

# Northern Environmental Assessment: A Gap Analysis and Research Agenda

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## 1. Introduction

Environmental assessment (EA) is amongst the most widely practiced environmental management tools in the world and is applied across the Circumpolar North to a range of activities and projects at variable scales. In recent years, however, the effectiveness of EA has been questioned. In a 2005 newsletter of the International Association for Impact Assessment, then president Richard Fuggle described a “disillusionment” about EA “...and skepticism that impact assessments are contributing to better decisions” (Fuggle 2005: 1). In the Finnish context, Pölönen et al. (2011) described the linkages between EA and decision-making processes as a major deficiency and, in Russia, Cherp and Golubeva (2004) identified several challenges in national-level approaches to EA implementation. More recently, with the introduction of the new 2012 *Canadian Environmental Assessment Act*, Gibson (2012: 186) described the change as a “a substantial retreat from almost all of the reasonable expectations for assessment regime design.” Morgan (2012), in his review of the international state-of-the-art of EA, similarly warned of weakening EA processes as governments seek more expedited approvals to support economic development initiatives.

Given the emerging and enduring concerns about the effectiveness of EA, Boyden (2007: 3) challenged the international EA community “...to better identify the benefits as well as costs of impact assessment.” Researchers, practitioners, communities and governments understandably want to know if the time and resources spent on EA is actually leading to improved environmental management and environmental quality. In a brief to a Canadian parliamentary committee, Hanna and Noble (2011) emphasised the importance of EA as an essential public policy instrument for environmental decision-making in Canada, but also noted the need to better understand effectiveness issues in Canadian EA practice and to improve EA rather than abandon it.

This paper examines what work has been done to understand the effectiveness of EA in the North, and identifies key gaps in research that need to be addressed to help understand and improve EA and increase its relevance to northern communities. This paper was commissioned as part of the Resources and Sustainable Development in the Arctic (ReSDA) research program to address research gaps and identify research priorities in a number of thematic areas, with the

aim to identify and analyze the impacts of resource development and find ways to help Arctic communities deal with these impacts through benefit enhancement and mitigating adverse impacts.<sup>1</sup>

This gap analysis is focused on EA, specifically what research exists and what research needs to be done to help increase the effectiveness and benefits of EA to northern communities. In the sections that follow we first provide a brief overview of EA, and EA in the Circumpolar North. The study approach is then outlined, followed by a synthesis of the major research themes in northern EA. We then present the major gaps in northern EA research and, based on our review, identify a number of priority areas for future research.

## **2. Environmental Assessment**

Environmental assessment is broadly defined as a process for identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made (IAIA and IEA 1999). Often described as an environmental protection tool, a methodology, and a regulatory requirement, EA is most importantly a process designed to aid decision-making through which concerns about the potential environmental consequences of proposed actions, public or private, are incorporated into decisions regarding those actions. In this regard, EA can also be viewed as a means of strengthening environmental management processes (Morrison-Saunders and Bailey 1999).

The underlying intent of EA is to enable project proponents, communities and decision makers to enhance the benefits and to minimize the environmental costs of development actions. In this sense, EA is both a planning and management tool for choosing and designing developments wisely. It can also be viewed in a much broader context – as a means to influence government decisions and to provide an opportunity for public debate about the merits of a proposed development.

Environmental assessment in the Circumpolar North emerged with the United States' *National Environmental Policy Act* (1969), with Canada following in 1972 by way of a Federal

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<sup>1</sup> See <http://dl1.yukoncollege.yk.ca/resda/>

Environmental Assessment Review Office policy that all new federally initiated projects and those under federal jurisdiction be screened for potential pollution effects. It was the Mackenzie Valley Pipeline Inquiry (Berger 1977), however, that “set an international standard for critical and cross-cultural public assessment” and created expectations “about what an assessment process should be” (Gibson and Hanna 2009: 22). Environmental assessment across the Circumpolar North is now a vast subject, capturing biophysical, social, economic and legal dimensions, and ranging in scope of application from individual project assessments to regional plan assessments and broad policy assessments at the strategic level (Table 1).

In the Canadian North, much of the current regulatory system for EA has developed from the settlement of comprehensive land claims agreements with Aboriginal groups, and is administered under a variety of regional boards and agencies including the Mackenzie Valley Environmental Impact Review Board; Nunavut Impact Review Board; and the western Arctic Environmental Impact Screening Committee and Environmental Impact Review Board. Through various co-management boards and committees, EA in Canada’s North is arguably more integrated into regional resource development planning than it typically is in the south.

