Achieving Next Generation Environmental Impact Assessment Follow-up and Monitoring

by

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A Thesis submitted to the Faculty of Graduate Studies of

The University of Manitoba

In partial fulfillment of the requirements of the degree of

MASTER OF NATURAL RESOURCES MANAGEMENT

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Abstract

Despite growing scrutiny of Environmental Impact Assessment (EIA) in Canada and worldwide, the follow-up and monitoring component remains under practiced, leaving EIA decision-makers and practitioners with little understanding of the accuracy of impact predictions made and the effectiveness of mitigation measures developed during the EIA project-planning phase. The Minister's Expert Panel further highlighted the importance of enhancing follow-up and monitoring during the recent review of EIA processes in Canada.

The research identifies six leading edge practices for next generation EIA follow-up and monitoring: public and Indigenous participation, continuous learning, clear roles and responsibilities, independent oversight, adaptive management and traditional knowledge. Approaches to implement those practices in a Canadian context are explored and supported by guidance that captures the learning potential of EIA follow-up and monitoring. The six practices are intended as a package and are presented with practical guidance for proponents, regulators, consultants and others involved in EIA.

Executive Summary

Environmental impact assessments (EIA) are a planning and decision-making tool used to identify, evaluate and mitigate effects of proposed developments. Once a development receives regulatory approval, follow-up and monitoring is essential to verify impact predications and determine the effectiveness of mitigation measures. While EIAs have received a great deal of attention in Canada since their inception in the 1970s, the follow-up and monitoring component remains under practiced. This was reinforced during the Canadian Minister's Expert Panel review of EIA processes, which further highlighted the importance of follow-up and monitoring in next generation EIA.

This research set out to establish a suite of leading edge practices and implementation approaches for next generation follow-up and monitoring in Canadian EIA. Three objectives were set to guide this work:

- Identify current leading edge practices for EIA follow-up and monitoring in Canada;
- Explore ways to implement leading edge EIA follow-up and monitoring; and
- Develop guidance for the implementation of leading edge practice that captures the learning potential of EIA follow-up and monitoring.

Practices for EIA follow-up and monitoring were initially identified during a literature review. Three proven and essential practices were then selected from the literature to narrow down the scope of enquiry – public and Indigenous participation, continuous learning and clear roles and responsibilities. These three practices were selected because they continue to challenge

practitioners and seemed to me to be foundational to achieving sound follow-up and monitoring while ensuring contributions to sustainability.

To examine different approaches to implement the leading edge practices identified during the literature review, interviews were conducted with EIA experts from across Canada including proponents, regulators, academics, consultants and others closely involved in the EIA process. A document review was also conducted to support the interview participants' responses. While the interview questions focused on the three leading edge practices listed above, participants were also provided with the opportunity to discuss other practices they considered leading edge in follow-up and monitoring. Based on the data collected during the interviews, three additional practices were included in the research as a result of the participants' responses – independent oversight, adaptive management and traditional knowledge.

It is recommended that all six leading edge practices be implemented together as a package for implementing next generation EIA follow-up and monitoring. While numerous approaches to realize each individual practice are presented throughout the thesis, practitioners must use their discretion to select the most appropriate approach(es) to implement each of the six practices based on the unique circumstances of each individual EIA project. This research is presented as a practical guide for proponents, regulators, consultants and others involved in EIA.

Acknowledgements

I would first like to thank my supervisor Dr. John Sinclair for his advice and patience throughout the research process. I wound not have been able to finish without his constant support and strong commitment to my research. I would also like to thank my committee members Dr. Nazim Cicek, and Professor Thomas Henley for their valuable feedback, guidance and time.

Second, I would like to thank my research participants from across Canada for sharing their knowledge and expertise with me. I would not have been able to complete my data collection without their generosity and willingness to share their time.

Third, I would like to thank the administrative staff at the Natural Resources Institute for their support and the Social Sciences and Humanities Research Council for funding the research.

Finally, I would like to thank my coworkers for their support, reassurance and flexibility throughout my graduate studies. While I may not have always appeared appreciative, I am grateful for their relentless encouragement for me to finish my thesis and constant reminders to keep on top of my studies. Their willingness to discuss research ideas and help me work through problems that I encountered along the way was invaluable. I am very thankful to be a part of such an amazing group of people.

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Abbreviations and Acronyms

BMP   Best management practice

CEAA   Canadian Environmental Assessment Agency

EIA   Environmental impact assessment

EIS   Environmental impact statement

ENGO   Environmental non-governmental organization

EPA   Environmental Protection Agency

IAIA   International Association for Impact Assessment

SEA   Strategic environmental assessment

TK   Traditional knowledge

1.0   Introduction

1.1   Background

Environmental impact assessments (EIA) are a planning and decision-making tool used to identify, predict, evaluate and mitigate the biophysical and socio-economic effects of proposed projects, programs and policies on the environment (IAIA, 1999; Elliot & Thomas, 2009). They ensure environmental considerations are incorporated into a development (Macintosh, 2010; Sinclair & Doelle, 2015). In a natural resources management context, proponents are often required to submit an EIA to government agencies as part of the regulatory process for project approval. This provides a basis for regulators to make informed decisions and promotes democratization of the governmental regulatory review process. The EIA also provides proponents with the breadth of information necessary to prevent, minimize or mitigate any adverse effects before any natural resources development occurs and thereby helps to promote sustainable development (Macintosh, 2010).

During the EIA, biophysical and socio-economic effects of a project are predicted prior to the development. Baseline studies and technical analyses assist in the development of impact predictions. Such predictions result in the implementation of mitigation or avoidance measures to help to minimize or eliminate any negative effects before they occur and amplify positive effects to the surrounding environment (Tinker et al., 2005; CEAA, 2015). Remaining significant adverse effects after the application of mitigation and avoidance measures are identified.

In most regulatory jurisdictions, a follow-up and monitoring program is required as part of the EIA process. Follow-up and monitoring programs aim to verify the accuracy of the predicted effects and the effectiveness of mitigation to ensure adjustments are made as needed (CEAA, 2015). Post-approval follow-up and monitoring activities therefore play a critical role in next generation EIA by maximizing the environmental, social and economic performance of a project through monitoring and evaluating its actual environmental impacts (Noble & Birk, 2011). EIA follow-up and monitoring considers the events that occur after a project has been granted approval from a regulatory authority. It aims to improve project management, enhance learning on EIA processes while evaluating and communicating a project's environmental performance (Morrison-Saunders, 2003; Noble & Birk, 2011). It forms a critical link between project preparation in the EIA phase, environmental management after project construction and learning for the assessment of future projects (Morrison-Saunders et al., 2003).

As such, EIA follow-up and monitoring provides a wide variety of benefits to natural resources projects. The data gathered from follow-up and monitoring programs provides insight to real project effects on the environment and nearby socio-economic conditions. This information allows proponents to take the necessary actions to mitigate those negative project effects identified by the program (Arts et al., 2001). Without any knowledge of the actual project-environment interactions occurring, prevention and mitigation of negative effects can prove challenging. Projects may also have positive effects including employment and economic opportunities. These positive effects also require follow-up and monitoring to ensure targets are achieved and the benefits are maximized. EIA follow-up and monitoring allows proponents to

meet regulatory requirements and manage the risks and uncertainties that can lead to litigation. Legal action against proponents often puts the project schedule at risk and creates costly delays.

Successful EIA follow-up and monitoring also helps maintain a community's acceptance of a project after the project is into the project construction and operation phases. It provides proponents with the opportunity to deliver on promises made during public engagement regarding project related environmental impacts (Arts et al., 2001). As well, future projects by the proponent in the nearby area may encounter less resistance from communities if the proponent demonstrates they can successfully manage their projects' adverse effects (Marshall, 2005). This enhances a corporation's reputation as greener and more environmentally responsible (Arts et al., 2001; Marshall, 2005).

For regulators and governments charged with the responsibility of ensuring environmental protection, follow-up and monitoring provides the opportunity to gather actual measurable impacts on the environment in their jurisdiction rather than simply relying on predictions made in the EIA. According to Arts et al. (2001:pg 177), "In the end it is not the predicted effects, but the real effects that are relevant to the environment". A stream of benefits from EIA follow-up and monitoring can also be created for communities in the project area. It gives communities an opportunity to learn about environmental and socio-economic effects occurring in their area. In addition, follow-up and monitoring programs act as a platform to respond and satisfy public complaints and concerns regarding safety, health, noise, pollution and other nuisances (Morrison-Saunders et al., 2001).

While the benefits of and approaches to EIA follow-up and monitoring have been well established, experience shows that practice often fails to maximize the full potential described in the literature. Next generation EIA involves ongoing follow-up and monitoring throughout the life of the project. The benefits for proponents, regulators and communities outlined in the paragraphs above demonstrate the full potential of EIA follow-up but are often not achieved, particularly for natural resource development projects. As a result, the influence of EIAs and their associated follow-up and monitoring programs on decision-making and environmental protection are not always as strong as anticipated (Morrison-Saunders, 2003; Noble & Storey, 2005; Jay et al., 2007). This has lead to questions about the rigor and suitability of follow-up and monitoring activities and of EIA itself as a result (Mcallister & Fitzpatrick, 2010).

As well, inadequate public input into follow-up and monitoring program design and public involvement in program implementation has been noted as a serious concern and particular area for improvement (Hunsberger et al., 2003; Morrison-Saunders, 2007). Further, it has been noted that stakeholders and the public generally have little influence over follow-up and monitoring programs that verify project impacts and the effectiveness of mitigation (Lawe et al., 2005; Morrison-Saunders, 2007). Criticisms towards the transparency of monitoring results have also been identified, most notably in the Albertan Oil Sands in the Canadian context. This is in part because primary monitoring data is not required to be made available to the public when it is collected (Lawe et al., 2005).

Effective EIA follow-up and monitoring requires a clear identification of objectives and priorities to avoid dissatisfaction and confusion about what the programs are expected to achieve.

An adaptable, flexible and timely process ensures that unanticipated effects, changes to the project or a shift in focus on environmental concerns can be taken into account (Noble, 2013). Data collection and handling procedures must be consistent so results are transferable and comparable to past, current and forecasted baseline conditions (Noble & Storey, 2005). Socio-economic impacts must also be carried forward from the EIA to the follow-up and monitoring program for effective monitoring. All to often, the post-approval and follow-up stage tends to focus solely on the biophysical elements of the environment. Successful follow-up will include developing measurable parameters and monitoring activities for socio-economic effects as well (Noble & Storey, 2005; Noble, 2013).

1.2   Purpose and Objectives

This research explored the current state of EIA follow-up and monitoring and its implementation. The purpose of the research was to study proven practices to EIA follow-up in Canada to develop next generation recommendations for EIA project approval processes. The objectives of the research were to:

- Identify current leading edge practices for EIA follow-up and monitoring in Canada;
- Explore ways to implement leading edge EIA follow-up and monitoring; and,
- Develop guidance for the implementation of leading edge practice that captures the learning potential of EIA follow-up and monitoring.

1.3   Methods

A qualitative design in combination with a case study research strategy was used in the research. The research considers Canadian EIA cases and focuses on the follow-up and monitoring

component of those cases. The case study is the most appropriate research strategy to achieve the research objectives because case studies are used to investigate contemporary phenomenon in real-life situations (Yin, 2009). Using this strategy allowed the investigation of events that are ongoing and observe the most current practices (Yin, 2009). This was crucial when studying the most leading edge EIA follow-up practices and how those practices may be implemented in follow-up and monitoring activities. EIA follow-up and monitoring is also a heterogeneous practice. Follow-up and monitoring programs, evaluations and management strategies have a high degree of variation from project to project. Research conducted on one natural resource project cannot be fully generalized to other projects within the same resource sector or in another sector. This made a case study strategy suitable to meet the research objectives (Wedawatta, 2010).

A literature review was conducted to identify current leading edge practices in EIA follow-up. Peer reviewed journal articles, government-developed guidance documents and non-governmental organization reports formed the basis of the literature review. Once a general understanding of leading edge EIA follow-up and monitoring was established using existing sources, a few practices were carefully selected to narrow the scope of the research project. Key person interviews were then conducted with people knowledgeable of and who have implemented or participated in EIA follow-up and monitoring programs to gain an understanding of leading edge proven practices and their implementation. Regulators, project proponents, consultants and academics with experience in EIA follow-up were interviewed. While interviews primarily focused on a select few follow-up and monitoring practices identified in the literature (such as public and Indigenous participation), participants were able to identify and discuss all of

practices they felt were critical to follow-up and monitoring. Interviews followed a semi-structured interview style. The methods are described in greater detail in Chapter 3.

1.4   Contributions

EIA follow-up and monitoring has long been recognized as a necessary activity for proponents and regulators to minimize environmental impacts and improve the environmental performance especially of natural resource projects. Best management practices have been established in the field and summarized in a series of International Association for Impact Assessment publications to help guide practitioners and overcome challenges (Morrison-Saunders et al., 2007). Despite the well-developed EIA follow-up theory, practice continues to fall short of expectations (Noble & Birk, 2011; Sinclair and Doelle, 2015). The proposed research addresses the gap between the wealth of knowledge on leading edge practices and the actual implementation of follow-up and monitoring programs. Recommendations were developed based on the research findings to assist regulators and proponents in maximizing the effectiveness of EIA follow-up and monitoring and moving towards a next generation model. Finally, the research contributes to the larger body of literature on EIA follow-up and monitoring as well as post-approval activities.

The importance of follow-up and monitoring in next generation environmental impact assessment was also highlighted in the Expert Panel's recent review of the Canadian environmental assessment practices in 2016 and 2017. The Expert Panel was tasked with evaluating and providing recommendations to improve federal environmental assessment processes. Follow-up and monitoring was identified as one of seven themes for discussion during

the review. The themes were suggested by the Expert Panel to guide the review of environmental assessment and assist with the public input process (Expert Panel, 2016).

1.5   Organization of Thesis

The thesis contains six chapters, beginning with the introduction chapter to establish the context and goals for the research. In Chapter 2, several pertinent areas to EIA follow-up found in the literature review are discussed to further develop the context of the research. Areas reviewed in the literature include EIA basics, EIA follow-up and barriers to successful follow-up. The third chapter consists of the research design and methods for the project. Data collection methods including document reviews and interviews are described in detail and ethical considerations are discussed. Chapter 4 presents the six overarching leading edge practices identified in the literature and interviews with EIA experts across Canada. Each practice is defined and benefits based on the interview participant's experiences and the literature are discussed. Chapter 5 then provides detail on the various approaches to implement the leading edge practices identified in Chapter 4. Guidance statements are provided throughout the chapter and are intended to capture the main lessons surrounding each approach and provide a clearer direction for implementation. Conclusions, recommendations and areas for future research wrap up the research in Chapter 6 and are followed by the references.

2.0 EIA Follow-up and Monitoring

A literature review, as summarized in the pages that follow, was conducted to gather current knowledge from existing publications on environmental impact assessment as well as leading edge practices for, and challenges to, EIA follow-up and monitoring.

2.1 Environmental Impact Assessment

Environmental impact assessments (EIA) originated in the United States with the National Environmental Policy Act of 1969. Shortly after, their use quickly spread to other countries around the world. EIAs continue to play an important role as a planning and decision-making tool in natural resources management and are now used in over 100 countries (Cashmore et al., 2008; Macintosh, 2010). In Canada, the Canadian Environmental Assessment Act, 2012 outlines the legislative requirements for EIAs at a federal level (Doelle, 2008; 2012). Each Canadian province or territory also has their own legislation with respect to EIAs in their individual jurisdictions (Sinclair and Doelle, 2015).

EIAs identify, predict and evaluate potential project effects on the surrounding environment, while attempting to minimize or avoid any adverse effects (Therivel & Morris, 2009; Macintosh, 2010). They consider components from both the biophysical and socio-economic environments in the assessment. Through incorporation of environmental considerations into the planning stage and decision-making process, they strengthen environmental protection and help manage the environmental outcomes of a proposed initiative (Cashmore et al., 2004; Jay et al., 2007). The EIA process provides regulators with the necessary scientifically based understanding for project

approval and democratizes governmental decision-making (Cashmore et al., 2008; Macintosh, 2010).

There are two main types of EIAs; project-based environmental impact assessments and strategic environmental assessments. The scope of a project-based assessment is confined to the impacts of a specific project. Completing such EIAs is typically the responsibility of the project proponent and used for regulatory compliance (Macintosh, 2010). Strategic environmental assessments (SEA) are concerned with high-level decision-making through the evaluation of policies, plans and programs rather than individual projects (Macintosh, 2010), and government has typically been the proponent of these. For the purposes of this thesis, project-based EIAs are the focus.

Within the academic literature, the EIA process is broken down into multiple steps, generally beginning with scoping. Scoping determines what aspects are included in the assessment (Noble, 2013). Receptors, environmental impacts, spatial and temporal boundaries, project alternatives and methodologies are selected in order to provide the EIA with a clear direction (Therivel & Morris, 2009). After scoping, baseline studies are conducted to establish key receptors and environmental conditions prior to project development. EIA studies often incorporate multiple methods of data collection on the biophysical and socio-economic environments in the project area. Desktop studies acquire existing information on environmental components in an effort to reduce duplication of data and increase efficiency. Further information is often collected through field surveys when existing data is not available or out of date (Therivel & Morris, 2009).

After studies are completed to help establish the baseline environmental conditions, impact prediction is used to determine how the proposed project will interact with the biophysical and socio-economic environment. Practitioners must determine the future state of the environmental receptors identified during scoping with and without the proposed project (Noble, 2013). The magnitude, geographic extent, duration and reversibility of changes to the receptors are predicted and build off the baseline conditions (Therivel & Morris, 2009). Once potential impacts are established, the significance of those impacts on environmental receptors must be evaluated. Impact significance determines the importance of impacts by considering the characteristic of the impact as well as the value attached to the environmental receptor (Noble, 2013). Impacts are examined prior to and after the implementation of impact management. Residual impacts may exist after impact management is implemented for the project.

Impact management sets out to maximize any predicted positive project outcomes while minimizing any negative effects. Plans are developed to address predicted negative effects typically through avoidance, compensation, rectification or mitigation (Noble, 2013). Mitigation measures are developed with the goal to avoid, minimize or remediate for adverse impacts that may incur from the project (Marshall, 2001). They address impacts in all stages of development including construction, operation and decommissioning.

Within the final step of the EIA process, a follow-up and monitoring program is developed to verify the accuracy of the predicted impacts, ensure that the mitigation measures are effective in addressing the adverse impacts and positive effects are realized (Noble & Story, 2005). As described by Noble (2013), proper follow-up and monitoring addresses the 'build it and forget

about it' syndrome displayed by many project proponents by establishing a follow-up and monitoring program that spans the life of the project. EIA follow-up and monitoring is explored in greater detail in Section 2.2.

Despite this rigorous framework for EIAs and over 45 years of practice, there continues to be room for improvement. For example, Jay et al. (2007) found that the completion of an EIA only had a minor influence on natural resource development decisions and associated project outcomes. They found that few proposed projects experienced significant changes beyond small design modifications (Jay et al., 2007; see also Macintosh, 2010). Lawrence (2013) also identifies many recurrent problems with current EIA practice that reduces its influence on the decision-making process. Often, project proponents and opponents attempt to sidestep the process under the belief that the proposed project is too 'important' for EIA because of its large economic and environmental potential. Political pressure from both sides of the project is used to influence the regulatory decision-making process because neither side believes the EIA will truly inform the process and result in their personal desired outcome (Lawrence, 2013).

Other times, the EIA misses the point and fails to address the bigger issue of whether or not the development should actually proceed based on the assessment findings (Lawrence, 2013). The EIA may place too much attention on the assessment data and technical studies of potential environmental and social effects of the proposed project while poorly evaluating whether the development has reason to proceed. In this case, the EIA simply becomes a procedural exercise and will have little effect on decision-making. The EIA must evaluate the overarching issue if the

proposed development is in the best interest of the people and community it is intended to serve

rather than merely a compilation of technical effects assessment studies (Lawrence, 2013).

In addition, the efficiency and timeliness of EIAs required for project approval has come under

fire in recent years (Middle & Middle, 2010; Doelle, 2012; Kirchhoff & Tsuji, 2014). Some

question if the costs associated with conducting an EIA and potential delays to the proposed

project from the approval process may outweigh the benefits to the public (Macintosh, 2010).

Western Australia recently underwent a comprehensive review of the timeliness and efficiency

of its EIA and approval process. The review coincided with the global financial crisis and

economic slowdown that began in 2008. The review resulted in both state and federal

government regulators fast-tracking approvals for large-scale resource development projects in

an effort to boost economic development as a response to the crisis (Middle & Middle, 2010).

A similar situation occurred in Canada, where EIA was seen as an impediment to economic

growth during a time period where the economy was perceived to be vulnerable due to the

financial crisis. The Canadian federal EIA process was streamlined to reduce financial costs for

proponents and governments as well as the time to receive project approval (Doelle, 2012;

Kirchhoff & Tsuji, 2014).

2.2   Follow-up and Monitoring

Follow-up and monitoring has long been considered the poorest performed element of EIA

(Hunsberger et al., 2005; Marshall et al., 2005; Jalava et al., 2015). While much attention is

given to the planning stages of a project prior to approval, practitioners often neglect the follow-

up and monitoring elements critical to the success of the entire EIA process. Arts et al. (2001) explain that the theory surrounding follow-up and monitoring is clearly understood however in practice, its implementation is plagued with challenges and uncertainties.

The need for follow-up and monitoring in the EIA process is well understood and even mandatory in many jurisdictions. Under the Canadian Environmental Assessment Act for example, projects require a follow-up and monitoring program to verify the accuracy of predicted effects and the effectiveness of mitigation measures in the EIA (CEAA, 2012). In most Canadian cases, EIA follow-up and monitoring falls under the responsibility of project proponents. Proponents are typically private developers, crown corporations or government organizations that put forward a proposed project or development (Morrison-Saunders et al, 2003; Marshall et al, 2005). While the responsibility of carrying out EIA follow-up and monitoring may lie with the proponent, other parties are also involved in the process, as described by Morrison-Saunders (2003). Regulators and government agencies are, for example, responsible for administering the EIA process and ensuring project approval conditions including requirements for follow-up and monitoring are meet by proponents (Morrison-Saunders et al, 2003). Regulators also play a role in identifying if a proponent has intentionally or unintentionally violated those conditions and how the violations should be addressed. Regulators and government agencies are also responsible for improving EIA processes by incorporating learning from past experiences to strengthen the overall process and enhance environmental protection (Morrison-Saunders et al, 2003; Marshall et al, 2005).

The public and stakeholders add value to EIA follow-up and monitoring and are independent of the proponent and regulator (Morrison-Saunders et al, 2003; Marshall et al, 2005). They may be directly impacted by a proposed project or belong to an interest group. As the public grows more skeptical of the proponent's ability to adequately conduct EIA follow-up and monitoring as well as the regulators' responsibility to oversee those activities, they and other public stakeholder organizations, such as ENGOs are becoming increasingly involved in the process (Hunsberger et al., 2005; Lawe et al, 2005; Wessels et al., 2015). As such, the incorporation of local knowledge and even community based monitoring programs are becoming more commonplace (Pullock & Whitelaw, 2005; Noble & Birk 2011). Public feedback and pressure can also influence the development of regulations and the way EIA follow-up and monitoring programs are implemented (Morrison-Saunders et al, 2003).

EIA follow-up and monitoring is not a homogenous practice. A single approach cannot be applied to all projects if effective follow-up and monitoring is desired. Proponents must use different approaches based on the project type and associated characteristics. Morrison-Saunders et al. (2003) have categorized developments into two project types for successful follow-up and monitoring: major and minor. Simpler forms of follow-up and monitoring may be sufficient for minor projects. In many cases, the impacts of minor projects are well-known and effective mitigation measures have already been established based on previous experiences with similar projects (Morrison-Saunders et al., 2003). Proponents of minor projects may also not have the capacity for sophisticated follow-up and monitoring programs. Rather, straightforward methods and simple checks can provide effective follow-up and monitoring. This includes using existing environmental data, local observations and complaints or permit requirements to monitor for

compliance (Morrison-Saunders et al., 2003). Of course, it is important the regulators keep track of the cumulative impacts of all of these small projects after development and through follow-up and monitoring.

However, these methods may not be sufficient for major projects. Major projects are characterized by a large timeframe and spatial extent. They are initiated by governments, multinationals or large private companies, whereas minor projects are typically initiated by small, single operation companies and cover a short to medium duration. Major projects typically require much more sophisticated and elaborate forms of EIA follow-up and monitoring (Morrison-Saunders et al., 2003). A relationship often exists between the financial investment in a project, its strategic importance and its potential for environmental consequences (Morrison-Saunders et al., 2003). In other words, high cost projects that play a key role in regional development have a tendency to create larger impacts on the biophysical and socio-economic components of the environment. Given this relationship, major projects may have the need for more comprehensive follow-up and monitoring programs than minor projects. This can include multiple inspection teams, independent committees and scientifically rigorous socio-economic and biophysical monitoring programs (Morrison-Saunders et al., 2003).

