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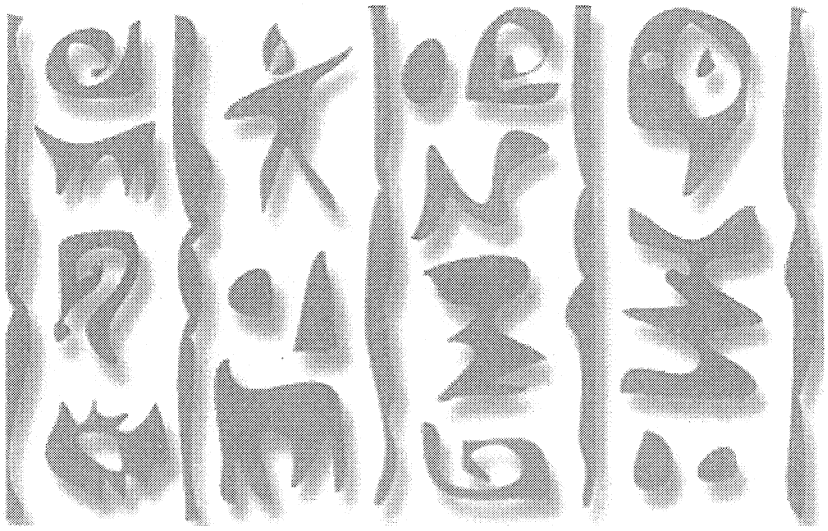

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CANADIAN NATURAL RESOURCES LARGE-SCALE PROJECTS « SOCIAL, CULTURAL AND ECONOMIC IMPACTS »

Synthesis Analysis and Annotated Bibliography of Post-Project Studies

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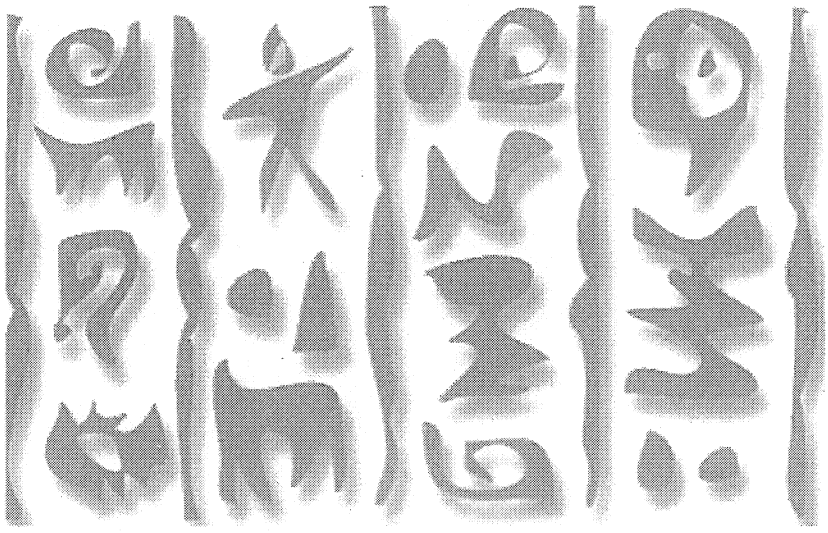

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Coordination of edition: François Guérard
Final edition: Mylène Bluteau, Marie-Julie Potvin

Bibliothèque et Archives Nationales du Québec
National library of Canada

ISBN: 978-2-923095-27-1

Distribution: GRIR
555, Boul. de l'Université
Chicoutimi (Québec)
G7H 2B1

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ACKNOWLEDGMENTS

This study was made possible through the financial support of the Environmental Assessment Division (EAD), Bureau of Risk and Impact Assessment (BRIA), Safe Environments Program, Healthy Environments and Consumer Safety Branch, Health Canada.

Anne-Laure Bouvier de Candia, who holds a Master's Degree in Geography, was hired by EAD as a consultant to identify, compile and analyze the documents that would be used in the Annotated Bibliography. Solange van Kemenade, EAD Senior Advisor on social impacts was responsible for the project and worked very closely with Anne-Laure providing guidance, references, reading and analysis of the material throughout the process. Jean-Philippe Waaub, professor in the Department of Geography, Université du Québec à Montréal and Christiane Gagnon, professor at the Department of Humanities, Université du Québec à Chicoutimi closely monitored research progress and provided valuable comments to guide the thinking process, and enhance the research and writing.

We would like to thank DJ. Smith, former EAD Manager, who seized upon the contribution of this research in the understanding of social, economic and cultural impacts of large-scale projects and encouraged it. Kathleen Hedley, current Manager of EAD as well as all the NCR and regional office coordinators were extremely supportive and contributed to the research providing references and any other pertinent material for the purpose of the research.

Margaux Brisco and Carolyn Dunn, both environmental health coordinators in EAD, deserve special recognition for the patient review of the preliminary version of this document. Without doubt, their comments and suggestions helped to produce a much-improved document. Rebecca Stranberg, also from EAD provided a final polishing.

We gratefully recognize the professional and patient work of Kathryn Jackson, Manager at the HECS Library who helped us with the database search and helped us to get a number of documents through the Interlibrary Loan Service.

We would also like to thank Nicole Paré and Christiane Gouin from Hydro-Quebec, who provided us all of the available documents pertaining to this research. Their help was much appreciated. Finally, Bram Noble, from the University of Saskatchewan was kind enough to make available to us the theses of his students on the topic, as well as his most recent publications.

THE AUTHORS

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LIST OF ACRONYMS

CEAA	Canadian Environmental Assessment Agency
EAD	Environmental Assessment Division
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
HC	Health Canada
HIA	Health Impact Assessment
IAIA	International Association for Impact Assessment
IBA	Impact Benefit Agreement
INAC	Department of Indian and Northern Affairs Canada
GNWT	Government of North West Territories
GBC	Government of British Columbia
PHAC	Public Health Agency of Canada
LNG	Liquefied Natural Gas
NRC	Natural Resources Canada
NWT	North West Territories
SIA	Social Impact Assessment
SCR	Social Corporate Responsibility
WHO	World Health Organisation
YCS	Yukon Conservation Society
YSWC	Yukon Status of Women Council

EXECUTIVE SUMMARY

The project's goal was twofold. First, the research team wanted to identify and review post-project studies on the social, economic and cultural impacts of Canadian large-scale natural resource projects. Secondly, the purpose was to produce a synthesis analysis of the studies found. The ultimate goal of the project was to increase knowledge on socio-economic and cultural impacts of large-scale projects in order to support the Environmental Assessment Division's evidence-based advice regarding projects' impacts on health as well as broader policy decision-making. Natural resource projects include mainly the sectors of mining, hydroelectricity, gas and oil sectors. Research revealed that sectors like LNG and oil sands were either relatively recent or projects were at the stage of obtaining the regulatory approval and had not started yet in Canada, Large-scale projects were defined as projects of significant financial engagement with major impacts on the host communities.

The authors tried to identify economic and social impacts through follow-up studies, but research revealed that these kinds of studies were not yet regularly conducted in the Canadian context. Instead, other sources such as academic studies, project case studies and specific studies presented in the EIS process were of a particular interest and useful for this purpose.

The central findings highlighted a fragile balance between positive impacts (e.g. higher employment for local communities, infrastructure, incomes and revenues for individuals and governments and negative impacts (e.g. loss of land and traditional way of life, an increase in social and health problems, overloading of services, a lack of affordable housing, loss of quality of life, etc.).

Aboriginal people appeared to be particularly impacted, as most of the large-scale natural resource projects in Canada are in remote areas. The authors also drew a series of lessons that could be taken into account for future projects of similar type.

LIST OF TABLES

1. THE CONTEXT

1.1 The Importance of Assessing and Monitoring Social, Cultural and Economic Impacts

An international study on the effectiveness of environmental assessment led by the Canadian Environmental Assessment Agency (CEAA) in collaboration with the International Association for Impact Assessment (IAIA) twelve years ago (Sadler, 1996) highlighted the fact that social and economic dimensions of EIS were neglected. The Commonwealth Health Impact Assessment Guidelines (Enhealth, 2001) also raised concern on the fact that consideration given to human health had been generally unstructured and confined only to the most direct, negative impacts. There is a trend that considers curative services to treat health problems instead of preventing them by assessing risks. The above-mentioned study states that considering social and economic dimensions in EIS, could help to better protect and promote health and avoid that costs fall on governments, the community and citizens.

Since the nineties, considering social and economic dimensions in the context of environmental assessment as well as monitoring these types of impacts once the project starts has become increasingly recognized needs, at the international level as well as in Canada. As the Ontario Association for Impact Assessment Conference call indicated: "*Differences in EA legislation among jurisdictions aside, a consideration of the positive and adverse effects of projects on people and their communities has become as equally important as the assessment of adverse effects on the biophysical environment*" (OAIA, 2006) [1].

The field has even been defined separately from environmental assessment by being called Social Impact Assessment (SIA), with its own methods and tools. It has been fully integrated as one of the topics addressed in the Environmental Impact Assessment of projects. In general, social impacts include social dimensions as well as cultural and economic aspects. In addition, SIA practice has led to the consideration of human health. This is how health was first included within social impacts. However, a new field of research, health impact assessment (HIA), has recently emerged. It is becoming increasingly autonomous, and is incorporating other fields as well. Such a thing shows how environmental assessment is confronted with complex relationships between the social components of the ecosystem.

In this context, the Environmental Assessment Division (EAD) within Health Canada has identified research needs in order to reinforce the evidence-base needed to support advice regarding the direct social and economic impacts on health associated with the environmental assessment of development projects in 2006. A preliminary plan has identified research on the social, cultural and economic impacts of Canadian large-scale projects as a priority, on the short, medium and long terms.

1.2 Research Goals

The project's goal was to produce an annotated bibliography as well as a synthesis analysis of the research sources on the socioeconomic and cultural impacts of Canadian natural resources large-scale projects. A similar bibliography was produced in 1993

[1] The main theme of 2006 Ontario Association for Impact Assessment Conference (OAIA) was "Incorporating Socio-Economic Impact Assessment (SIA) and Corporate Social Responsibility (CSR) into Environmental Assessment".

(Knight et al., 1993)[2], but since then several new large-scale projects have been evaluated and monitored, however their project information remains to be compiled and synthesized. Almost fifteen years after the first bibliography, it was time for an update in order to identify the timing, source, and methodology of the new SIAS and follow-up monitoring programs.

Complete and useful sector-specific studies and case studies targeting projects in different sectors that deepened the analysis on the project's impacts were identified through this research. The present report summarizes the findings on socioeconomic and cultural impacts of large-scale projects studies in the form of an updated annotated bibliography. The report goes beyond this goal because the amount of research, readings and analysis gave the research team the opportunity to drawn conclusions on impacts by sector (hydroelectric/ dams, mines, pipelines, etc.) and more globally.

The ultimate goal of this project is to increase evidence on mega-project-related socioeconomic and cultural impacts to support policy decision-making, especially pertaining to environmental impact assessment.

A research team formed by university resources and Health Canada's research capacity has conducted the research process.

1.3 The 1993 Annotated Bibliography on Socio-Economic Impacts of Canadian Mega-Projects

In 1993, five researchers from different Canadian universities produced the first annotated bibliography on the impacts of Canadian mega-projects. The Centre for Human Settlements, University of British Columbia provided guidance on the research and was responsible for disseminating the findings.

The study presented the *"results of a comprehensive and systematic effort to identify and review all post-projects studies of the socio-economic impacts of Canadian natural resource mega-projects on the existing local or regional residents"* (Knight et al., 1993). This bibliography included information of public domain and unpublished or non-public domain literature throughout Canada. The study examined Canadian mega-projects starting immediately after the Second World War until 1993.

The researchers were interested in natural resource mega-projects because they were - and still are- among the largest investment decisions made in the Canadian economy (Knight et al., 1993).

Research findings concluded that Canadian mega-projects reported low economic benefits for communities. The study highlighted that the fact that even if these projects mobilized vast amounts of money, created new jobs and were perceived as levers for regional economic development, some of the benefits promised to local communities never materialized (Knight et al., 1993). According to the study, which examined 36 mega-projects, most of the promises with respect to training, recruiting, salaries and local purchases were not kept once the project was approved.

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[2] Knight, N., P. Boothroyd, M.Eberle, J. Kawaguchi, C. Gagnon (1993). *What we know about the socio-economic impacts of Canadian Megaprojects: An Annotated Bibliography of Post-Project Studies.* Centre for Human Settlements, University of British Columbia

An impressive number of large-scale projects started in the last two decades in Canada, but despite the general consensus on the importance of assessing and monitoring social, cultural and economic impacts, our research found a very low number of follow-up studies[3]. However, alternative sources of information such as community-based studies, government reports and monitoring, doctoral and master's thesis and case studies were available in libraries and web sites. Access to Internet technology and search tools facilitated the availability of the information.

The differences between both studies will be reported in greater detail in the section of this report dedicated to the discussion, but it seems that progress has been accomplished in regulatory processes, mainly through increasingly demanding environmental assessment requirements and increasing requirement for post-project monitoring.