**Table 1. Select northern EA systems and provisions**

<b>EA system</b>	<b>EA provision(s)</b>
Canada (federal)	<p>Canadian Environmental Assessment Act (CEAA 2012); Cabinet Directive for the Environmental Assessment of Policy Plan and Program Proposals (2004)</p> <p>Federal EA in Canada is required by way of CEAA (2012), replacing CEAA (1992). EA under CEAA (2012) applies only to physical undertakings (designated projects). EA is the responsibility of three federal authorities: Canadian Nuclear Safety Commission (for nuclear projects); National Energy Board (for international and interprovincial pipelines and transmission lines); Canadian Environmental Assessment Agency (for all other designated projects). Strategic environmental assessment is not legislated; it is required by way of a federal Cabinet Directive and applies only to the policy, plan or program proposals of a federal department or agency that are submitted to an individual minister or Cabinet for approval and the implementation of the proposal may result in important environmental effects. In an effort to extend the principles of strategic environmental assessment beyond the federal level, the Canadian Council of Ministers of the Environment (2009) released principles and guidelines for regional strategic environmental assessment.</p>

	See <a href="http://www.ceaa-acee.gc.ca/">http://www.ceaa-acee.gc.ca/</a>
Mackenzie Valley	<p>Mackenzie Valley Resource Management Act (MVRMA 1998); CEAA (2012)</p> <p>The MVRMA emerged from the resolution of three comprehensive land claims in the Northwest Territories, requiring the coordinated management of land and water in the Mackenzie Valley. The MVRMA includes all of the Northwest Territories, with the exception of the Inuvialuit Settlement Region and Wood Buffalo National Park. The Mackenzie Valley Environmental Impact Review Board (MVEIRB), a quasi-judicial co-management board, is responsible for EA at a valley-wide level. The MVEIRB's (2004) guidelines describes EA as "a process, which examines the potential impacts of proposed developments to promote sustainability and avoid costly mistakes...to anticipate and avoid environmental problems, rather than reacting and fixing them after they occur." EA is to ensure protection of the environment from the significant adverse impacts; and ensure protection of the social, cultural and economic well-being of residents and communities of the Mackenzie Valley.</p> <p>See <a href="http://www.reviewboard.ca/">http://www.reviewboard.ca/</a></p>
Inuvialuit Settlement Region	<p>Inuvialuit Final Agreement (IFA 1984); CEAA (2012)</p> <p>The IFA established the Inuvialuit Settlement Region (ISR) and a framework for co-management between the Inuvialuit and the federal government. The ISR includes the Beaufort Sea/Mackenzie Delta and Yukon North Slope Region. Projects in the ISR are subject to EA by the Environmental Impact Screening Committee (EISC) and, depending on the potential for significant impacts, the Environment Impact Review Board (EIRB). The EISC is responsible for determining whether a proposed development could have significant environmental effects or affect present or future wildlife harvesting, and making recommendations as to whether the development can proceed or whether a more comprehensive assessment is required under the EIRB. The federal government has jurisdiction over and authority to manage the marine portion of the ISR.</p> <p>See <a href="http://www.eirb.ca/">http://www.eirb.ca/</a></p>
Yukon	<p>Yukon Environmental and Socio-economic Assessment Act (YESAA 2003); CEAA (2012)</p> <p>YESAA gives effect to provisions under the Umbrella Final Agreement (1993), between Canada, Government of Yukon and Yukon First Nations, respecting the assessment of environmental and socio-economic effects. The stated purposes of YESA are, among others, to: require that, before projects are undertaken, their environmental and socio-economic effects are considered; protect and maintain environmental quality and heritage resources; ensure that projects are undertaken in</p>

	<p>accordance with principles that foster beneficial socio-economic change without undermining the ecological and social systems on which communities and their residents, and societies in general, depend; and provide opportunities for public participation in the assessment process. The Yukon Environmental and Socio-economic Assessment Board administers EA under YESAA.</p> <p>See <a href="http://www.yesab.ca/">www.yesab.ca/</a></p>
Nunavut	<p>Nunavut Land Claims Agreement (NLCA 1993); CEAA (2012)</p> <p>Article 12 of the NLCA sets out the EA process for the Nunavut Settlement Area and Outer Land Fast Ice Zone. The NLCA established the Nunavut Impact Review Board (NIRB) to conduct EA. In carrying out its EA role, the primary objectives of NIRB are to protect and promote the existing and future wellbeing of the residents and communities of the Nunavut Settlement Area, and to protect the ecosystemic integrity of the Nunavut Settlement Area. The NLCA also allows for the establishment of a Federal EA panel. NIRB's mandate is applied to crown lands, territorial lands, Inuit-owned lands and private lands. The federal government retains an overriding authority on EA.</p> <p>See <a href="http://www.nirb.ca/">www.nirb.ca/</a></p>
Russia	<p>Law of Russian Federation on Ecological Expertise (1995); Assessment of Environmental Impacts Regulations (OVOS, 1994; 2000)</p> <p>EA under the OVOS is defined as a process encouraging an ecologically informed administrative decision on implementation of economic and other activities through identification of possible adverse impacts, assessment of ecological impacts, taking into account public opinions, and developing measures to mitigate and prevent negative impacts. EA is designed for project-level developments and provides a conceptual regulatory approach to review and permitting.</p> <p>See Solodyankina and Koeppel (2009), Cherp and Golubeva (2004)</p>
Iceland	<p>EU EIA Directive (2011/92/EU); EU SEA Directive (2001/42/EC)</p> <p>The EU EIA and SEA Directives set out the principles and procedural requirements for EA in Iceland, leaving it to the discretion of the state as to how the Directives are transformed into national legislation. The EU EIA Directive list projects that should always be subject to assessment or should be assessed case-by-case, but the state can widen the scope of included projects in their national legislation, reflecting local environmental and socioeconomic conditions. The Icelandic National Planning Agency is the state authority responsible for the administration, monitoring and implementation of the Icelandic Environmental Impact Assessment Act (2005) and Strategic Environmental Assessment Act (2005). Amongst the purposes of EA under state legislation are to minimize the negative environmental</p>