Arts et al. describe the sort of EIA follow-up and monitoring that would be required especially for larger projects as including four elements: monitoring, evaluation, management and communication. Together, the four elements link EIA activities prior to project implementation to effective management of environmental considerations after project implementation (Noble & Story, 2005). Monitoring involves data collection on various environmental factors, including

both biophysical and socio-economic components, which may be impacted by the project. The monitoring data is then compared with standards, expectations or predictions that were developed in the EIA for those components. Evaluation examines how well monitoring results compare to the standards, expectations or predictions in the EIA for each component. Management looks at how the results are addressed from the monitoring and evaluation components. It involves the decisions and actions taken to respond to the results of the EIA follow-up and monitoring to implement and necessary corrections. Finally, communication aims to inform the general public, stakeholder and aboriginal groups about the EIA follow-up and monitoring results (Arts et al, 2001; Morrison-Saunders et al, 2003; Marshall et al., 2004).

In a typical follow-up and monitoring program, the project proponent will outline the program objectives and identify monitoring priorities. A clear set of objectives and priorities provides guidance to those involved and is critical to evaluating the success and effectiveness of the program (Noble, 2013). Specific environmental components are then identified, which set the stage for data collection. For each environmental component, monitoring activities are described in detail. Common elements of monitoring activities include the site location, frequency and duration of sampling, specific monitoring techniques, monitoring parameters and measurable indicators for a known impact (Noble, 2013). A monitoring schedule is used to organize field activities for the various environmental components in relation to the various project phases. The responsibilities for carrying out monitoring activities are assigned to discipline specialists and a reporting structure is clearly defined (Lawrence, 2013). Thresholds are developed for each environmental component. If the monitoring results are not in agreement with the specified

threshold, corrective actions like remediation are taken to return the environmental component to an acceptable state (Lawrence, 2013; Noble, 2013).

2.3   Challenges to Successful EIA Follow-up and Monitoring

The need for strong EIA follow-up and monitoring to improve a project's environmental performance and comply with regulations is well documented in the literature as outlined above. In an effort to maximize the efficacy of follow-up and monitoring and achieve its desired objectives, beneficial practices have received much attention at EIA conferences such as the International Association of Impact Assessment (Arts et al., 2001; Morrison-Saunders, 2007). Despite this focus from academics and practitioners on the topic, many problems continue to persist during the development and implementation of follow-up and monitoring programs. Two outstanding problems of EIA follow-up and monitoring identified in the literature pertain to predictive accuracy and mitigation effectiveness (Noble & Story, 2005).

Predictive accuracy examines how well potential biophysical and socio-economic effects are identified during the EIA. It evaluates the degree to which the predicted environmental effects of a project conform to the actual environmental effects after implementation (Dipper et al., 1998; Noble & Storey, 2005). While verifying predictive accuracy is a requirement under the Canadian Environmental Assessment Act, its success among practitioners remains low. Noble & Storey (2005) conclude that in most EIAs, the accuracy of only a small number of predictive statements can be determined. They explain that predictive statements are typically unclear, imprecise and untestable. The necessary monitoring data required to determine accuracy is often inaccessible,

nonexistent or insufficient, making firm conclusions on predictive accuracy challenging (Dipper et al., 1998; Noble & Storey 2005).

In cases where it is possible to compare predictive statements against actual project outcomes, defining accuracy can present a challenge to EIA practitioners. Practitioners may have trouble determining how close a predicted impact must be to the actual impact to be considered accurate (Noble & Storey, 2005). In other words, what margin of error is acceptable when evaluating the follow-up and monitoring program? There is also a question whether to vary the margin of error for each predictive statement or remain consistent throughout the assessment (Noble & Storey, 2005)

The second problem identified by Noble & Storey (2005) is mitigation effectiveness. Mitigation is developed prior to project approval during the EIA and is required under the Canadian Environmental Assessment Act (CEAA, 2012). Mitigation measures are used to eliminate, reduce or minimize adverse project effects on the environment (Marshall, 2001). However, there are concerns that the mitigation measures prescribed in the EIA may not achieve their anticipated objectives (Tinker et al., 2005). Project proponents can make the mistake of assuming that the mitigation developed during the project planning stages will be successful in practice. Mitigation measures must be monitored, reported and audited to ensure the promised objectives are achieved (Sanchez & Gallardo, 2005). Residual impacts may occur even after the implementation of mitigation measures. With the project already approved, these residual impacts may receive little attention by proponents and regulators (Marshall, 2001).

Despite the attention predictive accuracy and mitigation effectiveness has received in the literature as common barriers to successful follow-up and monitoring, Lawrence (2013) cautions defining follow-up and monitoring too narrowly. Practitioners have a tendency to limit the scope of EIA follow-up and monitoring exclusively to verifying the accuracy of predictions, studying the success of mitigation or determining regulatory compliance (Lawrence, 2013). While these are important elements of EIA follow-up and monitoring that continue to require attention (Noble & Storey, 2005), a broader definition of follow-up and monitoring that encompasses a diverse range objectives must be adopted. Often a narrow scope will miss opportunities to enhance the projects environmental performance, achieve positive community outcomes and further sustainability (Lawrence, 2013).

In addition to the barriers described above that are frequently encountered during follow-up and monitoring program development, challenges continue to persist during the implementation of follow-up and monitoring programs as well. Morrison-Saunders et al. (2003) identified five common barriers to implementing EIA follow-up and monitoring with their associated root causes. The barriers look at common deficiencies and challenges experienced by practitioners and they offer a starting point to improve current follow-up and monitoring practice. Table 2-1 lists the five barriers and provides a description on the reasoning for each barrier.

Table 2-1 Barriers to EIA Follow-up and Monitoring

Barrier	Description
EIS deficiencies	Weak effects assessments, poor monitoring and mitigation proposals.
Underdeveloped techniques	Limited knowledge on proper follow-up techniques relative to other EIA activities.
Organizational and resource limitations	Limited money, time, expertise and manpower allocated to follow-up activities by proponents and regulators.
Limited support	Low priority for proponents, regulators and sometimes the public. A greater focus may be placed on new or upcoming project proposals.
Unclear benefits	Uncertainties in the advantages of follow-up to proponents and the environment.

<div align="right">Adapted from (Morrison-Saunders et al., 2003)</div>

In a review of EIA follow-up and monitoring in the United Kingdom, Jones & Fischer (2016) identified three primary barriers outlined by EIA practitioners. They concluded that the current challenges to advancing follow-up and monitoring is inadequate legislation, high cost associated with implementation and a lack of enforcement. Without legislation in place requiring a robust follow-up and monitoring program, it becomes a low priority for proponents and is quickly dropped from the scope of a project. While many practitioners understood that follow-up and monitoring in many cases is only a small fraction of the total project budget, proponents remained unwilling to risk profit margins (Jones & Fischer, 2016).

2.4   Proven Practices for EIA Follow-up and Monitoring

In response to inadequacies with existing EIA follow-up and monitoring, best management practices (BMP) have been developed. BMPs use the best available science and practice to develop and apply an environmental standard. In a natural resources management context, Measham et al. (2007) identifies two types of BMPs: regulatory and innovative. Regulatory

BMPs are required by government, whereas innovative BMPs focus on continuous learning and promoting improvement for a given sector (Measham et al. 2007).

Innovative, non-regulatory BMPs for EIA follow-up and monitoring were developed at a series of International Association for Impact Assessment (IAIA) workshops (IAIA, 1999; Marshall et al., 2005; Morrison-Saunders, 2007). The BMPs address the lack of internationally accepted guidelines for EIA follow-up and monitoring (Morrison-Saunders, 2007). Table 2.2 lists the 17 BMPs compiled by Marshall et al (2005) from the IAIA workshops (Table 2-2). The BMPs are intended to improve current EIA follow-up and monitoring effectiveness by providing direction for EIA practitioners with a set of principles and are available on the IAIA website (iaia.org) as a best practice manual for governments and practitioners. The first six BMPs are guiding principles that are concerned with the core values and nature of follow-up and monitoring. The remaining BMPs are operating principles that discuss the roles and responsibilities of those involved in follow-up and monitoring along with how it is carried out.

Table 2-2 Best Management Practices for EIA Follow-up and Monitoring

Principle Type	Theme	Best Management Practice
Guiding Principle	Core value	1. Follow-up is essential to determine EIA (or SEA) outcomes.
		2. Transparency and openness in EIA follow-up is important.
		3. EIA should include a commitment to follow-up.
	Nature of follow-up	4. Follow-up should be appropriate for the EIA culture and societal context.
		5. EIA follow-up should consider cumulative effects and sustainability.
		6. EIA follow-up should be timely, adaptive and action oriented.
Operating Principle	Roles and responsibilities	7. The proponent of change must accept accountability for implementing EIA follow-up.
		8. Regulators should ensure that EIA is followed up.
		9. The community should be involved in EIA follow-up.
		10. All parties should seek to co-operate openly and without prejudice in EIA follow-up.
		11. EIA follow-up should promote continuous learning from experience to improve future practice.
	How follow-up and monitoring should be conducted	12. EIA follow-up should have a clear division of roles, tasks and responsibilities.
		13. EIA follow-up should be objective-led and goal oriented.
		14. EIA follow-up should be "fit-for-purpose."
		15. EIA follow-up should include the setting of clear performance criteria.
		16. EIA follow-up should be sustained over the entire life of the activity.
		17. Adequate resources should be provided for EIA follow-up.

Adapted from (Morrison-Saunders, 2007)

The BMPs outlined by the IAIA (Table 2-2) offer an excellent starting point for consideration when looking to improve existing EIA follow-up and monitoring practices. They identify a wide variety of issues that are not always adequately addressed by practitioners. More importantly however, is how the 17 practices are actioned to achieve their intended outcomes. The following sections will specifically focus on BMP 9, 11 and 12 (Table 2-2) to understand how these practices are being advanced in practice. These three BMPs were selected because they continue to challenge practitioners and seem to me to be at the core of achieving sound follow-up and monitoring while contributing to sustainability.

2.4.1   Public Participation

BMP 9 (Table 2-2) promotes public participation in a project's follow-up and monitoring program as leading edge practice in EIA. While there are many articles that discuss public participation in EIA, most focus on the preapproval stage and rarely cover discuss public participation in follow-up and monitoring. One approach to public participation after project approval that has received some attention in the literature is establishing community-based monitoring programs. Community-based monitoring has been increasing in Canada in part as a response to a loss in confidence in the proponent and government's ability to properly manage environmental effects (Pullock & Whitelaw, 2005). Community-based monitoring involves concerned members of the public organizing and recording environmental and social observations in a methodological manner (Hunsberger et al., 2005). While most community-based monitoring groups are focused on the general state of the environment in a particular geographical area, some groups have worked with specific projects and their impacts. This type of work helps enforce regulations and implement corrective measures when environmental

impacts are deemed unacceptable (Hunsberger et al., 2005). Community-based monitoring also increases public involvement in the environment and influence broader environmental policy and conservation initiatives (Pullock & Whitelaw, 2005).

The public can also be involved in follow-up and monitoring through Independent Monitoring Agencies. These agencies have recently emerged in Canada and can facilitate public involvement during and after project approval. Independent Monitoring Agencies act as an environmental management 'watchdog' for projects and oversee both the proponent and the governmental regulatory authorities (Moyer et al, 2008). This collaborative approach has evolved in northern Canada and offers independent oversight through a negotiated legal agreement among project stakeholders (Noble & Birk, 2011).

In the past, agreements were typically limited to employment, benefit sharing and compensation. However more recently, agreements are beginning to include communities, aboriginal groups and other interested stakeholders in environmental monitoring and management of project impacts (Noble & Birk, 2011). These groups are involved in reviewing the proponent's environmental management plans and activities of regulatory authorities, monitoring the progress of environmental protection initiatives and providing recommendations based on their observations (Ross, 2003; Noble & Birk, 2011). The responsibilities of Independent Environmental Monitoring Agencies help address the public's concerns and ensure regulatory compliance (Ross, 2003).

Stepenuck & Green (2015) outlined that many positive outcomes occur when the public is involved in environmental monitoring. While the cases evaluated did not specifically pertain to Canadian EIA projects, they examined the benefits that arise when citizens are presented with opportunities to volunteer in environmental monitoring programs. Benefits were categorized into individual and community level impacts and are summarized in Table 2-3.

Table 2-3 Benefits of Public Volunteers in Environmental Monitoring Programs

Individual Benefits	Community Benefits
Gain in knowledge: content, skills and social learning	Increase in awareness
Change in attitudes and/or behaviors	Change in attitudes and behaviors
Attainment of social and personal benefits	Increase in social capital
Increase in the amount and effectiveness or civic participation	Influence upon natural resource management practices or policies
Attainment of a voice in decision making	

Adapted from (Stepenuck & Green, 2015)

Jones & Fischer (2016) describe proper reporting of follow-up and monitoring plans and results as good practice in their review of current EIA practices in the United Kingdom. They highlight a case where the effectiveness of mitigation measures is periodically laid out in both a technical and non-technical report. The reports were available to the public and the non-technical version aided the public in understanding the follow-up and monitoring initiatives for the project. Not only did proper reporting benefit the public, Jones & Fischer (2016) conclude that reporting also facilitates continuous learning for other practitioners. Practitioners were able to improve recommendations for mitigation and EIS prediction for future projects based on the outcomes reported in past cases. Continuous learning is explored in the following section.

2.4.2 Continuous Learning

BMP 11 (Table 2-2) promotes continuous learning to improve future follow-up and monitoring programs and the EIA process in general. Continuous learning allows practitioners and regulatory agencies to reflect on past experiences and apply that knowledge in future EIA impact prediction stages and follow-up and monitoring programs (Morrison-Saunder & Arts, 2005). Investing resources in learning from past experiences has many benefits in terms of increased efficiency, environmental performance and reduction in redundancies (Wathern, 2013). However, the wealth of knowledge developed through years of experience can easily be lost without proper knowledge management.

Sanchez & Morrison-Saunders (2011) stress the importance of a knowledge management strategy to enhance an organization's capacity for learning, storage, sharing and use of collective knowledge, all critical to EIA follow-up and monitoring. There are many different approaches to knowledge management for continuous learning. Post hoc reviews have been used successfully to contribute to knowledge retention, accessibility and availability. This facilitated discussion typically occurs upon completion of a project and identifies lessons based on people's experiences and perceptions (Fitzpatrick, 2006). Post hoc reviews were found to improve performance and result in double-loop learning. In certain cases, 'lessons learned' summary documents are published and made available to the public to promote knowledge sharing between organizations (Fitzpatrick, 2006; Sanchez & Morrison-Saunders, 2011).

The main functions of knowledge management are knowledge creation, retention and transfer. In a review of Quebec EIA agencies, Sanchez & Andre (2013) categorize knowledge management initiatives into six types:

- Maintaining a library of previous assessments;

- Staff, social networks and communities of practice;

- Provision of substantive guidance (know-how);

- Provision of internal procedural guidance (know-what);

- Treatment of spatial information (know-where); and

- After-action reviews including follow-up (know-why).

They concluded that "these initiatives have been driven by: (i) a shared understanding by successive managers that EIA does create knowledge; (ii) a concern with consistency and reproducibility of recommendations resulting from EIS review and public consultation; (iii) a concern with improving work efficiency. In addition, preparing for inhibiting the negative effects of staff turnover is another contributor to such initiatives" (Sanchez & Andre, 2013).

In addition, the data and information collected during EIA follow-up and monitoring must be processed into meaningful knowledge for use in future assessments. All too common are reports merely filed and forgotten once the project is complete (Sanchez & Morrison-Saunders, 2011). Documentation and reporting of findings must be improved for continuous learning to occur (Morrison-Saunders & Arts, 2005). Knowledge derived from follow-up and monitoring programs can go beyond simply informing decisions at the time of the project and move towards building a knowledge base for continuous learning. In Western Australia, a Shared

Environmental Assessment Knowledge Taskforce was established to develop a shared

knowledge system aimed at collecting, reporting and accessing environmental assessment

knowledge (EPA, 2009; Sanchez & Morrison-Saunders, 2011). The Taskforce is compiled of

members from project proponents, consultants, non-governmental organizations, and

government agencies. The Taskforce is expected to produce recommendations for a model to

strengthen EIA data management and build a knowledge base for retention and transfer of

knowledge to users.

2.4.3 Clear Roles and Responsibilities

BMP 12 (Table 2-2) advocates for establishing a clear division of roles and responsibilities for

those involved with EIA follow-up and monitoring. Roles and responsibilities must be assigned

prior to a regulatory decision in the EIA process and reiterated after receiving project approval

(Morrison-Saunders et al., 2007). According to Morrison-Saunders et al. (2007), "This should be

set down as a series of clearly defined steps outlining tasks and responsibilities within and

between the different parties, and all practitioners involved must be competent to their tasks."

Roles and responsibilities must also be distinguished to avoid potential conflicts of interest and

to make it clear to all EIA follow-up and monitoring participants who is responsible for what

activities (Lawrence, 2013). In a review of follow-up and monitoring for Finnish EIA projects,

Jalava et al. (2015) noted that responsibilities and information regarding planned cooperation

between stakeholders were often included in the follow-up and monitoring proposals developed

by proponents. Establishing responsibilities early on in the proposals will provide clear direction

to those involved in future follow-up and monitoring activities.

2.5   Summary

The importance of EIA to sustainability and of follow-up and monitoring as a central component of EIA in Canada and elsewhere is well established in the literature and in practice (Morrison-Saunders, 2003; Noble & Birk, 2011). Despite the growing attention, many projects continue to focus on pre-approval components of EIAs while inadequately addressing EIA follow-up and monitoring (Dipper, 1998; Jay et al., 2007; Noble, 2013). Many challenges have been identified with the development and implementation of follow-up and monitoring programs including predictive accuracy, mitigation effectiveness and limited program scope. To overcome many of the barriers to successful follow-up and monitoring, a series of best management practices have been developed to guide practitioners and improve overall EIA outcomes. While these best management practices cover a wide range of issues, they are typically inadequately addressed in follow-up and monitoring programs and practice still remains wanting. Of the 17 best management practices for EIA follow-up and monitoring, three continue to challenge practitioners and seem to me to be at the core of achieving sound follow-up and monitoring while contributing to sustainability: community involvement, continuous learning and the designation of roles and responsibilities. A focus will be placed on these practices while carrying out my research, but other innovative leading edge practices and barriers that are shared during the research process will not be ignored.

3.0 Research Design and Methods

The research design and strategy of inquiry introduced in Section 1.3 are explained in greater detail in this chapter. Specific data collection methods used in the research are identified, along with the rationale for their selection. The techniques for data analysis are laid out and strategies used to ensure validity are also provided.

3.1 Approach and Design

As established in Chapter 2, EIA follow-up and monitoring is a necessary step to achieve the goals set out in environmental assessment legislation adopted by many countries around the world. As described by Arts et al. (2001), it is the actual environmental impacts that practitioners, regulators and the public should be concerned with rather than predicted impacts. To further investigate leading edge practices to environmental follow-up and monitoring, a qualitative design was determined to be the most suitable for the research project. The data required to achieve the research objectives outlined in Section 1.2 is best collected through interviews and discussions with experts in the field of EIA since the data needed is not contained in documents or the literature. These methods and the data collected from these methods lend themselves to a qualitative design.

Qualitative research investigates issues in real-world settings, where the researcher does not attempt to manipulate the phenomenon being studied (Golafshani, 2003). The goal was to obtain the in-depth perspectives of regulators, academics, practitioners and other participants about EIA follow-up as it is being practiced to satisfy the research objectives. Participants' experiences provided valuable data and offer learning opportunities to improve future practices. Conclusions

were then drawn from the participants' perspectives and experiences shared in the study. As the knowledge gained from qualitative research seeks illumination, understanding and extrapolation to similar situations (Golafshani, 2003), the results presented here will be shared among the EIA community.

3.2   Case Study Strategy of Inquiry

A case study strategy of inquiry was carefully selected for the research project. A case study provides an opportunity to strengthen a researcher's understanding of a specific case or to further knowledge of a given problem using a case as an example (Creswell, 2012). Yin (2009) breaks down the scope of a case study into two different elements. Firstly, case studies are used for in-depth investigations of contemporary phenomena, as this research is attempting. Current cases allow the researcher to make ongoing observations in a real-life context. The second element describes that case studies are used where the boundaries between phenomena and context are difficult to distinguish. In other words, in situations where many variables are at play because the research lacks control of the environment, opposite to a controlled laboratory setting (Yin, 2009).

This strategy of inquiry can accommodate a single case or multiple cases. The case is often referred to as a bounded system, which is defined by a specific time and place (Creswell, 2012). Case studies offer many advantages including a highly adjustable strategy to accommodate the specific needs of the project and researcher and data collection and analysis is often guided by existing theory and incorporates multiple collection procedures (Yin, 2009; Creswell, 2012).

Selecting a highly flexible strategy of inquiry that can accommodate multiple data collection methods was critical to the research. Multiple collection methods helped to ensure a comprehensive and extensive investigation of leading edge practices and barriers to EIA follow-up and monitoring. The research involved a document review and semi-structured interviews as described in Section 3.3 – multiple methods embraced by a case study strategy of inquiry. A single data collection procedure may not provide the level of detail required for the project and jeopardize the research validity (Section 3.6). Another advantage to the case study strategy of inquiry is that it will help manage the scope of the research.

While case studies can be successful in qualitative research, there are some limitations that researchers must be aware of when selecting an appropriate strategy of inquiry. Results from case studies cannot be generalized and applied to all other cases. Findings in one case may not be representative of another case (Merriam, 2009). There is also potential for validity concerns when conducting case studies. Findings may not truly represent the subject if care is not taken (Merriam, 2009). However extra measures can be taken to ensure validity, which are discussed in Section 3.5 with respect to this thesis.

A specific natural resource project or development was not selected as the case. Rather, the case is the follow-up and monitoring component of EIAs in Canada. This allowed the EIA involved in this research to refer to a number of different cases as examples of leading edge practices for follow-up and monitoring. The cases identified by experts were further explored throughout the research to better understand points being made by interviewees. This technique was selected

because of the challenges with identifying a single case that would demonstrate all or even a few of the leading edge and best management practices identified in the literature review (Chapter 2).

3.3   Data Collection Methods

Semi-structured interviews followed by a document review were used to collect data for the research project. Each method is explained in greater detail in the following sections.

3.3.1   Semi-Structured Interviews

Semi-structured interviews were used to identify current leading edge practices for follow-up and monitoring as well as to explore ways of implementing these practices. Experts in EIA follow-up and monitoring were selected as outlined below and asked to draw on their case experience during interviews. Semi-structured interviews were the main data source for the research project. This style of interview provides middle ground between structured and unstructured interviews. Similar to structured interviews, questions on predetermined topics are prepared in advance of the interview often in the form of an interview guide (Bryman, 2012). However, in the case of semi-structured interviews, the interviewer is able to deviate from the prepared questions during the interview. This creates an opportunity to explore relevant topics introduced by the participant that may be of benefit to the research that was not accounted for in the interview guide (Bryman, 2012). The interviewer is also able to modify the order and wording of questions at any point during the interview, creating a natural flow while skipping any questions that are irrelevant to the specific participant. The semi-structured interviews used in this research took advantage of theses characteristics.

The draft interview guide developed and used in the research is in Appendix A. The interview guide provided direction and a flexible structure, helping to create a smooth flow to the interview. The interview guide consists of a series of questions carefully designed based on an understanding of the EIA follow-up and monitoring literature that touch on various topics pertinent to EIA follow-up and monitoring. The interview guide is divided into six sections (Appendix A). The Introduction and General Questions sections warmed up the participant and interviewer while gathering background data valuable to the context of the research. The next three sections pertain to each of the three focus areas of the research as captured in the objectives. The questions were designed to collect relevant data on continuous learning, public involvement and clear roles and objectives in EIA follow-up and monitoring. The interview guide ends with a Closing Section to conclude the session and creates an opportunity to gain new contacts that would be beneficial to the research.

Experts from across Canada were needed to ensure a wide range of experience and knowledge was captured by the research. Accordingly, the interviews were conducted using a variety of mediums to accommodate the diverse geographic range of participants. These different mediums included conducting interviews in-person, by telephone and through the submission of written responses. Participants local to Winnipeg were interviewed in-person at a mutually agreed upon location. Four interviews were conducted in this manner. In-person interviews allowed for a better rapport between interviewer and participant however were not feasible for participants located outside the researcher's home base area. When participants were not located in close proximity to the research, telephone interviews were selected as the primary communication method because of their simplicity and low costs. Two participants chose not to participate in an

interview but rather submit written responses to the questions from the interview guide. In this case, the participant was provided with a copy of the interview guide by email to guide their written responses. Any clarification or follow-up questions on the written responses were sent to the participant by email.