Also, over the last few decades, companies have become increasingly aware of their Corporate Social Responsibility (CSR). As we have been able to capture in this research, they tend to work more collaboratively with communities and other stakeholders to improve quality of life and wellness. This process has been complemented with new approaches and concepts that tend to reinforce values aimed at protecting citizens and communities from negative social, economic and cultural impacts. Among them, citizen participation is increased within processes of impact assessment and there is a higher awareness of inadequate management practices for environmental consequences.
Also, over the past few decades, there appears to be a trend among local host and Aboriginal communities of expecting opportunities and benefits as a result of these projects. More specifically, there are demands to increase participative governance with more transparency from decision-makers, private and public, as these stakeholders have shown over time that they are not always able to reach their goals or fulfill their promises.

[3] A five years follow-up on social impacts of new Alcan smelter is available on line for example. See www.uqac.ca/msiaa

2. CONCEPTS AND DEFINITIONS USED IN THE PRESENT STUDY

2.1 What are Social, Cultural and Economic Impacts?

Based on existing definitions of social, cultural and economic impacts (Burdge, 2004; 2006; Vanclay, 2002; Knight et al., 1993; Armour, 1990; ICGPSIA, 1994; Gagnon 2001, 2002) the following definition was adopted in the context of this research:

> *Social impacts, or effects or consequences refer to positive or negative changes caused by the construction or the exploitation of development projects that lead to changes to individuals and communities.*[4]

These effects can be direct, indirect, cumulative, and synergic, with varied duration and variable territorial boundaries (Gagnon, 2003).

Sometimes, the literature distinguishes between "effects" and "impacts". While "effect" is considered as an observable and measurable consequence of a project or intervention, the use of the term "impact" implies additional assessment that integrates different components such as intensity of the effect, geographical scope, duration, frequency, irreversibility of the effect, component sensitivity of the affected milieu, social valorization of the component, etc. All those components can be combined to make a statement about the impact in terms of importance or significance[5].

It is important to distinguish clearly between the source of the impact and the impact itself. For example, a road built to facilitate the access to a new project cannot be considered as a social or economic impact of a project. The social, cultural and economic impacts or effects may be for instance, more outsiders using Aboriginal lands because of the new roads, changes in hunting activities for Aboriginal peoples, disruptions of traditional way of life because of the new incomers, dietary changes or impoverished diet.

It is recognized that the assessment of socio-economic and cultural impacts of development projects is complex and that there is no standard definition[6]. However, studies on these impacts usually consider the following components: changes in employment levels in the region and nearby communities; the impacts of the project on local industries, impacts on local and regional services and infrastructure, changes in Aboriginal populations' traditional ways of life, impact on the local population's quality of life, demographic disruption, changes in land and resource use, impacts on social connectedness, etc. (Vanclay, 2002; Knight, et al. 1993; Armour, 1990; ICGPSIA, 1994; Goldsmith and Hildyard, 1984; Health Canada, 2004; Gagnon, 2001; Enhealth and Commonwealth of Australia, 2001; Burdge, 2004).

Assessment of social, economic and cultural impacts is usually done in the context of a Social Impact Assessment (SIA). SIA is linked to Health Impact Assessment (HIA) because it provides information that is needed to assess a project's impacts on social de-

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4 This definition is based on Burdge's definition (2006) stating that *"Social impacts (or effects/consequences) refer to changes to individuals and communities due to a proposed action that alters the day-to-day way in which people live and generally cope as members of society"*.

5 The use of these terms in national legislations also varies. CEAA uses the term environmental effect to describe consequences of the projects rather than impact.

6 It would be easier to predict ecological biophysical impacts of a project than its social and economic effects (Meredith, 2000).

terminants of health[7]. As an illustration of the inter-relation between social impacts and health impacts a large, international study on dams has shown that these projects have a broad range of social impacts. Their construction has resulted in the relocation of millions of people all over the world. In the great majority of cases, the economic well-being and health of those affected have declined after relocation. Existing communities have been displaced, often dispersed, causing people to lose their social support networks, as well as their livelihoods and ways of life (Goldsmith and Hildyard, 1984). Social and community health may also be affected negatively when individuals face a loss of cultural identity and quality of life, social disruption and violence, and a breakdown of community and family support networks. Socio-cultural well-being can further be affected by increasing stress, anxiety, and feelings of alienation (Health Canada, 2004, Canadian Handbook on Health Impact Assessment).

The present Annotated Bibliography looked at social, economic and cultural impacts that were commonly mentioned in the literature. However, researchers identified sector-related impacts or created new categories when impacts were not already inventoried. An example is the impact "emerging social initiatives or practices to minimize negative impacts". The following list, which was applied for each sector, summarizes the observed impacts:

- Changes in employment levels in the region and nearby communities
- Impacts on local industries and economic development
- Impacts on local and regional services and infrastructure
- Changes on Aboriginals' traditional ways of life
- Changes in the local population's quality of life, as well as demographics
- Changes to land and resource use
- Changes in the use or loss of Traditional Ecological Knowledge
- Social/psychological impacts of the project on surrounding communities
- Impacts of project's workers on communities
- Impacts on women and families
- Impacts on workers and working conditions
- Impacts on health, health care and safety issues
- Impacts of project decommissioning and closing
- Emerging social initiatives or practices to minimize adverse impacts
- Evolving relationships between companies and Aboriginal peoples

2.2 What are "Large-Scale Projects" and "Mega-Projects"?

The Annotated Bibliography of 1993 used the concept of "mega-project", which was defined as a project requiring investments of approximately 1 billion or more (in 1992 Canadian dollars), including associated infrastructure. Projects considered also were in the natural resources industry and were constructed since the Second World War (Knight et al., 1993).

Although the definition of "mega-project" is quite variable, the amount of investment is, in most cases, the criterion to determine whether a project can be defined as a mega-project or not. They are in all cases very large investment projects, in the order of millions of dollars.

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7 HIA is defined by different agencies in different ways, but there is a general consensus around a broad definition, published in 1999 as the 'Gothenburg Consensus Paper' by the WHO Regional Office for Europe. That definition is: *"a combination of procedures or methods by which a policy, program or project may be judged as to the effects it may have on the health of a population." (Commonwealth Department of health, HIA Guidelines, 2001)*

The US Federal Highway Administration defines mega-projects as major infrastructure projects that cost more than US$1 billion, or projects of significant cost that attract a high level of public attention or political interest because of substantial direct and indirect impacts on the community, environment, and budgets. "Mega" also describes the size of the task involved in developing, planning, and managing projects of this magnitude. The risks are substantial (Flyvbjerg, 2006). The same author also points out that: "*Other projects that cost less than $1 billion are sometimes also called mega-projects; it depends on the context, because a $500 million project in a medium-sized town may be considered 'mega', whereas, this would not necessarily be the case for a similar-sized project in a major world city*".

Following this rationale, in the context of this project, the perspective taken is not based on the investment but on the impact that a project may have on the local and regional economy as well as on possible social and cultural impacts on the communities. In this report, the research team uses either the term large-scale project or mega-project, keeping the limitations of both concepts in mind.

3. METHODOLOGICAL PROCESS

The literature review leading to the present Annotated Bibliography has required extensive searches in various databases and other sources. The main goal was to identify follow-up studies, academic articles, theses and case-studies, community-based and government reports, and any other document that could contribute to the knowledge of Canadian large-scale projects' socioeconomic and cultural impacts. Certain parameters had been settled before the beginning of the research as described below:

a) Time Boundaries: documents produced or published between 1992 and 2006[8];
b) Spatial Boundaries: Canada, all provinces and territories, as balanced as possible;
c) Thematic Boundaries: social, economic and cultural impacts of development projects;
d) Number of projects/references: as many as the research team could identify. Thirty-six projects were identified in the 1993 Annotated Bibliography (Knight et al., 1993).

Health Canada's Scientific Library conducted a first literature search in April 2006 for the research team. The scientific journal and abstract databases searched were:

- Canadian Research Index
- CSA Social Science Subject Area
- Current Contents
- EconLit
- PsychInfo
- Scopus
- Social Science Index

Later, the following databases were consulted as well and provided mostly academic resources:

- Science Direct
- Wilson Web
- OVID

The search focused on large-scale projects (or mega-projects) in Canada, using the keywords listed below either alone or in-groups of two or three, in French and in English. The use of the word "Canada" was particularly important when going into databases with international publications.

Mots-clés	**Key words**
Projet de développement	*Development Project*
Projet de ressources naturelles	*Natural resource project*
Mégaprojets	*Mega-projects or natural resource mega-projects*
Projet à grande échelle	*Large-scale project*
Impact(s)	*Impact(s)*
Impact(s) social/sociaux	*Social Impact(s)*
Effet(s)	*Effects*
Environnement(al)	*Environment(al)*

[8] Since there was the Annotated Bibliography from 1993, the research team decided to target the period starting in 1992 and until 2006.

Études de suivi	*Follow-up study (studies) or Monitoring*
Qualité de vie	*Quality of life*
Bien-être	*Well-being*
Habitant	*Resident*
Santé	*Health*
Social	*Social*
Économique	*Economic*
Culturel	*Cultural*
Mode(s) de vie traditionnel(s)	*Traditional way of life*

The search was also conducted introducing keywords related to project areas such as:

Barrages	Dams
Hydroélectricité ou projets hydroélectriques	Hydroelectric projects
Sables bitumineux	Oil sands
Mines	Mining / Mine
Terminal méthanier (ou Gas Naturel Liquifié)	LNG Terminals

Phase I of the search revealed that despite the large amount of databases consulted, few follow-up studies publications were found. Consequently, in Phase II, the research team examined the Canadian Environmental Assessment Agency database (www.ceaa-acee.gc.ca), where all the projects that have been subjected to the federal environmental assessment process since 1995 can be found. The CEAA database presents by year, by province and by sector of activity the projects as well as links to complementary information. After review, a number of projects were selected for possible analysis.

Moreover, CEAA publishes a yearly series of reports on subjects linked to environmental assessment in Canada. Some of these documents specifically targeted the follow-up and monitoring of natural resource projects. These papers were most useful as a source of relevant and valid data when searching for large large-scale natural resource projects in Canada.

However, at the end of this search, there were still very few follow-up studies available for analysis. Therefore, it was decided to open the search to all documents that would have socio-economic impact information on large-scale projects. This would allow the research team to obtain more relevant information on large-scale projects and industry sectors.

In phase III of the study, literature that could complement information on the identified projects or on a relevant industry sector was sought via the Internet, using mainly the *Google* search engine and key words listed above. This search allowed the consultation of many documents, mainly from community-based and governmental sources.

Reports from the following organizations were retrieved from their websites:

- Environmental Mining Council of British Columbia (www.ecbc.com)
- Mines and Communities (www.minesandcommunities.org)
- Yukon Conservation Society (www.yukonconservation.org)
- Mining watch (www.miningwatch.com)
- Oil and Sands Watch (www.oilandsandswatch.com)
- Western Mining Action Network (www.wman-info.org)
- North South Institute (www.nsi-ins.ca)

- Centre for Indigenous Environmental Resources (www.cier.ca)
- BC and Yukon Chamber of Mines (http://gateway.cotr.bc.ca/BritishColumbia/BC&YukonCh.asp)
- Pembina Institute (www.pembina.org)
- Canadian Arctic Resources Committee (www.carc.org)
- Library and Archives Canada (www.collectionscanada.ca)
- McKenzie Valley Environmental Impact Review Board (www.mveirb.nt.ca)
- Indian and Northern Affairs Canada (www.ainc-inac.gc.ca)
- Institute of Environmental Monitoring and Research (www.iemr.org)
- The Government of the Northwest Territories (www.gov.nt.ca)
- Le Bureau d'audiences publiques sur l'environnement BAPE (www.bape.gouv.qc.ca)

These organizations are government agencies, community-based organizations, environmental or citizen's groups working on environmental and social issues in specific project sectors. Even if most of them are dedicated to environmental issues in Canada, some look at the same issues at the international level.

Databases from the following university libraries were consulted as well:

- McGill University
- Concordia University
- Université du Québec à Montréal
- University of Saskatchewan
- University of Calgary and associated collections at the Arctic Institute

University sites provided references on PhD and Master's theses essentially centered on one project, for example a mine, a hydro-electrical project or an aluminum smelter. They also provided information on other databases specific to the issues of interest of this research.

Sites of international and national environment-related organizations were also explored:

- International Association for Impact Assessment (www.iaia.org)
- Millennium Ecosystem Assessment (www.maweb.org/en/index.aspx)
- WHO Health Impact Assessment (HIA) (www.who.int/hia/en/)
- Quebec Association for Impact Assessment (www.aqei.qc.ca)
- Ontario Association for Impact Assessment (www.oaia.on.ca)
- Institute of the environment (University of Ottawa) (www.ie.uottawa.ca)
- McMaster Institute of Environment and Health (MIEH) (www.mcmaster.ca/mieh/)
- McGill School of Environment (MSE) (www.mcgill.ca/mse/)
- McGill Center for Indigenous Peoples' Nutrition and Environment (CINE) (www.cine.mcgill.ca/index.htm)

The SEFA, a database operated by the Quebec Association for Impact Assessment was of particular interest for this project. This database contains about 700 references to follow-up studies published by proponents and developers. NGOs or university researchers, and the reports were catalogued by sector of activity, which facilitated the search.

The Library of Hydro-Quebec, a crown corporation providing energy to this Canadian province was consulted as well. A number of follow-up studies and other research on social, economic and environmental impacts of their hydroelectric projects were available

for consultation. These reports have often been conducted as part of the requirements from the federal or provincial governments.

Health Canada's environment assessment coordinators and advisors provided useful information about projects and studies. Also, there were other contact-persons who helped the research team to identify sources of data. Among them, Dr. Bram Noble, specialist in social, economic and health issues related to natural resource development projects, provided the research team with a number of useful references and publications on the topic.