	<p>impacts of developments and promote cooperation of stakeholders and other interested parties concerning projects that are subject to assessment.</p> <p>See <a href="http://www.skipulagsstofnun.is/english">www.skipulagsstofnun.is/english</a></p>
Sweden	<p>EU EIA Directive (2011/92/EU); EU SEA Directive (2001/42/EC)</p> <p>The EU EIA and SEA Directives set out the principles and procedural requirements for EA in Sweden, leaving it to the discretion of the state as to how the Directives are transformed into national legislation. The Swedish Environmental Code (2000) sets out national EA requirements. The stated purpose of EA under the Code is “to establish and describe the direct and indirect impact of a planned activity or measure on people, animals, plants, land, water, air, the climate, the landscape and the cultural environment, on the management of land, water and the physical environment in general, and on other management of materials, raw materials and energy. Another purpose is to enable an overall assessment to be made of this impact on human health and the environment.”</p> <p>See <a href="http://www.swedishepa.se/Legislation/The-Environmental-Code/">www.swedishepa.se/Legislation/The-Environmental-Code/</a></p>
Norway	<p>EU EIA Directive (2011/92/EU); EU SEA Directive (2001/42/EC)</p> <p>The EU EIA and SEA Directives set out the principles and procedural requirements for EA in Norway, leaving it to the discretion of the state as to how the Directives are transformed into national legislation. Norway’s Planning and Building Act (2008) establishes national provisions for EA, with the Ministry of Petroleum and Energy managing EA in offshore regions. The Norwegian Polar Institute (a Directorate under the Ministry of the Environment) also has a role in commenting on and reviewing EAs in Arctic regions. State regulations for EA set out the purpose of assessment: to ensure that the environment, natural resources and community are taken into account in the preparation of plans or projects, and when a decision is made as to whether, and if so on what conditions, plans or projects may be carried out. The Svalbard Islands has an EA procedure of its own, enacted by Norway (Act of 15 June 2001, Ch. VII, Svalbard Environmental Protection Act).</p> <p>See <a href="http://www.regjeringen.no/en/dep/md.html?id=668">www.regjeringen.no/en/dep/md.html?id=668</a></p>
Finland	<p>EU EIA Directive (2011/92/EU); EU SEA Directive (2001/42/EC)</p> <p>The EU EIA and SEA Directives set out the principles and procedural requirements for EA in Finland, leaving it to the discretion of the state as to how the Directives are transformed into national legislation. Finland’s EIA Decree (713/2006) lists further the types of projects that must always be subjected to assessment; however EA may also be required for any projects where adverse environmental impacts are likely, on the basis of decisions made by the regional environment authority.</p>

	See Jantunen (2011)
Greenland	<p>Mineral Resources Act (2009)</p> <p>Greenland has extensive self-government. It is not part of the EU and specifies its own EA rules. Assessments involve the National Environmental Research Institute and Greenland's Institute of Natural Resources. Greenland has consented to the UNECE Protocol on SEA in 2010, which are carried out in relation to oil exploration and mining to examine the vulnerability of areas when decisions are made regarding where to locate industrial development. The Bureau of Minerals and petroleum, as part of the project documentation when applying for an exploitation license, also require social impact assessment.</p> <p>See Hansen (2010), <a href="http://www.bmp.gl/petroleum/environment/environmental-regulation">www.bmp.gl/petroleum/environment/environmental-regulation</a></p>
United States (Alaska)	<p>National Environmental Policy Act (NEPA 1970)</p> <p>NEPA sets out US national environmental policy and goals for environment protection, maintenance, and enhancement and establishes the EA process for implementing these goals within federal agencies. The Council on Environmental Quality oversees NEPA. NEPA requires that federal agencies consider potential environmental impacts before taking major actions (e.g. issuing permits) concerning a development initiative and, if significant impacts are likely, prepare an environmental impact statement.</p> <p>See <a href="http://ceq.hss.doe.gov/">http://ceq.hss.doe.gov/</a></p>

### 3. Approach to the Gap Analysis

The gap analysis was based on a survey and content analysis of current and recent research on EA in the North. We focused only on literature in the field of 'environmental assessment'. This helped ensure that our analysis did not duplicate the efforts of other ReSDA gap analyses focused on themes such as traditional knowledge, community development impacts, or impact and benefit agreements. Our review was based on country-specific and a Circumpolar-wide search of the EA literature published in the last 20 years. Research papers and reports were identified using electronic database searches (e.g. Web of Science, Scopus); manual searches of key EA journals (e.g. *Impact Assessment and Project Appraisal*, *Environmental Impact Assessment Review*, *Journal of Environmental Assessment Policy and Management*) and journals that typically publish EA-related research (e.g. *Arctic*, *Polar Record*, *Environmental Management*). We also examined, although in a much more limited fashion, select regulatory

reviews and EA system performance reviews so as to identify key research issues and priorities that may be noted in the professional practice literature.