Interviews conducted in-person or by telephone were recorded with consent from the participant. Recordings are beneficial, as they ensure all aspect of the interview are captured. The researcher can also review the audio recording at any time for clarification or to assist with memory. Participants indicated their preference to be recorded on the Consent Form (Appendix C), which is explained in greater detail in Section 3.6. A digital recording device was used to record the audio from the interview. The audio recordings were later transcribed verbatim for ease of use during the data analysis. For participants who preferred the interview not be recorded, notes were taken by hand on paper and electronically on a laptop during the interview. This occurred for two interviews. The typed notes were later incorporated into the electronic notes and cleaned up to produce a draft of the interview. Draft notes were sent back to the participants for review before being finalized and used in the data analysis. In addition to the non-recorded interviews, a random sample of transcripts from the recorded interviews was also sent back to participants to review as part of the member checking process. Requests by participants not in the random sample to review their transcripts after the interview were also granted. Overall, 83 people were contacted and invited to participate in the research. A total of 22 interviews were conducted.

3.3.2   Participant Selection

Experts associated with EIA follow-up and monitoring in Canada were the primary target group for the interviews. Personal connections, committee suggestions and desktop research on potential people of interest were used as a starting point for developing an initial contact base and obtaining contact information. When engaging the initial contact base in the research, each was asked to recommend other experts for the research project. This technique is called snowball, or chain, sampling and helped me to identify other possible participants for the research. In addition to snowball sampling, many contacts were obtained through desktop research. Environmental monitoring reports, environmental assessments, regulatory filings and company websites were searched extensively to identify various people associated with EIA follow-up and monitoring in Canada.

Only individuals with publically available contact information could be contacted from snowball sampling to ensure the research respected the ethical guidelines provided by the University of Manitoba Joint Research Ethics Board. In the end this proved not to limit the extent of individuals that could be contacted as all individuals recommended through snowball sampling had publically available contact information online. Common locations that were used to confirm the public availability of contact information included government phonebooks, company/organization websites and regulatory filings.

Participants were contacted with an introductory email that introduced the researcher, outlined the research project objectives and invited the participant to an interview. If the participant indicated they were interested in participating in the research, a second email was sent that

provided more details about the research and specifics regarding the interview process. An interview was then scheduled. If no response was received in approximately two weeks after the introductory email, a brief follow-up email was sent.

A wide variety of individuals participated in the interviews including participants associated with regulatory authorities, government agencies, private developers, Crown corporations, academics, monitoring agencies and consulting firms. This diversity was necessary to ensure that perspectives from all roles in follow-up and monitoring were represented in the research. Participants were also selected from across Canada to ensure all regions would be represented.

3.3.3   Document Review

A document review is a cost-effective and time efficient method of collecting background information and historical context data (Bowen, 2009; Marshall & Rossman, 2010). Document reviews are very important in the beginning stages of research and are typically carried out before entering into the field (Bowen, 2009). Documents including government publications, industry reports, corporate meeting minutes and project-specific environmental plans are a rich source of information that is often publicly available. After a thorough search, all relevant documents were compiled and coded in preparation for analysis. These included items such as those outlined below.

In the research, the document review was primarily conducted to compliment the data gathered during the interviews. The documents helped develop a deeper understanding of current practices of follow-up and monitoring and deepen understanding of topics discussed with interview

participants. Documents related to the follow-up and monitoring initiatives of all projects identified during the interviews were compiled. Specific types of documents of importance to the review included environmental impact statements, monitoring reports, environmental protection plans, guidance documents and project certificates/licences. These were typically found on proponents' websites, public registries and monitoring agency websites.

The document review also played an important role in establishing the leading edge practices and challenges to EIA follow-up and monitoring. Recently, these topics have received much focus in the literature and at conferences (Arts et al., 2001; Morrison-Saunders, 2007). Publications and conference proceedings on leading edge practices from prominent academics and associations were compiled and examined during the literature review in Chapter 2. The leading edge practices identified during the document review helped narrow down the scope of the research and offer a starting point for the semi-structured interviews described in Section 3.3.2.

3.4   Data Analysis

NVivo software was used to code and organize the data from the transcripts, digital notes and documents. NVivo is a data analysis aid for qualitative information that is available for both Macintosh and Windows platform. This program was selected for its capacity to manage both primary and secondary sources of data. Primary data sources like semi-structured interviews can be stored along side secondary data sources like industry reports. This set-up improves data accessibility and simplifies the analysis process. Coding, through the use of NVivo, helped me organize the data with common themes, theoretical significance, or importance and relevance to the research (Bryman et al., 2009). These themes were derived from core constructs in the

literature and interview data (Table 3-1 and Table 3-2). Connections between themes and sub-themes are then identified using the software. These connections assist in drawing conclusions and meeting the research objectives described in Section 1.2.

After completing the semi-structured interviews, all digital recordings were transcribed. Any hand notes taken during non-recorded interviews were digitized and added to the typed notes. A database in Nvivo was created with the interview transcripts, written responses and notes to prepare for the coding exercise. The interview data was the primary component for the text analysis and theme development. The analysis proceeded with an initial set of themes being identified from the interview data and the literature. The themes classified barriers and leading edge practices as they emerged from the text analysis (Table 3-1).

Table 3-1 Initial Themes for Data Analysis

Theme	Sub-theme
Adaptive Management	Barriers
	Implementation
Aboriginal Traditional Knowledge	Barriers
	Implementation
Clear Roles and Responsibilities	Barriers
	Contracts and Agreements
	Guidance Documents
	Reporting Mechanisms
	Training
Continuous Learning	Barriers
	Document Evolution
	Knowledge Sharing and Industry Collaboration
	Knowledge Management and Storage
	Post-Project Meetings
	Frameworks and Guides

Table 3-1 Initial Themes for Data Analysis

Theme	Sub-theme
Environmental Agreements and Memorandums of Understanding	Barriers
	Implementation
Impact Benefits Agreements	Barriers
	Implementation
Independent Oversight	Barriers
	Implementation
Indigenous Involvement	Barriers
	Implementation
Public Involvement	Barriers
	Dissemination of Monitoring Results
	Local Employment in Monitoring Programs
	Community-based Monitoring
	Post-EA Community Meetings and Open Houses
	Partnerships
	Workshops
Other Practices	Relationship Building
	Transparency
	Early Strategic Planning
	Sustainability

After all interview data was coded, the initial themes were revisited and reviewed. Some of the initial themes were very broad and offered little benefit when it came time to draw conclusions from the data. Too much data under a single broad theme also made it near impossible to locate relevant information and specific references from the interviews when needed. Therefore the broad themes were further refined using sub-themes to avoid problems later on during the analysis. Alternatively, some of the initial themes were too specific and also offered little benefit to the analysis. These specific themes were combined with other themes containing similar content to improve the utility of the data. The coding process is presented in Figure 3-1.
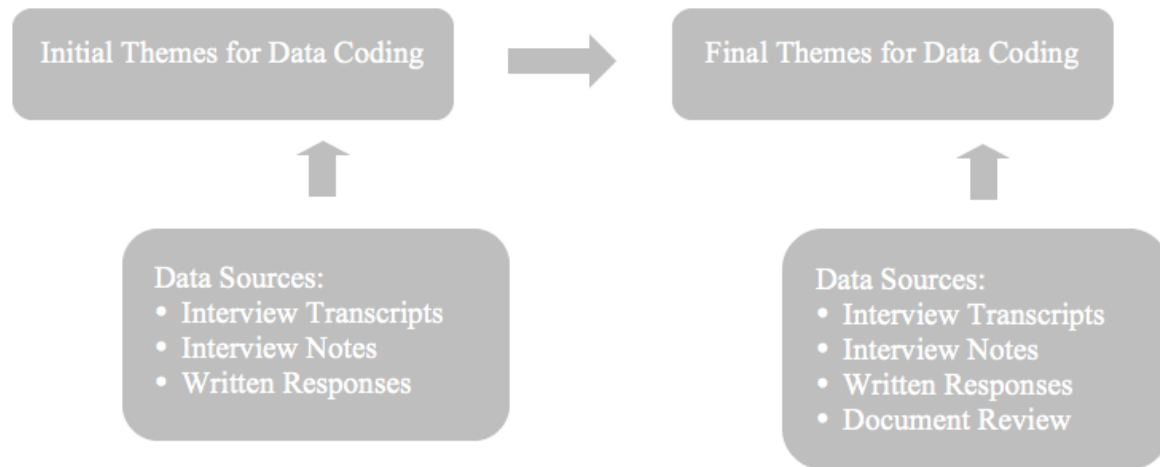
Figure 3-1 Data Coding Process

Once the initial themes were revised and a final set of themes was established, documents from

the document review were added to the NVivo database. Elements from the documents

pertaining to the final themes were coded accordingly. A summary of the final themes is

provided in Table 3-2.

Table 3-2 Final Themes for Data Analysis

Theme	Sub-theme
Adaptive Management	Barriers
	Program Structure
	Response Strategy
Aboriginal Traditional Knowledge	Barriers
	Indigenous Engagement
	Traditional Knowledge-Specific Monitoring Programs
Clear Roles and Responsibilities	Barriers
	Environmental Agreements
	Guidance on Expectations
	Reporting Structure
	Formal Communication
Continuous Learning	Barriers
	Document Evolution
	Knowledge Sharing and Industry Collaboration
	Knowledge Management and Storage
	Post-Project Reviews
Independent Oversight	Barriers
	Independent Environmental Monitoring Agencies
	Independent Monitoring Programs
	Other Models for Independent Oversight
Public and Indigenous Participation	Barriers
	Participation in Monitoring Plan Design and Studies
	Community-Based Monitoring Initiatives
	Public and Indigenous Engagement
	Monitoring Advisory Committees and Working Groups

3.5   Ensuring Validity

Maximizing research validity increases the credibility and defensibility of the findings. Within a

qualitative research context, validity is concerned with how accurately the findings represent the

phenomena that is intended to represent (Golafshani, 2003). There are many processes and

techniques used by qualitative researchers to ensure validity, each with their own advantages. Triangulation and member checking techniques were used in this research to ensure validity.

Triangulation involves the use of multiple data collection methods to study the same phenomenon (Golafshani, 2003). As described in Section 3.3, document analysis, semi-structured interviews and written responses were the primary data collection methods used in this research project. Findings from each method were compared in search of consistency and agreement. The documents, which included environmental impact statements, monitoring reports, project licences and environmental protection plans were used to support information gathered during the interviews. In many cases information and projects presented by participants in interviews also overlapped with previous interviews and allowed for additional triangulation.

Member checking also occurred to ensure validity of the interview transcripts and notes. A random sample of transcripts and interview notes was returned to participants for their review. This provided the participants with the opportunity to correct any factual errors and ensure their views are accurately represented. An additional advantage of member checking was that participants also added additional information and clarified their responses. In addition to the random sample, some participants also requested to review their transcripts or interview notes before being incorporated into the data analysis. Similar to the random sample, these transcripts or interview notes were sent to the participant for their review. Participants were given approximately one month to review the data collected during their interview before becoming finalized. If the participant required more time for the review, their request was granted.

3.6   Ethics

The research project involved the participation of academics, environmental practitioners and regulators. Accordingly, the project required an ethics review by the University of Manitoba. Approval was required from the University of Manitoba through the Joint Research Ethics Board prior to any participant involvement (Appendix B). This Board helped to ensure that participation in research was voluntary and all participants' personal information was kept confidential at all times.

Verbal or written permission was obtained from all research participants. Prior to participation, a written explanation of the research project and a consent form was distributed to all potentially interested participants. The consent form outlines the intent and the nature of the research project. Specific elements in the consent form include a brief description of the purpose of the research, a description of the procedures involving the participant, the benefits of the research and any potential risk to participant. Participants were also given the opportunity to grant permission to record the interview with a digital recording device on the consent form. The consent form requires the participant's signature that indicates they agree to participate in the research project. The electronic consent forms, transcripts and any other confidential information are stored on a password-protected computer with Adobe Acrobat password protection security features enabled. After a period of five years, all confidential information will be destroyed.

The data primarily contains the knowledge and opinions of experts in Canadian EIA follow-up and monitoring. Interview transcripts, notes and written submissions do not contain the participant's name to protect confidentiality. Rather, an alphanumeric code was assigned to each

participant to ensure confidentiality. Only the research advisor and the researcher have access to the raw data.

During the interviews, participants could ask questions and seek clarification if necessary before beginning the interview. Participants were also able to decline any questions during an interview or withdraw from the study at any point in time. In addition to a random sample used for member checking, any participant could request a copy of their interview transcript for review before finalization. During the review period, participants ensured their views have been accurately captured and could suggest modifications or additions to the data. Participants were typically given one month to review their transcript prior to finalization.

3.7   Dissemination

The research results are available in the final version of the thesis. The thesis is available to the public for viewing and download on the Natural Resources Institute's website. Research participants will be notified once the thesis is available online. The research findings will also be published in a relevant academic journal to further communicate the findings such as *Impact Assessment and Project Appraisal*.

4.0 Identification of Leading Edge Practice in EIA Follow-up

Data from the interview participants and the literature regarding leading edge practices to EIA

follow-up and monitoring are presented in the following subsections. While the literature review

and interviews primarily focused on three leading edge practices (public and Indigenous

participation, continuous learning and clear roles and responsibilities) that were selected during

the research scoping to help focus the study, interview participants were given the opportunity of

identifying any leading edge practice that they felt was critical to EIA follow-up and monitoring

based on their expertise and personal experiences. This led to the identification of three

additional leading edge practices grounded in the data itself including independent oversight,

adaptive management and traditional knowledge.

Together, these six leading edge practices provide the basic framework for the presentation of

the data gathered during the research. Each section below corresponds to a leading edge practice

that is followed by a description and the utility of the practice in EIA follow-up and monitoring,

based on the interview data collected and coding exercise described in Chapter 3. A comparison

is drawn between the practices identified by participants during the interviews and topics in the

literature pertaining to EIA. Finally overlapping concepts and links between individual practices

are discussed where they exist. Guidance on how to implement these leading edge practices is

introduced here, but fully covered in Chapter 5 of the thesis.

4.1 Public and Indigenous Participation

Public and Indigenous participation aims to involve those affected by a project or development in

the follow-up and monitoring process. While Canadian law requires participation in the

environmental assessment and decision-making process, participants noted that public and

Indigenous participation often ends once a project is approved (Participant 5, Participant 8 and

Participant 13). Research participants illustrated the importance of continuing public and

Indigenous participation in follow-up and monitoring and shared many of the benefits.

People in the past used to think that once the proponent has the permit to construct, that the proponent could do whatever they please. Most often people were very surprised to see that we were not done yet. That we still had a lot of homework to do towards the end of the project. I would say it does increase the acceptability of the project. I would say it maintains a link with the local population to try and adjust with some of their further needs or other propositions. (Participant 8)

In addition to an increase in project acceptability among public and Indigenous communities,

participants also describe participation in follow-up and monitoring as a way to ensure

accountability and transparency to a project and strengthen ongoing relationships.

I think it is absolutely critical because public involvement ensures accountability, it give clients, practitioners and everyone involved a second set of eyes on things, it provides an ongoing local knowledge on how things are progressing and if its done well it can create ongoing relationships. (Participant 1)

By having the public involved, there is a bit more transparency there. I think that the companies that actually get the public involved, not just to provide oversight or review information that is provided as part of the monitoring, but to actually get them involved in the monitoring, that is certainly a leading edge practice. (Participant 13)

The benefits of public and Indigenous participation noted by the interview participants are

reinforced in the literature. Extending public and Indigenous participation past project approval

and into the follow-up and monitoring stage of a project was identified as a beneficial practice in

the literature review (Morrison-Saunders, 2007) as it can be a means to obtain feedback,

influence decisions and transmit information to the public such as monitoring results. It adds

legitimacy to the process and leads to better, more informed decisions (Irvin & Stansbury, 2004). The literature also highlights the need for growth of participation in follow-up and monitoring programs in Canada (Hunsberger et al., 2003).

However, the interview participants primarily offered responses that explored different approaches and techniques to implement public and Indigenous participation in follow-up and monitoring programs rather than simply focus on the benefits. They did not question the benefits or whether such participation should occur, rather they focused on how to get the job done. During the interviews, participants discussed issues such as the dissemination of monitoring results, community-based monitoring initiatives, public engagement activities and monitoring committees as tools to successfully involve the public and Indigenous people after project approval.

4.2 Continuous Learning

As outlined in Chapter 2, continuous learning describes the process of reflecting on past experience to improve future follow-up and monitoring. Follow-up and monitoring must constantly foster learning to expand knowledge and advance existing practices. Past project experiences with follow-up and monitoring programs offer an opportunity for learning when regularly revisited to reevaluate practices, knowledge and assumptions. Proponents, regulators, governments and others involved in EIA must always be cognizant of the next project and recognize how lessons learned can be incorporated in future follow-up and monitoring. Participants explained that continuous learning is critical in improving systems and will contribute to better follow-up and monitoring from one project to another.

Continued learning is essential in improving systems. […] This allowed all involved staff to have an opportunity to discuss what worked and what didn't. (Participant 14)

There needs to be for follow-up a very good understanding of what has transpired in the past. That really dictates the future of follow-up or the success of it. Typically the assumption is the environmental assessment process or that EA document will be enough to decide what the follow-up should be. I don't think that's enough at all. I think there is a lot of context that gets missed out. (Participant 1)

We think that we should get better and better results in the long run from one project to the other. (Participant 8)

In addition to the benefits of continuous learning outlined above, one participant stressed the importance of the role of government in ensuring continuous learning occurs among the findings of mitigation from various projects. They noted that proponents or interveners can only do so much in facilitating continuous learning across projects in a similar industry sector or regulatory jurisdiction. They felt however, that governments have experience with the full extent of projects among different industries within their jurisdiction and therefore must play a critical role in maintaining knowledge sharing and transfer over the long-term and making it available for future projects. The participant below explains that this responsibility should not be shifted to proponents or interveners.

There is a tendency generally to shift responsibility to the proponent. And so there is a tendency, especially by government to minimize its role. And I think that is a big part of the problem because certainly on the aspect of this that you call continuous learning, the need to think about the next project during the follow-up program or a project that was approved, that is not the role of the proponent. And it is also unrealistic to put that responsibility primarily on interveners. That is a responsibility of government. Government needs to have responsibilities there, not just power. I think that is, with respect to the continuous learning, that is one of the missing pieces. In order for that to happen, there needs to be clear responsibilities on government to communicate effective and to be responsible for ensuring that those questions are asked. And to communicate effectively that that information is available for future projects and future EAs. (Participant 4)

In addition to the responses provided by participants, the literature promotes continuous learning as a beneficial practice for follow-up and monitoring that results in increased efficiency, improved environmental performance and reduced redundancies (Wathern, 2013).

Various approaches and techniques to facilitate continuous learning were shared during the interviews. Participants frequently mentioned knowledge sharing among similar projects, industry collaboration, post-project reviews and proper knowledge management as ways to implement continuous learning in follow-up and monitoring.

4.3   Roles and Responsibilities

As outlined in Chapter 2, setting clear roles and responsibilities for follow-up and monitoring involves establishing an explicit understanding of everyone's duties after project approval. Proponents, governments, regulators and others involved in follow-up and monitoring are all working toward the same goal of environmental protection. However without a clear division of roles and responsibilities, follow-up and monitoring initiatives risks falling short of anticipated goals and those involved are susceptible to duplicating efforts and uncertainty. Expectations, requirements and boundaries for all actors must be effectively communicated. In other words there must be a clear understanding of roles and responsibilities not only at an individual level within an organization, but also at an organizational level among actors including proponents, consultants, regulators and governments.

One participant illustrated multiple benefits from establishing clear roles and responsibilities in an EIA project.

Clear roles and responsibilities would allow for measuring the success of a project because you now have a framework in place. It would give you a good sense of who to talk to in case there is a problem. It would allow you to better plan for a future project and see if there is a responsible authority that is not delivering or operating the way you expected it too. Then it allows you to modify things. (Participant 1)

The literature offers little detail with respect to establishing clear roles and responsibilities in follow-up and monitoring beyond expressing a need for the practice. This may be a research area covered more extensively in business management journals as a general practice for organizations rather than a practice specific to EIA. Nevertheless, many interview participants acknowledged the importance as well as lack of clear roles and responsibilities in follow-up and monitoring that was similarly identified in the limited literature selection.

Despite the overlap with general business management practices for organizations, participants discussed different approaches to establish clear roles and responsibilities specific to follow-up and monitoring during the interviews. Some noted that environmental agreements are becoming increasingly common and can be used to outline the roles and responsibilities of all actors involved as well as provide a means for legal enforcement. Other participants discussed the utility of guidance from regulatory authorities to support project licence/certificate conditions in an effort to clarify expectations for proponents. Additionally, establishing formal communication and a reporting structure within an organization can ensure a clear understanding of roles and responsibilities.

4.4   Independent Oversight

Independent oversight is a watchdog function associated with follow-up and monitoring activities aimed at promoting transparency in the process. Participants noted that there are varying degrees of independence in follow-up and monitoring. For example, authorities tasked with providing independent oversight can be entirely independent from the project proponent, regulator and government, operating autonomously of all actors involved in follow-up and monitoring. In other situations independent oversight may be a function of a regulatory body or government agency. In this case, oversight is independent from the proponent responsible for the project but not from the regulator and/or government. One participant illustrates this distinction between different degrees of independence.

I think that independent oversight can be extraordinarily valuable [...]. The government will tell you that government inspectors are independent oversight, and they are not wrong. But there is also independence of both the project operator and the government. (Participant 2)

The literature outlines independent oversight as a critical practice for effective and credible follow-up and monitoring. These autonomous authorities bring accountability to follow-up and monitoring and can establish public confidence in the process (Diduck et al., 2012). Participants voiced similar benefits of independent oversight during the interviews. For example, participant 21 explained that independent monitoring adds confidence and transparency to follow-up and monitoring. In another interview credibility was noted as a benefit of independence.

The use of independent experts to help design the follow-up study should be encouraged as it leads to a better and more credible study. (Participant 2)

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There are two distinct approaches to implement independent oversight that were mentioned by participants during the interviews. Each approach aligns with a different degree of independence. The first model involves establishing an independent environmental monitoring agency that operates independently from the proponent, and regulatory agencies. The second model uses independent monitoring programs conducted by the regulator and/or government agencies that are independent but complimentary to the initiatives of the proponent.

It is important to note that in some instances independent oversight can and should overlap with public and Indigenous participation (Section 4.1). Independent oversight helps build trust between the public and proponents (Diduck et al., 2012). In the cases shared by interview participants (examined in Section 5.4), many of the independent environmental monitoring agencies or independent monitoring programs also serve as a liaison with communities. They have, for example, responsibilities in disseminating follow-up and monitoring information to communities, obtaining input and feedback from communities and facilitating engagement activities. On the contrary, some of the approaches to public and Indigenous participation that are discussed in Section 5.1 may also overlap with independent oversight. Community monitors that are selected by the community to actively participate in the proponent's follow-up and monitoring program or community-based monitoring programs organized by communities to compliment existing project-specific monitoring conducted by the proponent can serve as independent oversight. It is important to be cognizant of this overlap when considering the various approaches to implement independent oversight and public and Indigenous participation in Chapter 5.

4.5   Adaptive Management

Adaptive management was recognized as an important, if controversial, practice for follow-up

and monitoring during the interviews. One participant briefly summarizes how adaptive

management was incorporated into the follow-up and monitoring of a project.

*So there was an impact from the project that was just not anticipated in the environmental
assessment. The impact was identified and changed the nature of the operation at the mine in a
variety of substantial ways. [...] The data was used to identify a trend that was unfortunate and a
mitigation measure was put in place. That is an example that I would call adaptive
environmental management because monitoring programs were put in place, the results of those
were analyzed, the analysis lead to an understanding of what was going on at the mine site and
in both of those cases, there was a change to environmental management. (Participant 2)*

Some respondents indicated that projects can benefit from adaptive management in follow-up

and monitoring due to the process flexibility. There is often uncertainty towards the effectiveness

of follow-up and monitoring plans as well as specific mitigation measures when initially

proposed. This uncertainty stems from the complexity of natural systems and the unpredictability

of how management strategies will interact with the environment. Therefore, an adjustable

management approach to follow-up and monitoring can enhance environmental outcomes but

requires careful monitoring and transparent reporting.

*Adaptive management provides flexibility to identify and implement new mitigation measures or
to modify existing ones during the life of a project. (CEAA, 2016)*

Examples on the implementation of adaptive management provided by participants can be

categorized into two different approaches based on scale. The first approach deals with applying

adaptive management at a broader scale to the follow-up and monitoring program itself and

associated structure. The second approach looks at implementing adaptive management at the scale of individual mitigation strategies and specific responses to environmental effects.

Adaptive management is also documented in the literature and the views expressed by the participants generally agree with what the literature contends. Adaptive management is a process that aims to learn from the implementation of management strategies and use those lessons to improve future management practices. It treats decisions as experimental hypotheses that offer learning opportunities (Kwasniak, 2010). Adaptive management acknowledges uncertainty and enables decision-makers to work with ambiguity, which is often present when dealing with the complexity and unpredictability of environmental systems. It is often compared to a system of trial and error but differs with its defined process and structure. There is a structured decision-making process in which objectives are identified, potential outcomes are estimated and trade-offs are evaluated. This is followed by opportunities for learning where decisions are implemented, monitored, evaluated and then adjusted as necessary (Allen et al., 2011).