A few projects from the previous bibliography (e.g. Hibernia, La Grande) were used again in this study. This is mostly due to the fact that more follow-up studies were conducted on these same projects after 1993 giving us a long-term perspective of their impacts.

Finally, other sources also provided clarification and helped us in identifying appropriate definitions for the concepts used in the present research, such as social, economic and cultural impacts. The references used for this purposes are listed at the end of the report.

Table 3.1 Distribution of Specific Projects by Sector and by Province

Province/ Territory	*Hydro-electric*	*Mining*	*Oil sands – oil*	*Gas, LNG and Pipelines*	*Aluminum*
Alberta			EnCana Syncrude		
Newfounland and Labrador		Voisey's Bay	Hibernia		
Quebec	SM-3 Toulnustouc La Grande Eastmain-1 Perimbonka	Raglan			Alcan
North West Territories		Ekati Diavik			
Saskatchewan		McArthur River			
Ontario		Musselwhite			
Total	**5**	**6**	**3**	**0**	**1**

Table 1 shows the projects on which post-project information was found either in the form of follow-up studies, case studies or sector-specific studies such as a mining sector

study. Hydroelectric projects in Quebec are monitored by the project proponent. Diamond mines companies also monitor their projects in the North West Territories. Independent follow-up committees monitored Alcan, an aluminium smelter project in Quebec for 5 years. Hibernia, an offshore oil development project in Newfoundland and Labrador was also the subject of much research.

4. THE SCOPE AND NATURE OF THE LITERATURE IDENTIFIED

More than 50 studies were identified during the research process. The documents identified included follow-up studies as well as other post-project studies. As we can see in table 4.1, mining is the sector in which most studies were identified. It is followed by the oil sands and hydroelectric sectors with an equal number of studies. It should be taken into consideration that the significant number of hydroelectric follow-up studies from Quebec is mostly due to the fact that access to such information was easier in this province.

Probably due to its relatively recent exploitation, the oil and oil sands sector is lacking in follow-up studies on projects as in the case of the mining and hydro-electricity sectors. Information found was more often sector-related than project-related. The same occurred with the pipelines and LNG projects. In fact, LNG projects are a very new occurrence in Canada. From eight projects under regulatory process, only three have finished the environmental assessment process and received federal and provincial approvals (Natural Resources Canada, 2006). This means that no follow-up studies can have been done on the sector at this point in time. However, the EIS process has revealed interesting information on potential social and economic potential impacts related to the LNG sector. These findings will be discussed later in the report. Regarding the source of the studies, academic research seems to be the main producer of documents, followed by proponents or industry, government and then stakeholders.

Table 4.1 Distribution of Identified Studies by Study Source and Sector

Sector	*Academic*	*Proponent/ Industry*	*Stakeholder*	*Government*	*Unknown*	*Total*
Hydroelectric	2	11	0	0	0	**14**
Mining	6	2	7	7		**22**
Oil sands – oil	6	2	3	3		**14**
Gas, LNG and pipelines				3	0	**3**
Aluminum	4					**4**
Total	**18**	**15**	**10**	**13**	**0**	**57**

This search process shed light on the type of research that has been conducted since the early nineties in Canada. **Monitoring of socio-economic and cultural impacts is not yet a regular practice in the Canadian context, therefore follow-up studies are still very rare and difficult to find.** However, the requirement of this type of study is rapidly increasing and it is expected that it will become a regular practice for every large-scale project and that the reports will need to be available for consultation by interested stakeholders. Mines like *Diavik* or *Ekati* that started operations at the end of the nineties

as well as hydroelectric projects in Quebec have already produced some follow-up studies. More details will be provided in the sections of this report where both sectors are addressed.

Interestingly, academics and governmental specialists as well as community-based organizations have tried to fill in the gap. A high number of the studies that our research identified were produced by the above-mentioned organizations. A debate around the controversial benefits of large-scale projects for communities and in particular the need to know if clauses and promises included in economic benefit agreements were kept may be the reason why specialists and community-based stakeholders examined impacts.

The industry has also realized that it is important to start keeping tabs on the changes occurring in local communities as early as the construction phase of a project. The NWT and Nunavut Chamber of Mines produce regular reports on the social impacts and Aboriginal participation in the mining industry of these territories. Similarly, for the past 25 years Hydro-Quebec has conducted follow-up studies on the impacts of its hydroelectric infrastructures (Hayeur, 2001).

Federal and provincial departments are increasingly participating in monitoring social, economic and cultural impacts of large-scale projects. The Government of the Northwest Territories (GNWT), Indian and Northern Affairs Canada, and Environment Canada, among others, have released regular reports. The GNWT seems to have a strong commitment in examining impacts of large-scale projects in the Territories, in the mining sector in particular. A report entitled "Communities and Diamonds" was published in 2005 as a requirement under three Socio-economic Agreements (SEAs) signed with three mining companies (GNWT, 2005). Also, new practices in social impacts monitoring are becoming more and more regular. Besides governments and companies, monitoring and follow-up studies are also conducted by public watchdog organizations such as the Independent Environmental Monitoring Agency that reports on impacts of the Ekati diamond mine[9]. In Quebec, citizen-based committees were set-up to monitor the impacts of an aluminum plant managed by the company Alcan. Researchers from the closest university to this project were part of those committees during a five-years period. Findings of the follow-up studies are now available (Gagnon, 2002, 2003).

The different industry sectors are presented below. Each presentation includes a definition of the sector, an overview of the type of studies found and the social, economic and cultural impacts identified in the literature.

4.1 Mining Industry

According to Industry Canada the mining sector "comprises establishments primarily engaged in extracting naturally occurring minerals. These can be solids, such as coal and ores; liquids, such as crude petroleum; and gases, such as natural gas." The term *mining* is used in the broad sense to include quarrying, well operations, milling (for example, crushing, screening, washing, or flotation) and other preparation customarily done at the mine site, or as a part of mining activity. As two other sections of this study are dedi-

[9] This is an independent agency set up under the Environmental Agreement negotiated in 1996, and consists of seven directors appointed by Aboriginal organizations and federal departments. BHPB Diamonds Inc. provides the funding for the Agency and will be responsible for it over the lifetime of the mine (Independent Environmental Monitoring Agency, 2007).

cated to oil and gas sectors, this section will focus on solid mineral mines (gold, diamonds, nickel, etc.).

The literature reviewed for this research reveals that there is a growing interest among all stakeholders to track changes brought about by projects. This literature was produced by governmental sources, academia, companies and sector chambers, and community-based organizations. As the results show, while the reports produced by the government-based organizations or companies reports tend to focus more on the positive impacts of mining such as the economic benefits, those produced by community-based organizations as well as academia are more likely to focus on the negative impacts of mining on local populations and the environment.

The mining sector has been more scrutinized in terms of socio-economic and cultural impacts, with a particular focus on Aboriginal communities. This would mainly be due to the fact that, since the beginning of the 1990's, mining activities have mostly occurred in largely remote areas where only Aboriginal people were living (Miningwatch, 2001).

Overall, studies still focus largely on the biophysical environmental impacts of mining but there is an increasing awareness of the influence of mining activities on the surrounding communities from a socio-economic point of view. As stated in a recent publication of the International Development Research Centre and the World Bank (IDRC, 2001: p.2) traditionally, *"most research has focused on the macroeconomic effects, determining the benefit (or lack thereof) to the mining sector's impact on the traditional economy"*. The same publication highlights the fact that there is little analytical research on the local or regional effects that focus on socio-economic and, especially, environmental effects. This is particularly important given that the mining sector has had to deal with the phenomenon of "Boom towns" or mono-industrial cities, built solely for the purpose of mining exploitation. On the other hand, some mining companies opt for camps around the site separate from surrounding communities. These two different options lead to different social impacts because of the different living conditions for the families of the workers, the workers themselves and the host communities.

Increasingly, companies have to work with Aboriginal communities when sites are located on traditional lands (Kuyek and Coumans, 2003; Natural Resource Canada, 2003). This has been recognized at the international level and Aboriginals and companies have been consulted by the International Council for Mining to deal with these issues (Render, 2005).

Aboriginal communities have been particularly active in grouping themselves together in assemblies. The negative experiences of these communities from similar past projects (hydropower, oil/gas activities) can explain the shift in their attitudes towards large-scale projects, from reactive to proactive (Render, 2005). Health and social concerns around older operations make it difficult for both promoters and community members to develop positive relationships. Proactive attitudes from communities range from complete opposition to the project to conditional support. Some Aboriginal Nations have developed an endogenous vision of their development that allows them to negotiate the terms and conditions of project development and in some cases even lead them to become partners. Other Nations are still going through the process of developing their own vision of what would be an appropriate development for their communities.

As it occurs as well in other sectors, impacts of mineral exploration and development are still only considered in isolation while they should be looked as a whole (EMCBC, 1998).

Overall, positive socio-economic impacts derived from the development of mining mentioned in the literature are related to: increased employment, increased level of education and generation of new economic revenues for governments and with the arrival of the mining industry, a migration of new workers may allow for a revival of the community (EMCBC, 1998; Natural Resource Canada, 2003). Aboriginal communities have also been receiving more benefits from mining. Reports mention direct and indirect employment, a growing business capacity, returning to school or increasing training opportunities, higher incomes, development of mine-related businesses, etc. (INAC, 2003; NWT and Nunavut Chamber of Mines, 2005).

Negative impacts quoted in the literature are related to an increase in social problems in local communities such as family violence, alcohol and drug abuse, neglect of children, violent crimes, stress on infrastructure and services, bust and boom effects (GNWT, 2006; Yukon Status of Women Council, 2000). Further details on these impacts are provided in the following sections.

4.1.1 Changes in Employment Levels in the Region and Nearby Communities

Literature on mining highlights employment as the main positive social and economic impact of this industry. Corporate literature provides data on the benefits it represents for provincial and territorial and regional economies. Diamond mining, for instance, with 19,742 person/year of employment represented 89% of the total employment in NWT between 1991 and 2004. Exploration and manufacturing also contributed to the creation of employment (4.0% and 6.9% respectively) (NWT and Nunavut Chamber of Mines, 2005). In Saskatchewan, uranium mining is considered the main catalyst of economic development for communities (Parsons and Bars, 2001).

Increased personal income and reduced social assistance payments as well as an important growth in the number of people enrolled in post-secondary education programs are some of the reported positive socio-economic effects of the diamond mining industry in the NWT (NWT and Nunavut Chamber of Mines, 2005; GNWT, 2006).

However, employment increase in the area of the project is not generally equal for all groups. Non-local people often get hired in a higher proportion than local residents (EMBC, 1998) Nevertheless, it is recognized that in recent years, pressure from Aboriginal communities and socio-economic agreements, have pushed the companies to hire more Aboriginals workers, sometimes prior to the beginning of the impact assessment (Cleghorn, 1999; Benoît, 2004; NWT and Nunavut Chamber of Mines, 2005; GNWT, 2006). In the early 1990s, 12% of workers in the mine sector were Aboriginals. Recently, Aboriginal workers have accounted for approximately 30% of the workforce. 27% of employees working in Ekati mine were Aboriginal and 38% of workers in the Diavik mine[10] (including contractors) were Aboriginal according to the NWT and Nunavut Chamber of Mines report of 2005.

Impact Benefit Agreements (IBA's) or Impact Management Agreements (IMA) are private and confidential agreements signed between the company and the Aboriginal groups who historically shared the land on which the mines are to be located. They usually include provisions for employment and business opportunities and a form of cash payment. They are also referred to as Participation Agreements (PA's) (Sosa and Keenan, 2001; Parsons and Bars, 2001; Gibson and Klinck, 2006).

[10] Both are diamond mines located in the Northwest Territories.

A case study on the Raglan mine in Nunavik (Benoît, 2004), assessed the impact of the agreement signed between the Falconbridge corporation, the Aboriginal communities on the site and the government. The agreement established $ 75 million in compensation to the Inuit as well as the promise of giving 150 out of the 800 jobs to Aboriginals. These agreements often offer assurance to the communities that they will effectively get these jobs (Gibson and Klinck, 2006). What remains at stake is the fact that the positions filled by Aboriginals are not highly skilled and should they want to do these ones, they would have to get additional training.

Employment in mining does not always fit Aboriginal traditional livelihood, which may imply that some workers will not want to work in order to avoid suffering major impacts to their way of life (EMCBC, 1998). In effect, work schedules in certain seasons are not compatible with social and family relations, and conflict traditional activities. All these aspects may be deterrents for Aboriginals to keep their position in the mining sector. In Ekati diamond mine, after six months of production, the mine lost most of the Lutsel K'e people employed there (only 3 of the original 22 were still employed in 1999) because of inadequate training and development programs, the lack of native food, substance abuse problems, etc.). Companies have made more efforts recently to better account for these aspects of the traditional Aboriginal lifestyle (C. Cleghorn, 1999; Natural Resource Canada, 2003; Macharia, 2005). Recent reports indicated that the situation has been reversed for Ekati, where Aboriginal employees represented 27% of the work-force in 2005 (NWT and Nunavut Chamber of Mines, 2005). There is increasing sensitivity among companies of the need to adapt working conditions to better accommodate certain aspects of Aboriginal lifestyles. For example, Falconbridge has made several changes to the work environment after seven years of operation of the Raglan mine (McIntosh, 2005).