Results from our survey of the literature were used to identify gaps in research or understanding of EA in the North. Initial research gaps and priorities were identified based on:

- i) Knowledge and information ‘missing’ from northern EA research when considering current issues facing the North (e.g., regulatory change, energy development, climate change, adaptation, cumulative effects, social change); and
- ii) Consolidating recommendations from the range of literature we reviewed on research needs or priorities.

We also surveyed the views of 10 key individuals from across the North, from 4 different countries, involved in EA research or regulation. We asked what they perceived to be the major gaps in research and issues in EA research in the North that require significant attention. The 10 individuals were purposively identified and were either members of our own research networks or recommended by our colleagues. Our objective was to seek guidance in identifying and validating research gaps and priorities identified from our review of the literature, and to determine whether there were additional research needs not captured in our review or the literature.

#### **4. Survey of Northern Environmental Assessment Research**

The amount of research on EA in the North is relatively limited compared to EA research in the south; however, many of the issues addressed are similar. Our survey of the literature resulted in the identification of 104 research papers with a focus on various aspects of EA in the North. From this, we identified eight major research themes, each consisting of various sub-themes. We do not claim these to be the definitive themes, nor do we claim that we have captured all northern EA research. Rather, the purpose was to synthesize the work that has been done so as to assist in identifying research gaps. We also do not claim that these are the ‘only’ research themes; the themes identified were influenced by the scope of our review and are a product of our understanding of the literature. The themes are also not independent. For example, some of the recent research focused on transboundary EA is set within the context of strategic EA. In such cases, we assigned papers to the theme that we perceived as the most appropriate representation of its content based on the paper’s objectives and recommendations.

Of the eight research themes, ‘collaboration and participation’ and ‘cultural, social and health impacts’ comprised approximately 38% of the papers identified in our literature survey. This was not surprising as such topics have been of long-standing research interest and importance in the North. Research on traditional knowledge and community participation in the EA process, and on the assessment of social, health and cultural impacts were particularly dominant sub-themes. Research on regional and strategic EA comprised 15% of the papers identified. Much of the research identified under this theme was relatively recent, within the past five to eight years, and much of it focused on emerging Arctic energy resource development and the assessment or cumulative environmental effects. The remaining 47% of the literature addressed various aspects concerning the procedural effectiveness of EA, the influence of EA on decision making, transboundary assessment and international EA laws and regulations, negotiated agreements (e.g. impact and benefit agreements and environmental agreements), and specific tools and techniques that support EA application.

**Table 2. Current EA research themes and sub-themes**

<b>EA research theme</b>	<b>Sub-themes</b>	<b>Select examples</b>
Collaboration and participation	Collaborative EA; Learning; Participation and deliberative democracy; Community participation and negotiation; Traditional knowledge; Interactive planning; Local capacity for engagement; Conflict and early consultation; Knowledge mobilization; Social equity, empowerment and exclusion	Armitage (2005); Couch (2002); Fitzpatrick et al. (2008); Hilden (2005); Huttunen (1999); Koivurova (2008); Lajoie and Bouchard (2006); Lidskog and Soneryd (2000); Meschtyb et al. (2005); Sasvari (2012); Saarikoski (2000); Wismer (1996)
Cultural, social and health impacts	Integrating spiritual and cultural issues in EA; Social impact follow-up and monitoring; Health integration in EA; Mitigating health impacts; Determinants of health; Scope of health considerations in EA; Planning for community impacts of mega-projects; Strengthening social impact assessment; Consideration place meaning in EA	Ehrlich (2010); Erikstad et al. (2008); Gagnon (2003); Juslén (2005); Kaltenborn (1998); Kwiatkowski and Ooi (2003); Meschtyb et al. (2005); MVEIRB (2008); National Research Council (2003); Noble and Bronson (2005); Noble and Bronson (2006); Sasvari (2012); Storey and Hamilton (2003); Wernham (2007)