The adaptive management process as outlined by participants fosters principles of learning and thus it is important to acknowledge its overlap with continuous learning, identified in Section 4.2. Ideally, adaptive management uses learning from past trials to reduce uncertainty in management decisions with respect to follow-up and monitoring in more recent cases (Participant 10 and Participant 17). Evaluating the outcomes of follow-up and monitoring strategies, such as aquatic mitigation measures or terrestrial remediation initiatives, creates opportunities to gain knowledge and enhance learning that can be applied not only to the current project under adaptive management, but to future projects as well. Additionally, adaptive

management can contribute to knowledge management and storage, which is covered in Section 5.2.3 under continuous learning. The adaptive management process encourages that knowledge including effective/ineffective management strategies, lessons learned and experiences are documented for future reference (Allan & Stankey, 2009). These links must be considered during the discussion of implementing continuous learning and adaptive management practices in Chapter 5.

4.6   Traditional Knowledge

Participants discussed the importance of incorporating traditional knowledge into follow-up and monitoring during the interviews. They outlined the need for traditional approaches to be used alongside scientific methods for follow-up and monitoring and described how traditional knowledge can contribute reliable data for reporting.

For proper EA follow-up, there has to be a good use of traditional knowledge, not solely science in the monitoring and management of environmental impacts. (Participant 7)

That community engaged in enhanced monitoring in a way that would use the knowledge of the elders to transfer knowledge from that generation to the younger people and build reliable data to incorporate it into a process for reporting. (Participant 6)

However, participants noted that challenges are often encountered when incorporating traditional knowledge with technical knowledge into follow-up and monitoring. They indicated that traditional knowledge can be an afterthought or become an add-on to an existing follow-up and monitoring program primarily based on technical knowledge.

These ideas are supported in the literature, which describes traditional knowledge as a body of knowledge that is held by and unique to Indigenous peoples. This knowledge is passed down through generations and is always evolving (Matsui, 2015). While there is no single definition for traditional knowledge, it can be described as a dynamic system of knowledge based on culture, nature and spirituality gained through a close connection with nature. Traditional knowledge holders can range from elders, to hunters, trappers and gatherers of medicines and plants. Various elements make up traditional knowledge including environmental knowledge, knowledge of the use and management of the environment and environmental values (Gondor, 2016).

Similar to the views expressed by participants, the literature indicates that all too often follow-up and monitoring solely relies on technical knowledge during planning and implementation. As Parlee et al. (2014) explain, traditional knowledge systems for monitoring and management have historically been in conflict with more modern and technical methods. However, as indicated in the literature, it is essential to incorporate both traditional knowledge and technical knowledge into follow-up and monitoring. This unique knowledge about the local environment can help identify successful environmental management strategies, strengthen mitigation, improve decision-making and provide an avenue to meaningfully involve Indigenous people in follow-up and monitoring (Parlee et al., 2014).

It is of interest that incorporating traditional knowledge into follow-up and monitoring can overlap with the practice of public and Indigenous participation. This may be intuitive as many of the approaches to implement Indigenous engagement can also facilitate gathering traditional

knowledge and incorporating that information into follow-up and monitoring. As an example, the use of workshops to involve communities in the design and development of a follow-up and monitoring program also offers an opportunity to integrate traditional knowledge from elders and resource users into the program (Participant 7).

Similarly, approaches to incorporate traditional knowledge into follow-up and monitoring can also be linked to independent oversight. Independent environmental monitoring agencies often have the responsibility of serving as liaison with Indigenous communities and contributing to the development of follow-up and monitoring programs. To support these mandates, independent environmental monitoring agencies may partake in facilitating the collection of traditional knowledge.

4.7   Summary

Three leading edge practices to follow-up and monitoring were selected from the literature: public and Indigenous participation, continuous learning and clear roles and responsibilities. While these practices formed the base for the semi-structured interviews, participants were given the freedom to discuss other practices pertinent to follow-up and monitoring. After reviewing the data collected from the interviews, three additional practices were established based on participant's responses: independent oversight, adaptive management and traditional knowledge.

All of the interview participants noted in some way the importance of the three leading edge practices selected from the literature - these practices resonated with all participants. Most participants were also able to provide with ease firsthand experiences or examples for each of

these three practices. There was also a good level of convergence around the additional practices identified based on the participant's responses. While not every participant mentioned the additional practices in their interview, many participants independently discussed each of them.

All six leading edge practices are supported by the literature as demonstrated throughout the current chapter. The initial three practices were selected because of their prominence in the literature and their importance in achieving sound follow-up and monitoring while contributing to sustainability. While the other three practices were added to the research later on based on participants' responses, they are also found in the literature. However, it is important to note that this is by no means an exhaustive list of all practices critical to next generation follow-up and monitoring. Other practices of importance mentioned by participants during the interviews or found in the literature included accountability, sustainability, early strategic planning, cumulative effects and setting clear performance criteria (Table 3-1; Lawe et al., 2005; Gallardo et al., 2015). Other key elements to follow-up and monitoring were discussed at a series of IAIA workshops and compiled by Marshall et al. (2005) in 17 BMPs. Key elements to follow-up and monitoring in the BMPs include transparency, openness, timeliness, cooperation, objective-led and adequately resourced.

The following chapter delves into these six leading edge practices further by sharing the data related to implementation and guidance offered by participants.

5.0 Implementation of Leading Edge Practices in EIA Follow-up

Six high-level, leading edge practices for follow-up and monitoring were identified and discussed in Chapter 4. In this chapter, the approaches suggested by participants to implement the six leading edge practices are discussed. This data is supplemented with information collected from the supporting document review of EIA projects referred to by the interview participants. The successes and challenges encountered by participants during follow-up and monitoring proved to be essential for developing this implementation guidance.

In this chapter, each leading edge practice is covered in a section of its own that includes a series of approaches for implementation, organized into subsections. These subsections contain tools, techniques, and methods to facilitate the implementation of the leading edge practice. Each subsection begins with a guidance statement that is followed by a discussion on implementation. The guidance statements capture the main lessons surrounding each approach and are intended to provide clear direction for implementation. The following figure outlines the relationship between practices, approaches and guidance statements.
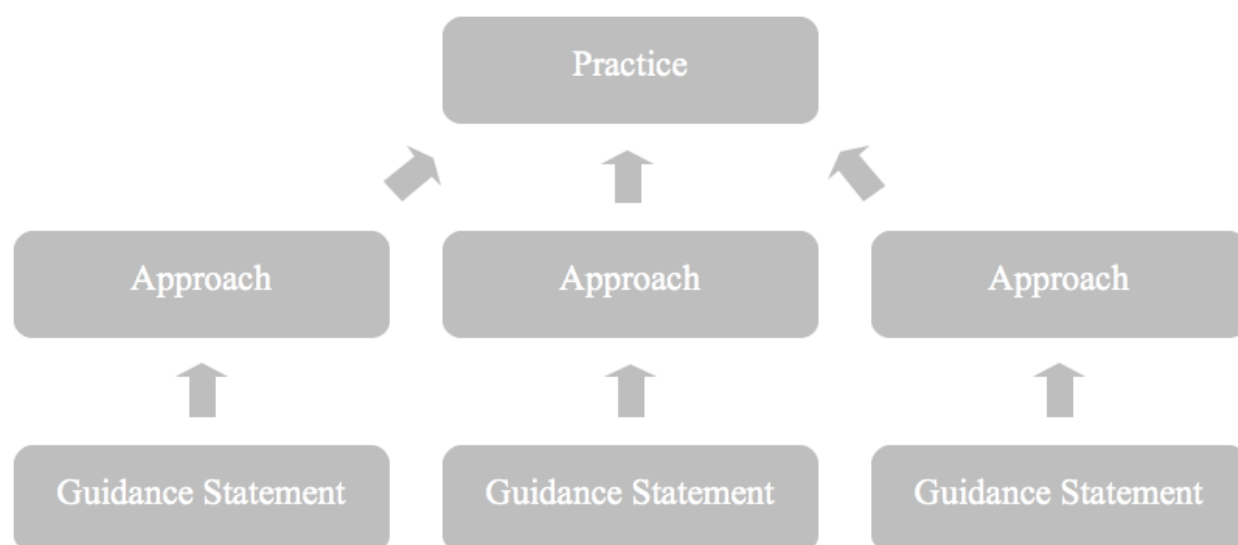
Figure 5-1 Relationship Between Practices, Approaches and Guidance Statements

Table 5-1 summarizes the guidance statements for each leading edge practice and provides the

outline that the chapter follows.

Table 5-1 Guidance to Implement Follow-up and Monitoring

Leading Edge Practice	No.	Guidance Statement
Public and Indigenous Participation	1	Monitoring plans and results should be disseminated in a manner so that they are easily accessible to the public and Indigenous communities.
	2	The design, development and implementation of follow-up and monitoring programs should involve public and Indigenous participation.
	3	Monitoring programs should be supported by community-based monitoring initiatives when relevant.
	4	Public engagement should continue after project approval and into the follow-up and monitoring stage of a project.
	5	Ensure monitoring advisory committees and working groups are open to all interested stakeholders and that full access to all monitoring results is provided.
Continuous Learning	6	Follow-up and monitoring documents should continually evolve to capture learning from past projects and experiences.

Table 5-1 Guidance to Implement Follow-up and Monitoring

Leading Edge Practice	No.	Guidance Statement
	7	Knowledge sharing and industry collaboration should foster learning among projects of similar nature or operating in close proximity.
	8	A knowledge management and storage system should be implemented and catalogue follow-up and monitoring information for future reference to facilitate continuous learning.
	9	Follow-up and monitoring initiatives should be reviewed post-project with a focus on implementing the learning of the review.
Clear Roles and Responsibilities	10	Agreements should be considered as an option to enforce roles and responsibilities in follow-up and monitoring.
	11	Guidance should be provided to improve clarity of the expectations, roles and responsibilities for follow-up and monitoring.
	12	A robust reporting structure should clearly outline the roles and responsibilities for communicating follow-up and monitoring information.
	13	Formal communication should occur regularly to ensure all involved parties (employees) understand their roles and responsibilities in environmental protection.
Independent Oversight	14	Independent environmental monitoring agencies should have legal backing, a clear mandate and sufficient funding, all established in a binding agreement.
	15	Independent environmental monitoring programs should add credibility to existing follow-up and monitoring.
	16	Follow-up and monitoring should capitalize on public and Indigenous participation to capture an independent perspective that reflects the community's interests.
Adaptive Management	17	Adaptive management should be applied to the follow-up and monitoring program structure itself and responses to environmental effects.
Traditional Knowledge	18	Traditional knowledge-specific monitoring programs should use a community-developed methodology to collect and interpret information in a meaningful way.

5.1   Public and Indigenous Participation

Overall participants supported the need for public and Indigenous participation in follow-up and

monitoring established during the initial literature review and provided many recommendations

for implementation. The following subsections contain ideas shared by participants for implementing public and Indigenous participation in follow-up and monitoring. Topics established and reviewed include dissemination of monitoring results, community liaisons, community-based monitoring, public and Indigenous engagement, advisory committees and working groups.

5.1.1   Disseminating Monitoring Plans and Results

Guidance # 1: Monitoring plans and results should be disseminated in a manner so that they are easily accessible to the public and Indigenous communities.

Participants frequently expressed the importance of disseminating monitoring information to the public and Indigenous communities. This includes making the monitoring plan itself and other documentation easily available to the public to ensure the public is informed of a project's monitoring objectives, methods and proposed field activities. Equally important is the availability of monitoring results once monitoring activities have begun. This ensures the public is informed of monitoring outcomes and strategies to address any issues that were detected during monitoring. Most importantly, proper dissemination can notify the public and Indigenous communities of the outcomes of impact predictions and the effectiveness of mitigation measures prescribed during the environmental assessment.

The people and other stakeholders were very keen to ensure that if we developed this project that we were able to very clearly demonstrate through our monitoring program that our predictions about the potential for negative effects were borne out. As well as seeing that the mitigation we proposed for a variety of different effects was effectively implemented. So what we did as part of

that was to share the monitoring reports with organizations that represent interests in the communities. (Participant 17)

Approaches identified during the interviews surrounding disseminating monitoring information can be categorized into two topics - reporting methods and information access. Reporting methods include various communication tools or mediums to disseminate information such as technical reports, plain language reports, brochures and visuals. Information access looks at how the public and Indigenous communities access the monitoring information and locations to host these communication tools.

Reporting Methods

Many different communication tools to disseminate follow-up and monitoring information were shared by participants, with annual monitoring reports being mentioned as the most frequently used approach. Participants explained that annual monitoring reports can communicate monitoring program successes, current issues, results from past studies and future plans for monitoring to a large audience. Many proponents from across Canada already develop publically available annual monitoring reports for projects either on a voluntarily basis or as a licence condition. However, participants explained that historically, these annual monitoring reports have been quite technical in nature. The technical nature of this information presents a challenge to the general public and Indigenous communities interested in reviewing and understanding the results of follow-up and monitoring activities. This has resulted in a push for plain language versions of these annual monitoring reports. Plain language versions cover the same content as the technical versions however, are more appealing and easy to read for a general audience. Participants explained that this is typically accomplished with the use of visuals and the absence

of jargon and other scientific language. The intent of the plain language version is not to replace the technical version of the annual monitoring report, but rather make the information more accessible to a wider audience (Participant 21).

In the first year it (the annual monitoring report) was very technical like a masters thesis. Then we realized that we needed to provide something in plain language that is more appealing to the public. [...] We included a lot of photos to illustrate the points we are making. But its much more comprehensible. Not less technical but much more presentable. (Participant 2)

Also of critical importance, we have an annual report that we publish every year that goes out to all the communities, all the regulators, everybody. We determine that it would help to have two versions of that. What we call the technical version, which has always been our version since day one, but also a plain language version. So basically covering the same content but in plain language. So covering it in jargonless plain language that the folks can understand. (Participant 7)

In addition to annual monitoring reports, participants indicated that brochures or bulletins are other communication tools used to disseminate monitoring plans and monitoring results in plain language. They are typically less detailed than the annual monitoring reports, providing only monitoring program highlights and summary information. These communication tools are designed to keep the public involved without being overwhelmingly detailed. Brochures or bulletins can be easily mailed out to the public and local communities, which is also particularly valuable in rural and remote regions of Canada where internet services are inconsistent and not always accessible.

Other participants expressed the importance of adopting visuals such as videos, presentations and maps to disseminate follow-up and monitoring information. Visuals offer many advantages over written documents when communicating technical information and it was noted that these have been well received in northern communities.

It is hard to give people the full impression of what is being talked about on paper. It takes a lot to describe things on paper and it is a very poor way of showing things. (Participant 12)

It was noted that visuals can give the public a better understanding of project effects and the types of monitoring activities being carried out in a region. One successful application of visuals in follow-up involved videos demonstrating caribou collaring survey results from the monitoring program of a northern resource development project. The videos, which were a series of animated shorts, showed viewers caribou movements across the landscape from previous years using the data obtained from collaring activities. Another video illustrated to communities the visual concept of icebreaker movements and the disruption to Arctic sea ice (Participant 12). The participant explained that videos do not have to be cinematic and mimic a professional documentary, but simply a short illustrative clip to provide the public a more complete understanding and impression of project effects and monitoring activities. These visuals have received positive feedback from both the public and Indigenous communities.

Information Access

In addition to using a diverse mix of communication tools, participants explained that selecting a suitable platform to host project information and other resources is equally important to ensure the accessibility of monitoring plans and monitoring results to the public and Indigenous communities. Most participants mentioned websites as an effective platform to host documents, maps, visuals and other information. Project proponents, regulators or independent environmental monitoring agencies typically operate these websites. While using websites may no longer be considered leading edge in today's technology-oriented society, having a well-

maintained resource library is critical to disseminating follow-up and monitoring information. Resource libraries need to be easy to navigate and offer a:

[…] one-stop source of documents, reports and correspondence relating to the (project), from time of the environmental assessment to the present"(SENES Consultants Limited, 2009)

Online resource libraries need to be up-to-date and contain complete information that is hosted in a single location with documents available for download. The public and Indigenous communities must also be made aware of the resource library's existence and how the information can be used. One participant also mentioned the use of social media as another potential platform to disseminate information to the public and Indigenous communities. However, none of the participants were able to share a successful example of social media being used to notify or transmit information related to monitoring activities.

While online resource libraries are becoming more common for large projects in Canada, simply uploading large volumes of information online is likely not be the most effective approach to disseminating information. Participants highlighted the importance of using a more hands on approach and maintaining a standing within the community. They indicated that it is important to continue to visit communities after project approval and into the operation phase to disseminate results of monitoring programs and explain plans for future follow-up and monitoring activities in the region. Engagement activities offer an opportunity to disseminate monitoring plans and results in person. Typical engagement activities noted by participants included using open houses, community meetings and workshops as venues for making information more accessible

to the public. This approach also addresses the challenge experienced by many Canadians living in rural and remote regions with inconsistent internet service.

Maybe four of five times during the year we present the results from the past year and announce studies will be undertaken for the current year. And this covers the whole follow-up program for the year. (Participant 8)

The last platform for the public and Indigenous communities to access monitoring plans and results mentioned by participants was through the use of community liaisons. Community liaisons will be discussed in greater detail in Section 5.1.2 but are included in this section because of their utility in disseminating monitoring plans and monitoring results back to the public and Indigenous communities. Participants described community liaisons as typically involving a member from each community affected by a project or in proximity to a project being selected to serve as an intermediary between the project proponent and the affected community. The community liaison is responsible for disseminating information from the proponent regarding project construction and follow-up and monitoring activities to their community and leadership. The community liaison's independence from the proponent and the regulator also increases the transparency of the process.

Participants identified that language barriers and the technical terminology commonly used in monitoring documents were the primary challenges to disseminating monitoring program information to the public and Indigenous communities. These challenges were expressed repeatedly throughout the interviews and appeared to be of greater concern in northern and remote regions of Canada. This supports the need for information to be available not only in plain language, without the use of technical terms, but also translated into local languages to

increase accessibility and reach a larger audience. Communication tools including plain language

versions, summary brochures and bulletins appear to be a start in addressing these challenges.

The use of community liaisons will also help communicate follow-up and monitoring

information in local languages, absent of technical terminology, in a way that is easily

understood by the community.

I think it continues to be a big challenge for people who work in EA. It is translating technical
EA documentation into laymen terms. It is incredibly time intensive and it is fairly challenging to
find someone who understands both the very technical language that is in these documents and is
able to translate that language down to various reading an understanding levels. (Participant
16)

5.1.2   Monitoring Plan Design and Studies

Guidance # 2: The design, development and implementation of follow-up and monitoring

programs should involve public and Indigenous participation.

Participants expressed the importance of having the public and Indigenous communities actively

participate in the development of monitoring programs and field activities associated with

implementation. This ensures that public and Indigenous interests and concerns are represented

in the final monitoring program design. There is also an opportunity to apply traditional and local

environmental knowledge in follow-up and monitoring when the public and Indigenous

communities actively participate in a program's design, development and implementation. This

approach can increase the legitimacy and credibility of the follow-up and monitoring program as

the public and Indigenous communities add an independent perspective from the proponent and

regulator to the program.

The first part of this section identifies approaches to involve the public and Indigenous communities during the design of follow-up and monitoring programs using techniques including workshops, committees and discussion panels. Afterwards, approaches to getting the public and Indigenous communities actively participating in the implementation of follow-up and monitoring programs are examined, including community monitors and community coordinators or liaisons.

Monitoring Program Design

Participants identified workshops as a successful tool to involve the public and Indigenous communities in the design of monitoring plans. Workshops facilitate the collection of input and feedback from local people. This information can strengthen the overall monitoring program and ensure that environmental components valued by the public and Indigenous communities are considered and incorporated into the proposed monitoring initiatives.

At that workshop, which lasted typically a few days, we would report on what we had found during the previous years of the aquatic effects monitoring program and wildlife effects monitoring program. We would discuss those (monitoring programs) and also changes to improve the aquatic effects monitoring program and wildlife effects monitoring program. [...] The use of annual environmental workshops to get feedback from the public improved the monitoring programs from mediocre to really good. (Participant 2)

Linking back to public participation there was sort of a high degree of public participation and similar type of workshop approach that allowed informal and iterative contributions to the monitoring response framework, [...] in which continuous learning and improvement to minimize impacts to the environment would take place. (Participant 10)

One participant presented an example of how new species were added to a monitoring program based on public and Indigenous input. The initial program proposed by the project proponent

overlooked some specific species of high importance to the local people including a medicinal

plant and a certain fish species. Through involvement in the development and design of

monitoring initiatives for the project, the public and Indigenous communities had the opportunity

to add these valued species to the monitoring program (Participant 21).

In a publically available annual monitoring report from the Ekati Diamond Mine, the importance

of workshops as a tool for incorporating the public and Indigenous communities in the design of

monitoring plans was highlighted.

Throughout 2010 and 2011 there were several community based workshops and site visits to enable involvement of community members in the development of the Wildlife Effects Monitoring Program and discussion on how TK [Traditional Knowledge] can be incorporated into the wildlife monitoring programs:

- *[…] a Mines, Regulators, and Scientists Technical Workshop was conducted to obtain recommendations on how to better monitor wildlife, examine opportunities to synchronize and align the various diamond mine environmental monitoring programs, and review how the mines can enhance the involvement of TK holders in these programs.*

- *[…] the Diamond Mines Wildlife Monitoring Programs - Community Workshop was held at the Tree of Peace in Yellowknife. The objectives for the workshop were (1) to discuss the use of TK in monitoring wildlife and determine how it can be incorporated and (2) to get ideas on how the mines can conduct and improve their wildlife monitoring programs using input from TK holders to incorporate community perspectives. The workshop provided the community representatives and TK holders a forum to voice recommendations on proposed changes before the mines prepare their 2011 Wildlife Monitoring Permit applications. (BHP Billiton Canada Inc., 2012)*

In addition to workshops, other tools identified by participants to involve the public and

Indigenous communities in the design of monitoring plans included committees and discussion

panels. These tools are particularly successful in obtaining comments and feedback from the

public on proposed monitoring plans, which can then be incorporated into the final version of the

program. One participant described discussion panels as a very successful tool for connecting with a wide range of participants that represent different interests.

With this type of (discussion) panel, we were able to reach almost 100 representatives of various organizations from municipalities, ministries, citizen associations, Indigenous Band Councils and economical agencies. This has worked fairly well for us. We were able to reach a large body of interests. (Participant 8)

Monitoring Program Implementation

Public and Indigenous participation in monitoring programs must also go beyond simply incorporating feedback from the public into the design of monitoring plans. Participants explained that the public and Indigenous communities must also be directly involved in the implementation of these programs including conducting monitoring activities such as environmental studies, inspections and compliance monitoring. Participants indicated that having members from nearby communities participate in sampling, data collection and even analysis activities for monitoring programs or join project environmental staff as an observer to monitoring activities could successfully achieve this level of participation. These community participants may receive funding or be volunteers but are primarily selected by the community and are independent from the project proponent and regulator.

Two types of community participants were identified during the interviews; community monitors and community coordinators or liaisons. The document review was used to compliment the interview data and help establish a clearer idea of the roles of these community participants. Community monitors often work side-by-side with the project proponent and environmental consultants to conduct field monitoring activities. Field monitoring may include verifying

mitigation effectiveness, conducting environmental compliance audits and remediation

inspection. Community monitors also provide local and traditional environmental knowledge to

enhance these monitoring initiatives. Community coordinators or liaisons serve as an

intermediary between the project proponent and the community. They communicate their

community's concerns to the project proponent and environmental staff while reporting back to

their community and leadership about their observations of the follow-up and monitoring

program. Similar to the community monitors, community coordinators or liaisons also contribute

environmental knowledge to the monitoring program.

During the winter the Community Monitors and Community Liaisons go along with the Environmental Inspector and tour around while construction is happening. In the off-season there are some communities that continue to work during the summer and will go with our consultant to do follow-up and monitoring. […] they do their ongoing monitoring for say water crossings or vegetation management […] where they will help in the auditing process. And that again is seeing how well our mitigation work and was followed. […] So the Community Monitors and Liaisons were there to bring up any questions they had and bring them back to the community and present findings or communicate what they saw as far as process in construction and environmental protection as a back and forth to the community. […] The community picks the member, we don't pick the member. I don't even think we pay them directly. I think we pay the community and they get paid that way. (Participant 3)

In some cases we were able to include local specialists or local Aboriginal people within our follow-up studies. I think it is also adding credibility to the whole process. […] So there are some topics like salmon studies, beaver and caribou where their involvement is expected. (Participant 8)

In monitoring and follow-up, a lot of the times communities will want to actively participate in any monitoring programs and receive results from those monitoring programs. And that is strongly encouraged by regulators as well and that is just something that happens and is kind of engrained in the system here. So there are, for example for wildlife monitoring projects, often local people from the community are brought in to actually participate as an equal observer for some particular monitoring initiative. […] they try and keep it independent so they'll have an observer […] who is doing the same kind of job as the other people there but isn't being directly paid for by the company. (Participant 20)

One of the barriers to community monitors and community coordinators or liaisons is the limited number of opportunities available for individuals to participate. The environmental knowledge and perspectives provided by the community participant may therefore not be representative of the views of the entire community, but only the community participant's individual views. On the contrary, the information presented to the communities from the community participant may only represent community participant's perspective rather than the monitoring program as a whole. This supports the need for a combination of different platforms to ensure the perspective of an entire community is accurately represented in the design, development and implementation of follow-up and monitoring.