4.1.2 Impacts of Project Workers on Communities

Often, the arrival of new migrants has many impacts on the host communities as identified in the literature. Communities are aware and concerned about potential impacts (McIntosh, 2005). In order to limit these, some companies have chosen to fly their workers to the mine so that they do not reside in the neighboring communities. "Fly-in/fly-out" (term used) can be seen positively or negatively. On the positive side, communities are not as impacted by the new workers since they do not come to the surrounding communities outside of their working hours (Ritter, 2001; Natural Resource Canada, 2003). On the other hand, frequent traveling increases the stress on workers, which consequently may result in an increase of the prevalence of accidents on the workplace. Long distance commuting may be very stressful for both workers and families (Kuyek and Coumans, 2003). Also, if workers are flying in, the host communities do not benefit economically from the increased need for service and good provisions.

In similar projects, the solution has been to favor local Aboriginal employment. Aboriginal workforce skills can be upgraded with proper training programs, as was the case in recent projects in the mining industry as well as in the oil sands industry (Brisbois and Saunders, 2005). IBAs often stipulate that there is a quota for employment of local/Aboriginal residents, as in the Raglan Agreement (McIntosh, 2005). Local people can eventually make up most of the work force, which allows them to benefit adequately from economic development of the area and there is also an increase in community services and limited external disturbance (Natural Resource Canada, 2003).

Another negative indirect impact raised in the studies is the increase in poaching/hunting because of the increased accessibility to the areas, which may cause conflicts with Aboriginals when the poachers are newcomers to the area. Often these conflicts alter their subsistence lifestyle with a subsequent shift in values, social networks, and loss of their traditional knowledge. This type of disturbance is considered as one of the most significant impacts of road building as the territory opens up to non-Aboriginals (EMBC, 1998; Gibson and Klinck, 2006).

Outside workers can also bring in social problems such as drug trafficking and prostitution and consequently sexually transmitted infections (STI). The increase of STIs has been documented in the NWT's reports on projects impacts (GNWT, 2006; 2007).

On the other hand, the employment of local workers may also create imbalances in local communities. In effect, a growing gap between high and low-income earners can create social and economic inequalities such as were observed in Yellowknife since the diamond mines started production (NWT, 2006). The NWT report entitled "Communities and Diamonds" (2006) stated that despite the improvement since 1997 in the percent of families with low income, the rise in high-income earners was greater than the drop in low-income families (p.33).

4.1.3 Changes in Aboriginals' Traditional Ways of Life

Mining activities occur increasingly in isolated areas where communities are mostly Aboriginals. While non-Aboriginal mining workers may be highly mobile and move after the end of the exploitation of the mine, First Nations want to preserve their traditional culture and values for themselves and for future generations and will be less likely to move.

Preliminary monitoring on the Ekati mine has shown that industrial development has created a great deal of anxiety for the whole community and has had definite impacts on the Dene way of life (Cleghorn, 1999). It is recommended in some reports that companies help people to make the transition from a strictly traditional life-style to a more modern way of life, without losing their traditional essence (Natural Resource Canada, 2003, EMCBC, 1998; Kuyek and Coumans, 2003).

Aboriginal communities are also affected by the displacement that occurs when settlers move in with the beginning of the mine exploitation. The in-migration of transient workers into mining areas can create disruptive economic and cultural relationships between communities.

4.1.4 Impacts on Women and Families

It is reported that women are particularly affected by mining, this can be due to family disruption, violence, stress, and substance abuse linked to having a relative (often the spouse or the sons) working in mining (Yukon Status of Women Council and Yukon Conservation Society, 2000; Status of Women Council of NWT, 1999; CCSG Associates, 2004). During project consultations and in post-project studies it was observed that women expressed concern about the disruption of marriage and family life, increased responsibility at home, spouses' alcohol abuse, sexual harassment in the workplace and lack of job opportunities (EMCBC, 1998). In fact, gender is considered as a key indicator of well-being (Gibson and Klinck, 2006). Women were also concerned by social mobility; and whether or not more educated young people would be willing to work in mining (Archibald and Crnkovich, 1999).

There are now instances in which women are more active in monitoring because they are more aware of the impacts mining can have on their children and their community (CCSG Associates, 2004). Hence, they can do the monitoring themselves or ask for it to be done by the appropriate authorities.

As paradoxical as it may appear, and being aware of the negative impacts that mining can bring to their lives, women increasingly demand more employment opportunities and more skilled positions in mining. They feel left out of mining activities and want to take a more active role in it. For example, they want equal chances and training opportunities in conventional mining jobs rather than the traditional activities usually offered to them (e.g., cooking, cleaning) (Natural Resource Canada, 2003; CCSG Associates, 2004).

4.1.5 Impacts on Local Industries and Economic Development

The economic development of the community linked to the arrival of mining implies an increase of economic growth and business economy. In the NWT, for instance, during the period 1996 to 2004, when the impact of the diamond industry was the most significant, the NWT and Nunavut Chamber of Mines (2005) reported that the NWT economy grew from $2.3 billion to $4.1 billion.

However, economic growth does not necessarily mean economic stability. Mining activities rely heavily on the market and can be temporarily shut off if prices are too low (EMCBC, 1998). The Yukon Status of Women Council and Yukon Conservation Society Report (2000) pointed out the effects of the boom and bust mining cycle, particularly on women and children. A former mine laborer interviewed for the occasion expressed the impact in the following way:

> *When things are up and running, there's a lot of economic activity. When shutdowns occur, people have to adjust their lifestyles and maintain payments taken on when expecting a good paycheck. People have moved to the communities, bought homes, and then can't sell them once the mine shuts down.* (YSWC and YCS, 2000).

Therefore, it is recommended in some reports that communities have to plan economic development keeping in mind that the mine will close (EMCBC, 1998; Kuyek and Coumans, 2003). With appropriate education and skill development, local communities would be more likely to keep their economic dynamism (Natural Resource Canada, 2003). An essential part of this is economic diversification with goods and services that would be independent from the mines. Mining companies can successfully help to diversify the economy of a region by assisting in the development of local and -where warranted-, Aboriginal enterprises (Natural Resource Canada, 2003). A good example of such diversification is the city of Sudbury (Richardson, 1999).

Small business development has to be taken into account as well. These businesses are indirectly linked to the mines and may help communities to diversify their economic activities. Overall, the literature reviewed indicated that Impact Benefit Agreements have positive outcomes for the Aboriginal communities that have the opportunity to sign them (Kuyek and Coumans, 2003). In an attempt to support Aboriginal entrepreneurship, in particular in their own communities, two government programs are available:

- Community Futures (Industry Canada)
- Aboriginal Economic Development Program (Department of Indian and Northern Affairs)

It is reported in the reviewed documents that Aboriginal business capacity was strongly developed in some locations due to the mining industry. The Rae Band close to the diamond mines in the NWT is cited as an example of an Aboriginal community that: *"is actively working to take advantage of the opportunities presented by the diamond industry and based on the indicators, is having a great deal of success"* (NWT and Nunavut Chamber of Mines, 2005). The same group employed close to 200 band members in its five firms.

Communities do not need to be tied to the mine to survive. Increasingly, Aboriginal communities express their concern about their future and want to have meaningful input into decisions related to the mining projects and to the development of their communities (EMCBC, 1998).

4.1.6 Impacts on Health, Health Care and Safety Issues

Numerous health impacts have been associated with mining: cancer, physiological problems due to noise pollution or various emissions (EMCBC, 1998; CCSG Associates, 2004). In fact, one may experience impacts from working in mining or from living close to a mining production site. For example, fluids used for certain mining activities (mining, tailings etc.) can leak into the river system and cause contamination / pollution. The decrease in water quality is the most common effect reported. Noises from the heavy equipment also are reported to cause disturbance as well for both residents and animals (EMCBC, 1998). These impacts have indirect health effects such as the increase of stress due to increased noise levels.

Mental health is another element under great threat while working in mining. The uncertainty and intense workload demands inherent in most mining operations can increase susceptibility to mental health concerns. The separation from family and friends while working and the inability to get away from the working site can create stress with consequences on workers' mental health. Such stress often results in destructive behaviors like substance abuse. In order to deal with it, appropriate services need to be available to both workers and their families' onsite and in the communities (Natural Resource Canada, 2003; GBC, 2005, GNWT, 2006). Overall, some authors' point of view is that health effects are not sufficiently documented (Kuyek and Coumans, 2003).

Literature reviewed has pointed out that appropriate mitigative measures could help to reduce many of the impacts or even avoid them. These measures may be of a physical nature or they may be behavioural modifications. They may be obtained through a consultation process.

4.1.7 Impacts of Project Decommissioning and Closing

Mining activities have a life cycle and once mine exploitation is no longer profitable, operation is terminated. Environmental or feasibility studies rarely take into account the fact that there will be a 'life after the mine' and that the communities may not have made long-term plans to be able to survive the closing of the mine.

Companies are encouraged to set up training programs for skills that will be transferable after the closure of the mine (Natural Resource Canada, 2003). Company programs should be implemented before the opening of the mine and adjusted throughout its life to integrate mining-independent activities into the communities (Natural Resource Canada, 2003).

4.2 Hydroelectric Industry

Since the 1990's, Quebec has been the province in which the various impacts of hydroelectric development have been the most monitored and studied. In this province, 95% of energy produced is of hydroelectric origin and development is still ongoing.

Since the beginning of hydroelectric development in Canada, we have observed a shift in the type of monitoring studies conducted. Increasingly, the follow-up plans include monitoring of the socio-economic and cultural impacts of development as opposed to focusing solely on biophysical environmental components.

Lavallée and André (2005) indicate that it is not easy to gain access to follow-up studies, especially those pertaining to socio-economic impacts. This could explain why most of the data gathered in the context of this research came from Hydro-Quebec. Despite the 'provincial' bias, the findings show a fairly global overview of hydroelectric development in Canada. Previous research at the national level has provided similar results (Rosenberg et al. 1997). The impacts of hydroelectric projects are described in the following paragraphs.

4.2.1 Changes in Aboriginals' Traditional Ways of Life and Changes in Land and Resource Use

One of the important components of hydroelectric development - if not the most important- is the flooding of a significant part of the land, which is often used for traditional hunting, fishing and trapping activities by Aboriginal peoples. As well, the flooding of land can cause the loss of sacred land or of burial grounds. In the 1980's companies realized that the biophysical impacts such as the loss of the flooded land brought much distress to the affected communities from a cultural point of view. Since then an increasing number of studies focus on social, cultural and/or economic consequences of the loss of land.

The change in landscape was also significant and long-term. It required for the surrounding communities to adapt to the new environmental conditions. The Cree population in James Bay has experienced a loss or reduction of the trap lines, implying a loss of economic power, as a result of hydroelectric development projects (Whitman, 2004; Hayeur, 2001; Roquet et al, 2004).

Moreover, hydroelectric development leads to the creation of a large reservoir. Also, the land was consequently opened up by a series of roads to monitor the infrastructure. It has appeared that access to the land was one of the key factors influencing change (SEBJ, 2005). The development of the road system allowed for a number of new people and businesses to travel to the region for specific purposes such as recreational activities. This is a particularly important phenomenon for hydroelectric infrastructure because of the change of landscape with the reservoir. A mine pit or an oil-sand field often offers nothing attractive to people, a body of water, on the other hand may offer many opportunities. Consequently, there is an increase arrival of short-term visitors who participate in specific activities such as sport fishing, hunting or camping. Studies mention that the improved road system made trapping and hunting much easier for Aboriginals as well (Roquet et al., 2004) and it allows for more people to use the land during longer periods of time, both Aboriginals and non-Aboriginals. This competition for the already scarce resources may cause conflicts or an overexploitation of the land (Plourde et al., 2002; SEBJ, 2005). As well, these migrants or visitors may be disturbing traditional activities or forcing Aboriginals to relocate to increasingly remote areas (Plourde et al., 2002).

4.2.2 Impacts on Local Industries and Economic Development

From an economic point of view, studies have reported that hydroelectric development can have many positive outcomes when neighboring communities take advantage of it. For instance, it is suggested that Cree-owned businesses can be built based on the new opportunities linked to the incoming of new people and their needs (Roquet et al, 2004). In the case of Toulnustouc, a hydro-electric project located at the north of Baie-Comeau in Quebec, an agreement was signed to support Aboriginal economic development (Lampron et Poirier, 2002), and to favor Aboriginal employment (Plourde and Vézina, 2003). Companies may even involve themselves by creating training programs intended to assist Aboriginals in the hydro-development process (McIntosh, 2005). This type of accommodation reflects Corporate Social Responsibility principles that companies are increasingly adopting.

Like in the mining industry, in hydro-electricity projects, Impact Benefit Agreements (IBA) have been proved to be an adequate means to ensure that proponents will indeed use local companies to do some of the work and surrounding communities will benefit from the project (Plourde and Vézina, 2003; McIntosh, 2005).

4.2.3 Impacts of Projects' Workers on Communities

The presence of workers has also been reported as having significant negative impacts on the neighboring communities as mentioned in section 4.2.1. Workers may use the land for hunting and fishing activities, which may conflict with traditional activities of the Aboriginal people using the same land (Alliance Environment, 2005). Mitigation measures to reduce conflicts included monitoring workers' activities outside of working hours in order to ensure that they do not infringe on Aboriginal territories and developing educational programs to sensitize workers on the issues of hunting and fishing on Aboriginal land (Plourde and al., 2002b; Plourde and Vézina, 2003).