Regional environmental assessment	Cumulative environmental effects; Opportunities and constraints to strategic EA in the Arctic; Strategic EA for offshore energy; Need to upstream EA to the strategic level; Regional strategic EA for coordinated marine spatial planning; Strategic EA for marine environmental sustainability; Identifying priorities for northern development; Regional assessment for sensitive wildlife	Bruhn-Tysk and Eklund (2002); Doelle et al. (2012); Elvin and Fraser (2012); Fidler and Noble (2012a); Fidler and Noble (2013a); Fidler and Noble (2013b); Hansen and Kørnøv (2010); Johnson et al. (2005); Newton et al. (2002); Noble et al. (2013); Orenstein et al. (2010); Solodyankina and Koeppl (2009)
Procedural effectiveness	Adequacy of EA scoping; Weight of evidence of cultural impacts; Inter-cultural communication; Problems of non-binding decisions; Adaptive approaches; Limitations to highly systematic decision processes; Mitigation effectiveness; Follow-up and monitoring; Timing of application; Institutional evolution; Regulatory complexity	CARC (1996); Cherp and Golubeva (2004); Couch (2002); Ehrlich (2010); Haefele and Cliffe-Phillips (2004); Jalava et al. (2010); MVEIRB (2008); McCrank (2008); Mulvihill and Baker (2001); Nellesmann and Vistnes (2003); O'Reilly (1996); Ovind and Sneve (2004); Ross (2004); Voutier et al. (2008)
Environmental assessment and decision making	Legality versus legitimacy; Use of EA information in decision process; Action-forcing mechanisms for implementing EA results; Securing knowledge versus influencing decisions; Influence of community consultation on decisions made	Ehrlich (2010); Haefele and Cliffe-Phillips (2004); Hansen (2011); Hildén and Jalonen (2005); Hokkanen (2001); Noble and Birk (2011); Pölönen et al. (2011); Sasvari (2012)
Transboundary assessment and international law and policy	Strategies for arctic environmental protection; Existence versus uptake of Arctic guidelines for EA; Consultation challenges regarding transboundary issues; Challenges to the variability in EA across the Arctic; Strategic EA to address transboundary impacts; Disregard for Arctic ecosystems in jurisdictional EA processes	Arctic Environment Protection Strategy (1997); Azcarate et al. (2011); Brubaker and Ragner (2010); European Union (2010); Huebert (1998); Koivurova (2002); Koivurova (2008)
Negotiated agreements	Rationale for impact and benefit agreements; Scope and function of impact and benefit agreements; Environmental agreements and regulatory process; Aboriginal engagement in negotiated agreements; Community-based monitoring under environmental agreements; Link	Fidler (2009); Fidler and Hitch (2007); Galbraith et al (2007); Klein et al. (2004); Knotsch and Warda (2009); Noble and Birk (2011); Noble and Fidler (2011); O'Faircheallaigh (2007); Prno and Bradshaw (2008); Sosa and Keenan

	between environmental agreements and environmental assessment	(2001)
Supporting tools and techniques	Scenario analysis; Remote sensing for biodiversity assessment; Geographic Information Systems application; Technical tools for monitoring support; Wildlife assessment	Greig and Duinker (2007); Johnson et al. (2005) Kumpula et al. (2011); Newton et al. (2002); Rigina (2002); Vlassova (2006)

## 5. Research Gaps

In the sections that follow we identify several gaps in research that, arguably, need to be addressed in order to advance the effectiveness of EA and ensure its relevance to northern communities and stakeholders. Some of these gaps reflect enduring concerns about the efficacy of EA; others reflect more emerging issues and concerns in northern EA. The research gaps were identified based on our analysis of the literature and key informant feedback. We limit our focus to those research gaps and opportunities that are most closely linked to ReSDA's focus on northern communities.

### 5.1 Understanding expectations about EA

“There is no guarantee that the processes and mechanisms currently in place to help guide oil and gas exploration and development in the Mackenzie Delta–Beaufort Sea region will strike an adequate balance between competing environmental, social, and economic objectives”

Voutier et al. (2008: 109)

Notwithstanding the breadth of research on northern EA, we found very little research that has addressed community and stakeholder experiences with and expectations about EA.

Environmental assessment has come under much criticism in recent years; however, Fuggle (2005) warns that EA is not a ‘magic bullet’ that can resolve all environmental and socio-economic issues. Part of the challenge to understanding the efficacy of EA is that the underlying purpose of EA is still much debated. Cashmore (2004) argues that EA can be perceived as a series of nebulous models, operating along a broad spectrum of philosophies and values concerning the role of science in EA. At one end of this spectrum is the belief that the scientific method provides the basis for EIA theory and practice; at the other end of the spectrum is the belief that EA is a civic science designed to empower communities, promote social justice, and help realize community self-governance (Bond et al. 2012).

What constitutes ‘effective’ EA can be “...viewed from the various and differing perspectives of the many actor groups that are a part of the EIA system and its processes - legislators, proponents, competent authorities, NGOs etc.” (Hilding-Rydevik 2006: 25). Different actors have different roles and aspirations concerning EA, and may view effective EA based on their role in and influence on the decisions that emerge. In reviewing the EA process for the BHP Diamond mine, for example, O’Reilly (1996) and CARC (1996) argued that the process was neither rigorous or comprehensive nor fair. Kaltenborn (1998) argued that EAs often do not capture a sufficient breadth of place meanings in its process. Sasvari (2012) reports on recent EA experiences of Saami communities and developers and concludes that policies continue to conflict with Saami perceptions and knowledge. More recently, in her review of EA in the western Arctic, Ketilson (2011) identified a range of expectations about EA, specifically strategic EA, and what it can and should deliver and to whom.

Requirements for, and the practice of EA varies considerably across the North, but there has been limited effort amongst the EA research community to fully understand the diversity of community and stakeholder expectations about EA:

- What is EA expected to deliver?
- Is EA the right process to deliver on these expectations?