Community monitor and community coordinators or liaisons selected by their communities may also not have the necessary skills to participate meaningfully in the implementation of a project's follow-up and monitoring program. Education and training prior to participation is required to ensure all community participants can effectively contribute to the follow-up and monitoring program is often necessary. However, this increases the costs and time of public and Indigenous participation.

So you have people that want to be involved but they don't have the training or they might be in poor health, they might not have a high school education, they might not have reading and writing skills and so automatically your monitoring programs have to incorporate a level of training and capacity building a head of actually implementing the monitoring. And so that increases costs and time and energy for the proponent. It can become a much tougher sell in terms of getting your leadership to buy into community participation. That has been our experience and it's what we've done. […] So there is a level of training incorporated in the actual implementing the monitoring program. (Participant 16)

5.1.3   Community-Based Monitoring

Guidance # 3: Monitoring programs should be supported by community-based monitoring initiatives when relevant.

Community-based monitoring provides the public and Indigenous communities with an opportunity to participate in follow-up and monitoring either at a project scale or regional scale. Participation often occurs through a community organization rather than the project proponent. Community-based monitoring can compliment existing proponent-run monitoring programs and offer an independent perspective on the health of the environment. Participants discussed the application of community-based monitoring for aquatic effects and biodiversity management such as in the examples below.

As part of those monitoring programs, they have what you call community-based monitoring. […] There is a few different examples of how that works but in general, what it amounts to is having […] surrounding communities participate actively in the field of monitoring, particularly for fish monitoring and evaluation of fish health and fish condition and fish tasting as well to see whether effects or are somehow integrating or being cumulative in some way that has an impact on palatability or texture that wouldn't necessarily show up in the individual test and any individual indicator. (Participant 10)

There is intent in the biodiversity management framework to move towards incorporating traditional ecological knowledge, traditional land use and potentially moving towards community-based monitoring for the purposes of that framework explicitly. I think that we might be moving in that direction as well with our surface water quantity management framework that is also moving in that direction. (Participant 18)

One participant provided an example of how a community-based monitoring program was intentionally used in conjunction with the proponent's monitoring program. The community-based monitoring program was implemented prior to project construction by nearby community

members with assistance from the local Indigenous government. The community-based

monitoring program studied environmental effects at a regional scale, and thereby overlapped

and complimented the proponent's project-specific monitoring program. Community-based

monitoring in this case was able to address some possible gaps in the proponent's project-

specific monitoring program including the absence of lower priority species with no legal

requirements for monitoring.

The project itself has not yet been constructed but a community-based monitoring framework has been implemented and it was also the intention to implement that program before construction of the mine. The idea there is basically it has a regional monitoring program with a specific methodology looking for more direct effects and sort of a single point of overlap between the company's own program. [...] It has the ability to address not only cumulative effects, being a regional design, but it also has the ability to address perceived effects, which often can have as much impact as real effects. And it can do that by indicators that may not be prioritized by the company in order to fulfill their legal obligations. One example is that of a small fish that resides in a lake or a section of river that receives wastewater. Those fish are a really good indicator for effects on the aquatic environment but those are not fish that people are interested in, nor do people harvest. And so then the regional monitoring program between the Tlicho Government and the communities, has the ability to be consistent and be rigorous, but to also be sort of complimentary, looking environmental effects beyond the legal requirements for monitoring out of environmental assessment. (Participant 10)

5.1.4   Continued Engagement

Guidance # 4: Public engagement should continue after project approval and into the

follow-up and monitoring stage of a project.

Most participants noted that all too often a project's public and Indigenous engagement program

ends once licences and permits are granted for a project and typically does not advance into

follow-up and monitoring. Participants frequently expressed the importance of continuing public

and Indigenous engagement activities throughout the life of the project – making it part of the program design. They noted that this was the best way to share information, gather feedback and address concerns with communities in the operation and decommissioning phases of a project.

[…] they (communities) see a lot of consultation historically with the preparation for approval of a project or preparation for the decision-making. But once the decision is made and the permit is issued, there is a lot of discussion about the fact that there just isn't much follow-up. […] So when it comes to best practices, I think one of the things that would be important is starting to consult to the expectations of what is going to happen in post closure. I think that is a piece that has been missed to date. (Participant 12)

In the past, people used to tell us 'you come and see us at the beginning of the project of the project when you have a very broad understanding then you come back at the end when everything is done'. They have asked us to be involved throughout the whole process. So regularly we are out in the whole area to try and keep them (the public) informed of our studies, whether prior or with the results of our follow-up studies. (Participant 8)

Many different approaches to successfully engage the public after project approval were shared during the interviews. These approaches were organized into traditional and non-traditional engagement activities. Traditional engagement activities are ones commonly used during the development of environmental assessments prior to project approval, including activities such as open houses and stakeholder meetings. Non-traditional engagement activities are not commonly used during the assessment phase and involve more interactive approaches.

Traditional Engagement Activities

Some traditional engagement approaches described by participants included activities from the project's existing engagement program that can simply be extended into follow-up and monitoring from the pre-approval stage. Engagement activities such as open houses, community meetings and town halls were noted by participants as being effective platforms to engage the

public and Indigenous communities in follow-up and monitoring. Similar to the pre-approval stage, discipline specialists are available at these events to interact with attendees, answer questions and hear and understand concerns with the aid of various exhibits to explain project initiatives. It was indicated that the content of these engagement activities shifts from project planning and design to topics including planned follow-up studies, mitigation, monitoring results and decommissioning.

We will have what we call an open house. So there will be several specialists on hand to answer questions from the Innu communities. We'll have forestry specialists, salmon specialists, anthropologists, and the coordinator for the power line project. So we are on a one-on-one basis. People will be able to walk in. We will have of course maps, pictures and other devices to be able to answer their concerns or their questions on the follow-up results. (Participant 8)

Another participant discussed the utility of town halls and explained the need to also provide opportunities for the public and Indigenous people to speak with specialists on a one-on-one basis. This participant noted that while town halls are an effective platform for public and Indigenous engagement, not all attendees are comfortable speaking in front of a large audience. This may discourage some attendees from participating fully in the process and limit the utility of the town hall (Participant 21). The participant suggested that techniques such as separating attendees into smaller groups where they can cater to individual interests by discussing specific topics and concerns can increase the utility of town halls.

Non-Traditional Engagement Activities

Other participants provided examples of non-traditional approaches to continue engagement into the follow-up and monitoring stage. These non-traditional approaches typically create an opportunity for members of the public and Indigenous communities to observe follow-up and

monitoring initiatives and include activities such as site visits, informative tours and interpretive

trails. Rather than using various exhibits like storyboards, maps and presentations at a public

venue to communicate follow-up and monitoring, the public is encouraged to see first-hand the

project effects, mitigation measures, and monitoring activities in action.

We hold community events where we take an opportunity to partner with another community event or host our own in the community and invite people to come visit the facility, to see the monitoring areas, and to participate in reviews of some of the monitoring results before we send it into the regulators. And so we've done that on an annual basis since that project was developed about four years ago. [...] Anyone can come to these sessions. [...] As part of the project, what we did for one of the mitigation or fish compensation exercises was to develop some compensatory fish habitat. And so we reactivated this old floodplain channel that had been reclaimed by the bank vegetation and used that with tailrace flows from the power plant to provide steady flows throughout the year for rearing salmon, juvenile salmon. As part of that, we decided we would build an interpretive trail that passes by some historic artifacts and farm homesteads, which we also protected, and then used interpretive panels to talk about the First Nations cultural history and science behind the plant and how it operates to generate electricity, the historic resources along the trail as well as the fish and wildlife aspects. And that trail creates a loop. It is totally open to the public year round. [...] But we are looking to expand that sort of practice to get key stakeholders and First Nation elders out into these environments in a way that allows them to be on the land but at the same time allows them to see and understand what it is we are doing to try and understand our impacts on the environment and what other things we might be doing to enhance or restore those environments to which we know we've had an impact. (Participant 17)

They floated the idea of having [...] basically a tour bus that would go and pick up people from the community and tour the project. Which was good in a sense because you get more of a variety of community members that are interested. They can see it first hand. You are not taking one person's interpretation. (Participant 3)

In addition to the responses provided by participants during the interviews, the document review

uncovered a number of other non-traditional engagement initiatives that provide an opportunity

to observe follow-up and monitoring first hand. A follow-up and monitoring document for a

transmission line project proposed construction follow-up and monitoring field trips with

representatives from affected communities. It was noted that project staff and discipline

specialists would guide the field trips, which would occur on a regular basis throughout the

project construction and monitoring. The following quote provides further detail on the field

trips.

During the construction field trips, representatives will learn and witness activities associated
with various topics, including:
- *mitigation measures*
- *project schedule*
- *clearing and construction practices*
- *inspection results*
- *monitoring results*

During follow-up and monitoring field trips, representatives can participate in monitoring
activities such as vegetation, traditional plant, stream crossing, mammal track, bird and camera
trap surveys. Construction and follow-up and monitoring trips always allocate time for
representatives to share concerns and ask questions of the Project staff along with receiving a
materials package and copy of photos/video taken that day to share [...]. (Manitoba Hydro,
2015).

Participants indicated that engagement fatigue is one of the barriers to extending engagement

into the follow-up and monitoring stage of a project, making the use of varied techniques of

engagement all the more important. Multiple participants highlighted that engagement fatigue

can occur in communities that are frequently involved in various environmental assessment and

regulatory processes for one or more projects near their community. Adding additional

opportunities for public engagement around follow-up and monitoring may only increase

engagement fatigue in these communities. One participant explained that flexibility could reduce

the impacts of engagement fatigue. A flexible engagement plan can be designed to reflect the

community's appetite for engagement. In the example below, the participant explains that

flexibility is accomplished by having communities indicate their preferences with respect to how

they would like to be involved, the frequency of involvement and the desired level of

involvement.

That is probably a big way that we've tried to deal with consultation burnout is ask them directly and explicitly what is the best way to engage you going forward on these issues or this project and try and really listen to that and follow-up with an engagement plan that fits those needs. (Participant 17)

Another participant indicated that engagement fatigue only supports the need for more

meaningful engagement rather than simply increasing the frequency and variety of engagement

opportunities available to communities.

We see consultation happening from federal agencies, from the proponent, from the Regional Inuit Associations. So that is one of the challenges we've come up to is over consultation, which puts more pressure on meaningful consultation. (Participant 11)

Many communities may also lack capacity to participate in engagement initiatives. Participants

indicated that some communities do not have sufficient time, financial resources and expertise to

be fully involved in the opportunities available to them. Supporting communities and interested

participants to participate remains critical to the success of follow-up and monitoring

engagement initiatives.

Participatory funding is really crucial to their capacity building because they require funding for outside experts. That can give them a better understanding of what documents are supposed to be telling them. (Participant 7)

Participants also discussed geographic barriers to public and Indigenous engagement. Many

regions in Canada, particularly in the north, are difficult to access and lack reliable internet

services. Often aircraft is the only option to access some remote communities, which increases

the cost and time to conduct engagement (Participant 21). Another participant added that weather

delays are quite common in the north and remote regions, further affecting cost and time

constraints (Participant 12).

5.1.5   Monitoring Advisory Committees and Working Groups

Guidance # 5: Ensure monitoring advisory committees and working groups are open to all interested stakeholders and that full access to all monitoring results is provided.

Monitoring committees and working groups can play an important role in follow-up and

monitoring. They are often established as the result of a regulatory licence condition, pressure

from the public or through the will of the project proponent (Participant 4; Participant 11;

Participant 20; Hydro Québec, 2010). These organizations typically include the project

proponent along with representatives from Indigenous communities, municipalities,

environmental organizations and other stakeholders serving as members. One participant

described formation and member selection process for terrestrial, marine and socio-economic

working groups as a naturally occurring transition from the environmental assessment process.

*It was pretty organic in that the environmental assessment process itself has defined
stakeholders who either by their mandate or their interest self select to participate in the review
of the environmental assessment. So once the environmental assessment was approved, those
people naturally were the best fit in engaging into these themed working groups. So all of those
people now are participating. Since we've started the themed working groups, we've also had
additional interest in participating. […]And so now they (specific stakeholder) have come on
after the fact. In the communities we just went to the key organizations and said to them*

'nominate the knowledge holders in your group'. The people that would be best suited to engage in this type of working group and that has worked out really well for us. (Participant 16)

Similarly, another participant indicated that the stakeholder organizations with an interest and desire to participate on a monitoring committee or working group are already well established during the environmental assessment process.

If they (an interest group) have an interest in being involved, than it is open to them. I would say that specific interest groups or target interest groups are sought by the company with the regulator and that would be after the environmental assessment has happened and after the regulatory process. […] The parties that have an interest in effects studies are usually well known by that time and have well established their interest and desire to be involved in the design of the follow-up and monitoring programs. (Participant 10)

While the roles of monitoring committees and working groups vary from project to project, participants did identify some overlapping responsibilities. Overall participants felt that these committees and groups are best placed to offer technical expertise to support the proponent's follow-up and monitoring initiatives, including the design and implementation of the program. Reviewing monitoring program plans prior to finalization was also a common responsibility described by participants. Monitoring committees and working groups can also review aspects of a monitoring plan that are working well, aspects that require improvement and make recommendations to the proponent to strengthen follow-up and monitoring for a project. They are also required to review the results of monitoring programs and discuss corrective actions that need to be implemented to address monitoring results that are of concern. Some committees and groups are also involved in planning field programs and developing partnerships with other organizations with overlapping mandates and research interests in the same area. Participants describe these responsibilities in the examples selected below.

Through the follow-up committee with the Aboriginal communities, we present our preliminary version of the report. We include their comments on hand. They have a two week period within which they can send us more comments and after that the report is finalized in the following weeks. (Participant 7)

There is a terrestrial environment working group and marine environment working group and those gather all the stakeholders or representatives from all the stakeholders together and they meet once or twice a year and go over the monitoring efforts that have been done that year with respect to terrestrial wildlife or marine wildlife and what could be improved, what is going well, those kinds of things. So everyone is at the same table hearing everything at the same time. That hopefully helps the proponent as they are getting feedback at the same time. And that kind of approach is taken through socio-economic monitoring as well through socio-economic monitoring committee." (Participant 20)

We meet twice a year at a minimum and the committee has input into our monitoring. They review our monitoring results, they help us plan our field programs, they give use technical feedback and then partnerships can form between other organizations and the company if we have similar mandates or similar research interests. (Participant 16)

In certain instances, participants noted that working groups have even designed monitoring plans

for a project rather than simply providing feedback on the existing monitoring plan developed by

the proponent.

What they (Aquatic Effects Monitoring Program Working Group) are supposed to do is bring together representatives of organizations that are potentially affected by the project or have an interest in the project or the project area. Get them together and have them actually design of the aquatic effects monitoring program be developed in a collaborative manner with all those participants as well as of course the developer and the regulator. That has worked quite well in giving a voice to the public and to the organizations that represent different figures of the public and giving them a direct line into the design into the process and setting out priority indicators to lead them under. That is kind of at the front end, before the monitoring program even starts. (Participant 10)

An alternative type of monitoring committee or working group was also uncovered during the

document review. In this case, Monitoring and Community Liaison Committees or Community

Working Groups were responsible for facilitating open communication and dialogue between the

proponent and stakeholders including local residents, Indigenous groups and municipalities

during follow-up and monitoring (Nalcor Energy, 2012; Port of Vancouver, 2015). This differs

from the technical oriented committees and working groups described in the examples above that

support the design and implementation of follow-up and monitoring studies, research and

mitigative actions. The document review indicated that Monitoring and Community Liaison

Committees or Community Working Groups can provide early identification of local interests

and develop a better understanding of project related concerns, which can be brought to the

attention of the proponent. They can work cooperatively with communities to address issues that

arise during the project or provide recommendations to the proponent on specific actions to

address community concerns (Nalcor Energy, 2012). These committees or working groups

operate in conjunction with other public and Indigenous participation initiatives for follow-up

and monitoring. They are another resource to gather community and stakeholder input and can

have a role in education on the project and monitoring activities (Port of Vancouver, 2015).

One of the barriers to the effective functioning of monitoring committees and working groups

identified during the research is a lack of access to all necessary monitoring results. Participants

explained that it is critical for all members to have full access to monitoring results to properly

inform decisions and recommendations. Committees may also encounter challenges with

improper membership.

I think a well-struck committee that reviews and has access to all the results of monitoring and that has an appropriate mandate, which considers all the different things that should be done with monitoring, can be an important part of good follow-up. […] If you strike an appropriate committee that has appropriate membership and you provide adequate resources that time for those at the committee to engage with the interests that they represent, that can be very effective public engagement. (Participant 4)

5.2   Continuous Learning

Continuous learning was identified as a leading edge practice in the follow-up and monitoring literature, as outlined in Chapter 2. Overall interview participants supported the need for continuous learning in follow-up and monitoring as established by their comments in Chapter 4 and provided many recommendations for implementation. The following subsections contain these ideas for implementation organized into the following approaches: document evolution, knowledge sharing and industry collaboration, knowledge management and storage and post-project reviews.

5.2.1   Document Evolution

Guidance # 6: Follow-up and monitoring documents should continually evolve to capture learning from past projects and experiences.

The data shows that lessons learned from previous projects or experiences need to be captured in the evolution of follow-up and monitoring documents such as monitoring plans, frameworks and regulatory licences. Interview participants typically described a process where follow-up and monitoring documents from past projects are used as a starting point to develop new documents for current projects of similar nature. They noted that building on past documents has lead to a gradual evolution of monitoring plans, frameworks, regulatory licences and other related documents. Participants indicated that this process allows for continuous learning to occur during the development of follow-up and monitoring documents. As documents evolve, there is an

opportunity for knowledge obtained during past projects and experiences to be rolled into new

documents being developed for current projects. Interview participants noted that using past

documents as a starting point encourages the author to look back and evaluate successes and

weaknesses as well as identify opportunities to improve follow-up and monitoring for the next

project.

To demonstrate how the gradual evolution of documents can capture lessons learned from past

projects, two participants provided examples of their experiences with licence conditions. They

noted that regulators must reflect on which licence conditions where successful in the past,

which licence conditions did not meet expectations and how to improve those licence conditions

when building off of earlier licences. This process has resulted in learning being captured

through the evolution of project licences and associated conditions. The lessons derived from the

regulator's previous experiences with licence conditions are reflected in the next project

approval.

We always learn from our experience. Our licence conditions evolve, monitoring plans evolve, follow-up practices evolve It is all kind of evolutionary. (Participant 5)

As I mentioned earlier, you can see one project certificate issued by the (regulator) building on previous ones. They learn what terms and conditions work, or which ones don't and how to better improve them. And one the other hand and at the same time proponents all talk and they definitely see what has worked in another proponents project in the environmental assessment process and certainly would look to implement or at least consider implementing similar types of things. (Participant 20)

Similarly, other participants provided examples of the potential for learning being captured in

monitoring documents. Past monitoring plans may be used as a starting point to develop future

monitoring plans, with proponents and consultants reflecting on previous experiences with

specific mitigation measures, monitoring activities and field studies. In the example below, a participant describes a case where successful mitigation measures from one mining project are incorporated into the design of the next project. In this example, mining project documents evolved to capture learning from the past experiences with mitigation measures for acid rock drainage.

I've seen evolving from one project description to another project description certain things that we have said in the first project description as mitigation measures tend to become design changes in the second project description. So one example that I can think of for one of my clients, we were talking about ore stock piles and just how those stock piles could be laid down without there being a high risk for acid rock drainage. For the first project, we debated doing a certain type of geotech cell or a specific concrete base or do we just lay some more lime. I remember having a very detailed two-day long conversation with a few specialists about what would be most feasible and economical. For the rest project, we just decided to put in a solid foundation with a seepage collection system because we had determined in the first project that that was just the most reasonable thing to do. And in the second one, we did not have to have that two-day long discussion. Moving forward, the next project looked at what modification could be made to that seepage collection system to minimize that risk even further. (Participant 1)

In an example selected from the document review, an environmental impact statement for a transmission project explains how lessons from the proponent's past projects are transferred among transmission projects using a single standardized environmental protection program for all transmission projects. The standardized program continually evolves with the improvement of follow-up and monitoring practices as well as other program elements over time. With all transmission projects by the proponent sharing the same standardized program, lessons are applied to all projects as the environmental protection plan evolves with time.

The development of the Environmental Protection Program has allowed the standardization and consistent approach to environmental protection, monitoring and follow-up. Through the use of a single Environmental Protection Program, learnings from each project (e.g., monitoring and

inspection results, documentation format changes) are shared among all projects. (Manitoba Hydro, 2015)

5.2.2   Knowledge Sharing and Industry Collaboration

Guidance # 7: Knowledge sharing and industry collaboration should foster learning among projects of similar nature or operating in close proximity.

Participants indicated that information and knowledge sharing through industry collaboration has supported continuous learning in follow-up and monitoring. Sharing monitoring approaches, challenges, results and other information can help develop collaborative solutions and enhance overall regional environmental management. Lessons learned from one monitoring program can enhance existing or future monitoring programs for projects of similar nature. These initiatives can reduce duplicating efforts between projects operating in close proximity to each other or projects from the same industrial sector, for example mining or hydroelectric development. The responses provided by the interview participants were categorized into three approaches to implement knowledge sharing and industry collaboration. The first approach utilizes independent environmental monitoring agencies, which are discussed in detail in Section 5.4.1, to establish communication between two or more projects conducting follow-up and monitoring. The other two approaches involve industry associations and government databases to share lessons learned and other knowledge across industry.

Communication Between Independent Environmental Monitoring Agencies

One participant described how follow-up and monitoring information from three different mining projects each with different owners was shared between the mines' Independent Environmental Monitoring Agencies. The mines are located relatively close to each other and therefore share many common elements in their monitoring programs with respect to wildlife, watershed and other regional impacts. Understanding the successes and challenges of each other's monitoring programs and how to overcome those common challenges has proven to be very valuable in strengthening the environmental performance of all the mines in the area and has lead to better regional environmental management. Technical information related to specific monitoring components such as caribou, successful mitigation strategies and reoccurring problems were shared with the other Independent Environmental Monitoring Agencies of the nearby mining projects. The agencies invited the executive board members of the other Independent Environmental Monitoring Agencies to participate in board meetings. This facilitated knowledge sharing and establishes a collaborative working relationship.

We took it upon ourselves to work together on certain things. First of all, information sharing. As many board meetings as we can during the year, we invite the executive directors from the other boards to attend our board meeting to fill us in on what's happening at their mine. Through that we are able to get a lot of valuable technical information with what is going on with caribou or another wildlife species, or how their monitoring program is going, or mitigating potential dust problems for example. [...] So this kind of information is important to share with each other. And the same thing applies with the other two agencies. When they have their own board meetings, they ask our executive director to appear to fill them in on what is going on at our mine and what we are doing. (Participant 7)

Another participant indicated that meetings and discussions with other proponents in the same industry sector facilitates knowledge sharing. The proponents were able to share common issues related to follow-up and monitoring, and learn from each other's experiences.

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In the past we've had some meetings with our counterparts from other Canadian companies. This has been very interesting because we found that we have a lot in common. So these discussions are always very interesting. [...] So this has also improved the way we do things. (Participant 8)

Industry Associations

Industry associations are another platform noted by participants that can facilitate continuous learning by bringing together members of the same industry and sharing information pertinent to follow-up and monitoring. One participant shared their experience with learning outcomes being implemented in a series of Canadian energy facilities that originated from an international industry association. The lessons and associated corrective actions were adopted in the Canadian energy facilities after a disaster occurred at a similar facility in another part of the world. Through the industry association, these learning outcomes were shared and communicated to other members and helped prevent a similar disaster and associated environmental consequences from occurring again (Participant 21). The interview participant also indicated that the industry association facilitates member visits to other facilities. In this specific case, international delegates can visit Canadian facilities and vice versa through an initiative by the industry association. The visits encourage knowledge sharing between proponents, industry collaboration and foster continuous learning (Participant 21).

Some industry associations also establish environmental subcommittees that are designed to provide resources and share information among members to promote continuous learning. One participant described the utility of a database maintained by a provincial mining association that contains reports, journals and other documents accessible to all members.

The mining industry association does have some committees and certain groups that are kind of designed to share information among the industry. [...] Every province also has their own mining associations as well where they share this information. And they have journals and databases where you can kind of access the reports and so on and so forth. (Participant 13)

Government Databases

The same participant also mentioned a database developed by Environment Canada that hosts

water quality information from mine sites across Canada and from the Canadian pulp and paper

industry. The database is part of Environment Canada's Environmental Effects Monitoring

Program and the shared knowledge has been used to predict and mitigate water quality impacts.

