Differing views of engagement existed between the community and JOSM. An Environment Canada scientist working in the Alberta oil sands with JOSM indicated that the only TEK component required for researchers proposing a project was to check a box on project proposal forms to indicate whether or not their project would involve TEK. This scientist indicated that this addition to the form was not present from the beginning of the JOSM project but was added later (Int. 2). Although Aboriginal communities were involved in the research process and cases of successful engagement did occur due to the work of individual scientists facilitating engagement, there was a lack of coordinated effort to do so across all communities and from an early stage by JOSM (Int. 2).

Aboriginal communities appeared to have had insufficient opportunities to shape the monitoring design and implementation beyond a few individual cases. This may be related to the lack of concrete, transparent strategy for collecting, documenting and addressing Aboriginal input. Some training and direct participation did occur in collaboration with a number of Aboriginal communities. However, as with the engagement and eliciting of TEK, there appears not to have been a consistent, mutually agreed-upon plan for facilitating opportunities for direct access to involvement in monitoring activities for all communities involved.

There also appears to have been a greater focus on eliciting TEK from communities rather than facilitating active involvement in monitoring activities. There are practical complications associated with more active involvement such as training, safety, data-sharing and allowing equal access to all communities despite differences in locations and capacities. However, complexity does not excuse a lack of organised effort to do so. This would likely have been easier to achieve with early agreements on participation strategies and a larger allocation of funding from the total budget and/or developing TOR with communities that include funding existing community monitoring projects for inclusion into JOSM data collection.

JOSM Engagement Strategies

The 2014 Fall Report of the Commissioner of the Environment and Sustainable Development identified a number of JOSM strategies for Aboriginal engagement. These engagement processes included multi-stakeholder forums, meetings with representatives of Aboriginal communities and Component Advisory Committees (CACs) but these were successful to varying degrees. Overall, there appears to have been a lack of consistent and mutually agreed-upon strategy for engagement with Aboriginal communities. The ACFN and MCFN stated that engagement was insufficient and an inefficient use of time due to limited response to Aboriginal concerns (Lepine & King, 2014). Also, an engagement strategy appears to have initiated with stakeholders more than mid-way through the project.

According to the 2013-2014 JOSM report, Environment Canada had documented multiple Aboriginal concerns and, although progress on engagement had occurred, challenges remained. In order to establish "appropriate mechanisms" to include advice from Aboriginal peoples, JOSM officials met with Aboriginal representatives on a number of occasions to discuss JOSM. The report states that the Aboriginal representatives indicated their desire for meaningful participation in the program and expressed interest in having direct influence on JOSM planning, execution and decision making, respectful inclusion of TEK, ensuring capacity building support and ensuring participation support such as access to experts to understand technical aspects (JOSM 2013-2014 Report).

In response, JOSM planned to establish mechanisms for continuing relationship development and communications with Aboriginal Organisations. This would include an Aboriginal advisory body with greater inclusivity that would "directly give advice and recommendations to the JOSM co-chairs" (JOSM 2013-2014 Report). The report also indicated that JOSM would enable TEK use in data collection, evaluation and reporting and community capacity building through the creation of training opportunities. However, at the time of the report's publication, an agreement on the inclusion of TEK into the JOSM program had not been made and the Aboriginal Engagement strategy also remained in draft form.

Based on the information available, an Aboriginal advisory body was created in the form of one of the seven CACs. Stakeholders were formally engaged for 2014-2015 work plan development through CACs focusing on air, water and biodiversity with mandates to examine current monitoring and to recommend future monitoring to achieve JOSM long-term goals. The CACs also were intended to identify gaps in the monitoring objectives for potential consideration. Committees included representatives from Aboriginal communities, industry, non-government organisations, academia and sometimes other government departments.

Establishing advisory committees was considered an improvement to the engagement process by the 2014 Commissioner's report but the report also stated that participants in JOSM had concerns about the "role and purpose of the committees". Additional challenges include concerns about the processes of participant selection, input into developing the work plans and differences between how committees operated across the monitoring components. The Commissioner's report suggested that effective and meaningful stakeholder engagement would only be ensured if these concerns were addressed (Office of the Auditor General of Canada, 2014). Additionally, the CACs were created without any prior discussions

with First Nations (Lepine & King, 2014) despite being one of the main JOSM Aboriginal engagement mechanisms.

Another Canada/Alberta decision that raised concerns was the creation of a distinct sub-table to consider Aboriginal concerns through the Athabasca Tribal Council (ATC) instead of a direct incorporation with the remainder of the program (Wohlberg, 2013). Fort McKay cited a lack of coordination and communication by the federal and Alberta provincial governments as reducing the efficacy of monthly ATC meetings. The Alberta government stated that the ATC sub-table did not intend to segregate Aboriginal interests but rather to enhance effectiveness of discussions that may otherwise be unfocused if every part was present at one meeting (Wohlberg, 2014).