4.2.4 Social or Psychological Impacts of the Project on Surrounding Communities

The development of infrastructure (road network, air strips, etc.), and the increasing number of worker migrants resulted in the Aboriginal communities experiencing distress as they feel they are losing control of their land (Plourde et al., 2002; Roquet et al., 2004). This feeling of losing control can also be reinforced by the fact that companies can often start using the land without asking for permission (Whitman, 2004).

Linked to this loss of control are the profound changes occurring in the social structures of Aboriginals. Literature indicates that it is somewhat difficult to distinguish whether changes affecting Aboriginal peoples are caused by the hydroelectric projects or by other factors associated with the transition to a modern lifestyle. The inherent difficulty comes from the fact that Aboriginal society is going through transition at the same time as these external changes are taking place (Hayeur, 2001). However, studies have reported increased social problems such as feelings of anomie[11] and the lack of interest from younger generations for traditional knowledge, an increased suicide rate and increased access to alcohol, drugs, prostitution and gambling in all the affected communities.

[11] Anomie means a condition or malaise in individuals, characterized by an absence or diminution of standards or values.

Cultural impacts also resulted from the incoming of new people, as they may use the land without the traditional approval from *tallymen* (Roquet et al., 2004) who lose their high-status role in the community (Whitman, 2004).

Finally, the discovery of methylmercury in reservoir fish and its consequences on human health was reported in the literature, as were the cultural impacts of this, which has had a high impact on traditional activities. In Quebec, the Mercury Agreement (1986) was signed to deal with the reorientation of traditional fishing activities in order to limit Aboriginal exposure to mercury (Schetagne et al. 2002). The cultural consequences of such changes have not been assessed and followed-up yet. However, research on this topic has recently started (Boucher de Grosbois, 2006).

4.3 Oil and Oil Sands Industry

This section includes an overview of the oil sector and of the oil sands. Oil sands are massive deposits of a mixture of sand, clay, water, and bitumen, which is a black, asphalt-like hydrocarbon as thick as molasses (Alberta Economic Development, 2006). These deposits are located in three geological regions: Athabasca, Cold Lake, and Peace River in the Canadian province of Alberta. Commercial development of the oil sands started in the late 1960s when Great Canadian Oil Sands (now Suncor Energy) built a mine and upgrader north of Fort McMurray. Development continued through the 1970s and there are presently numerous projects under regulatory approval processes. The Government of Alberta lists 50 major oil and sands projects, of which 32 are proposed and 12 are already under construction. All these projects are considered "major" because they will cost more than five millions Canadian dollars (Alberta, 2007).

The documents mentioned above point out the impressive development of the oil sands industry since the late 1960's, and they also predict a continued growth (Alberta Economic Development, 2006; Timilsina et al., 2005). However, no follow-up studies on the oil sands industry were found in the context of this study. This does not mean they do not exist; they are just not publicly available.

Instead, some stakeholders have attempted to describe the negative impacts of oil development (Woynillowicz et al, 2005), but overall, most of the literature produced by governmental sources (Alberta, 2007; National Energy Board, 2006; Alberta Economic Development, 2006) focus on the positive aspects of economic development of the area. It was even more difficult to find sufficient data relating to the socio-economic impacts of the oil industry.

There was much more information on the offshore oil development sector but presumably this is caused by the fact that a team of researchers (Storey and Noble, 2004; Storey and Jones; 2005; Storey and Noble, 2005; Jones 1998; Locke and Storey, 1997; Locke 1995) had focused on a specific project (Hibernia), and especially on its socio-economic impacts. The impacts of oil and oil sands projects are described in the following sections:

4.3.1 Changes in the Local Population's Demography and Quality of Life and Social or Psychological Impacts of the Project on Surrounding Communities

The literature analyzed for the oil sands sector identified the following concerning socio-economic impacts: population growth, changes in the traditional ways of life of Aboriginal people, increasing traffic, lack of housing and high prices, inadequate infrastructures and shortage of services (Alberta Economic Development, 2006). Insufficient infra-

structure and services are thought to cause a decreasing quality of life that has to be dealt with (National Energy Board, 2006). Demographic challenges such as a higher net migration rate, a higher proportion of young and single males, have been also mentioned as potential factors that can exacerbate socio-economic impacts (National Energy Board, 2006). In fact, many organizations have raised the existing problems in the context of EIA as mainly connected with worker migration, such as an increase in prostitution and the prevalence of Sexually Transmitted Infections, as well as a lack of security for young women living in nearby communities.

4.3.2 Changes of Employment Levels in the Region and in Nearby Communities

On the other hand, employment and training are the main socio-economic benefits reported in the literature. Currently, oil sands companies are conducting major hiring campaigns and are still in need of more skilled workers. Companies require more labor force, and are willing to contribute to the development of training programs which in return, contributes to the economies of the federal, provincial and municipal governments (Alberta, 2007).

4.3.3 Emerging Social Initiatives or Practices to Minimize Adverse Impacts

Documents consulted on the sector highlighted that rapid oil sands expansion has led to the creation of local and regional co-operative initiatives that try to minimize adverse impacts and promote orderly growth (Alberta Economic Development, 2006).

Some of these organizations are the Regional Issues Working Group (RIWG), the Cumulative Environmental Assessment Association (CEMA), the Wood Buffalo Environmental Association (WBEA) and the Athabasca Tribal Council. The CEMA, for instance, was created to address biophysical issues focusing on the cumulative impacts of regional development in northern Alberta. One of the CEMA working groups is looking into traditional ecological knowledge as well. The Athabasca Tribal Council represents the five First Nations of Northeastern Alberta. The Athabasca RIWG deals with economic aspects of oil sands development within the regional Municipality of Wood Buffalo for the benefit of all stakeholders. The WBEA's mandate is to monitor the health of the environment in the Wood Buffalo area. Provincial and federal governments, local Aboriginal groups, NGOs, and companies nominate representatives to participate in the committees and working groups of these associations.

4.3.4 Changes on Aboriginals' Traditional Ways of Life

In most large-scale projects that this research examined, First Nations are present in the areas and are affected by the projects' impacts. With respect to the oil sands sector, First Nations have expressed a number of concerns such as the cumulative impacts on the environment from several projects being developed in the same area, contamination of country foods, their participation in the projects, the loss of land and therefore of the traditional ways of life. The Mikisew Cree First Nation of Alberta complained about the monitoring of impacts of a newly proposed development, which lack integration of traditional knowledge, did not involve the community in designing the monitoring programs, as well as the lack of scientific research. In general, these issues are to be addressed by the proponent to obtain the support of the community and to build a trust-based relationship with them (Lawe et al., 2005). Some actions have tried to address these concerns with the creation, for example, of the Regional Issues Working Group whose mandate is to perform cumulative impact assessment of all oil sands projects (McIntosh, 2005a).

Cumulative impacts are a recurring issue for Aboriginals as several oil sand projects develop in relatively small areas (Woynillowicz et al., 2005). Governments are starting to look into it as well. Some stakeholders claim that there is currently inadequate scientific data to understand how the ecosystem will react to the impacts of development (Alberta Economic Development, 2006).

4.3.5 Evolving Relationships between Companies and Aboriginal Peoples

First Nations' proximity to project sites makes them vulnerable to environmental, as well as social, economic and cultural impacts. In this context, relationships with companies may be complex and ambiguous. In some cases, (Syncrude for instance) (McIntosh, 2005a), Aboriginals have developed a relationship with the company to become part of the development of the area, while protecting their traditional culture and values. Syncrude offered Aboriginal Development Programs training in corporate leadership, employment, business development, education, community development and the environment. These types of initiatives are mostly related to the economic impacts of oil development. They have an impact on social and cultural structures as well. For instance, Syncrude started a fly-in/fly-out program, which allows Aboriginals to pursue their traditional activities while remaining in an income-based economy. Some Aboriginal communities have expressed their willingness to become competitive in the marketplace as well by starting businesses linked to oil development.

This became a reality in the case of the Métis Nation of Alberta that created its own company with the help of an energy company (McIntosh, 2005b). Moreover, the Métis launched a training program with funding from the Department of Indian and Northern Affairs Canada (INAC). It seems that First Nations are increasingly willing to build strong relationships with the industry in order to become part of the development. Some authors have noted that companies have made serious efforts in the past decades to be sensitive to their neighbors and to include them (McIntosh, 2005a).

Recent Changes in the Oil Sands Industry's Approach to Public Consultation.

In 2006, the Government of Alberta started a province-wide series of public consultations on its strategy of development of the oil sands sector in several phases. Phase I (now completed), consisted of an initial public consultation where feedback was used by the Oil Sands Consultation Multi-stakeholder Committee (MSC) to develop recommendations for a vision for oil sands development and principles to assist in guiding future policy directions. The *Interim Report for Phase I* prepared by the Oil Sands Consultation Multi-stakeholder Committee outlines recommendations to the government on the vision and principles that should guide future oil sands development (Multi-stakeholder Committee, 2006). In phase II, which is on its way the MSC will incorporate the Panel information and other feedback to develop policy recommendations for implementation of the vision and principles. A component of Phase II will have the findings of the MSC validated with First Nations and Métis groups who participated in the consultation to ensure that the recommendations presented to the Ministers of Energy, Environment and Sustainable Resource Development in June 2007, accurately reflect what was heard from the First Nations and Métis who participated in the consultation (Energy Alberta, 2007).

The implementation of this consultation mechanism reflects the Government's desire to receive feedback from the population. It is expected that such efforts will be reflected in the future by an increased number of research projects on the impacts of the oil sands industry, in particular the social and cultural impacts.

4.3.6 The Oil Industry: Hibernia Offshore Development

Hibernia is an oil field located 315 km east southeast of St. John's, Newfoundland, in 80 meters of water. It was discovered in 1979 and is the fifth largest oil field ever discovered in Canada.

The development of this project started in 1990. The particularity of this project is that there was governmental follow-up monitoring to study socio-economic impacts but also academic studies that analyzed study results.

In the context of this project, the Hibernia Construction Sites Environmental Management Committee was created. It established different programs to monitor the impacts of the project, notably the Biophysical Environmental Effects Monitoring and the Socio-Economic Environmental Effects Management Program (SEEM). The SEEM program focused mainly on the following components: business/employment, community services and social infrastructures, housing, public services, commercial and industrial infrastructure.

The monitoring of the socio-economic impacts was not done by the proponent, who considered that it was not part of its mandate, but by the government (Storey and Noble, 2005). Researchers who analyzed the post-project studies concluded that the program did not result in any recommendations and did not improve the understanding of the social impacts of the project (Storey and Noble, 2005). The authors of the study pointed out, among other things, that community disruption was minimized through the assessment process (Storey and Jones, 2003). Rural communities affected by the project were particularly concerned by the potentially negative social impacts. As revealed by public consultation, communities were particularly worried about the influx of outsiders. Hence, a self-contained work camp was created to limit the presence of the workers in the communities and to avoid disruptive social impacts. This measure proved to be successful (Storey and Noble, 2004). By minimizing potential demographic changes in the local communities, demands on the social and community services and infrastructure and potential impacts on the community composition and interactions (conflicts with outsiders) were mitigated (Storey and Noble, 2005). Further discussion on this project is included in the recommendations section of this report.

4.4 Gas, Liquefied Natural Gas (LNG) and Pipelines

This section consists of an overview of the state of LNG projects in Canada. Neither gas exploitation nor pipelines literature was identified through the search. However, we should mention that a huge natural gas project and pipeline – the Mackenzie Gas Project- is currently going through the regulatory process.

Liquefied natural gas or LNG is natural gas that has been processed to remove either valuable components (e.g., helium) or those impurities that could cause difficulty downstream (e.g., water, and heavy hydrocarbons) and then condensed into a liquid at almost atmospheric pressure by cooling it to approximately -163 degrees Celsius. LNG is transported by specially designed cryogenic sea vessels and cryogenic road tankers; and stored in specially designed tanks. LNG is about 1/614th the volume of natural gas at standard temperature and pressure (STP), making it much more cost-efficient to transport over long distances where pipelines do not exist.

North America has historically relied on domestic natural gas supplies, with very small amounts of imported LNG from overseas to supplement domestic production, but today as explained by Natural Resources Canada (2006), growing needs push to meet the expected growth in demand and new sources of natural gas supply, including increased LNG imports, will be required. The same source mentions that there are currently more than sixty LNG import projects proposed in North America, and eight in Canada. Of these projects only three completed the environment assessment process and received federal and provincial permits[12] (Natural Resources Canada, 2006).

This means that no follow-up studies were done on the sector. However, the EIS of some of the submitted projects reveal interesting information on potential social and economic impacts related to the sector. Interestingly, some of the studies conducted in the context of the EIS showed that social and health impacts can appear in local communities before the commencement of the project. In effect, LNG projects are not popular and therefore it is hard to get broad community support. However, it seems that projects that have conducted an extensive, transparent and early public consultation have been more likely to be accepted than the ones that do not respect these criteria.

Kitimat LNG, one of the three Canadian projects to get the necessary permits seemed to have fulfilled the requirements of an adequate public consultation. The project also involved a First Nation, and negotiations with this community were also successfully accomplished.