Environment Canada has been compiling data since the late 90s on water quality for mine sites across Canada. Pulp and paper is the same. Pulp and paper has been collecting water quality data as well for decades and all that data has been compiled in databases that consultants and the industry know can be accessed and that information is stored. [...]They've been studying water quality for decades on the mining side. Environment Canada, under their environmental effects monitoring program, has a massive database of water quality data and has used this information to predict water quality impacts based on information that has been collected from various mines sites. Things like water quality are very widely studied and understood. There is lots of information out there. But things like, we talked about with the vegetation for example, a lot of that is you got to come across somebody that experienced that before to completely understand it. (Participant 13)

While the databases above demonstrate an effort to share information across industry and foster

continuous learning for follow-up and monitoring, they also highlight a significant barrier.

Participants observed that information like monitoring data, lessons learned, challenges and

successes are scattered among many different registries and databases and fragmented by

industry sector, regulatory jurisdiction and province. The lack of a centralized database presents

a challenge when searching for specific information.

For the most part, there isn't that one central area where all those lessons learned are achieved. A lot of it is still word of mouth or knowing the right person. I guess there should be some sort of resource [...] or a compilation of all that information in one area where consultants, mining companies and the general public can reach out and get that information and not have to rely upon two years of being unsuccessful to realize that you should have done something different. (Participant 13)

An additional barrier that was mentioned during the interviews was that proponents and

consultants might consider follow-up and monitoring information proprietary and confidential.

Organizations may be reluctant to share monitoring results, experiences and research because it

might put them at a competitive disadvantage. Organizations may feel like they are paying for

initial research that subsequent proponents will receive for free and reduce costs associated

follow-up and monitoring or project management. One participant expressed their frustration

with obtaining monitoring results from past projects that would be beneficial in the development

of a subsequent follow-up and monitoring program for a similar type of project.

I've been involved in projects where we've tried to get the results of follow-up programs from pervious projects that seemed relevant to the project we were discussing and were told that that information is confidential. We couldn't get access to it. [...] my sense is that they've been successful in arguing that that puts them at a competitive disadvantage with respect to subsequent proponents. In other words they're paying for research that subsequent proponents get for free and their project management and development is cheaper because they get for free the results of the work that the first proponent had to do. (Participant 4)

Sometimes a lot of the information is proprietary. So companies may not want not share their experiences with other companies. That is one problem and that is based on the mining side. (Participant 13)

5.2.3 Knowledge Management and Storage

Guidance # 8: A knowledge management and storage system should be implemented and catalogue follow-up and monitoring information for future reference to facilitate continuous learning.

Without proper knowledge management and storage, learning outcomes from past projects may fail to be implemented in future follow-up and monitoring and lessons are at risk of being forgotten. Participants indicated that lessons learned from past follow-up and monitoring programs might never be formally recorded and simply held by individuals if a storage system is not put in place. The opportunities for learning are then lost when the individual departs that position, for example by retirement, layoff or career advancement. In the rare case where learning is recorded or documented, all too frequently these records and documents are shelved and never revisited. Knowledge needs to be organized and catalogued in such a way that it is easily accessible for future reference by others involved in follow-up and monitoring at the organization. One participant described the need for such a system to progress continuous learning within the organization in the example below.

We don't have an information management tracking system. We don't have a database. A database is probably the best way to describe it. There is some movement to get one. But that seems to me to be the most obvious answer is to have document control systems. Really document control systems and information management databases in place to move that information beyond the person that is in charge of assessing that project or the group that is assessing that project on to the next people to take up the reign. When people retire that information is not lost. We have a conceptual idea how to do that. Well we know how to do that but we don't have that in place here yet. We understand that there is a need as well but we do not have that in place. It would be an information management system, an actual database derived system is what we would like to have. That is our thinking right now. (Participant 19)

The example above describes the utility of electronic storage systems to organize and catalogue

project information. Electronic storage typically allows for the information to be easily accessed

and incorporated into future follow-up and monitoring. Such systems also allow for better

document control and can distribute learning throughout an organization and beyond if shared.

Continued learning is essential in improving systems. The last private consulting firm I worked with had a learning database, which was primarily for incidents, but was also used to improve systems. Additionally, this same firm held end-of-project debriefs. This allowed all involved staff to have an opportunity to discuss what worked and what didn't. (Participant 14)

We have a system, a registry […] that is also a repository for documents that include things like the monitoring program itself, monitoring results, anything else that you want to attach to it. So it is an electronic management system for these types of requirements. So that is one way we do it. And that obviously puts in place something where if I get hit by the bus, than the person who would take over my responsibilities would be able to clearly see what commitments we've made, what regulatory requirements we have and then how those programs have been historically managed and operated. (Participant 17)

I would say the Environmental Protection Information Management System is kind of a communication tool. […] Daily reports go in there, your construction meetings go in there, all your Environmental Protection Program documentation. It is also set up where you can assign tasks to each other. Anybody that is in the system can communicate changes or issues. It has dashboarding capabilities, which help identify areas of issues. Information is easier if you access through the Environmental Protection Information Management System where before if you had paper work, it would be just an impossible amount of work to compile all that stuff even in order to even start dissecting the information that was coming in. (Participant 3)

While most participants highlighted the advantages of using electronic storage systems to

promote continuous learning, one participant outlined people's resistance to adopt new

technologies as a barrier to evolving such a system within an organization.

We have difficulty with buy-in, like as far as who uses it and how much they use it. You set up the best system possible but it can be a frustrating system to use. It is time consuming, it can be glitchy at times. […] Depending on the person, some have a high level of patience with

technology, others do not have a high level of patience or level of buy in. They think it is a waste of time so they don't use it or they'll do the bare minimum. (Participant 3)

5.2.4 Post-Project Reviews

Guidance # 9: Follow-up and monitoring initiatives should be reviewed post-project with a focus on implementing the learning of the review.

Upon completion of a project, it is critical to review the successes, challenges and solutions encountered during follow-up and monitoring of a project. Interview participants mentioned the use of post-project wrap up meetings, lessons learned workshops and closure reports as essential tools for continuous learning. These types of reviews must occur at regular intervals and give practitioners an opportunity to share learning and experiences among the group and discuss ways to improve future practices during the post-project review. Furthermore, the reviews must focus on the implementation of the learning outcomes rather than simply identifying lessons from past projects. Without developing a strategy for implementation, the post-project reviews lose their effectiveness in promoting continuous learning and risk becoming a paper exercise. The examples below share some participants' experiences with post-project reviews.

The first thing is just doing a bit of a debrief and going back and looking (at the follow-up and monitoring). The second thing is documenting the results of that analysis. And the third thing is trying to find a way to implement those results. So if I were to look back on things, I would try and focus more on the ad hoc nature of doing those types of reviews as well as a commitment to implementing your learning. It is really about entrenching the things that you have learned somewhere so that it has feet and it has legs. [...] You have to be systematic about it. (Participant 17)

We do these post-wrap up meeting and try and look for ways to improve. [...] It would become some kind of a process where we would on every month, stop and sit down and document the things that we've learned and what our adjustment is. (Participant 3)

One participant briefly outlined how lessons learned workshops foster learning and improve future practice. These workshops involved environmental working groups meeting on a regular basis to develop follow-up and monitoring lessons (Participant 9). Another participant stressed the importance of recording and documenting post-project review comments and outcomes for future reference.

When you do the reviews, it is important that there is documentation of people's perspectives. Like if you are going to have a meeting and bring all those stakeholders together to review say an annual monitoring report or a follow-up report, that you take a summary of the comments that were provide and you keep some running history, not just the report itself but all of those parties that you engaged, what they think about it. In fact the new representative for that organization ten years from now can go back and look at what their board said or their Chief and Council said through the representative of those organizations from year to year. So keeping a record like that is helpful too. (Participant 17)

It was established by participants that one barrier to post-project reviews is that the scope or purpose for which knowledge is stored can limit the use of knowledge for continuous learning. The reviews need to foster learning with the goal of improving future projects. However, as one participant points out, rather than simply looking for lessons to improve the existing or current project, there also needs to be a focus on deriving lessons for similar projects in the future.

It should be part of every follow-up program that at some point or at certain points in the follow-up, somebody turns their mind to the question of 'what are the lessons for similar projects in the future'. As opposed to focusing, which I think at best is what happens now, on how do we manage this project to minimize the risks and impacts from unanticipated effects and how do we ensure compliance from terms and conditions (Participant 4)

Another barrier to post-project reviews noted by interview participants was failing to integrate

the learning outcomes revealed into the organization's business model. One participant explains

that if periodically reviewing projects and programs are not entrenched in the corporate culture,

it can be difficult to implement good continuous learning.

I think if it is entrenched in your company's approach to just doing their work is that there is a behavior on projects and programs that from time to time revisit your performance and affect a real plan-do-check-act sort of governance structure, than that can really lead to success. But if it is done in an ad hoc way, than that is probably the downfall of trying to implement good continuous learning is that it is not integrated into how you do your business. When it is, it is successful. (Participant 17)

5.3   Clear Roles and Responsibilities

Establishing clear roles and responsibilities was identified as a leading edge practice to follow-up

and monitoring in the literature and was supported by the data obtained from the interviews and

document review as outlined in Chapter 4. The following sections are a series of approaches

suggested by participants for the implementation of clear roles and responsibilities in follow-up

and monitoring.

5.3.1   Environmental Agreements

Guidance # 10: Agreements should be considered as an option to enforce roles and

responsibilities in follow-up and monitoring.

Agreements are becoming increasingly popular for large EIA projects and developments in

Canada (Participant 21). Participants identified various forms of agreements during the

interviews including impact benefit agreements, environmental agreements, contracts and

memorandums of understandings. While these different forms of agreements vary in terms of

structure and legal recourse, they all provide the opportunity to establish clear roles and

responsibilities for engaged parties during follow-up and monitoring. In some cases, the roles

and responsibilities set out in the agreements are legally binding whereas other agreements are

not necessarily enforceable by law. Roles and responsibilities can be clearly laid out for

proponents, communities, and independent environmental monitoring agencies and others

involved in follow-up and monitoring. One participant explains the utility of an environmental

agreement in establishing a clear understanding of monitoring between all parties involved.

Our role is actually spelled out in a legally binding document. That is called the Environmental Agreement. That agreement was signed jointly by the company and the two levels of government. It has laid out the role of the Agency. One of the important aspects of the Environmental Agreement is it delineates the importance of our recommendations, in that we are to provide recommendations to the company and/or government on things that we feel need to be addressed that may have pending problems to the environment. Those recommendations have to be, under the terms of the agreement, have to be responded to by the company or the government, whoever the individual recommendations are addressed to. In other words they cannot just ignore it. They have to say why a recommendation was either accepted or rejected. So there is a level of transparency there. It is clear to the Aboriginal groups or the public why our recommendations have been rejected or accepted. (Participant 7)

Another participant describes Impact Benefit Agreements as a tool for the public and Indigenous

communities to legally enforce the follow-up and monitoring responsibilities of the proponent

and other signatory parties.

I think that we see in Impact Benefit Agreements, has established a certain degree or roles and responsibilities between proponents and communities. Insofar as communities remain, have capacity and some influence in enforcing the requirements of an Impact Benefit Agreement. At least it is clear who is to do what, or reasonably clear who is to do what. (Participant 6)

Having legally enforceable roles and responsibilities also addresses one of the barriers outlined by participants – being that while roles and responsibilities may be clear and understood by all participants, they may not necessarily be carried out. Agreements provide an incentive and way to hold those with responsibility accountable.

Simply I guess, having some clear responsibilities is crucial but is insufficient. The responsibilities are not necessarily taken up effectively even if they are clearly defined. Having clearly defined responsibilities is one way of helping to ensure that people know what they are supposed to do and helping others keep them accountable to their commitments or what they've been given as a responsibility. You also need somebody to keep the fire under their feet. There has to be some means of other exerting influence if the responsible authority turns out not to be very responsible. And preferable it's important for that responsible authority to have its own incentive to do a good job. So yes, clear lines and responsibilities are important, but unless it has all the other requirements for transparency and accountability and motivation and the rest, it is not likely to succeed just having responsibility. (Participant 6)

5.3.2   Guidance On Expectations

Guidance # 11: Guidance should be provided to improve clarity of the expectations, roles and responsibilities for follow-up and monitoring.

The importance of good guidance to establish expectations for follow-up and monitoring programs was clearly noted by participants. Expectations of all parties need to be understood by all involved in follow-up and monitoring. Interview responses fell into two themes in this regard, regulatory guidance and guidance set out in environmental agreements. In particular, participants noted the need for regulatory guidance to clearly outline the regulatory expectations with respect to achieving licence conditions and follow-up and monitoring program requirements.

Environmental agreements also offer an opportunity to establish the expectations for follow-up and monitoring among all signatory parties of the agreement.

Regulatory Guidance

Participants recommended using a framework to guide proponents, consultants and other agencies responsible for developing follow-up and monitoring plans. The most common example discussed during the interviews was a post-environmental assessment monitoring framework for follow-up and monitoring that is provided to project licencees in Nunavut. The framework is included with the project certificate as an appendix and clearly establishes the roles and responsibilities of those involved in follow-up and monitoring for the project – typically the proponent, the agency issuing the project certificate and the government on occasion. The appendix outlines the expectations for the monitoring program and provides direction in terms of monitoring program components, timelines, communication protocols and reporting.

What they've done is created an appendix to the Project certificate called Appendix D. That is where the expectations for a post environmental assessment-monitoring program are outlined. [...] So the framework keeps proponents involved in the process and outlines responsibilities from the Nunavut Impact Review Board and from other permitting agencies and responsible agencies throughout the year in monitoring. So that would be checking in at various times for progress, making sure there is clear communication on what is going on in the agencies and having follow-up reporting. [...] It is actually a very, very specific list of required undertakings throughout the year. The first part is the instruction to the Nunavut Impact Review Board and that would contain requirements such as appointing a monitoring officer, requiring annual sites visits, requiring follow-up with the other agencies. The second part is the instruction to the proponent. So that will often cover the reporting requirements, the update requirements, through the whole development again. It doesn't have a date of expiry. It is in place for the life of the project so we have to consider the requirements through construction, operation and decommissioning. So it is very much a life of the whole project-detailed certificate. And so we also have the third component, which are the responsibilities for those responsible authorities or permitting agencies. (Participant 12)

In this example, the licencee is also provided with guidance to implement the certificate

conditions in addition to the post-environmental assessment monitoring framework. Each

certificate condition contains a section dedicated to identifying the responsible parties, defining

the objective, determining the applicable project phases and outlining reporting requirements.

The certificate also contains commentary with some certificate conditions. The commentary

provides additional details to support the roles and responsibilities for implementation.

*The recent project certificates from the Nunavut Impact Review Board, I think do a pretty good
job of this. Part of one of the tools they use to accomplish this clarity is they have a project
certificate, which basically looks like a licence or a permit. It is a legal document with a whole
bunch of conditions. It has legally robust language. Along side many of those conditions is what
they call a commentary. So it includes sort of one or two sentences of important information that
helps explain roles and responsibilities, especially supporting roles and responsibilities. They
have the role of a regulator that identified within the condition itself that is related to follow-up.
In the commentary column, that requirement is connected to expertise, the interest of other
organizations like, maybe it is the Department of Fisheries and Oceans or an organization in a
local community. (Participant 10)*

Environmental Agreements

One final tool to provide guidance to proponents and others involved for follow-up monitoring as

well as to establish the expectations of governments, communities and regulators is the use of

environmental agreements. While the utility of environmental agreements to legally enforce roles

and responsibilities was discussed in Section 5.3.1, participants also indicated that such

agreements are also used to provide guidance for follow-up and monitoring programs.

Environmental monitoring provisions can be a component to environmental agreements and can

include mitigation commitments, remediation and establishing various monitoring committees

(Gogal et al., 2006). These provisions are negotiated and developed with input from the

signatory parties, which establishes mutually agreed upon expectations for follow-up and

monitoring. The mutually agreed upon expectations can guide the development of follow-up and monitoring programs.

There isn't a regular process for comprehensive monitoring. There isn't a regular process for setting up bodies to follow what happens. At least under environmental assessment. Sometimes we get it under Impact Benefit Agreements. (Participant 6)

I guess some of those responsibilities and roles have been define through Memorandums of Understanding between the proponent, so the company or the developer and the government itself and the agencies that will be conducting those follow-up programs. So the have been formalized even in some cases to Memorandums of Understanding or similar types of agreements. So that is how they've done that, is to actually negotiate and sign these Memorandums of Understanding. (Participant 19)

5.3.3 Reporting Structure

Guidance # 12: A robust reporting structure should clearly outline the roles and responsibilities for communicating follow-up and monitoring information.

A reporting structure will effectively communicate the roles and responsibilities around follow-up and monitoring. The roles and responsibilities at every level of the follow-up and monitoring program must be clearly defined and support the program objectives. The reporting structure can be used to communicate compliance issues, monitoring results, mitigation limitations and other information within an organization. During the interviews, participants discussed the use of electronic management systems to communicate the roles and responsibilities and facilitate reporting.

We laid out in the environmental protection plan, each person involved on site has a defined bulleted list of roles and responsibilities. We've laid it out in a reporting sequence, in some kind

of a chart". [...] We have a daily reporting system where they are supposed to fill out a daily report on what they've found. That goes into the Environmental Protection Information Management System. (Participant 3)

Other participants specified using Environmental Management Systems to establish and

communicate a reporting structure that outlines the roles and responsibilities for follow-up and

monitoring within an organization.

As part of the Environmental Management System, there were reporting requirements. That information would be collected by the monitors and reported to the environmental manager. Than that would go to the proponent [...] and would be posted for the public to see as well because it was a publically funded project. [...] So there were formal reporting guidelines in place that were followed for the duration of the project. (Participant 13)

We have a regulatory compliance plan, which would have been prepared in the early days in the Environmental Management System. So it would outline who is responsible for each aspect. (Participant 11)

One participant outlined an electronic system that tracks all legal environmental requirements for

a project. Staff are assigned responsibilities through the system and as deadlines approach,

notifications are automatically generated and sent to staff responsible for completing that specific

task. This participant noted that the system helps keep track of all commitments made for

environmental protection, follow-up and monitoring and ensures they are completed in a timely

manner.

We have a system, a registry of all of our legal and regulatory requirements which includes a description of the program, the regulatory authorization associated with the project, there is an assigned position, a responsible person and then all of the details regarding the activities. They have descriptions as well as expiry dates or when to be performed dates. All of that stuff is managed electronically and there are alert systems for notifying people of when things are completed and when they are supposed to be done. That is also a repository for documents that include things like the monitoring program itself, monitoring results, anything else that you want to attach to it. So it is an electronic management system for these types of requirements. So that

is one way we do it. And that obviously puts in place something where if I get hit by the bus, than the person who would take over my responsibilities would be able to clearly see what commitments we've made, what regulatory requirements we have and then how those programs have been historically managed and operated. One other thing I would add to that is of course we have an internal reporting program. So some of these things can be tied to our corporate or departmental goals. So we'll set objectives and targets for certain things an we'll track and report on those things on a quarterly basis and of course an annual basis. And our board of directors looks at those as well as our senior executives. (Participant 17)

5.3.4   Formal Communication

Guidance # 13: Formal communication should occur regularly to ensure all involved parties (employees) understand their roles and responsibilities in environmental protection.

Formal communication is key to delivering clear roles and responsibilities for follow-up and monitoring. Types of formal communication identified by participants during the interviews included environmental briefings, training manuals and meetings scheduled at regular intervals. One participant described the use of environmental briefings to communicate the role of environmental protection to employees at a mining project. All employees must participate in the environmental briefings at the mine regardless of their position, similar to orientation, safety and other types of mandatory training. The briefings provide employees with environmental awareness training, as all employees are thought to have a role and responsibility in environmental protection during construction and operation of the mine.

All the employees get environmental briefings. They have to. In fact when we go in and we haven't one in the last 6 months, we have to go through another environmental briefing. (Participant 2)

One specific example was also selected from the document review to illustrate formal

communication as an education and training tool for employee's roles and responsibilities with

respect to environmental follow-up and monitoring. An environmental awareness training

program was provided to staff at a mine in an effort to reduce impacts of the mine on bird

species in the area and to contribute to the environmental monitoring initiatives. The goal of the

ongoing training program is to educate all staff on the mine's potential effects on birds and is

communicated to staff using site-wide presentations and posters. This strategy has been used to

effectively prevent impacts to active nesting birds sites on the mine infrastructure (BHP Billiton

Canada Inc., 2012).

Another participant explained that environment and safety training was used to communicate

roles and responsibilities of follow-up and monitoring to project staff. As part of the formalized

communication, staff are required to undergo a week of training prior to the start of the

construction season and provided a training manual with respect to environmental monitoring.

Staff who were unable to attend the week-long training were placed with another trained staff

member to transfer knowledge.

*They have a weeklong training. Prior to each construction season, they do a weeklong safety and
environment to get everybody on the same page, kind of communicate. I've only been to a
portion of one day of that but they try and communicate it there. There is the training manual as
well. When somebody is replaced, they'll be placed with somebody else for a little while just to
get them trained up. Like an inspector that has already been inspecting for a while. Cross
pollinate for a little while. (Participant 3)*

Similarly, one participant mentioned using daily monitoring meetings, email updates and recap

meetings to clearly reaffirm the expectations for follow-up and monitoring and to involve key

senior personnel.

Daily morning meetings, email updates, end-of-week recap meetings were all part in maintaining a clear line of communication not only to the work schedule, but to reaffirm expected roles and responsibilities. However, while a long-term project is underway, it was also important to see key senior personnel on site to take part in the EIA follow-up. (Participant 14)

However, it was noted that the uptake of information presented through formal communication

such as training and information sessions varies from person to person, which presents a barrier

to this approach. One participant explained that training sessions given to environmental

monitors to communicate roles and responsibilities prior to the field season vary in effectiveness

based on the individual. Some environmental monitors easily uptake information in this manner

whereas other struggle in this setting.

The Environmental Monitors would get an 8-hour session to go through a lot of information. Depending on who you are and depending on the individual, how well you absorb a lot of information differs from person to person. (Participant 3)

Another participant adds that daily monitoring meetings can become redundant and lead to

complacency. Effort needs to be made to make formalized communication unique to avoid

redundancy and maintain interest.

Redundancy in routine often leads to complacency… and there is nothing more redundant than daily morning meetings. It was a difficult process to undergo, but for the most part, the crew remained focus on their assigned tasks. […] The introduction of unique daily items maintained a level of freshness to the message. Understanding the daily goals also assisted in focusing the crew's attention to the tasks at hand. (Participant 14)

5.4   Independent Oversight

As established in Chapter 4, participants highlighted independent oversight as a leading edge practice for follow-up and monitoring. Keeping in mind the varying degrees of independence, participants offered different insight on how to implement independent oversight. Some approaches used independent environmental monitoring agencies that operate autonomously from the proponent, regulator and government. Other participants discussed monitoring programs conducted by the regulator, independent from the proponent's own monitoring initiatives. Public and Indigenous participation was also identified as a form of independent oversight by participants, most notably community monitors and liaisons. These three approaches to implementing independent oversight are discussed in greater detail below.

5.4.1   Independent Environmental Monitoring Agencies

Guidance # 14: Independent environmental agencies should have legal backing, a clear mandate and sufficient funding, all established in a binding agreement.

Independent environmental monitoring agencies are one approach to accomplish oversight for follow-up and monitoring noted by participants. These agencies operate independently of the project proponent, government and regulator and serve as a watchdog for the work conducted by industry and the government. This approach to independent oversight is intended to increase the credibility and transparency of proponent-led follow-up and monitoring activities and regulatory supervision for a project. Independent environmental monitoring agencies appear to be most

common in northern Canada, especially for larger projects with the potential for significant

environmental impacts. One participant explained that the independent environmental

monitoring agencies in northern Canada are a response to public distrust in government and

project proponents emerging from a history of negative experiences with past projects in the

region. This distrust caused local and Indigenous communities to push for independent oversight

in follow-up and monitoring in recent projects in an effort to prevent similar negative

environmental outcomes from reoccurring in the region.

So basically because of a distrust in the local Aboriginal communities with the federal government not upholding their judiciary rights to protect the land, that is the environment, on the behalf of local people, treaty people, those treaty people determined that the status quo would not prevail in this instance and they wanted a separate set of independent bodies. They wanted an oversight body that was independent not just of the company, but of both governments, the Northwest Territories and the Federal governments. […] So that is why our agency exists because of that level of distrust with the government and with their history of mining in the area. (Participant 7)

The participants go on to describe that the independent environmental monitoring agencies were

mandated through a licence condition and set up using environmental agreements. The

environmental agreement does not solely pertain to the independent monitoring agency but

contains a section dedicated to laying out the necessary framework to support the creation of the

agency. The agency's mandate, responsibilities, funding arrangement and legal groundwork are

established in the environmental agreement and are signed by the project proponent,

governments and, depending on the agreement, Indigenous organizations.

The mechanism for implementing the independent environmental monitoring agency is to have an environmental agreement in place. It is legally binding. It contained a section for creating the independent environmental monitoring agency. It is to be funded by the mine operator until the end of closure. The arrangement was proposed in the environmental agreement. […] What

created this was the engagement early on of environmental groups and Aboriginal people and then the environmental agreement giving it legal footing. (Participant 2)

Federal and provincial/territorial governments, the project proponent and public/Indigenous groups typically appoint independent monitoring agency members. The skills of agency members vary, with each member offering unique expertise to follow-up and monitoring. The example below describes how members were selected for a particular independent oversight agency.