Although community needs and culture can vary significantly on a case by case basis, JOSM engagement processes were sub-optimal for at least some oil sands communities. Engagement was also a lengthy process. The Fort McKay First Nation cited a year of trying for approval of its Terms of Reference (TOR) by JOSM on how to "effectively engage Fort McKay and other Aboriginal groups in the JOSM program" when withdrawing from JOSM in October, 2013. Fort McKay representatives were not provided with an official explanation of the reasons for TOR rejection. Alberta Environment and Sustainable Resources Development (ESRD) spokesperson Jason Maloney stated that the delay in Fort McKay TOR approval was related to considering the TORs provided by all five Athabasca Tribal Council Nations "in case there were similar items" (Wohlberg, 2013). However, approximately a year later, the MCFN and AFCN TOR was also rejected by JOSM despite the communities having developed it collaboratively for two years in collaboration with Alberta ESRD and Environment Canada (Lepine & King, 2014).

Engagement may have been particularly problematic in terms of JOSM strategies for responding to community concerns. The MCFN (Lepine, 2014) letter stated that the JOSM engagement process of sub-regional sessions with Elders would only be appropriate when combined with "well-planned, funded TEK collection research program including appropriate support for Elders" and a process for inclusion of TEK that was mutually-agreed upon process. They further stated that, "At best calling two Elders and two community members to speak to issues demonstrates a lack of understanding of how to appropriately elicit and incorporate TEK. At worst, particularly when considering in the ongoing absence of real efforts to address our concerns and credibly incorporate TEK into oil sands monitoring, it is suggestive of a dismissive and outdated view of Aboriginal involvement in oil sands monitoring" (Lepine, 2014). This lack of fulsome engagement is particularly problematic three or four months after the updates to the engagement strategy (described above).

The Commissioner's report indicated that stakeholders were engaged in development of the 2012-13 and 2013-2014 work plans including a multi-stakeholder forum in May 2012 and discussions with monitoring organisations (Office of the Auditor General of Canada, 2014). However, input from stakeholders was "not consistently documented and it was not always clear how the input was considered in the development of work plans" (Ibid). The report further suggested that while some Aboriginal communities had been engaged through the component advisory committees, more efforts were required to achieve the JOSM plan commitment to stakeholder engagement. In response, Environment Canada officials stated that they had been working in partnership with Alberta's ESRD and

Aboriginal communities to better understand their concerns and to develop appropriate ways to achieve meaningful engagement (Office of the Auditor General of Canada, 2014). A review of the CACs by JOSM identified that improvements could be made, such as consistent approach across all CACs, and these were implemented during 2013-2014 for 2015-2016 work planning. By June 2014 the last First Nation (Fort McMurray First Nation) had withdrawn from JOSM so the impact of such implementations on the planning and execution of 2015-2016 work plans may have been limited (Wohlberg, 2014).

Responsiveness to Aboriginal Concerns

More than six months following JOSM 2013-2014 report, the Lepine (2014) letter stated that, "Holding another forum for MCFN to raise the same issues we have raised previously is not an effective use of time and resources, or, indeed, a credible response to our concerns." These concerns included lack of sufficient inclusion of TEK and capacity support. The communities also expressed distress at the JOSM executives going ahead with the project with "these limited engagement strategies" and "apparently assuming that the First Nations are on board" despite significant concerns being raised. Although the communities had formally withdrawn from JOSM, they requested re-involvement including a request for approval of their terms of reference (TOR) and the budget linked to the stated activities in the TOR (Lepine, 2014).

The two communities suggested that the lack of positive action was due to a failure of Environment Canada to address concerns rather than a lack of Aboriginal groups' input about priorities and concerns. Concerns included exclusion of TEK, failure to consult meaningfully given Aboriginal concerns about exclusion of Aboriginal input into JOSM, problems due to Environment Canada's approach to community resource and capacity concerns and lack of fulfillment of commitments to train and facilitate Aboriginal participation in monitoring (Lepine, 2014). The Fort McKay first nation, withdrawing from JOSM in October, 2013, cited a "frustrating and futile process" of trying to have their representative's concerns addressed (Wohlberg, 2014).

JOSM did not include a major Aboriginal priority of monitoring, that is, human health impacts due to environmental oil sands industry pollution. Integration of this priority may have been difficult since Environment and Climate Change Canada does not directly conduct human health studies. However, the department states that it, "works with other federal departments that deal with natural resources", including Health Canada, to "collaborate on research" (ECCC, 2010). Collaboration with the Public Health Agency of Canada (PHAC) is consistent with the part of PHAC's mandate to "strengthen inter-governmental collaboration on public health and facilitate national approaches to public health policy and planning" (Government of Canada, PHAC, 2004). Since environmental quality (e.g., air pollution) is a significant risk to health (WHO, 2017), a joint project has many potential advantages. This includes providing baseline data for long-term health impact studies, which would reduce repeated work, allow more confidence when linking environment and human health factors. Monitoring can be co-designed to complement the needs of both projects and mitigate what may potentially be reduced community health as well as negative public perceptions of "late" reaction to community needs and Crown responsibilities under section 35.