The views of Indigenous peoples on EA, and within particular EAs, are not well understood.

### ***5.2 Process efficiency and responsiveness***

The Arctic Monitoring and Assessment Program (AMAP 2007) recommended that EA and related planning tools be “rigorously applied” in the Arctic, but also emphasized that such tools be “streamlined to increase their relevance and usefulness” (AMAP 2007: viii). Recent literature on EA effectiveness has tended to focus on making the process less cumbersome and more efficient. In Canada’s western Arctic, for example, evaluations of EA have largely been from the perspective of industry or regulators and focused almost exclusively on process or regulatory efficiency (e.g., Volutier et al. 2008; Harrison 2006; McCrank 2008). Volutier et al. (2008) have suggested that EA in Canada’s Arctic is becoming increasingly complex and that the “regulatory

regime will undermine the attractiveness” of Canada’s western Arctic to industry investors. However, there has been much less attention to community views of the EA process, its complexity and its responsiveness to community concerns about economic development and environmental change:

- Is the EA process sufficiently expeditious, flexible and responsive to communities and proponent’s needs in the context of a rapidly changing Arctic economic and biophysical environment?
- What reforms are needed to ensure EA processes are sufficiently expeditious, flexible and responsive to communities’ and proponent’s needs without compromising its effectiveness?

### *5.3 Impact and influence*

Efficiency is a valid concern, particularly for development proponents, but more attention needs to be given to understanding the impact or influence of EA on decisions and its contribution to improved environmental management. There has been some limited reporting on the impact of EA on decision outcomes in Canada’s North. Ehrlich (2010), for example, addressed the “weighing of evidence” with respect to the assessment of spiritual issues and the role it played in the rejection of three projects and conditional approval of another in Canada’s North. However, Hansen (2011) argues that besides securing environmental knowledge there is little evidence that EA has influenced decision-making. In the Finnish context, Hildén and Jalonen (2005) report limited influence of EA decision-making and choices; Hokkanen (2001) reports that a significant amount of raw information generated through EA but there is insufficient time to use all of the results; and Jalava et al. (2010) similarly reports that EAs suffer from irrelevant information reported in a lengthy way.

We agree with Mulvihill and Baker (2001) in that there is simply too little sharing of the lessons learned from EA applications and outcomes. Some of the high-profile northern EA processes have yielded valuable lessons, but too often these lessons are not shared, leading to lost opportunities for EA improvement:

- What influence has EA had on development decisions?
- What lessons can be learned, the good, the bad and the ugly, from the decades of EA application to resource-mega projects across the Circumpolar North?

#### *5.4 Capacity for meaningful engagement EA*

There is increasing recognition of the need for EAs to recognize and integrate traditional knowledge, and increasing expectations for industry to ensure early and ongoing community engagement (see Fitzpatrick et al. 2008; Armitage 2005; Meschytybe et al. 2005; Saarikoski 2000). In his analysis of the Sierilä hydropower station, northern Finland, for example, Huttunen (1999) reports that community engagement in the EA process increased mutual learning and understanding, as well the degree of interactive planning, resulting in “a significant awakening to their own empowerment and self-management.” At the same time, however, Huttunen cautioned that communities often lack the capacity to participate effectively in the EA process.

Growing requirements for, and expectations of, consultation with northern communities before, during and after the EA process, combined with increasing EA applications for development, particularly in the Canadian North, are raising concerns about the capacity of northern communities to become meaningfully engaged in EA processes. In their review of marine planning, assessment and science programs in Canada’s western Arctic, for example, Fidler and Noble (2013a) found capacity and resources as constraints to meaningful participation. MVEIRB’s (2008) EA practitioner’s workshop report similarly identified the lack of capacity as an ongoing concern in northern EA, noting specifically community concerns about the constant struggle to retain their capacity to participate in EA processes and the increasing workload of Aboriginal groups to coordinate EAs with land users, elders, and their chief and council. McCrank (2008) also identified limited institutional and human resource capacity of potentially impacted Aboriginal organizations as potentially hindering their ability to participate in the EA process and to document and interpret traditional knowledge to assist in decision-making.

Given the enduring concerns over capacity for engagement in EA, combined with the anticipated growth in EA application for northern development, there is a need for research that examines:

- How has past engagement in EA facilitated learning and capacity building in northern communities?
- What is the current capacity of northern communities and Aboriginal organizations, including co-management boards, to be meaningfully engaged in the EA process?

- What are the capacity building requirements to ensure sustained and meaningful engagement in EA given the expected increase in development applications in an ‘ice free’ Arctic?
- What institutional or process reform should happen, or is needed, to ensure more effective engagement in EA in the face of limited resources and under the time constraints of EA processes?

### ***5.5 Tackling regional and strategic EA issues***

Not all issues can be appropriately assessed, understood or managed at the scale of project-based EA. Increasingly, scholars, northern communities and environmental organizations are lobbying for more regional and strategic approaches to EA in the North (see IGC 2004; WWF 2005; Cherp and Golubeva 2004; Doelle et al. 2012; Fidler and Noble 2012). Specifically, there is a recognized need for EA to be more proactive in its approach to planning for future development and to better assess cumulative environmental effects, including climate change and transboundary effects. Based on recommendations emerging from recent literature on EA in the North, and the gaps identified through our analysis of the literature, we identify three priority regional and strategic issues: planning processes and EA, applied strategic EA, adapting EA to climate change.