4.4.1 Social or Psychological Impacts of the Project on Surrounding Communities

Social and psychosocial impacts in local communities were raised recently by two health authorities in Quebec in the context of a panel submission for one of the two projects under EIS in this province (Rabaska). The *Directions de santé publique de Chaudière-Appalaches et de la Capitale-Nationale* highlighted in their report (2007) some of these impacts. The level of stress on residents, changes in family and neighbour relationships, changes in work-place relationships, risk perception and social acceptability of the project were some of the dimensions examined in the assessment that the above mentioned authorities submitted to the panel. A survey conducted by the health authorities showed that the stress level of the closest residents was higher since the announcement of the Rabaska LNG terminal (21% higher); relationships with neighbours as well as with family members were more tense in 14% and 7% of the cases respectively and 15% of the residents close to the project were thinking of relocating if the project was approved. The report also indicated that the risk perception varies with individuals; it has a subjective and cultural value by it plays in all cases a determinant role in decisions that people take. Relocations and differences in the estimation of the compensation that the proponent should allocate to residents were among other public concerns around this project.

Social cohesion threats originated by different residents' positions on the benefits and losses from the projects were also raised in other cases. Frequently, communities are polarized and reconciliation is hard to obtain even in the case of a project reject (Santé Canada, 2006).

The implementation of adequate consultation processes in the context of industrial projects remains one of the lessons that has to be learnt from past experiences in Canada.

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[12] The three projects are: Canaport LNG located in Saint John, New Brunswick, Bear Head LNG near Port Hawkesbury, Nova Scotia and Kitimat LNG in British Columbia.

This is one of the major issues raised by citizens in LNG Quebec projects. Implementation of early public consultation and significant participation processes contribute to finding consensus around the projects. However, early public consultation does not necessary guarantee neutrality if they are leaded by the proponents. Frequently, the public perception is that proponents are in a situation of conflict of interest and these consultations may lead to a community polarization before the official and independent public hearings start.

Other social and economic impacts were raised by EIS studies of some LNG Canadian projects including: land and property expropriations, consequent relocations, visual impacts, noise, increasing traffic, night lights, air quality, security threat, etc. These threats and eventually real impacts generate stress, anxiety, and anguish, all symptoms negatively correlated with a good health status. Landscape change could also be an issue, as it may affect such sensitive issues as identity and heritage, which can be very important for the affected populations.

4.5 Other Sectors: Aluminum

The study done on the Alcan Smelter in Quebec can be considered as one of the most extensive follow-up studies on social impacts, since it was conducted over a five-year period.

The objectives of the study were to:

- Develop a model for social impact assessment
- Generate knowledge about the region and about assessment processes
- Propose preventive and mitigative measures
- Generalize the results for the benefit of future similar projects
- Develop expertise in the field of environmental and social monitoring

Rather than static research, the emphasis was for the follow-up to become a database and a learning tool so it could be applied to similar projects. The themes were broad while remaining in the realm of social impact follow-up. Stakeholders, the proponent and populations were involved in many ways throughout the program.

Study results were divided in two parts: a. characterization of the host community and b. summary of the human impacts. It appeared to the authors that it was essential to acquire extensive knowledge on the host community and on the area *prior* to starting any monitoring, as it would help to design a more appropriate follow-up programs and to get a better idea of the potential extent of social impacts, as well as possible mitigative measures. Moreover, they established a (non-exhaustive) summary of social impacts as determined in the EIA and as seen in the monitoring program.
They following categories of social impacts were monitored throughout the five-year follow-up program: [13]:

- Demographic changes;
- Impacts on co-inhabitance and land settlement/planning;
- Local/regional economy and learning of businesses

[13] The twenty reports that were produced as a result of this follow-up program can be consulted at the following link www.uqac.ca/msiaa

- Participation of citizens and dialogue among stakeholders;
- Quality of life and perceptions
- Social equity.

These categories of impacts were documented and represent about 57 indicators. However, the authors listed one hundred impacts that could not be analyzed because of various constraints (Gagnon et al. 2002).

As well, the authors concluded that a systematic and scientific methodology for social impacts was necessary to develop, at the planning phase, a useful monitoring program. These conclusions resonate much with the ones from Storey and Noble (2005) on the importance of social assessment methods for better results.

The authors found that social impacts were not synonymous with social concerns of the community even if they are strongly linked. Again, a systematic approach has to be established to ensure that they are not mistaken. Moreover, the authors believe that this follow-up study demonstrated that the difficulties encountered when integrating complex social impacts in environmental assessment processes could be overcome. This model was developed with the intention of being used again and adapted for future similar projects. Some obstacles remain, such as the lack of practical use of this innovative multidimensional integrated approach.

5. ANALYSIS AND DISCUSSION

5.1 Have Trends Identified in the First Annotated Bibliography been Maintained?

From the early nineties until now, some of the trends identified in the Centre for Human Settlements' Annotated Bibliography have been maintained but new trends are also emerging.

Hydroelectric and Energy Projects: Disruptive Projects

The 1993 Bibliography considered hydroelectric projects to be the most disruptive projects due to their enormous spatial impact and the ecological changes that resulted. Literature reviewed in the context of this project seems to confirm the continuation of this trend. Hydro projects still affect large areas and cause ecological changes which affect human lives as shown in follow-up studies of projects in Quebec.

For projects spatially concentrated (e.g. mines), the former bibliography stated that the effects on the native resource-based economy appeared to be minimal. Since then, much research at the international as well as at the national level has been done on the impacts of this type of projects. Literature on mining has indicated that those impacts appear to have been highly disruptive from a socio-economic and cultural perspective. In general, projects which cause a loss of land or changes in land use are considered to cause high social impacts as they affect traditional ways of life impacting on identity, self-esteem and social connectedness, which are intrinsically connected to physical and emotional health (Royal Commission on Aboriginal Peoples, 1996; Svenson and Lafontaine, 1999). Outside workers also cause disruption in Aboriginal communities by perturbing traditional ways of life.

Finally, still regarding disruption, the 1993 Bibliography highlighted the significant negative social impacts of Alberta's oil sands projects on the native resource-based economy. Reviewed literature on the sector confirms this finding. However, research on oil sands is just starting, and the hypothesis on the extreme disruptiveness of this activity may be confirmed in the future.

Projects' Impacts on Aboriginal Peoples

The second trend identified in the 1993 Bibliography was related to projects having negative impacts on Aboriginal peoples while having minimal beneficial impacts. Limited training and little opportunity to advance were pointed out as constraints for Aboriginals as potential workers in the projects.

Since then, Impact Benefit Agreements (IBAs) have become a generalized negotiation tool between proponents and Aboriginal communities, and seem to have helped to counterbalance negative impacts and obtain higher benefits for these communities. On the positive side, more opportunity for training and employment has been made available for native and local populations (Brisbois and Saunders, 2005). Furthermore, in some sectors, such as diamond mines, Aboriginal communities are sufficiently represented taking into account their proportion in the NWT population (INAC, 2002).

However, although training and employment opportunities have been improved, the challenges are still important because Aboriginal workers usually do not reach professional or managerial positions (INAC, 2002). A higher education, skills upgrading pro-

grams and other training programs are mentioned in reports as a way to improve the situation.

Also, it was observed that an improvement for the local and regional development facilitated the development of the local business sector in parallel with the project needs. Aboriginal business capacity is highlighted frequently in the reports as an important and new positive impact of large-scale projects. Moreover, there are currently Aboriginal organizations that are participating as partners in large-scale projects in Canada[14] and others have been exploring the potential for taking equity positions in mining exploration and production companies (NWT & Nunavut Chamber of Mines, 2005).

However, Aboriginal communities request for a controlled pace of development and recognition of the need to accommodate local and regional cultures, economy and lifestyles (IRC, 2007). Aboriginal as well as non-Aboriginal communities want plans to manage the consequences of the projects and demand follow-up studies to monitoring social, economic and cultural impacts.

All these benefits are associated with an overall increase in Corporate Social Responsibility and willingness to involve the surrounding communities to obtain broader support. Citizens and Aboriginal Nations are also better organized which give them more weight when negotiating with the companies.

Role of Women in Canadian Large-Scale Projects

In the 1993 bibliography, there was little or no discussion as to the place and role of women in Canadian large-scale projects. Gender issues are represented in the reviewed literature as important concerns.

On the one hand, women employment in large-scale projects remains an important challenge. Women are not only under-represented but they also have to face huge workplace challenges such as be limited to care-giver jobs, harassment, stress, etc. (CCSG Associates, 2004; SWC of NWT, 1999; YSWC; 2000). On the other hand, women have to face huge social challenges being in the communities nearby the projects. Large-scale projects, as we saw before, are accompanied by social problems and not always seem to contribute to an increase of women's quality of life.

This latest concern was reported in the 1993 Bibliography, which pointed out that: *"Affluence and access to the communities appears to have often resulted in more alcohol and drug abuse, more crime and violence, and family breakdown"*.

Similar problems are still reported including other social problems such as suicide and particularly youth suicide, excessive gambling, child abuse and neglect and prostitution (GNWT, 2007; GNWT, 2006).

Local impacts of Large-Scale Natural Resource Projects

Overall, and as noted in the 1993 Annotated Bibliography, large-scale natural resource projects still tend to be located in remote areas, and they are still perceived important as a regional economic growth tool.

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[14] The Innut of Quebec have recently been partners of a Hydro-electric project and there is also Aboriginal involvement in the Mackenzie Gas Project (the Aboriginal Pipeline Group) although this project is still under EIA process.

Monitoring and Follow-Up Practices and Information Availability

Also, research results confirm the difficulty of predicting impacts and the necessity to manage the unknown in management practices (Storey and Noble, 2004). The recommendation made in 1993 to develop community-based impact management has been since then used in a couple of cases (e.g., Hibernia and Alcan).

Literature analysis in the context of this research revealed the following main trends regarding process and information availability:

1. A higher awareness and recognition on the need of assessing socio-economic and cultural impacts
2. A progress in the assessing of these impacts through EIS
3. A progressive tendency to demand follow-up studies and monitoring on socio-economic and cultural impacts
4. A higher production of documents from diverse sectors
5. More accessibility to material given facility of the new technologies of information, and
6. New practices in monitoring and follow-up.

In terms of monitoring practices, it was mentioned earlier in this report that new practices are being adopted regarding monitoring and follow-up studies on social, economic and cultural impacts. Stakeholders committees or independent groups are replacing the traditional model where the companies are monitored with multi-sector funding that can guarantee the objectivity of the assessment process. The model of the Independent Environmental Monitoring Agency (IEMA) for the Ekati Diamond Mine or the Citizens' Committees in Quebec for Alcan's project seem to indicate new forms of democracy in the environment and social impacts assessment of natural resource or development projects (Gagnon, 2002). In the case of Ekati, for example, the committee is composed of members nominated by the different parties (Aboriginal Nation, company, government bodies) yet, once nominated, these members become completely independent and only respond to the IEMA (Ross, 2004).

5.2 Future Research Needs

A systematic practice of monitoring and follow-up studies on socio-economic and cultural impacts is needed to enhance research on this topic. Increased recognition of socio-economic and cultural impacts have already reinforced the consideration of these issues through EIA process, and in panel reports' recommendations for some large-scale projects in Canada but there is still an important investment to do. Reliable and high quality follow-up studies can feed academic, governmental and community-based research. Follow-up studies could contribute to have data from long-term research (a project can last from 15 to 30 years) and project wide research. They could also provide good practices in follow-up methods and techniques.

Significant Gaps

The sectoral overviews presented in this Annotated Bibliography revealed significant gaps in terms of research and follow-up studies in some of them. Although the reasons vary (e.g., LNG projects not started yet), it seems clear that the oils sands industry re-

mains the sector where the most important effort should be done. Mining, on the other hand is well studied but it should not be neglected.

Available long-term follow-up studies could provide information to build guidelines adapted to the Canadian context to assess socio-economic and cultural impacts derived from large-scale projects, including variables and indicators.

A survey among developers could provide information on the reasons for not conducting follow-up studies. Further information on the obstacles and benefits encountered would certainly clarify the situation.

Mitigation measures remain significantly understudied and should be targeted as a priority for future research. The effectiveness of mitigation measures can only be assessed through carefully directed research. At the end, research will provide the evidence needed for successful planning and decision-making.

6. LESSONS LEARNED

Although improvements to communications technology (e.g. the Internet) have greatly improved the availability of EA information, follow-up studies are not currently adequately disseminated[15]. Major improvements to availability and dissemination are needed and should be incorporated in the EA process. Monthly or annual monitoring results posted on web sites would be a useful measure. Stakeholders, citizens and local, provincial and federal government should have access to findings as part of the public and transparent nature of the whole environment assessment process.

Also, researchers that have been working on these issues have recommended that in the case of megaprojects be an obligation to set up follow-up committees (Gagnon. 2002). Lately, increased participation of government experts has been required to assist in large-scale projects monitoring and follow-up, which seems to respond to preceding recommendations but this is not a regular practice in all the cases.

While conducting follow-up studies, some good practices have been recommended by the documents explored in this research (Gagnon. 2003).

1. It seems to be important to consider the social consequences of the changes and of the mitigating measures pertaining to it.
2. Social incidences as well as the significance of the impact (measured by temporality, spatiality, frequency, sampling and individuals/stakeholders involved) have to be documented early in the project because the lack of information will lead to imprecise results when designing the follow-up and the mitigation measures.
3. The link between biophysical and social impacts has to be established since the former can directly affect the latter.