In order to attempt to address the significant health related concerns of these communities, JOSM could have facilitated communication with the appropriate contacts at Health Canada or Alberta Health who could support health related research. Some actions were taken to address Aboriginal concerns such as budget allocation for Aboriginal engagement (2014-2015 work plan), updating the engagement processes and establishing increased consistency across all CACs, including regular scheduling. However, overall, it appears that response to Aboriginal concerns were insufficient. This is based on the fact that similar sets of Aboriginal community concerns, across various communities, were documented over multiple years in the documents examined in this project.

Community Capacity Support and Resources

The Lepine & King (2014) letter cited a "persistent failure to provide capacity for First Nation involvement in JOSM" and that "all co-initiatives between First Nations and both levels of government" were rejected by JOSM executives. As Section 35 rights holders, the communities felt they had been "marginalized" from the process. JOSM rejected the ACFN and MCFN even though communities worked collaboratively for almost two years with the Alberta ESRD and Environment Canada staff to develop a TOR and budget. The TOR outlined a process for meaningful involvement in JOSM and inclusion of these Nations in JOSM, including funding for community involvement in JOSM. The letter indicates that a senior level representative assured forthcoming TOR approval and funding and that it would be worth the effort to develop "based on successful models with other Alberta First Nations" (Lepine & King, 2014).

Another potentially problematic aspect of capacity support was the allocation of the JOSM budget prior to the 2014-2015 work plan (see below). For example, division of the stakeholder forums into the seven CACs aimed to improve engagement but it also divided the JOSM budget. At a stakeholder meeting (June 11, 2013) the concept of a First Nation/Metis Engagement CAC was presented but seven months later no funding had been allocated t (Lepine & King, 2014). In January 2014 general manager for Fort McMurray local 1935 was concerned about a 6% budget and groundwater monitoring reduction. He stated that "there always have to be budget considerations, but this is supposed to be a world class monitoring program governed by science and we're not seeing that" (McDermott, 2014b).

The 2014-2015 JOSM work plan included $540,000 for Aboriginal participation of the total JOSM budget of $5.2 million, an addition that was likely based on Aboriginal input about lack of capacity support. This part of the budget consisted of $120,000 in approved budget for Aboriginal training and field operations (capacity building), $100,000 for integration of TEK into CAC planning processes, $220,000 to enable Aboriginal representatives' participation in the Aboriginal Advisory Committee, and $100,000 to identify community priorities (Environment Canada, 2017).

Aboriginal Training

According to the JOSM 2013-2014 Report, Aboriginal Training was provided to some communities. This included training opportunities for Fort Chipewyan community members created in collaboration between government and Mikisew Cree First Nation and Athabasca Chipewyan First Nation. In May 2013, an Environmental Monitor Training Program also trained First Nations and Métis individuals in basic monitoring techniques, such as contaminants and water monitoring. Sediment sampling training in

the Peace-Athabasca Delta was provided to Smith Landing First Nation, Fort Smith, NWT to help equip Aboriginal persons with the skills to become involved in existing scientific studies and/or design their own monitoring programs.

2013-2014 work plan activities included direct participation by Aboriginal persons. This includes Graduates of the Environmental Monitoring Training Program participating in the Winter/Spring Atmospheric Contaminant Snow Survey. An Air Quality Monitoring Site was also in operation through collaboration with the Fort McKay First Nation. Aboriginal community members, including Mikisew Cree First Nation, Athabasca Chipewyan First Nation, Deninu K'ue First Nations, and several Métis locals, were engaged to deliver components of the Wildlife Contaminants and Toxicology monitoring.

However, Aboriginal leadership expressed feelings of being "pigeonholed" into contributing only traditional and cultural knowledge. They expressed the desire for "full participation across the program". The Fort MacKay First Nation has a history of working with monitoring groups such as the Wood Buffalo Environmental Agency (WBEA) and already had hands-on experience in monitoring projects (McDermott, 2014b). According to the 2013-2014 JOSM report, Environment Canada had documented multiple Aboriginal concerns and suggested that progress on engagement had occurred but challenges remained.

Objectives of the JOSM project based on the framework of co-production consist of inclusion of TEK, establishment of appropriate mechanisms to integrate advice from Aboriginal people and the development of effective working relationships with Aboriginal communities and organisations. Although it was not an explicit goal or objective, Environment Canada also acknowledged the value of TEK and its role as complimentary to western science. The department also acknowledged that Aboriginal engagement, including considering TEK, increases the legitimacy of the JOSM processes through addressing communities' views, concerns and priorities.

These objectives are consistent with many co-production characteristics including combining academic and non-academic perspectives, respect and recognition that each party provides important input to the discussion, and a role for citizens to help direct science. Environment Canada's acknowledgements are consistent with incorporating non-academic priorities, roles for citizen direction of science and context-specific negotiation of knowledge.