Three board members are appointed by the two governments, the Government of the Northwest Territories and the federal government as well as the company. The other four board members are appointed by Aboriginal groups affected by the mine. All of the seven board members all have different skills. (Participant 7)

The mandate laid out in the environmental agreement will guide the follow-up and monitoring activities conducted by independent environmental monitoring agencies. While the mandates for different agencies will vary based on the individual monitoring needs of their respective EIA project, Diduck et al. summarizes the responsibilities and activities typically performed by agencies as:

- Monitoring (independent of government);
- Reviewing monitoring reports (from proponents and government);
- Providing advice and guidance; and
- Carrying out inspections and acting as a public liaison (Diduck et al., 2012).

This list derived from the literature generally agrees with the various roles of independent environmental monitoring agencies and follow-up and monitoring activities identified by

participants during the interviews as well as in the document review. However, one additional

role of independent environmental monitoring agencies mentioned by interview participants that

is absent from the list is a role in filling regulatory or legislative gaps in a jurisdiction. In the

example below, a participant describes the utility of independent environmental monitoring

agencies in identifying regulatory gaps and providing recommendations to address those gaps,

ultimately enhancing environmental protection in the project region.

Having independent oversight bodies established is important to address whatever falls through the cracks of the regulators, and there are a number of things that do because there are a number of things that do not have legislation attached to them. For example, air quality in the Northwest Territories or wildlife. Then it is the job of those independent bodies to provide some identification of gaps and also to provide some recommendations on how to fill those gaps. In our case we have in the past provided an early warning of impending environmental problems that the regulators didn't catch. (Participant 7)

5.4.2   Independent Environmental Monitoring Programs

Guidance # 15: Independent environmental monitoring programs should add credibility to existing follow-up and monitoring.

Independent environmental monitoring programs are another approach to independent oversight.

Unlike the independent environmental monitoring agencies that operate autonomously from both

the project proponent and government as described in Section 5.4.1, participants indicated that

these independent environmental monitoring programs are implemented by government

regulators and are solely independent from the project proponent. An independent environmental

monitoring program is not intended to replace the proponent's monitoring initiatives but rather

compliment existing monitoring conducted by the proponent (Participant 21). The environmental

monitors working for the regulator sample various environmental parameters of interest from

publically accessible areas, which are analyzed by the regulator to identify issues or concerns.

The results of the independent environmental monitoring program are often reported to the

public on the regulator's website, with reports also available by request. According to Participant

21, the independent environmental monitoring program addresses public skepticism regarding

the concept of proponents monitoring for environmental impacts from their own projects by

adding transparency to follow-up and monitoring.

This participant also identified the independent environmental monitoring program as a

successful engagement tool for follow-up and monitoring. Participant 21 explained that the

regulator notifies surrounding communities of planned monitoring activities in advance of

sampling. During sampling the environmental monitors are frequently stopped by the public with

questions, comments and concerns. This provides the environmental monitors with the

opportunity to engage one-on-one with the community, facilitate a discussion pertaining to

follow-up and monitoring, gather public feedback and address any questions specific to the

monitoring program. Due to a high number of interactions with the public, the environmental

monitors now carry informative pamphlets to handout to the public while conducting follow-up

and monitoring.

5.4.3   Other Models for Independent Oversight

Guidance # 16: Follow-up and monitoring should capitalize on public and Indigenous

participation to capture an independent perspective that reflects the community's interests.

Participants described the use of public and Indigenous participation as another approach to independent oversight. While public and Indigenous participation was primarily covered in Section 5.1, some of the approaches discussed also have the potential to increase the credibility and transparency of follow-up and monitoring, most notably with community-based monitoring, community monitors and community coordinators/liaisons. These participation approaches support a community perspective in follow-up and monitoring that is independent from the project proponent, regulator and government perspectives. In the case of the community monitors and community coordinators/liaisons, they oversee and participate in the proponent's monitoring program and represent their community's interests without being directly employed by the proponent or the regulator as described by Participant 13 below. With community-based monitoring, they offer a complimentary and independent perspective to project and regional environmental effects monitoring typically conducted by the project proponent or government.

I think the one leading edge practice, which I really like, is finding people from the local communities to be involved in the follow-up and monitoring programs. The reason for that is it provides some legitimacy to the monitoring and follow-up. […] By having the public involved, there is a bit more transparency there. I think that the companies that actually get the public involved, not just to provide oversight or review information that is provided as part of the monitoring, but to actually get them involved in the monitoring, that is certainly a leading edge practice. What that sometimes means is providing them with the training, but at the same time it might be a worthwhile investment because it placates the public and helps to meet the needs of the company on the monitoring side. (Participant 13)

5.5   Adaptive Management

Participants identified adaptive management as a leading edge practice for follow-up and monitoring as outlined in Chapter 4. The examples provided by participants during the interviews and identified in the document review pertaining to implementing adaptive

management can be grouped into two distinct themes based on the scale of application. The first theme explores implementing adaptive management at a high-level with respect to the structure of the follow-up and monitoring program as a whole. The second theme applies to adaptive management for individual mitigation strategies or specific responses to environmental impacts from the follow-up and monitoring program.

5.5.1   Adaptive Program Structure and Response Strategies

Guidance # 17: Adaptive management should be applied to the follow-up and monitoring program structure itself and responses to environmental effects.

Participants felt that adaptive management is important when dealing with uncertainties in follow-up and monitoring including the effectiveness of prescribed mitigation measures and the accuracy of impacts predicted in the environmental assessment. It is often challenging for regulators to determine the feasibility of licence conditions or for project proponents to foresee how their proposed monitoring programs and specific mitigation strategies will address environmental impacts in the real world. This uncertainty is inherent when dealing with complex ecosystems and project-environment interactions. In response to this uncertainty, participants identified the importance of applying adaptive management in follow-up and monitoring.

What seems to happen fairly often is the terms and conditions that are written into the project certificate, it is hard to know how those are going to work out down the road. It is easy to write them but it is not always certain either how effective they will be or how practical they will be or even how possible they will be. (Participant 20)

The regulatory processes and licences aren't necessarily going to capture everything that can protect the land, water and wildlife from experiencing a stressors or impact of any kind. So through an adaptive management plan they endeavor to learn by doing. To do that, you need to be able to identify how things are changing adversely. And you need to be able to formulate a plan that can tell you early enough as things are changing. Can tell you early enough that those things are changing before those changes approach a point that is going cause a significant adverse impact to the thing being measured. (Participant 7)

Monitoring Program Structure

Participants explained that adaptive management can ensure that the monitoring program

proposed at the start of a project, sometimes even prior to project approval, continues to address

project impacts on the environment and environmental management remains effective over the

life of a project. After implementing a follow-up and monitoring program, it must be periodically

reviewed against a determined set of objectives to evaluate the continued effectiveness of the

program. Based on the outcomes of the review and lessons learned, the follow-up and monitoring

program must be adjusted accordingly. This plan-do-act-check process must be repeated at

planned intervals throughout the life of the program. In the example below, Participant 18

describes periodically reviewing monitoring frameworks and refining various components based

on learning outcomes from monitoring experiences.

So the idea is that there will be adaptive management over time. As we learn more we want to make sure we refine our frameworks. So that our indicators if they are new contaminants that we are learning about that every five years we would have the opportunity to open up those frameworks, refine them, refine the thresholds that are established for finding the indicators, refine the monitoring programs, those networks. (Participant 18)

Specific Monitoring Responses

Participants also suggested that mitigation measures and other specific systems that manage

environmental effects must be periodically refined based on lessons derived from past

experiences to ensure their continued effectiveness. Similar to the high-level implementation for the monitoring program itself, a plan-do-act-check process must occur to capture learning and make necessary adjustments to the individual mitigation strategies and responses to environmental effects on ecosystem components such as water quality, wildlife populations or emissions. In the examples below, participants describe the importance of quickly identifying unexpected environmental changes, adjusting existing monitoring strategies based on the lessons learned, then implementing the refined mitigation to respond to those environmental changes before a critical level has been reached.

People need to be ready to respond to environmental impacts in a changing situation and adjust whatever monitoring is being done for a project quickly because it is often really hard to tell what is going to be either a problem or not a problem until things are actually running on the ground. (Participant 20)

I'll point back to that phrase or that term adaptive management. […] *Reviewing what the ecosystem or human environment response has been to your activities and then using that along with what you understood to be threshold of acceptable or unacceptable change to then make some sort of response if you see something that is not good. (Participant* 17)

5.6   Traditional Knowledge

Interview participants indicated that incorporating traditional knowledge into follow-up and monitoring is a leading edge practice. Many of the approaches to implement of this practice overlap with the public and Indigenous participation approaches extensively covered in Section 5.1 such as working groups, advisory committees, community monitors and community coordinators/liaisons, and therefore are not repeated in this section. Instead traditional knowledge-specific monitoring programs are the focus of this section.

5.6.1 Traditional Knowledge-Specific Monitoring

Guidance # 18: Traditional knowledge-specific monitoring programs should use a community-developed methodology to collect and interpret information in a meaningful way.

Interview participants frequently expressed the need to not only incorporate traditional knowledge into the environmental assessment but to continue to facilitate the use of traditional knowledge into follow-up and monitoring stage after project approval. Many tools described in Section 5.1 Public and Indigenous Participation offer an opportunity to incorporate traditional knowledge into follow-up and monitoring during the development of monitoring plans and while conducting monitoring activities. As an example, the community monitors and community coordinators/liaisons can provide traditional knowledge of the area, bring cultural awareness to the project and add an Indigenous perspective to the monitoring program. Similarly, workshops can facilitate the exchange of traditional knowledge, which can be incorporated into the design of follow-up and monitoring. In addition to the tools laid out in Section 5.1, the interview data and document review uncovered the use of traditional knowledge-specific monitoring programs as a successful way to collect and incorporate traditional knowledge into follow-up and monitoring.

During the interviews one participant mentioned a traditional knowledge-specific monitoring program that was implemented for a northern Canadian mining project. Additional details surrounding this case were gathered from publically available documents provided by the

interview participant. The traditional knowledge-specific monitoring program involved the

Lutsel K'e Dene in the Northwest Territories and was a regional community-based monitoring

program designed to understand the potential community and environmental impacts of a

diamond mine. In this particular case, traditional knowledge was the backbone of the monitoring

program and principle source of information and rather than technical or scientific knowledge

(Hunsberger et al., 2003).

Rather than considering TEK (traditional ecological knowledge) as a form of public participation or a supplement to conventional scientific studies, the [...] program is designed to collect and interpret information in a way that is locally determined and locally meaningful. (Hunsberger et al., 2003)

Traditional indicators that represent biophysical and socio-economic components of the

environment were developed by the community for the traditional knowledge-specific

monitoring program. These traditional indicators were selected based on their importance and

value to the community and were used to measure environmental change and gain a deeper

understanding of ecosystem health. A data collection methodology was developed that took

advantage of the traditional skills, knowledge and values held by community members. This

typically involved community members obtaining monitoring data by engaging in traditional

land use activities including hunting, fishing, camping and gathering (Lustel K'e Dene Band,

2002). As an example, interviews were conducted with community members after gathering

berries. The interviews aimed to capture the community member's experiences with gathering

berries and would focus on traditional indicators such as berry species, abundance and berry

harvesting locations in an effort to identify changes or impacts to berries and the community.

Similar interviews were conducted with community members knowledgeable of caribou, fish,

grouse and small mammals and are actively engaged in traditional land use activities. The results of the program were evaluated in a culturally appropriate context and interpreted within a traditional knowledge framework developed by the community. The monitoring program also examined the changes to the overall quality of life for the community in addition to the environmental indicators of value to the community (Lustel K'e Dene Band, 2002).

Another interview participant described the success of community-based monitoring in incorporating traditional knowledge into follow-up and monitoring. While the participant did not specifically refer to this approach as a traditional knowledge-specific monitoring, the community-based monitoring appeared to share the same elements of the traditional knowledge-specific monitoring programs described above. This program draws on the traditional knowledge of community members to gather information on environmental components of value to the community.

As part of those programs, they have what you call community based monitoring. It is a little more specific that public involvement and it is a way to also access and bring in some traditional knowledge and local knowledge into the monitoring program as well as the so called western science. There are a few different examples of how that works but in general, what it amounts to is having traditional knowledge holders from surrounding communities participate actively in the field of monitoring, particularly for fish monitoring and evaluation of fish health and fish condition and fish tasting as well to see whether effects or are somehow integrating or being cumulative in some way that has an impact on palatability or texture that wouldn't necessarily show up in the individual test and any individual indicator. (Participant 10)

The interview participant goes on to describe that the regional monitoring framework used in the community-based monitoring program between the Indigenous communities and Tlicho Government was able to examine environmental components outside of legal requirements and address the communities' perceived effects.

The regional monitoring framework that I mentioned is really owned by the communities and the Tlicho Government in this case. It has the ability to address not only cumulative effects, being a regional design, but it also has the ability to address perceived effects, which often can have as much impact as real effects. And it can do that by indicators that may not be prioritized by the company in order to fulfill their legal obligations. One example is that of a small fish that resides in a lake or a section of river that receives wastewater. Those fish are a really good indicator for effects on the aquatic environment but those are not fish that people are interested in, nor do people harvest. And so then the regional monitoring program between the Tlicho Government and the communities, has the ability to be consistent and be rigorous, but to also be sort of complimentary, looking environmental effects beyond the legal requirements for monitoring out of environmental assessment. (Participant 10)

A traditional knowledge-specific monitoring program or community-based monitoring may also address the common barriers to traditional knowledge frequently described by interview participants. Participants explained that there continues to be a gap in the understanding of traditional knowledge with non-community members. Without a proper understanding, soliciting traditional knowledge and interpreting the results in a meaningful way becomes very challenging. Additionally, using traditional or scientific knowledge in conjunction with technical knowledge to improve follow-up and monitoring remains poorly executed.

There is a certain aspect on how to solicit TK that was just not well done and I think part of that was a cultural problem. Where I think some folks don't really understand what TK is to begin with. Yes they see the definition provided by academics and the government as to what it is, but don't often understand how to find out where they actually get it and actually how to understand what they're receiving when elders are telling them certain aspects of their TK that they can use. (Participant 7)

There are still a lot of challenges between the western science and traditional knowledge or what we call temporary indigenous knowledge about their areas and the species that are there and the geography that's there. So that just continues to be a challenge and needs to be better understood and industry needs to have better tools for incorporating both types of knowledge into EA and post EA follow-up. (Participant 16)

The traditional knowledge-specific monitoring programs offer an opportunity to overcome these challenges identified by participants because they are designed, analyzed and reported by the community in a culturally appropriate context. They reduce the risk of misunderstanding traditional knowledge when community members are in charge of the program as opposed to external consultant or project proponent. The traditional knowledge-specific program also avoids blended traditional and technical methodologies into one follow-up and monitoring program, which can diminish the weight and influence of traditional knowledge.

5.7   Summary

Participants discussed numerous approaches to implement the six leading edge practices during the semi-structured interviews. The approaches suggested by participants are a collection of tools to be used by EIA practitioners to implement each of the six leading edge practices. Despite the overwhelming responses from participants, overall the approaches received little coverage in the literature when compared to the abundance of articles concerning each of the leading edge practices. The literature often focused on the identification, importance and need for the six leading edge practices rather than exploring techniques and methods to implement the practices. Regardless, some approaches identified by the participants also appeared in the literature, most notably with respect to public and Indigenous participation. Community-based monitoring (Hunsberger et al., 2005; Pullock & Whitelaw, 2005) and the proper dissemination of monitoring results (Jones & Fischer, 2016) are both discussed in detail in the literature and during the interviews. The literature describes community-based monitoring as an increasingly popular approach to public and Indigenous participation in Canada in part as a response to a loss in confidence in the proponent and government's ability to properly manage environmental effects

(Pullock & Whitelaw, 2005). Based on this literature review it was therefore anticipated and later confirmed that participants would identify community-based monitoring when asked about approaches to implement public and Indigenous participation in Canadian EIA projects. Similarly, participants discussed the importance of providing plain language reports and other materials when disseminating follow-up and monitoring plans and results. Developing non-technical versions of reports intended for public consumption was also identified in the literature as an effective approach to help the public and Indigenous communities gain a better understanding of EIA project initiatives (Jones & Fischer, 2016).

Knowledge management and storage was identified as an approach to implement continuous learning in follow-up and monitoring, which was also supported by the literature. Participants indicated that lessons learned from past follow-up and monitoring programs are rarely recorded and simply held by individuals. A proper knowledge management and storage system would assist in documenting and transferring this knowledge to others within the organization. While participants identified other approaches to implement continuous learning, the literature surrounding continuous learning primarily focused on proper knowledge management. Sanchez & Morrison-Saunders (2011) add that the data and information collected during EIA follow-up and monitoring must be processed into meaningful knowledge for use in future assessments. All too often reports are merely filed and forgotten once the project is complete.

While interview participant's responses and the literature overlapped for some approaches to implement continuous learning and public and Indigenous participation, specific approaches to with to implement clear roles and responsibilities were absent from the literature. Participants

were able to identify many approaches, whereas the literature only established the importance of this practice in follow-up and monitoring (Morrison-Saunders et al., 2007; Lawrence, 2013).

To support the approaches to implement the six leading edge practices for follow-up and monitoring, guidance statements were developed that capture the main lessons surrounding each approach and provide a clear direction to EIA practitioners. The guidance statements, approaches and suggested actions are summarized in Table 5-2.

Table 5-2 Guidance and Approaches to Implement Follow-up and Monitoring

Leading Edge Practice	Guidance	Approach	Actions
Public and Indigenous Participation	Guidance # 1: Monitoring plans and results should be disseminated in a manner so that they are easily accessible to the public and Indigenous communities.	Disseminating Monitoring Plans and Results	• Reporting Methods: plain language materials • Information Access: online document libraries, community liaisons
	Guidance # 2: The design, development and implementation of follow-up and monitoring programs should involve public and Indigenous participation.	Participation in Monitoring Plan Design and Studies (Proponent-driven)	• Monitoring Program Design: Workshops • Monitoring Program Implementation: Community Monitors/Coordinators
	Guidance # 3: Monitoring programs should be supported by community-based monitoring initiatives when relevant.	Community-Based Monitoring Initiatives (Community-driven)	• Project specific and regional community based monitoring
	Guidance # 4: Public engagement should continue after project approval and into the follow-up and monitoring stage of a project.	Continued Engagement	• Traditional Engagement Methods: Open houses, meetings, town halls • Non-Traditional Engagement Methods: site visits, informative tours
	Guidance # 5: Ensure monitoring advisory committees and working groups are open to all interested stakeholders and that full access to all monitoring results is provided.	Monitoring Advisory Committees and Working Groups	• Technical Advisory Committees and Working Groups • Monitoring and Community Liaison Committees and Working Groups
Continuous Learning	Guidance # 6: Follow-up and monitoring documents should continually evolve to capture learning from past projects and experiences.	Document Evolution	• Evolving licence conditions, monitoring strategies • Standardized documents

Table 5-2 Guidance and Approaches to Implement Follow-up and Monitoring

Leading Edge Practice	Guidance	Approach	Actions
Continuous Learning	Guidance # 7: Knowledge sharing and industry collaboration should foster learning among projects of similar nature or operating in close proximity.	Knowledge Sharing and Industry Collaboration	• Independent Environmental Monitoring Agencies • Industry Associations • Government Databases
	Guidance # 8: A knowledge management and storage system should be implemented and catalogue follow-up and monitoring information for future reference to facilitate continuous learning.	Knowledge Management and Storage	• Electronic Storage Systems
	Guidance # 9: Follow-up and monitoring initiatives should be reviewed post-project with a focus on implementing the learning of the review.	Post-Project Reviews	• Wrap-up meetings • Lessons-learned workshops • Closure reports
Clear Roles and Responsibilities	Guidance # 10: Agreements should be considered as an option to enforce roles and responsibilities in follow-up and monitoring.	Environmental Agreements	• Impact Benefit Agreements • Memorandum of Understanding
	Guidance # 11: Guidance should be provided to improve clarity of the expectations, roles and responsibilities for follow-up and monitoring.	Guidance on Expectations	• Licence condition guidance • Regulator-developed monitoring plan frameworks • Environmental Agreements
	Guidance # 12: A robust reporting structure should clearly outline the roles and responsibilities for communicating follow-up and monitoring information.	Reporting Structure	• Environmental Management Systems

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Table 5-2 Guidance and Approaches to Implement Follow-up and Monitoring

Leading Edge Practice	Guidance	Approach	Actions
Clear Roles and Responsibilities	Guidance # 13: Formal communication should occur regularly to ensure all involved parties (employees) understand their roles and responsibilities in environmental protection.	Formal Communication	• Environmental briefings, training manuals, periodic meetings
Independent Oversight	Guidance # 14: Independent environmental monitoring agencies should have legal backing, a clear mandate and sufficient funding, all established in a binding agreement.	Independent Environmental Monitoring Agencies	• Monitoring independent from the proponent and government
	Guidance # 15: Independent environmental monitoring programs should add credibility to existing follow-up and monitoring.	Independent Monitoring Programs	• Monitoring independent from the proponent with regulator/government monitoring programs
	Guidance # 16: Follow-up and monitoring should capitalize on public and Indigenous participation to capture an independent perspective that reflects the community's interests.	Other Models for Independent Oversight	• Community-based monitoring • Community Monitors/Coordinators
Adaptive Management	Guidance # 17: Adaptive management should be applied to the follow-up and monitoring program structure itself and responses to environmental effects.	Adaptive Program Structure and Response Strategies	• Monitoring Program Structure • Specific Monitoring Responses
Traditional Knowledge	Guidance # 18: Traditional knowledge-specific monitoring programs should use a community-developed methodology to collect and interpret information in a meaningful way.	Traditional Knowledge-Specific Monitoring	• Traditional Knowledge-Specific Monitoring Programs • Community-based monitoring Programs

6.0   Conclusions and Recommendations

While the literature suggests a number of ways that follow-up and monitoring can be successfully achieved, practice in Canada remains wanting (Hunsberger et al., 2005; Expert Panel, 2016). In addition, the importance of follow-up and monitoring in next generation environmental impact assessment was recently highlighted in the Canadian Minister's Expert Panel's recent review of the environmental assessment practices. Accordingly, this research set out to establish a suite of leading edge practices and proven approaches to implementation for next generation follow-up and monitoring Canadian EIA. Three objectives were set to guide this work:

- Identify current leading edge practices for EIA follow-up and monitoring in Canada;
- Explore ways to implement leading edge EIA follow-up and monitoring; and
- Develop guidance for the implementation of leading edge practices that captures the learning potential of EIA follow-up and monitoring.

Practices for EIA follow-up and monitoring were initially identified during the literature review. Three proven and essential practices were then selected from the literature to narrow down the scope of enquiry: public and Indigenous participation, continuous learning and clear roles and responsibilities. These three practices were selected because they continue to challenge practitioners and seem to me to be at the core of achieving sound follow-up and monitoring while contributing to sustainability.

To explore different approaches to implement these practices, interviews were conducted with EIA experts from across Canada including project proponents, regulators, academics, consultants

and others closely involved in the EIA process. A document review was also conducted to

support the interview participant's responses. While the interview questions focused on the three

leading edge practices listed above, participants were also provided with the opportunity to

discuss other practices they considered leading edge in follow-up and monitoring. Based on the

data collected during the interviews, three additional practices were included in the research as a

result of the participant's responses: independent oversight, adaptive management and traditional

knowledge.

A series of guidance statements were then developed for each leading edge practice based on the

data collected from the interviews and document review. These statements are flushed out by

suggesting different approaches identified by participants for implementing the leading edge

practices in Chapter 5. Barriers and challenges encountered by participants while implementing

these practices are also outlined in Chapter 5 and offer learning opportunities for future practice.

6.1   Conclusions

6.1.1   Leading Edge Follow-up and Monitoring Practices

The first research objective was to establish leading edge practices in follow-up and monitoring

using literature, interviews with Canadian EIA experts and a document review. Interview

participants supported the three leading edge practices selected from the literature as central to

effective follow-up and monitoring – public and Indigenous participation, continuous learning

and clear roles and responsibilities. They were able to provide many experiences and examples

of all three leading edge practices enhancing the environmental outcomes of EIA projects in Canada.

Overall, participants showed support and established the essential need for public and Indigenous participation in follow-up and monitoring programs. Public and Indigenous participation should aim to involve those affected by a project or development in the follow-up and monitoring process. Doing so adds accountability to follow-up and monitoring and may improve the acceptability for a project among nearby communities. This was mirrored in the literature, which suggests public and Indigenous participation in follow-up and monitoring adds legitimacy to the process and results in better decision-making (Irvin & Stansbury, 2004). Hunsberger et al. (2003) also highlights the need for growth of participation in follow-up and monitoring in a review of citizen participation initiatives in Canada.