#### ***5.5.1 Opportunities and mechanisms to link strategic initiatives with EA***

There are many planning, science and assessment programs ongoing in the Arctic. How these programs contribute to better EA, and vice versa, often remains unclear. In the Canadian Arctic, for example, regional initiatives such as the Integrated Oceans Management Plan (IOMP), Beaufort Regional Environmental Assessment (BREA), Integrated Regional Impact Studies (IRIS), the Cumulative Impact Monitoring Program (CIMP) and various land use plans address issues that may be relevant to EA; however, the challenge is determining how the processes and data and knowledge generated are best translated and used to inform and influence EA processes and decisions (Fidler and Noble 2013). There is also an assumption that these processes, and the data and information generated, are useful to EA. However, with regard to CIMP, for example, the MVEIRB (2005: 7) reports: it is unclear to the MVEIRB what information is being collected through CIMP...and how this information can be used in the EA process.”

In the EA literature, the relationships between regional and strategic initiatives and EA is described as ‘tiering’ (see Fischer 2007; João 2005), whereby regional or higher-level initiatives (e.g., planning processes, regional studies and monitoring programs) are intended to influence, or provide strategic direction to project-based EA. How to facilitate such tiering arrangements, however, remains a significant challenge in practice. Research is required to determine the value added of such initiatives to EA in the North, and on the governance and institutional opportunities to better link land use plans and broad regional studies and science initiatives with downstream project-based impact assessment:

- Are current regional planning, science, and monitoring programs in the Arctic responsive to the regulatory needs of EA?
- How can EA practice be improved through better coordination with regional planning?
- What are the mechanisms, existing or required, to ensure that regional planning is influential over project EA applications and decisions?
- How can current science and monitoring programs in the Arctic be better integrated to EA practices?

#### *5.5.2 Applied research to demonstrate regional strategic EA*

In 2008, the Beaufort Sea Strategic Regional Plan of Action (BSSrPA 2008) identified the need for a coordinated and strategic approach to EA in the Beaufort region (BSSrPA Steering Committee 2008). The federal response was BREA – a four-year research project designed to collect data on specific issues related to offshore oil and gas development to identify and fill gaps in environmental baseline data related to offshore activities and the marine environment for the purpose of supporting project specific assessments. BREA will hopefully prove valuable in these regards, but the strategic need to identify priorities for sustainable development in the North (see Newton et al. 2002), a fundamental feature of regional strategic EA, is missing from the BREA process.

Work has been done to advance the understanding of, and a generic framework for, regional strategic EA (see CCME 2009; Gunn and Noble 2009); and there is a growing volume of research on regional strategic EA opportunities in the North, particularly in the marine environments of Norway and northern Canada (e.g. Fidler and Noble 2013; Doelle et al. 2012; Kinn 1999). Offshore Norway, for example, regional strategic EA is described as an effective process for determining how to move forward in terms of planning for development and, in the

context of offshore hydrocarbon development, where future leasing could occur (Fidler and Noble 2012). However, Ketilson (2011), in her review of regional strategic EA in Canada's western Arctic, identified reservations amongst communities, regulators and industry about regional strategic EA due to its 'unproven benefits.'

The research community has approached the need for, and potential role of regional and strategic EA in the Arctic; however, further applied research is needed to pilot test regional and strategic EA applications, specifically applications that involve prospective or futures-based assessment, and to learn from those applications. Specifically, we suggest the need to:

- Pilot a regional strategic EA at the community or sub-regional scale, as a futures-oriented planning and assessment process.
- Identify the lessons, opportunities and institutional requirements to scale-up regional strategic EA to Arctic planning regions and transboundary eco-regions.

### *5.5.3 Adapting EA to climate change*

The requirements for, and scope of EA varies considerably across the Arctic. Yet, all regions are faced with the challenges of a rapidly changing climate and mounting energy development. The MVEIRB (2005: 7) notes that climate change "has not yet featured prominently in any EA, with the exception of the Mackenzie Gas Project", but "anticipates that climate change issues will play an increasing role in future assessments." Notwithstanding the volume of research on Arctic climate change, we found very little northern EA research focused specifically on climate change and how, through EA, the impacts of climate change on Northern development, and the impacts of northern development on climate change, are best addressed. Is EA up to the challenge of climate change and adaptation? More specifically:

- What are the implications of climate change for current EA systems and processes?
- How can, or should, climate change adaptation be addressed through EA processes?

### *5.6 Other enduring and emerging research needs*

There are also a number of other issues that we suggest are important to advancing the effectiveness of EA and its relevance to northern communities and stakeholders, but not necessarily captured under the above themes.