Summary of Successes and Challenges in Aboriginal Engagement

Explicit acknowledgement of TEK's significance and importance in the monitoring project was positive. However, the inclusion appears to have been limited and/or sporadic, incorporated in only a few projects. There appears to have been a lack of consistent, coordinated and appropriate strategies to gather information early on in the project. This limited the collection and integration of TEK into projects. A JOSM strategy for TEK inclusion appears to have only been released approximately halfway through the project timeline. The absence of an early public draft or proposed strategy for TEK inclusion likely contributed to poor organisation and incorporation of TEK throughout.

A potential challenge for meaningful and respectful elicitation and incorporation of TEK is that appropriate engagement with TEK requires a "deep understanding" of a culture. TEK can be community

specific and based on the unique experiences and traditions of that community. The culturally-dependant nature of TEK can add complexity to the TEK input and integration processes, especially when diverse communities are involved, such as in the Alberta oil sands region. Understanding the community TEK response to a monitoring question or topic may require an understanding of the relationship between the knowledge holder and the natural world. This understanding can require a relationship with the knowledge-holder and an understanding of their culture, which is a non-trivial task (David, 2015). David (2015) states that:

> *"Learning traditional knowledge is not something that happens quickly […] With education and relationship building, it seems possible for some people outside Indigenous cultures to appropriately engage with traditional knowledge".*

Therefore, adaptation of TEK integration strategies to the local cultural context can determine the success of not only TEK collection but also the level of understanding often required to effectively integrate it into projects. A mutually-agreed upon strategy developed through collaboration between JOSM executives and Aboriginal representatives, supported by appropriate funding at an early stage of JOSM, would have likely significantly improved quantity of TEK received through JOSM engagement and meaningful incorporation into more projects. This could have been achieved through JOSM releasing a tentative draft at an early stage to allow Aboriginal representatives to direct TEK collection and inclusion strategies. Integration of elements of Aboriginal community TORs could have also helped achieve a community-adapted strategy since they included explanations of how communities needed and wished to be engaged in terms of TEK. This would have also likely increased many communities' trust and satisfaction with the effectiveness of TEK incorporation, in contrast to the views expressed in the documentation examined in this project. Such processes may have resulted in significant benefits throughout. These benefits include increased quantity of TEK input, more effective TEK integration into projects, increased opportunities for Aboriginal communities to direct project design, and implementation and increased understanding of the local context for JOSM researchers. This, in turn, may have increased trust and satisfaction of Aboriginal communities and improved the effectiveness of relationship between JOSM and those communities.

The addition of a TEK aspect to the project proposal forms was a step in the right direction but seems a minimal improvement in comparison, for example, to actively facilitating a program of collaboration between JOSM researchers and Aboriginal community members to create TEK-integrated sub-projects. Although the 2014-2015 work plan included increased funding for TEK integration, the benefits of this increase may have been limited by its relatively late timing in light of the withdrawals by multiple Aboriginal communities by 2014.

Mechanisms for Enhancing Engagement Advice from Aboriginal Peoples

Opportunities for obtaining Aboriginal input regarding values, concerns and priorities occurred at multiple stages during the JOSM process. In some cases, especially in terms of how processes received and addressed Aboriginal input, the mechanisms may not have been appropriate. Also, Aboriginal input only appeared to have significantly shaped engagement strategies mid-way to late in the JOSM timeline and had minimal to moderate impact on project design and implementation. In cases such as the

creation of the CACs, Aboriginal input appears not to have been elicited or applied. The lack of discussion about creation of engagement processes is contrary to the co-production principles of citizen input into project design. Communities impacted by the project outcomes should have opportunities to help shape many aspects of the project, especially the ways in which they are engaged. These strategies of engagement will impact whether their concerns and values are effectively heard and addressed. While the division into the seven CACs and the ATC sub-table strategies were intended to improve engagement, without consultation and a delay in funding these processes risk being exclusionary to Aboriginal participants. Separating these bodies in order to create more "focused" processes is contrary to co-production principles where decisions ultimately benefit from input from and participation of a variety of stakeholders.

Engagement processes have a higher chance of facilitating effective working relationships with Aboriginal communities if these processes were more adaptive and responsive to communities' needs, culture and traditions based on their input (e.g., in TOR, from CAC meetings, etc.) A meaningful attempt to understand the communities and their cultures could improve lack of trust (David, 2015). The TORs provided by multiple Aboriginal communities could have provided an excellent starting point for developing effective engagement strategies by examining features common to the TORS. Even if Aboriginal communities' TORs could not have been accepted outright, a formal response explaining what aspects were not possible to implement and which aspects could be integrated needed to be made.

In general, engagement success may have been reduced due to the lack of clarity on how input was collected and used to influence decision making. Success may have been improved by an Aboriginal engagement strategy developed much earlier in the process since it would have clarified the above and given earlier opportunity for communities to contribute to a mutually agreed-upon final strategy. It increases the difficulty for any citizen group to have input and influence on how they are engaged if the actual strategy is not clear. Availability of an early-stage strategy draft that could have been iteratively improved by collaboration with Aboriginal input may have increased the perceptions that engagement was meaningful and "co-produced" rather than prescribed and unresponsive to Aboriginal concerns and priorities.