Interview participants supported continuous learning as a leading edge practice to follow-up and monitoring during the interviews. Follow-up and monitoring must constantly foster learning to expand knowledge and advance existing practices. However, participants expressed that the responsibility for continuous learning is not simply the responsibility of only a single actor involved in follow-up and monitoring. Governments, proponents and consultants must work together to ensure learning is passed on from one project to the next. While this topic has yet to receive much attention in the literature, Watern (2013) notes that continuous learning contributes to increased efficiency, improved environmental performance and a reduction of redundancies.

Participants also acknowledged the need for clear roles and responsibilities in follow-up and monitoring. Without a clear division of roles and responsibilities, follow-up and monitoring initiatives risk falling short of anticipated goals and those involved are susceptible to duplicating efforts and uncertainty. The literature outlined a similar conclusion; suggesting that tasks and responsibilities within and among the various actors must be clearly defined and all actors must be competent at those assigned roles (Morrison-Saunders et al., 2007). However participants expressed that while clearly communicating and delegating roles and responsibilities to all actors involved in follow-up and monitoring is critical, it is not always enough to ensure successful environmental protection. There needs to be mechanisms in place to ensure that actors fulfill those roles and responsibilities. As well, sometimes actors are given more responsibilities than they can handle.

There was also convergence around three additional leading edge practices to follow-up and monitoring from the interview data - independent oversight, adaptive management and traditional knowledge based on their experiences. These additional practices were added to the scope of the research based on participant's responses during the interviews.

Independent oversight was identified by participants as a leading edge practice and noted that it serves as a watchdog function. Independent oversight promotes transparency and brings accountability to the follow-up and monitoring process. This practice is also documented in the literature and the views expressed by the interview participants generally agree with what the literature contends. As an example, Diduck et al. (2012) suggests that independent oversight is a critical practice for effective and credible follow-up and monitoring. However, it is important to

consider that there are varying degrees of independence in independent oversight. The appropriate degree of independence must be carefully selected based on each individual project or situation.

Interview participants frequently mentioned adaptive management as a leading edge practice for follow-up and monitoring. Adaptive management is a process that aims to learn from the implementation of management strategies and use those lessons to improve future management practices. Participants described the flexibility of adaptive management as useful when working with uncertainties regarding the effectiveness of follow-up and monitoring plans as well as specific mitigation measures. The participants' experiences are supported by the literature, which suggests that adaptive management acknowledges uncertainty and enables decision-makers to work with ambiguity that is often present when dealing with the complexity and unpredictability of environmental systems (Allen et al., 2011). While both the interview participants and the literature support this leading edge practice, practitioners must fully understand the limits and intended use of adaptive management prior to implementation. There are many misapplications and controversies surrounding adaptive management that warrants extra caution from practitioners, for example when it is used incorrectly as a mitigation measure.

Traditional knowledge is the final leading edge practice participants discussed in the interviews. Traditional knowledge is unique to Indigenous peoples and is gained from a close relationship to the land and passed down through generations. Participants established the idea that follow-up and monitoring must not solely rely on technical knowledge and science but also incorporate traditional knowledge. This idea has been brought forward in the literature many times. Parlee et

al. (2014) conclude that traditional knowledge can help identify successful environmental management strategies, strengthen mitigation, improve decision-making and provide an avenue to meaningfully involve Indigenous people in follow-up and monitoring. However, based on the participants' responses and literature, there continue to be challenges with successfully incorporating both forms of knowledge into a single follow-up and monitoring program.

Currently efforts to carry out EIA follow-up and monitoring are inconsistent throughout Canada. The strength and effectiveness of follow-up and monitoring varies extensively between different industry sectors, geographic regions and project sizes in Canada. The application of the six leading edge practices identified in this thesis also follows a similar inconsistent pattern. While some EIA projects have made notably attempts to conduct follow-up and monitoring programs, other programs fall short of accomplishing any actual environmental protection. These six leading edge practices offer a starting point to create consistency in follow-up and monitoring in Canada. This will lead to strong and effective environmental protection and ensure project benefits are maximized regardless of the EIA project.

The six leading edge practices will also bring accountability to development in Canada. Follow-up and monitoring is carried out in the interest of the public. It ensures environmental impacts are addressed in an effective manner so as to not leave the public on the hook for expensive clean up efforts after a project as a result of poor planning and environmental management.

6.1.2   Implementing Leading Edge EIA Follow-up and Monitoring

The second research objective was to explore ways to implement the leading edge practices into

EIA follow-up and monitoring. After analyzing the interview transcripts, the approaches for

public and Indigenous participation in follow-up and monitoring discussed by participants were

organized into the following categories:

- Disseminating monitoring plans and results;

- Participation in monitoring plan design and studies;

- Community-based monitoring;

- Continued engagement; and

- Monitoring advisory committees and working groups.

Public and Indigenous participation received the most attention from participants during

interviews. Participants identified more approaches to public and Indigenous participation than

the other leading edge practices identified in this research, indicating how important they thought

this practice is to follow-up and monitoring. Some of the approaches established by participants

were also covered extensively in the literature. As an example, Pullock & Whitelaw (2005) and

Hunsberger et al. (2003 & 2005) have both promoted community-based monitoring as an

approach to involve the public and Indigenous communities in follow-up and monitoring in EIA

projects. The literature also touched on proper dissemination of monitoring results, mostly the

use of non-technical or plain language reports to improve accessibility to the public. However,

the approaches identified by participants listed above goes beyond the approaches identified in

the literature for public and Indigenous participation in follow-up and monitoring. Approaches

including continued engagement, advisory committees, working groups and participation in monitoring plan design and studies have received little attention in the literature.

Although continuous learning received less attention in the interviews than public and Indigenous participation, participants still identified many approaches for implementation. After analyzing the interview transcripts, the approaches discussed by participants were organized into the following categories:

- Document evolution;
- Knowledge sharing and industry collaboration;
- Knowledge management and storage; and
- Post-project reviews.

These approaches were all covered in the literature to varying degrees except document evolution. Document evolution appears to be the most naturally occurring or intuitive approach identified by participants for continuous learning, which may have contributed to the approach being overlooked in academia. Knowledge management and storage received the most attention in the literature. Sanchez & Morrison-Saunders (2011) and Sanchez & Andre (2013) have both explored knowledge management as an approach to ensure lessons from past experience are incorporated into future projects and not lost.

The final leading edge practice selected from the literature is establishing clear roles and responsibilities in follow-up and monitoring. Expectations, requirements and boundaries for all actors involved in follow-up and monitoring must be effectively communicated and understood.

After analyzing the interview transcripts, the approaches discussed by participants were organized into the following categories:

- Environmental agreements;

- Guidance on expectations;

- Reporting structure; and

- Formal communication.

While establishing clear roles and responsibilities was identified as an important practice to follow-up and monitoring in the literature, there were few examples of approaches to implement this practice. This may be a research area covered more extensively in business management journals as a general practice for organizations rather than a practice specific to EIA. Nevertheless, the interview participants were able to identify many examples for establishing clear roles and responsibilities specific to EIA follow-up and monitoring that fell into the four categories outlined above.

In addition to the three leading edge practices selected from the literature, participants also discussed the importance of independent oversight in the follow-up and monitoring of Canadian EIA projects. Participants described different approaches to independent oversight linked to the varying degrees of independence. In the case of independent environmental monitoring agencies, the agencies operate autonomously from the proponent, regulator and government. Other participants discussed independent environmental monitoring programs that are conducted independently of the proponent by either a regulator or government agency. As noted in Chapter 4 and Chapter 5, public and Indigenous participation overlaps with independent oversight and in

certain cases can even be an approach to independent oversight. While independent monitoring agencies and independent monitoring programs may be feasible for larger projects, they require a lot of resources to implement and maintain, which may not be feasible for smaller EIA projects. Public and Indigenous participation may be a more realistic approach to independent oversight for these smaller EIA projects.

Adaptive management was also added to the research based on participants' responses. Upon review of the interview data, the approaches to adaptive management were organized into two categories based on their scale of implementation. Some approaches involved adaptive management in the monitoring program structure itself, whereas other participants described using adaptive management for individual mitigation strategies and specific responses to environmental impacts. Adaptive management remains a controversial practice in the literature, as it is often misused and does not achieve the promised or desired outcomes. Accordingly, practitioners must exercise caution when implementing either approach identified in this research.

The final leading edge practice explored in the research is incorporating traditional knowledge into the follow-up and monitoring programs of Canadian EIA projects. This practice was added to the research based on the participants' interview responses. Many approaches to facilitate the collection of traditional knowledge overlapped with approaches to public and Indigenous participation including Indigenous engagement and community-based monitoring programs. Of particular interest, however, participants discussed the benefits of traditional knowledge-specific follow up and monitoring programs. This approach offers a solution to the long-standing

challenge of integrating traditional knowledge and technical knowledge into follow-up and monitoring.

All actors involved in EIA have a responsibility for implementing next generation follow-up and monitoring in Canada. Without cooperation of all actors, follow-up and monitoring will not reach its full potential and continue to fall short of expectations. Project proponents have a responsibility to meaningfully implement the package of six leading edge practices using the approaches and guidance presented in this research. Project proponents are responsible for selecting the most appropriate approaches on a project-by-project basis, as they are most familiar with the project. Governments also share responsibility for implementing some of the approaches discussed in this thesis, especially with respect to continuous learning by ensuring lessons and data from past endeavors are transferred and applied to future projects. The roles and responsibilities of all actors are best directed by governments as developing clear guidance on regulatory expectations for proponents and the public involved in the EIA process. Finally the public must also take advantage of the opportunities for participation that presented to them by projects proponent and governments. This may even include proactive involvement when participation opportunities prove to be inadequate.

6.1.3 Guidance for the Implementation of Leading Edge Practice

While the literature suggests a number of ideas for leading edge practices to EIA follow-up and monitoring, there is little guidance on how these practices can actually be implemented in EIA projects. Consequently these practices are often absent in follow-up and monitoring programs.

The final research objective was to develop guidance for the implementation of the leading edge practices that captures the learning potential of EIA follow-up and monitoring.

Eighteen guidance statements were developed to direct and aid the implementation of the six leading edge practices. The guidance statements capture the key lessons for each approach discussed in Chapter 5 to implement the leading edge practices. While all six leading edge practices are an essential package to effective EIA follow-up and monitoring, the data does not suggest that an EIA practitioner to try to implement every approach for each practice noted in this thesis into a single follow-up and monitoring program of an EIA project. Nor does the data suggest that a government require each approach be included into a single follow-up and monitoring program for an EIA project. Rather these approaches should be viewed as an assortment of tools to enhance follow-up and monitoring program based on a project's unique environmental objectives, regulatory requirements and social complexities. As an example, the approaches selected to implement public and Indigenous participation in a follow-up and monitoring program will vary from project to project based on factors including the type of development, the size of development, the project location, available resources and past successes and failures with implementing public and Indigenous participation.

EIA practitioners must also be aware that six leading edge practices and supporting guidance identified in this thesis is not an exhaustive list. As discussed in Section 4.7, the literature identifies other critical leading edge practices for EIA follow-up and monitoring that were not captured in the data collected for this research. Practitioners must not overlook these other important practices when developing and implementing a follow-up and monitoring program

including accountability, sustainability, early strategic planning, cumulative effects and setting clear performance criteria.

Similarly, the guidance statements developed for each leading edge practice and associated approaches are not all encompassing. There are likely other effective ways to implement each of the six leading edge practices that were not identified in the interviews, document review and literature review. The guidance and associated approaches to implement the six leading edge practices will also continue to evolve over time as new methods are tested and techniques are refined.

6.2   Recommendations

Based on the interview participants' responses, document review and literature review, proponents and consultants need to develop follow-up and monitoring programs that include all six leading edge practices to EIA follow-up and monitoring. These practices are critical to successful EIA follow-up and monitoring regardless of the project. As discussed in Section 6.1.3, approaches to implement each leading edge practice must be carefully selected on a project-by-project basis to strike a balance between implementation costs and environmental benefits. While every follow-up and monitoring program needs to include all six practices, not every approach is required.

Follow-up and monitoring plans must also be developed during the project planning and design phases and should be submitted to the responsible regulatory authority along with the EIA as part of the project application at the time of filing. In other words, developing a plan and integrating

the six leading edge practices into follow-up and monitoring should be well thought out in advance of construction and operation rather than a quick last minute exercise once project approval is granted. Older projects already under construction or in the operation phase must also explore ways to integrate any of the leading edge practices that are currently absent into their existing follow-up and monitoring programs.

Regulatory authorities can enforce these leading edge practices through project licence/certificate conditions. Regulatory jurisdictions across Canada currently fall short of mandating all, if any, of the leading edge practices identified in this thesis specifically in the follow-up and monitoring stage. Project licence/certificate conditions therefore would be an effective mechanism to put these practices in place. To assist project proponents and consultants, governments must develop follow-up and monitoring guidance documents to establish expectations and provide direction on what the leading edge practices would look like in a follow-up and monitoring program.

6.3   Future Research Directions

While the research detailed various approaches to implementing leading edge practice, it did not explore what incentives proponents have, or need, to conduct robust follow-up and monitoring. Implementing a strong follow-up and monitoring program that utilizes the leading edge practices and some of the guidance discussed in this thesis such as public and Indigenous engagement, independent oversight or adaptive management requires a lot of effort, time and expenditure by both project proponents and government. Yet many would argue we cannot afford to have weak follow-up and monitoring. We see already that often neither the time nor effort is forthcoming (Hunsberger et al., 2005; Marshall et al., 2005; Jalava et al., 2015). However, without incentive,

these leading edge practices may simply remain a concept on paper rather than become a real life

exercise in the majority of Canadian EIA projects. Future research is needed to understand the

best mix of incentives that might be used to encourage the development of follow-up programs

that utilize these practices. This may involve the use of regulatory, economic or other policy

instruments with the goal of providing the much-needed incentive. The current review of the

Canadian Environmental Assessment Act may result in a revised assessment law that includes

incentives for action – certainly the review includes follow-up and monitoring as a key issue.

In addition to exploring various incentives to encourage the implementation of leading edge

practices in follow-up and monitoring there are also opportunities to conduct research on follow-

up and monitoring outside the discipline of EIA. Lessons and practices from other non-EIA

disciplines may be transferred and applied to enhance current practice in EIA follow-up and

monitoring. While this was generally outside the scope of the research, one participant

recommended that other disciplines like regional planning, forestry and even medicine or

education be examined.

You might want to look outside of environmental assessment. Monitoring is most important at the cumulative effects level and therefore it may be possible for you to find examples in regional planning or sectoral planning. There may be interesting examples from integrated forest management efforts. [...] There are some kinds of monitoring from certification and recertification under the Forest Stewardship Council's process for, you know, getting the labeling. That is something that is driven by a non-government body, set up initially by NGOs and the private sector. It is a labeling exercise. Which suggests that they are doing some monitoring and checking out what is going on. This whole certification exercise and the monitoring attached to it is possibly a model that is very different from what we are seeing in environmental assessment. There may be some great examples of how you can mobilize motivation and carful watching. [...] Just about anywhere you think, there is some kind of monitoring exercise. Of course there is almost certain to be a distinct shortage of anybody looking across the boundaries. Environmental assessment people look at environmental assessment as if environmental assessment does monitoring and is the only place that does. So

you could probably benefit from looking at medicine and education and forestry and fisheries no doubt. (Participant 6)

While this research provides guidance on how to implement leading edge practices in follow-up and monitoring, it does not explain how to financially support the follow-up and monitoring practices and approaches identified throughout the thesis. A sustainable funding model must be explored to guarantee that sufficient funds always exist for adequate follow-up and monitoring, regardless of the financial status of the proponent or other responsible authorities. Reclamation performance bonds present one potential solution to ensure that follow-up and monitoring for a project will have sufficient funds to continue regardless of the status of the responsible authority, typically the project proponent. A proper funding model can prevent potential legacy effects from occurring.

6.4   Concluding Comments

While there has been a strong focus on the pre-approval components of the EIA process, historically little attention has been given to projects after regulatory approvals. However, there is a growing interest in following up with the impact predictions made in the environmental assessment and the effectiveness of mitigation measures prescribed for projects in next generation EIA. This growing interest is challenging the long-standing attitude that environmental assessment is about receiving approval and ends once a decision has been reached by regulatory authorities. Even with this shift in attitude, proper follow-up and monitoring remains largely under practiced in many EIA projects across Canada. The lack of direction and guidance for follow-up and monitoring may be partially responsible for this. The research aims

to address the lack of direction and guidance to implement the leading edge practices found in the literature.

The six leading edge practices presented in this research are critical to next generation EIA follow-up and monitoring. While it is recommended that all six leading edge practices be implemented together as package in EIA follow-up and monitoring, practitioners must use their discretion when selecting appropriate approaches for implementation based on the unique circumstances of each individual EIA project. This research is intended to be a practical guide for proponents, regulators, consultants and others involved in EIA.

All actors in involved in EIA – including proponents, governments, regulators and the public – have a responsibility in implementing next generation follow-up and monitoring in Canada to ensure its full potential is reached. However, governments have the greatest responsibility to ensure next generation follow-up and monitoring occurs in Canada, as they are elected to act in the best interest of the public. The EIA process, including the follow-up and monitoring component, was synthesized with public interest in mind. The public continues push for accountability with respect to development and the protection of the environment. As governments represent public interest, it is their ultimate responsibility to ensure all six leading edge practices are implemented in follow-up and monitoring.

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Appendix A

Interview Guide

A-1: Interview Guide

Introduction	1. How long have you been involved with EIA follow-up? 2. What where your responsibilities related to EIA follow-up in your particular organization? 3. Have you been involved in EIA follow-up in other countries or strictly Canada? 4. How do you describe or define EIA follow-up? 5. How have best practices changed since your initial involvement in EIA follow-up?

Public Involvement
 	
 "The community should be involved in EIA follow-up"
	6. Public participation is critical to good follow-up - In your opinion, is there a project/development that you've been involved with (or seen) that has stood out as a leader for public involvement during the follow-up stage?
	 7. What factors made this project stand out as a leader in promoting public involvement compared to other projects you've been involved with? (*i.e. Why was this the best project you've seen, how was the public involved*)
	 8. What encouraged/motivated public involvement for this project and assisted with its implementation?
	 9. What were the challenges/barriers that were encountered while involving the public during the project?
	     a. How were those challenges/barriers overcome?
	     b. Were there any challenges/barriers that you were not able to overcome?
	 10. Looking back, how do you think the public involvement component of the follow-up program could be improved?

Continuous Learning
 	
 "EIA follow-up should promote continuous learning from experience to improve future practice"
 	
 (From the literature: knowledge management, data sharing agreements, lessons learned docs, post hoc reviews, corporate memory...)
	11. Continuous learning is critical to good follow-up – In your opinion, is there a project/development that you've been involved with (or seen) that has demonstrated leading edge practice in continuous learning during the follow-up stage?
	 12. What factors made this project stand out as a leader in promoting continuous learning compared to other projects you've been involved with*? (i.e. How has knowledge, lessons learned or experiences from previous projects been incorporated into this project? What mechanisms are in place to ensure that knowledge, lessons learned or experiences from this project are incorporated into future projects?)*
	 13. What encouraged/motivated continuous learning for this project and assisted with its implementation?
	 14. What were the challenges/barriers that you encountered while implementing continuous learning during the project?
	     a. How did you overcome those challenges?
	     b. Were there any challenges/barriers that you were not able to overcome?
	 15. Looking back, how do you think continuous learning in the follow-up program could be improved for next time?

Clear Roles and Responsibilities
 	
 "EIA follow-up should have a clear division or roles, tasks and responsibilities"
	16. A clear division of roles, tasks and responsibilities are critical to good follow-up - In your opinion, is there a project/development that you've been involved with that has demonstrated leading edge practice in delivering clear roles, tasks and responsibilities?
	 17. What factors made this project stand out as a leader in promoting clear roles and responsibilities compared to other projects you've been involved with?
	 18. What encouraged/motivated delivering clear roles and responsibilities for this project and assisted with its implementation?
	 19. What were the challenges/barriers that you encountered while delivering clear roles and responsibilities during the project?
	     a. How did you overcome those challenges?
	     b. Were there any challenges/barriers that you were not able to overcome?
	 20. Looking back, how to you think the division of roles and responsibilities could be improved for the follow-up stage of the

	project next time?
Closing	21. Are there any other leading edge practices for EIA follow-up that you've encountered during your experiences that you'd like to discuss?
	22. Are you aware of any other people closely involved in EIA follow-up that it would be beneficial for me to talk to for my research?
	23. Thank you!

Appendix B

Research Ethics and Compliance Approval Certificate

Human Ethics
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UNIVERSITY
OF MANITOBA | Research Ethics and Compliance
Office of the Vice-President (Research and International)
APPROVAL CERTIFICATE

December 16, 2015

SSHRC
33609

TO: **Brett Andronak**   **(Supervisor: John Sinclair)**
Principal Investigator

FROM: **Lorna Guse, Chair**
Joint-Faculty Research Ethics Board (JFREB)

Re: **Protocol #J2015:134**
**"Approaches to Next Generation Environmental Impact Assessment
Follow-Up"**

Please be advised that your above-referenced protocol has received human ethics approval by
the **Joint-Faculty Research Ethics Board**, which is organized and operates according to the
Tri-Council Policy Statement (2).   **This approval is valid for one year only**.

Any significant changes of the protocol and/or informed consent form should be reported to the
Human Ethics Secretariat in advance of implementation of such changes.

Please note:

-    **If you have funds pending human ethics approval, please mail/e-mail/fax (261-0325)
a copy of this Approval (identifying the related UM Project Number) to the Research
Grants Officer in ORS in order to initiate fund setup.   (How to find your UM Project
Number: http://umanitoba.ca/research/ors/mrt-faq.html#pr0)**

-    **if you have received multi-year funding for this research, responsibility lies with
you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval;
otherwise the account will be locked.**

The Research Quality Management Office may request to review research documentation from
this project to demonstrate compliance with this approved protocol and the University of Manitoba
Ethics of Research Involving Humans.

The Research Ethics Board requests a final report for your study (available at:
http://umanitoba.ca/research/orec/ethics/human_ethics_REB_forms_guidelines.html) **in order to
be in compliance with Tri-Council Guidelines.**

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Appendix C

Letter of Consent for Research Participants

Natural Resources Institute
Clayton H. Riddell Faculty of
Environment, Earth, and Resources

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Research Project Title: Approaches To Next Generation Environmental Impact Assessment Follow-up

Principal Investigator: Brett Andronak
Phone: xxx-xxx-xxxx
Email: xxxxxxxxx@cc.umanitoba.ca

Research Supervisor: Dr. John Sinclair
Phone: xxx-xxx-xxxx
Email: xxxxxxxxx@umanitoba.ca

Sponsor: Social Science and Humanities Research Council of Canada

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The purpose of the research is to study proven practices for EIA follow-up in Canada to develop next generation recommendations for EIA project approval processes. The objectives of the research are to: establish current leading edge practices for EIA follow-up, explore ways to implement leading edge EIA follow-up, and develop guidance for the implementation of leading edge practice that captures the learning potential of EIA follow-up. Recommendations will be developed based on the research findings to assist regulators and proponents in maximizing the effectiveness of EIA follow-up and moving it toward next generation approaches. Support for the project has come from the Social Science and Humanities Research Council of Canada.

Your participation in this master's thesis will involve an interview lasting approximately one hour with questions related to environmental impact assessment follow-up. A recording device will be used during the interview with your consent. If you do not agree to the use of a recorder I will keep hand written notes of the interview. This research and your contribution will help address the gap between the wealth of knowledge on leading edge practices and the actual implementation of follow-up and monitoring programs following project approval through EA.

There are some privacy risks associated with your participation. However, your privacy is of great importance and numerous precautions will be taken accordingly to protect privacy. All research data, including digital audio recordings and electronic transcripts, will be stored and protected on my personal laptop that I have sole access to. Transcripts will not contain participant's names. Rather, an alphanumeric code will be assigned to each participant to ensure confidentiality. Any hand written notes and non-digital data will be stored in a locked container at the Natural Resources Institute and will also only be identified by code number. I will provide you will a copy of the transcript of our interview to ensure accuracy should you choose to review it. You will have two weeks to review your transcript and suggest modifications and additions. Only the Principle Investigator and Research Supervisor will have access to the data.

You may withdraw from the research or from the interview at any point without penalty. You may also choose not to answer any question during the interview process. You may request to withdraw from the research after the interview either in person or by the phone number or email address provided on this consent form. If you wish to withdraw, your data will be destroyed. However, after the data has been analyzed and presented in the thesis defense, it is no longer possible to withdraw.

After the research project is complete, results will be disseminated in the final version of the thesis. Confidential data will be deleted and/or shredded after my thesis defense and publication within two years. You will also be provided with a summary of the major findings should you request these. The summary will also provide details on how to access the final version of the thesis. Feedback will be communicated via email or mail within six months after final completion of the thesis. The final version of the thesis will be available to the public for viewing and download on the Natural Resources Institute's website.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the Joint-Faculty Research Ethics Board (REB). If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Coordinator (HEC) at 204-474-7122 or humanethics@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

Participant's Signature _____ Date _____

Researcher and/or Delegate's Signature _____ Date _____

Permission to be recorded   Yes____   No____

Request copy of summary results   Yes____   No____

      Please send my summary of results by email or ground mail to: _____

      _____