The effectiveness of the monitoring and follow-up practices for social, economic and cultural impacts remains tightly tied to guidelines provided at the earliest stages of EA process. In the Canadian context, these guidelines need to be standardized and improved. The way CEAA conceptualizes socioeconomic impacts is increasingly recognized as a limitation of the Act for the analysis of social and health impacts on populations and individuals. A redefinition of this approach would ensure better follow-up of the social, cultural and economic impacts (Storey, 2004) respecting the targets of viable and sustainable development of the project, the territory and the affected communities.

Finally, perceptions, expectations, reactions and concerns from social actors have to be taken into account when doing the assessment because they condition social impacts. This is due to the fact that the human environment is not a recipient of the changes but part of them. In other words, actors, stakeholders and individuals contribute to shaping social impacts.

A closer and more regular collaboration between university researchers, experts and environment assessment professionals in provincial and federal departments will certainly create a synergy that will be reciprocally enriching and productive.

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[15] Follow-up database such as SEFA in Quebec province are useful tools that facilitate achievement of these goals.

Literature reviewed had also highlighted the need of taking into account the cumulative impacts when assessing the socio-economic and cultural impacts of a project. In fact, the impact of other projects going on in the same geographic area, and past projects that affected local and Aboriginal's communities over the years should be considered. These issues constitute a recurring concern for Aboriginals peoples and mono-industrialized, isolated communities, living in all Canadian provinces and territories.

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APPENDIX I - Impacts, variables and key words associated with literature reviewed

Social, cultural and economic impacts		
Categories	*Variables*	*Key words*
Changes in Employment Levels in the Region and in Nearby Communities.	Increased employment opportunities and training. Increased number of people enrolled in post-secondary education programs. Opportunities for local contractors. Unequal opportunities among local residents. Decrease or loss of employment (at the end of project).	Employment Contractors Inequalities Training and education
Impacts on Local Industries and Economic Development.	Increase of economic growth and business economy. Implantation of new industries. Small business development. Development of Aboriginal entrepreneurship and Aboriginal business capacity.	Corporate Social Responsibility. Impact Benefit Agreements. Local business.
Impacts on Local and Regional Services and Infrastructure.	Decrease or increase in the quality of services and infrastructure.	Lack of housing or high prices, educational, social, health or recreational services.
Changes on Aboriginals' Traditional Ways of Life.	Loss or change in the use of the land. Loss of hunting areas. Increased non-native hunters, fishers, trappers.	Disruption, anomie, alienation.

Social, cultural and economic impacts		
Categories	*Variables*	*Key words*
	Relocation of residents. Changes or interruption of traditional activities. Changes in diet habits. Increase of social problems.	
Changes in the Local Population's Quality of Life as well as Demographics	Higher cost of living Lack or inadequate infrastructure and services.	Housing, services, infrastructure.
Changes to land and resource use.	Flooding of land. Changes or disruption of traditional activities or ways of life. Loss of sacred land or burial grounds. Property expropriation. Loss of agriculture land. Road system development or improvement. Overexploitation of the land. Increased number of migrants or visitors.	Reservoirs. Outside visitors. Access to the land facilitated. Loss of land.
Changes in the use or loss of Traditional Ecological Knowledge.	Changes or interruption of traditional activities.	Sacred land or ceremonial sites affected. Not taken into account or lost by young generation.

Social, cultural and economic impacts		
Categories	*Variables*	*Key words*
Social or Psychological Impacts of the Project on Surrounding Communities.	Evolution of the social landscape (since beginning of project). Increased level of stress, changes in family or neighbor relationships. Risk perception. Social Acceptability. Social inequalities (increase/decrease). Effects on social networks or social cohesion.	Stress, fear.
Impacts of Project's Workers on Communities.	Introduction of new habits. Disruption of traditional/local culture. Increased demands of services. Higher cost of living.	Stress, fear, internal community conflicts.
Impacts on Women and Families.	Difficult working conditions, work far from settlements and rotational shifts. Increased social problems (family violence, alcohol or drug abuse, single parent families, suicide, etc).	New residents, immigrant workers, increase of social problems. Stress, fear, internal community conflicts.
Impacts on workers and working conditions.	Difficult working conditions, work far from settlements and rotational shifts. Increased social problems (family violence, alcohol or drug abuse, single parent families, suicide, etc).	Stress-related condition (violence, alcohol abuse, etc.) Separation from family. Rotational shifts.

Social, cultural and economic impacts		
Categories	*Variables*	*Key words*
	Interethnic problems, discrimination, etc.	Social problems.
Impacts on Health, Health Care and Safety Issues.	Physiological problems. Water quality. Quality of life and wellness of residents. Work conditions and workers' quality of life. Increase of social problems. Increase of disruptive activities (noise, dust etc.).	Stress, fear, internal community conflicts. Mental well-being. Stress-related condition (violence, alcohol abuse, etc.). Well-being in terms of water, air, noise, lights, visual impacts, risk perception. Cancer, STDs, fertility, depression, suicide…
Impacts of Project Decommissioning and Closing.	Dramatic decrease of employment. Boom and bust effects. Increased social problems (family violence, alcohol or drug abuse, single parent families, suicide, violent crimes, etc). Problems related to mono-industrial cities.	Social problems. Boom and bust.
Emerging Social Initiatives or Practices to Minimize Adverse Impacts.	Creation of local and regional co-operative initiatives Increased number of citizen or aboriginal organizations.	Implication of citizen and population.

Social, cultural and economic impacts		
Categories	*Variables*	*Key words*
	New Partnerships.	
Evolving Relationships Between Companies and Aboriginal Peoples.	More opportunities for Aboriginal. Increased Aboriginal participation in business, joint-ventures, etc. Development of Aboriginal entrepreneurship and Aboriginal business capacity.	IBA signed. Royalties to the communities. Increased social acceptability of the projects. Corporate Social Responsibility.

Some of above listed variables are considered positive impacts while other are considered negative impacts.

APPENDIX II - Documents that could not be analyzed

These documents were not analyzed even though they were considered as relevant. The two main reasons for that were time constraints and unavailability of the document at the time of the research.

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Fraser E.D.G, A.J. Dougill, W. E. Mabee, M. Reed & P. McAlpine (2006). Bottom up and top down: Analysis of participatory processes for sustainability indicator identification as a pathway to community empowerment and sustainable environmental management. Journal of Environmental Management. Vol 78(2):114-127.

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Hydro-Québec (2005) Centrale de l'Eastmain-1-A et dérivation Rupert. Complément de l'étude d'impact sur l'environnement. Volume A.

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Noble, BF and JE Robinson (2005). Integrating health in EIA: case studies of Canada's Northern mining resource sector. *Arctic*. 58(4): 395-405.

O'Faircheallaigh, C. (2006). Environmental agreements in Canada: Aboriginal participants, environmental impact follow-up and environmental management of major projects. Prepared for the Canadian Institute of Resource Law. 218 p.

Rasmussen, R.O. and N. E Korelera (Eds) (2003) Social and environmental impacts in the North: Methods in evaluation or socio-economic and environmental consequences of mining and other energy production in the Arctic and Sub-Arctic. Dordrecht, Boston, London: Kluwer Academic Publishers. 526 p.

Roche Associés Ltée ; Dessau Inc. (1995) Aménagement hydroélectrique Sainte-Marguerite-3. Suivi environnemental 1994 : Impacts économiques. Montréal (Qc) : Hydro-Québec, 2 vols.

Roche Associés Ltée ; Dessau Inc.(1995) Aménagement hydroélectrique Sainte-Marguerite-3 : Suivi environnemental 1994 : Utilisation du territoire. Montréal (Qc) : Hydro-Québec, 2 vol.

Roche Associés Ltée ; Dessau Inc.(1996) Aménagement hydroélectrique Sainte-Marguerite-3 : suivi environnemental 1994 : impacts sociaux. Montréal (Qc) : Hydro-Québec, 65 p.

Roche Associés Ltée ; Dessau Inc. (1997) Aménagement Hydroélectrique Sainte-Marguerite-3 : Suivi Environnemental 1995 Et 1996 : Impacts Sociaux. Montréal (Qc) : Hydro-Québec, 94 p.

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Roue, M. & Nakashima D. (2002). Knowledge and Foresight: The Predictive Capacity of Traditional Knowledge Applied to Environmental Assessment. International Social Science Journal. 54, 3(173): 337-347.

Vlavianos, N. (2006). Albertans' concerns about health impacts and oil and gas development: a summary. Prepared for the Alberta Civil Liberties Resource Centre: 16 p.

Wheatley, M.A. (1997). Social and cultural impacts of mercury pollution on aboriginal peoples in Canada. *Water Air Soil Poll.* 97, 85-90.

Witteman, J.; Beaulieu, R.; Burlingame, D., and Hanks, C (2002). The Contribution of BHP Billiton's Ekati Diamond Mine? *Sustainable Development in Canada's North* p. 179-184.

APPENDIX III – Summary of reviewed documents – mining sector

Render, J. M. 2005. Mining and Indigenous Peoples Issues Review. Prepared for the International Council on Mining and Minerals. Available at http://www.icmm.com/publications/763IPReport.pdf

This paper deals with the very general aspects of mining and does not focus on a country in particular. The document is the conclusion of an actual survey of the International Council of Mining and Minerals (ICMM) corporate and association members on how they define the issues, challenges and solutions available to them. The results of the industry survey are compared to how the stakeholders define the issues, the priorities given to Aboriginal people and their organizations but also more generally to development institutions and practitioners, NGOs, national governments and investors.

The author examines the issues that have plagued the relationship between the mining industry and aboriginal communities; some are contextual concerns and some are at a local-level. He identifies the following issues: historical lack of trust, national governments, land rights, broad industry recognition and support, local issues (process and outcomes), gaps in understanding. The table on page 43 summarizing the issues comparing the Industry to the Indigenous perception is very useful.

The ICMM concludes that Aboriginal Peoples and Industry need a coordinated way to dialogue. Then, it makes a series of recommendations based on the findings of this document.

We note a summary of the different definitions given to the term "indigenous".

G. Gibson and J. Klinck. 2006. Canada's Resilient North: the impact of mining on Aboriginal communities. Pimatisiwin. Volume 3(1): 115-139.

The article looks at the characteristics of mining in the North as well as both positive and negative impacts linked to these mining activities. The authors underline the fact that Aboriginal communities are particularly involved in and affected by mining due to the proximity of mining sites to their villages. The characteristics can be listed as such: the high wages of miners compared to other activities, the cyclical nature of mining due to the life span of a mine, the high mobility of miners, the remoteness of mining sites and the high risks in injury and exposure to injury. The authors focused particularly on the impacts on indigenous people such as: mental stress, addictive substances and high risk behavior, the alteration of their subsistence life-style, the changes in family integrity, gender issues and other shift in values and social networks. They bring forward the socio-economic impacts of mining, which include the increase in employment and other benefits for communities that have signed private agreements with the mining corporations. The authors use gender issues as a key indicator of well-being.

This article has a very useful table of all general impacts of mining with a particular focus on health impacts.

It concludes with the fact that northern development is unavoidable but that it needs to be done while rethinking the distribution of impacts and benefits, with more work towards self-defined community health and well-being.

CCSG Associates. 2004. Labrador West Community Monitoring for Overburdened project. Prepared for Femmes francophones de l'ouest du Labrador, Labrador West Status of Women Council and Mining Watch Canada.

This document presents the monitoring of the biophysical and health related components such as soil, water, vegetation and dust present in the area around the Wabush Mine in Labrador. Since this monitoring was initiated by a women's organization, the results are more gender specific and health specific.

Hence, for the water analysis, the emphasis is put on recreational and fishing areas, and on the drinking water standards. Identically, the vegetation samples are mostly vegetables that can be consumed by the people of the community.

The authors of the document recommend replicate the sampling the following year in order to make comparisons. Moreover they propose different other sampling methods that are considered as non-intrusive.

Review of Diavik Diamond mines projects: socioeconomic and environmental effects on women and families. 1999 Available at: http://www.statusofwomen.nt.ca/download/review_diavik.pdf

This document expressed the opinion of women on mining focusing on the negative impacts and proposing mitigating measures. It gives as well an overall opinion of the women on the Diavik project since the document is written by an advisory body composed of exclusively of women. They review a document that is to be approved before being used. From this document, they look at employment in mining, especially women employment in mining and its subsequent impacts and propose a series of measures to take to improve the situation. They state that there is a problem of gender discrimination and harassment on the workplace, without the proper support for it. Community training programs are needed, especially for women in non-traditional jobs for them. Other issues were mentioned as well such as the difficulties of childcare while working, the loss in culture, and other social problems.

They review a monitoring report published by BHP (Diavik's main owner) because, they need to see if the monitoring program that was proposed by the mining company was done. They conclude that despite a strong commitment to working closely with Aboriginal communities, some issued are still not addressed such as socio-cultural effects assessment and monitoring and cumulative effects assessment and monitoring and they need to be looked at by the company, before getting approval from the communities.

Environmental Mining Council of British Columbia. 1998. Mining In Remote Areas: Issues and Impacts. 33p.

This cornerstone document was designed by the EMCBC to be both a literature review and an information kit. It should be read by anybody that wants to have an overview of the impacts of mining in Canada. Despite the fact that this document targeted remote areas, a lot of the impacts described are in fact true for most mining communities, regardless of their location.

The document describes in great details the following impacts: environmental impacts, community impacts, social and cultural impacts and health and safety impacts. It provides as well a number of case studies to illustrate the issues at stake. The authors try to put forward both positive and negative aspects of mining development. An important part in the document is the stance the authors take in regards to the role of environmental impact assessment in identifying and preventing or mitigating potential

impacts. They expose both advantages and disadvantages of Environmental Assessment, and put it into the context of the mining sector.