Improving Engagement

Overall, JOSM's processes were moderately successful in achieving knowledge co-production between government, researchers and First Nations communities. There were multiple JOSM objectives that fit under a framework of co-production and multiple processes of engagement implemented. However, successful co-production and JOSM objectives were not fully achieved due to insufficient community capacity support, organised collection and incorporation of TEK into projects, opportunities for active Aboriginal participation in activities, implementation of Aboriginal input into project design and engagement strategies, and an apparent lack of effective response to Aboriginal concerns.

Factors that may have increased the success of co-production of knowledge include: greater organisation by JOSM to develop, present and facilitate communities' adaptation of strategies for engagement and TEK, greater allocation of funding to support Aboriginal engagement process and participation in monitoring activities, better communication when responding to concerns, and a greater

commitment to and transparency about using Aboriginal input to help shape project design and implementation. Many engagement processes and allocation of funding would likely be more effective if they had been implemented earlier in the JOSM timeline. These strategies may have increased the effectiveness of eliciting and integration of TEK and overall perception of effective engagement and meaningful input into the project goals and work plans.

Aboriginal communities' priorities that did not match with the mandate of Environment Canada could have been addressed by a number of different responses. Ideally, JOSM could have collaborated with the appropriate health departments and ministries to co-design a complimentary health study. At the very least, JOSM co-chairs could have connected community representatives with the appropriate contacts at health organisations.

It is important to acknowledge that the number and likely large diversity of the Aboriginal communities in the Alberta oil sands increase the complexity and challenge to effectively achieving co-production in engagement and TEK inclusion. However, a more coordinated, early attempt to produce and adapt strategies for eliciting and acting on Aboriginal input and the collection and implementation of TEK based on early stakeholder discussions could have increased the success of these strategies and community satisfaction as well as increased the number of communities that continued participation until mutually agreed-upon methods were established. This would likely have benefited from multiple stakeholder groups, increased the legitimacy of the monitoring project, and helped to provide a more complete picture of state of environmental quality.

Major Barriers to Successful Engagement

A number of major barriers to successful engagement were identified by the key informants. These include:

Mistrust

Both the MOECC and ECCC interviewees identified mistrust as a major barrier to successful engagement and attributed it at least in part to the fraught history between Indigenous peoples, government and industry (Int. 1, Int. 2). The government may delegate some consultation aspects (though the Duty to Consult ultimately rests with the Government) but the levels of sensitivity in their modes of communication, cultural understanding and trustworthiness can vary greatly between industry players. If issues between the industry and an Indigenous community arise and cannot be resolved then the government becomes involved to attempt a resolution (Int. 1). First Nations' concerns about the social, economic and environmental impacts of major industrial projects is unsurprising based on the history of "broken promises and flawed resource developments" on Indigenous lands during the past century. However, when engaged with the energy sector in meaningful partnerships that include both consultation and active participation, First Nations have been able to balance local eco-systems protection, guaranteeing responsible development on their territories, and economic opportunities for their communities in a sector that tended to largely exclude them until recently (Coates, 2016).

Mistrust may be associated with the release and sharing of project information (e.g., scientific results). For example, during JOSM an Aboriginal community representative asked the JOSM scientists for access

to raw instrumental data because the community did not know how much the scientific team could be trusted. Timely communication of scientific results of environmental projects can be particularly challenging because raw data may not have any meaning until analyzed or processed, which can also take significant time. It is particularly challenging to balancing being open and transparent with ensuring that only quality-assured and checked data be released. An effective solution was achieved in this example by discussing with the community why the raw data had little use pre-processing but that the community would be provided first access to analysed results and given graphing tools to help view and interpret the results (Int. 2). For scientific projects that extend beyond fundamental, laboratory-based research, it is not sufficient for academic publications and presentations to be the only means of dissemination of results. Particularly when generating data that concern or will affect a community or its treaty rights, it is problematic to simply complete the research data collection and then completely sever ties with the community. Communities will want to know why the results are not being shared with them. Effective relationships between researchers and communities and increased community capacity are more possible when researchers not only communicate study results but also assist in formulating next steps and help address additional concerns that arise from the study results (Int. 3).

Mistrust in general and lack of acceptance of policies are critical barriers to not only successful public engagement but successful policy in general (Int. 3). Long-term relationships between the community and government representatives (scientists, policy makers, etc.) and meaningful involvement from the very beginning of the project help to build trust. Long-term, positive relationships with government representatives tend to reduce tensions because these individuals have had the opportunity to develop a relationship with the community and a positive track record of actually delivering on promises (Int. 1). This long-term relationship could allow government representatives opportunities to gain understanding of the community's culture, essential to effectively understanding and addressing community needs, concerns and TEK.