The first research need concerns socio-economic indicators to support EA practice. The MVEIRB (2005), for example, identified the lack of baseline information on socio-economic conditions in the North as an ongoing concern to EA practice. This is a concern that extends to other northern jurisdictions, and is also a common challenge in the south. Of particular need, however, is to identify a suite of indicators for monitoring socio-economic conditions that is not only responsive to regional change, but also useful for predicting and evaluating the specific impacts of local resource development projects.

Second, we suggest that there is also a need to examine closely the relationship between negotiated agreements (e.g. Impact Benefit Agreements) and the EA regulatory process. Although such agreements are becoming commonplace in the North, and perhaps part of the reality of doing business (Veiga et al. 2001), whether such confidential agreements complement or undermine the public EA process needs to be addressed. Specifically, what is the relationship between agreements, negotiated between communities and development proponents, and the regulatory EA process?

Third, and specific to the Canadian North, there is a need to examine the implications of recent changes to the Canadian federal EA process. With the introduction of the new federal *Canadian Environmental Assessment Act* in 2012, the role of the federal government in EA has changed. Although there has been some critical analysis of the new federal legislation (see Gibson 2012), the implications of the new federal EA legislation and approach for EA systems across Canada's north have not yet been examined. What are the implications of these changes for northern EA systems and requirements? Are there likely to be additional demands placed on northern EA systems given the changing federal role in EA? Is there capacity to meet these additional demands?

## **6. Conclusions**

This paper examined the current state of research on northern EA and identified gaps in research that should be addressed in order to advance the effectiveness of EA, enhance its relevance to northern communities and stakeholders, and address issues unique to northern EA and management. We recommend 10 priority research themes for northern EA (Table 3). These are

not the *only* research gaps and priorities and others may have different views of what EA is and can or should deliver in Northern contexts. There is also a diversity of interpretations about what works, what isn't working, and what needs to be done to improve the practice of EA across the North. The gaps and priorities identified in this paper are based on our analysis of the literature, the responses and advice of key informants, and our informed and experiential views based on both EA research and professional practice experiences.

**Table 3. Synthesis of northern EA research priorities**

<b>Research theme</b>	<b>Research questions or objectives</b>
1. Community and stakeholder expectations about EA	<ul style="list-style-type: none"> <li>a. What do northern communities and stakeholders expect of EA?</li> <li>b. Is EA the right process to deliver on these expectations?</li> </ul>
2. Efficiency and responsiveness	<ul style="list-style-type: none"> <li>a. Is the EA process sufficiently expeditious, flexible and responsive to communities and proponent's needs in the context of a rapidly changing Arctic economic and biophysical environment?</li> <li>b. What reforms are needed to ensure EA processes are sufficiently expeditious, flexible and responsive to communities' and proponent's needs without compromising its effectiveness?</li> </ul>
3. Impact and influence of EA	<ul style="list-style-type: none"> <li>a. What influence has EA had on development decisions across the North?</li> <li>b. What lessons can be learned, the good, the bad and the ugly, from the decades of EA application to resource-mega projects across the North?</li> </ul>
4. Capacity for meaningful engagement in EA	<ul style="list-style-type: none"> <li>a. How has past engagement in EA facilitated learning and capacity building in northern communities?</li> <li>b. What is current capacity of northern communities and Aboriginal organizations to be meaningfully engaged in EA?</li> <li>c. What are the capacity building requirements to ensure sustained and meaningful engagement in EA given the expected increase in development applications in an 'ice free' Arctic?</li> <li>d. What institutional or process reforms are needed to ensure more effective engagement in EA in the face of limited resources and under the time constraints of EA processes?</li> </ul>
5. Strengthening EA through land use planning and science	<ul style="list-style-type: none"> <li>a. Are current regional planning, science, and monitoring programs in the Arctic responsive to the regulatory needs of EA?</li> <li>b. What are the opportunities and mechanisms to improve EA practice through better coordination with regional planning?</li> <li>c. How can current Arctic science and monitoring programs be</li> </ul>

	better integrated to EA practices?
6. Applied regional and strategic EA	<ul style="list-style-type: none"> <li>a. Pilot a regional strategic EA at the community or sub-regional scale, as a futures-oriented planning and assessment process.</li> <li>b. Identify the lessons, opportunities and institutional requirements to scale-up regional strategic EA to Arctic planning regions and transboundary eco-regions.</li> </ul>
7. Climate change	<ul style="list-style-type: none"> <li>a. What are the implications of climate change for current EA systems and processes?</li> <li>b. How can, or should, climate change adaptation be addressed through EA processes?</li> </ul>
8. Socioeconomic indicators	a. What indicators are best suited for monitoring socio-economic conditions at the regional scale, but also useful for predicting and evaluating the specific impacts of local resource development projects?
9. Relationship between EA and negotiated agreements	a. In what ways do private agreements, negotiated between communities and proponents, support or threaten the regulatory EA process?
10. Implications of the new Canadian EA Act	<ul style="list-style-type: none"> <li>a. What are the implications of federal EA changes for northern EA systems and requirements?</li> <li>b. Is CEAA (2012) likely to place additional demands on northern EA systems and, if so, is there capacity to meet these additional demands?</li> </ul>

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