Capacity, Resources for Engagement

Resources of Indigenous communities in Canada can vary greatly between communities. For some, even the time and effort required to read, process and respond to all the information sent by the Crown resulting from the Crown's Duty to Consult could be a significant burden. If there is a possibility that a community's treaty rights are being violated, capacity can limit the ability to gather the "evidence" suggested by the courts to support a claim (Morellato, 2014). For example, even if a community has the funds to purchase scientific environmental monitoring equipment, they may not have access to the expertise needed to interpret these data. Some communities have enough resources to hire staff and buy equipment but the scale of the resources required are often disproportionate to availability (e.g., one piece equipment can cost tens of thousands of dollars) (Int. 1).

A community would also have to make choices about whether to allocate available funds to, for example, monitoring activities or health support. In general, having sufficient capacity to invest in long-term research about complex environmental issues such as air or water quality is not the norm (Int. 2). Capacity needed to generate evidence about environmental problems will be even a greater challenge in regions such as the Alberta oil sands because the number of pollutants in various forms (for example, air, water, soil) requires measurement by multiple instruments. Identification of which chemicals to

target (e.g., most significant negative health effects) is challenging given the sheer numbers likely present and the limited number of chemicals for which there are sufficient data on their likely and combined effects (European Commission, 2012).

The Complexity of Environmental Policy and Monitoring Projects

Environmental policy decisions and associated monitoring projects used to inform them are challenging because they deal with "contested environmental issues". There is often no single obviously "correct" solution but rather different possible courses of action that can significantly affect outcomes (Pielke Jr., 2007). The different interests among the various parties shape their views of what "correct" should be (Int. 1). Scientific information is needed to understand the consequences of different possible courses of action but different stakeholder perspectives and values will often shape commitments to different alternatives. A lack of shared values on both the means and ends often occurs between the many stakeholder groups (Pielke Jr., 2007). Additionally, the problems are often multi- and cross-disciplinary (e.g., air quality, ecosystem health, human health, etc.) as well as trans-boundary (Int. 1).

There can be many stakeholders with conflicting needs and expectations from the national to the single community levels. These issues are also often politically charged such that science only has the capacity to impact some issues. But other factors such as economic pressures, carbon emissions targets, social justice, and human and ecosystem health must be considered and weighed by decision makers. In these cases, it is important to accurately determine what role scientific evidence will play in the policy decision-making process (Pielke Jr., 2007). This includes deciding how the science process can most improve the policy decision maker's knowledge and understanding of the issues. In these cases, a stakeholder model is likely to be more effective than the linear model where stakeholder values help shape the scientific approach rather than where scientists are free from political accountability (Pielke Jr., 2007). However, even when all parties agree and support a principle of why the problem needs to be fixed, the practicalities and challenges of solution execution can be enormous (Int. 1).

Complexity comes from the inevitable divisions across ethical, regional and political lines due to differences of opinion about natural resource and energy development. While resource development could potentially contribute to climate change, ecological degradation, and marginalisation of First Nations on their lands there is also potential for increased employment and business opportunities, investment in First Nations and significant increase in prosperity for all Canadians (Coates, 2016).

Specifically for the JOSM project, the potential diversity of culture, needs, priorities and values across the various Aboriginal communities involved likely adds complexity and increases the difficultly of developing a single, effective engagement strategy during monitoring. However, awareness of and accounting for the likely impacts of added complexity on timelines and resources needed may ultimately improve outcomes.

Mismatch between Government and Indigenous Community Timelines

A mismatch between the time-lines of government projects (i.e., on a strict time-line) and of Indigenous communities can cause tension where communities feel rushed, that the interactions are not real conversations, that the project was preconceived and was not sufficiently developed with the input of

consultation (Int. 1). In the JOSM project, frustration was expressed by the MCFN with the JOSM executives going ahead on the project despite significant Aboriginal concerns (Lapine, 2014). Economically-speaking, governments generally want industry projects to go forward or at the very least need to consider the impact of limiting or downsizing industry on the communities affected and possibly the economy of Canada as a whole. In other cases timelines are reversed where policy reforms are updated and applied over what the public often feels are unreasonably long timelines due at least partly to bureaucratic processes (Int. 1).

The current short-term design of monitoring projects (e.g., JOSM or EA) leads to a lack of commitment to long-term relationships with communities. There is a tendency to arrive, do the work, publish and "disappear". This is further complicated by a lack of a set framework for engagement, which was only recently defined in 2004. This can cause disorganisation, delayed engagement and, ultimately, stakeholder frustration (Int. 4).The definitions of consult and accommodate may vary between government and Aboriginal communities (and even within communities) with the courts being the final arbiter. However, the government is legally required to be transparent, engage respectfully and balance everyone's interests in good faith (Int. 1).

The multifaceted nature of the environmental issues crossing research subject areas and the often overwhelming range of issues raised by a community does not mesh well with a bureaucracy separated into discrete departments that do not necessarily collaborate from the beginning (Int. 1). Government has to balance the needs and effort available between different communities (Int. 1). In general, environmental monitoring projects tend to be issue specific, triggered by certain situations and changing project mandates. This can result in the same work (e.g., data collection) being done multiple times (Int. 4). For example, JOSM may eventually be followed up by a human health survey. However, conducting projects sequentially over many years with the inevitable repeated groundwork could increase the risk that communities feel that their major concerns are not being addressed in a timely manner and that the entire context of the issue is not being explored (Int. 4). In general, lack of collaboration between government organisations can reduce the effectiveness of a single project to address important stakeholder values and priorities that cross mandates (e.g., environment and health). This is problematic in the context of capacity issues since requiring a community to track down the correct contact at each ministry individually to address each issue increases the burden of engagement.

Recommendations for Enhancing Effective Aboriginal and JOSM Co-Production

1. Western Canada Focussed Framework for Engagement and Integration of TEK Aboriginal Input

A Western Canada focussed framework may be more effective than a generalized national framework due to the increased complexity of engagement processes from the resource rich provinces in Western Canada (e.g., oil, forests, etc.). This framework could be developed in collaboration between representatives of Western Canada Aboriginal communities, Aboriginal and non-aboriginal engagement

scholars, policy makers and scientists who have had experience engaging with communities for environmental monitoring. In general, Aboriginal engagement must begin early in the project or it will not feel meaningful or valued. Given the lack of legal definition of engagement, such a process may be easier to achieve if a basic framework (a "starting point") for engagement of Aboriginal communities in the Western Canada already existed. A mutually-agreed upon initial framework or guide could be designed in collaboration with Aboriginal communities in Western Canada through an iterative series of discussions funded by the Government of Canada and the Western Provincial governments. This framework could then be provided to communities at an early stage of monitoring projects. Such a framework should include explanations of how Aboriginal input will be elicited, collected and assessed and how responses to the input will be communicated in a timely manner.

2. Designate Time and Funding for Framework Adaptation

Designated funding and time could be allocated at the beginning of each monitoring project for adaptation of the basic framework in collaboration with the specific communities involved in order to achieve reasonable accommodation for specific cultures, needs and priorities. Given the often highly culturally-dependent nature of TEK, successful engagement must become adaptive in order to develop an understanding of the community contexts.

3. Optimize the Co-Production Process to Community Priorities

Optimizing the co-production process is especially important considering the diversity of values, capacity and needs among the communities that would likely be involved in the discussions. The priorities of the communities would have to be balanced at least in part by practicalities of government processes such as the EA. Total satisfaction of all communities involved would also likely be impossible given potentially conflicting priorities. Ideally, the co-production would be a negotiation where no single party holds the power to determine the final product, including government representatives. However, an initial framework developed, based on the commonly agreed upon priorities set in practically applicable processes, could have many advantages. These could include increased effectiveness, organisation and transparency of information eliciting, addressing community concerns, priorities and needs, integration of TEK, and building trust and effective relationships. There will likely be a reduction in time wasted through lack of clarity in initial engagement strategies and inefficient adaptation of such strategies. More time and effort can be spent on integrating and addressing Aboriginal values and knowledge as well as active involvement in projects and capacity building.

7. Increase Integration and Collaboration between Government Departments and Ministries

Increase integration between different government organisations (e.g. Environment and Climate Change Canada and Health Canada). The volume, variety, complexity of research findings for policy decision making increase the importance and the challenge of connecting researchers across disciplines and of connecting researchers' findings to decision makers. Collaboration can be aided by technological advances that help facilitate interdepartmental and interdisciplinary communications that are currently often underutilized. Maximum benefit of policy research findings and reaping the value of the research

investment requires effective synthesis, integration and dissemination of the different types of knowledge generated (Policy Horizons Canada, 2013).

Increased integration could improve community engagement and project efficiency and effectiveness through:

a) Reduced burden on the community due to having to contact, meet with and/or work with multiple divisions separately. This is significant given the capacity issues many communities face.

b) Increased ability to address multiple participant values and concerns; if not simultaneously then at least in a timely manner rather than consecutively, over potentially long periods of time where initial work must be repeated.

c) Enhanced data sharing and project co-development between divisions that in turn significantly improves meaningfulness and timeliness of results since issues surrounding environmental pollution can be highly interrelated (e.g., pollution and human health). The studies could be designed to be complementary with data collection methodology that supports the goals of multiple studies.

d) Increased success in development of sufficient baseline data (e.g. environmental, socioeconomic) required to "enable the future comparison of predicted and actual impacts" and that "could support and inform future follow-up" (Clausen, 2007). A lack of generation of sufficient baseline data can reduce stakeholder confidence (Clausen, 2007).

5. Aboriginal Engagement Training for Monitoring Project Members

A key aspect of co-production is the interaction and mutual learning of the different parties involved. Training for members of a monitoring project about how to effectively engage with Aboriginal communities and TEK could enhance mutual benefits of interaction. Different communities have different capacities and understanding of operations (e.g., industrial, governmental). While interactions in general with indigenous communities should be culturally sensitive this can be more crucial in certain communities where it is essential to be highly sensitive about acknowledging cultures and about the tone of the dialogue. This is not to say that the opinions of the community would/should be dictated solely by the tone of the dialogue. However, training environmental monitoring project members who will be working with community members to co-generate information and build community capacity may significantly improve project, participant and community outcomes (Int. 4). This may be especially true for STEM researchers, who are traditionally less likely to have experience with or knowledge about engaging with Indigenous cultures compared, for example, to environmental studies researchers. At a minimum, the government position on the value of TEK and the importance of engagement with Indigenous communities should be made clear to everyone involved in monitoring projects.

Training content should be designed by Indigenous communities, ideally the ones the scientists will be working alongside. General guidelines for training could be included in the above suggested framework for engagement. Insight from researchers or policy makers who have a history of engaging effectively with Indigenous communities could also provide helpful insights since they work at the interface of research and communities or government and communities (Int. 3). Advantages of trained project

members include increased cultural sensitivity, two-way understanding and ability to target important environmental issues and changes to methodology that they may have otherwise missed or not known about (Douglas, 2005).

6. Restructure Design of Monitoring Project to Facilitate Long-Term Relationships and Community Capacity Building

Improved engagement of Aboriginal communities could be achieved by updating the typical design of environmental monitoring projects. These updates would in some way facilitate longer-term relationships between researchers, policy-makers and the Aboriginal communities involved in research. The best results likely occur if a researcher or policy maker has a long relationship with community or communities rather than coming, collecting some data and effectively disappearing in a short period of time (and potentially not sharing information or having any positive change for the community) (Int. 4). These design changes are likely practically very difficult given procedural complexities of the EA or projects like JOSM, including the resources available and the fact that employees cannot be forced to choose a certain position for a set period of time. However, some suggestions are to allocate funding to create a federal program to identify and support government employees who have already established a relationship with a community (or communities) and help them continue to support those communities while fulfilling their job duties and division mandate. Some government employees are already achieving positive, long-term relationships with specific Aboriginal Communities (e.g., at Environment Canada and Climate Change) (Int. 2). A support program could give these individuals an opportunity to provide their expertise when a monitoring project is proposed if the project leaders are less familiar with the Aboriginal communities that will be involved (Int. 4).

Conclusion

While there has been and will likely continue to be conflict between First Nations and government and industry, engagement of First Nations in the energy sector has produced collaborative, trust- and partnership-based, models with the potential to change engagement nation-wide for the better. There is considerable opportunity for First Nations agreement and collaboration – and significant barriers and concerns about the path forward (Coates, 2016). Projects such as JOSM and the review of the EA process provide opportunities for significant improvement in Canadian engagement and reconciliation with Aboriginal communities. Meaningful engagement of Aboriginal communities in environmental monitoring projects has legal, ethical, democratic and social justice implications. This is important in an increasingly “complex, interdependent and sophisticated” society where non-renewable resources must be both protected and managed (Morelatto, 2014). Given the current government’s objectives of reconciliation with Aboriginal peoples and mutual respect, a co-production approach during engagement processes has the potential to significantly contribute towards this long-term goal. The recommendations made in this report are unlikely to be trivial to implement but have many potential short- and long-term benefits for all stakeholders.

Advantages for Aboriginal communities include strengthened community capacity, more effective long-term relationships with government, protection of their treaty rights and greater opportunities to shape

policies that will ultimately affect them. Advantages for government include increased public trust in public policies and scientific monitoring results, enhanced legitimacy and quality of monitoring, better ability to protect public health, fulfill duties to consult and improved knowledge required to address environmental of issues. Environmental problems could be addressed more effectively, including addressing stakeholder priorities in a timelier manner and setting a foundation for better environmental policy practices. Improvements are happening already, based mostly on land-mark cases in Supreme Court of Canada that shape legal practices and policy (Int. 1). There are also individuals in government who are laying the foundations for much better relationships. We have the capability to improve engagement and often the changes are quite intuitive but it will take time and commitment to overhaul the system design to accommodate these new methods and objectives (Int. 4). There will be challenges but even making the effort to engage better with Aboriginal communities using co-production principles are likely to reduce major barriers to engagement examined in this report.

Author Biography

Zoe Davis is a PhD candidate in Earth and Space Science at York University. Her doctoral research focuses on measuring air pollution levels in the Alberta oil sands and other industrial regions. She collected her data during the JOSM campaign with Environment Canada in 2013 at the field site AMS13 near Fort McKay. As part of her research program funded by NSERC CREATE IACPES, completion of a policy project provided an opportunity to explore issues beyond 'pure' science. Zoe saw this was an opportunity to contribute to making a positive impact for local communities impacted by the Alberta oil sands Industry, understand the oil sands context from the perspectives of First Nations communities and to learn about science policy and conducting social science research. Positive impacts for local communities identified in this project could include increased likelihood of ability to shape methods of engagement during projects; capacity building through supported, active participation in monitoring projects; protection of treaty rights and of ecosystem and community health; and reduced time and resources wasted on inappropriate or ineffective engagement processes that do not effectively address the communities' major concerns.

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