Cleghorn, C. 1999. Aboriginal Peoples and Mining in Canada: Six Case Studies. Prepared for MiningWatch Canada. 23 p. Available on the net at www.miningwatch.com

The author presents six case studies:

- The Innu Nation and Inco's Voisey's Bay Nickel Mine
- Lutsel K'e Dene First Nation and BHP Diamonds Inc.
- Tahlan First Nation, the Mining Industry and Environmental Assessment
- Little Salmon Carmacks First Nation and B.Y.G Nansen Gold Mine
- Makivik Corporation and Falconbridge's Raglan Mine
- Nishnawbi-Aski Nation and Ontario's Living Legacy

After giving background information in the case and the concerns linked to the projects from the communities involved, it exposes the lessons learned from the case by both communities and mining proponents.

Lapalme A. 2003. The Social Dimension of Sustainable Development and the Mining Industry: a Background Paper. Mineral and Metals Sectors, Natural Resources Canada. 33p. Available at www.nrcan.gc.ca/mms/poli/sust_e.htm#soc

This document from the Natural Resources Canada is a very good overview of the many different impacts of mining on host communities in Canada.

The author relates mining activities to sustainable development (SD) by contrasting the short-term of mining without SD with the long-term profits for both industries and communities with SD. In the first chapter, she gives a historical background of mining in Canada then she goes into the social issues linked to mining.

The most basic requirement for mining workers is ensuring a health and safe working environment, this should be dealt with in management plans. Because of the substance abuse arising from the presence of mining, industry should have health services on site.

Moreover, Aboriginal people are particularly impacted by the presence of mining because of the location of the mining sites. Companies have to help them make the transition from their traditional way of life to a more economic based one. The author observes that the Aboriginals want to preserve their traditional culture and values while developing. They are afraid of losing their traditional resources and of life after the mine shuts down.

One way of lowering the impacts is by flying in the workers rather than keeping them onsite. Another way is to have training programs to develop skills that are reusable after the mine closes, especially for the Aboriginals (businesses).

For the author, it is important to install mutual trust is to have a strong communication process involving the consultation of the population and respecting the Aboriginal cultures and values. Their participation in EIA and SIA is necessary to identify their concern.

Another group with specific concerns is the women, as they see the link between the impacts. Substance abuse from mining activities causes them strained relationship, violence, financial stress. They particularly believe that health care should be open to all

family members and not only to workers at the mine site. Moreover, they want to have the same work opportunities and equal chance and training for jobs in mining with skills that will help them after the mine closure.

Mining development can have impact on education. Companies should encourage learning. Employment is linked to that as well. Mining activities are usually important for their positive socio-economic impacts as they generate employment and make economic development possible. Through the generation of income, this can lead to a rise in the standard of living of communities.

Economic diversification is essential for the community to survive the closure of the mine. Mining companies should encourage and assist such diversification.

The influx of outsiders into a community can be source of concern because of what it brings into it: prostitution, substance abuse, violence, etc. This can be limited by improving health services, by flying in the workers, by encouraging local employment.

Overall, this document intends to make a summary of all the social impacts of mining in general, with a focus on remote areas because it is a Canadian specificity. The author proposes for each issue a series of solutions that may be used. She focuses in particular on the role that companies have to play in maintaining the 'health' (at large) of the communities while mining and after mine closure. It gives as well a 'catalogue' of the social practices in the Canadian Mineral and Metals Industry, without analyzing them but the author emphasizes corporate social responsibility. Since it is a governmental document, it brings forward the solutions that are available to the companies in order to be a model of good practices nationally and internationally as mining corporations are increasingly required to deal with the social issued linked to their activities.

Kuyek J. & C. Coumans. 2003. No Rock Unturned: Revitalizing the Economics of Mining Dependent Communities. Prepared for MiningWatch. 66p. Available at www.miningwatch.com

This document is both an analysis and a literature review of the ways mining-dependent communities may revitalize their economy after the closing or downsizing of the mines. It makes it clear that mining communities have to develop and diversify their economic activities so as not to be faced with major crisis upon the closure of the mines.

The arrival of the mining industry has many impacts on the host community. One of the most common consequences is the displacement of original aboriginal population by the new settlers and transient workers. Besides, the impacts of mining go beyond the pit itself. The mining industry tends to ignore the various impacts once the mine closes.

Mining seems to impact women in particular due to their central role in Aboriginal culture.

Parsons G.F and R. Barsi. 2001. Chapter 7: Uranium Mining in Northern Saskatchewan: A Public-Private Transition. In Large Mines and The Community: Socioeconomic and Environmental Effects. Ed. By G. McMahon and F. Remy. IDRC/World Bank Publications. 342p.

In this document, the authors describe how private uranium mining companies committed themselves to improve socioeconomic conditions in the Northern communities in which they operate. These actions include educational strengthening, encourage of the youth to study, drug and alcohol prevention in the North. In this document, communities recognize that mining corporations can often be more effective in addressing communities' issues and problems than can government. In the far North of the province,

several corporations signed in 1999, with the communities of the Athabasca region an Impact Management Agreement (IMA), which addresses many of the communication, environmental, social, and economic issues raised. The central issue of lack of trust, that has plagued governments, corporations and communities relationships in the past, is now addressed through benefit sharing and through Environmental Quality Committees. In effect, uranium-mining companies have become in Northern Saskatchewan catalysts for community and regional development.

NWT Diamonds. 2005. The economic Impacts of the Diamond Industry on the economy of the NWT 1994-2001. A report by the NWT and the Nunavut Chamber of Mines.

The document described how the diamond industry came to NWT and what main companies are involved or will be involved in it in the near future. The mines concerned are the EKATI Diamond mine (1998), the Diavik Diamond Mine (2000) and the De Beer's Snap Lake Diamond project scheduled to being operations in 2007.

It described as well the economic impacts linked to the diamond industry, especially the positive impacts such as income, capital investment or economic growth. The strong growth in business activity and employment led to an increase in revenues and expenditures of both Federal and Provincial (GNWT) governments. Moreover, the royalties and various taxes by these companies bring more revenues to the governments. Then, the document listed the increase rates in employment, GDP, northern businesses directly due to diamond mining.

Aboriginal employment and business was another essential component of diamond mining. Participation or Impact Benefit Agreements were signed between companies and Aboriginal groups to ensure the support and participation of Aboriginals in the new industry. This support took place by encouraging Aboriginal business in relation to diamond mining, or by ensuring a certain number of Aboriginal hiring. This led to an income rise helping to reduce social assistance in the area, and to increase school enrollment.

This document focused strongly on the positive aspects of Diamond mining in NWT, in particular, the economic impacts on the population and on local businesses.

CCSG Associates for Mining Watch Canada. 2004. Overburdened: Understanding the Impacts of Mineral Extraction on Women's Health in Mining Communities.

This document was intended to be a comprehensive literature review on women, mining and health. This document aims at:

- Enhancing the level of knowledge about the impact of mining on women's health; and
- Developing the capacity of women in mining communities to protect themselves and their families from the effects of mining.

According to the authors, gender-based determinants can be classified as physical or social determinants of health. Much of mining's health impact on women is also mediated by the social determinants of health, including poverty, housing, the lack of social and economic power held by most women around the world. According to this document, women are affected by mining as individuals, workers, and as community members. Health problems arise for women both from the environmental and social impacts of mining.

It particularly focuses on how little is known of toxicological effects on women of a variety of minerals. It widens the literature on looking at both toxicological and non-toxicological health impacts for women mineworkers.

This literature review shows that women are affected by the mining industry from work to home, at all stages of their lifecycles, by all types of mining, and in ways that include physical, emotional, sexual and spiritual aspects of their lives. Involvement of women in mining must be recognized, and the impacts they have to deal with must be looked into. Many of the health effects of mining on women are linked to the social determinants of health. Finally, a series of recommendations are made to address the issues mentioned in the document.

McIntosh, W.K. (2005). Case Study 8 The Raglan Nickel Mine: What comes after an Impact/Benefits Agreement?. In Building Sustainable Relationships: A Compendium of Leadership in Aboriginal Engagement and Sustainability. Published by Canadian Business for Sustainable Responsibility. Available at www.cbsr.ca: p. 63-73.

The Raglan Agreement (1995) was the first Impact Benefits Agreement (IBA) signed between a mining company and an Aboriginal group in Quebec. Prior to that was signed an Agreement in Principle with four main points: environment, employment, training and compensation.

Falconbridge knew that community support was absolutely necessary to be able to go ahead with the project. They would not have received the governmental authorization without it. From the public consultation that took place, as part of the environmental assessment procedure, it came out that the Inuit were concerned about employment, the environment and the migration of new workers from the 'south'. They were particularly afraid of losing their traditional lifestyle with the incoming of wage economy. These concerns were addressed in the Raglan agreement that had specifics requirements:

- priority employment for Inuit (20% of the total workforce to be Inuit)
- priority to award contracts to Inuit-owned companies
- monetary compensation and profit sharing
- creation of the Raglan committee
- additional mitigation measures taken after publication of Raglan report.

There are still issues as the Aboriginal employment target that has not been reached yet for example. Other issues are still at stake, but the Raglan committee is trying to address them all. Overall, there has to be more of a long-term perspective.

APPENDIX IV – Summary of reviewed documents – hydroelectric sector

Hayeur Gaétan. 2001. Synthèse des connaissances environnementales acquises en milieu nordique de 1970 à 2000. Montréal : Hydro-Québec. 110p.

This document is an excellent overview of all the impacts of hydroelectric development. The fact that the document is written by a hydroelectric company explains why the emphasis is put on the positive impacts of hydro-development. The document looks in particular at northern hydroelectric development, which is a specificity of Quebec.

After describing the northern environment in which the infrastructures are located, the author exposes the evolution of this environment following the implantation of a series of hydroelectric structures in the area. The impacts mentioned are biophysical, archeological, social, economic and cultural. Historically, Aboriginals inhabit the region, and their communities were the ones to be most directly affected. After showing these impacts, the author focuses on the mitigation measures taken to deal with the negative changes that may have occurred.

Overall, the document intends to be a summary of all the lessons learned from such massive development in a completely isolated area until then. These impacts have deeply affected the human and physical environment, and these observations may be used for future development in similar environments. Hydro-Quebec has continued the development of the province's hydroelectric potential and used their previous experiences to mitigate these impacts.

L. Lavallée and P. André. 2005. Social impact follow-up in Quebec, Canada: 25 years of environmental impact assessment practice. Impact Assessment and Project Appraisal. Vol. 23(3): 241-245.

The authors of this article focus on social impact follow-up in a Canadian context. Quebec has had environmental regulation since the early 1980's. We may mention that the authors included cultural impacts in their definition. They intended here to report on the practice of social impact follow-up in Quebec and to identify elements that influenced the dissemination of their results. After explaining the process of follow-up in Quebec, the authors explain that if the proponent is required to perform follow-up studies, it does not have to make them public, however.

The results of the research show that very few social follow-ups were available since the implementation of EIA in the early 1980's. Interestingly, private businesses and crown corporations showed the best record of available follow-up, for their availability, their public involvement and the adjustments made overtime to deal with new realities. The results showed as well that the practice of social follow-up was uneven amongst the different stakeholders, and that the availability of reports was not uniform. Moreover, the social impact follow-up reports are still very superficial and do not reflect the complexity of the changes in social environments. Accessibility to reports is key. It seems that private corporations tend to promote access to their follow-up report to improve their image and get more feedback from the communities. Community-based monitoring increases the comprehensiveness of unexpected social impacts but they usually have little public exposure.

The authors recommend that all follow-up reports be made available regardless of the decision of the proponent.

Plourde D, Castonguay D and Charmard L.. 2002. Aménagement hydroélectrique Sainte-Marguerite-3. Suivi environnemental 2001. Suivi de l'utilisation du territoire 1999-2001 et Bilan 1994-2001. Rapport présenté par Roche Limitée, Groupe Conseils à Hydro-Québec. 55p.

This report presents the results of the follow-up studies done on land-use since 1994, when the building of this hydro-electric project started. These follow-up studies were required as stated in the governmental (federal and provincial) authorization.

The authors used the same sources of information from the beginning of the studies (1994) until 2001. Due to the location of the hydroelectric infrastructure (Sainte-Marguerite-3 is close to the city of Sept-Iles), both Aboriginal (Innu/Montagnais) and non-Aboriginal people were concerned. They were both consulted on a regular basis.

The non-Aboriginal used the territory mostly for fishing, hunting and trapping. These activities increased since 1994 due to better access to the land with new roads. However, this increase is not homogeneous. Some sectors are in fact less frequented than they used to be. They observed as well an increase in tourist activities.

We note that Aboriginal people increased the number of temporary camps (for fishing, hunting and trapping) in these territories thanks to the funding given through the SOTRAC. Overall, both Aboriginal and non-Aboriginal increased their use of the land following the great improvement of the road system with permanent roads. Non-Aboriginals have started to build secondary housing (cabins) in areas until then difficult to reach. Aboriginal use more the land as well, especially since they received financial support by SOTRAC to build camps.

The follow-up over almost eight years allowed observing difference between expected impacts and actual impacts. The competitive access to the land between the different groups present in the territory was one of those unexpected impacts. Aboriginal felt that they lost control over the territory for example. But non-Aboriginal felt as well the loss of territory that they had been using for a long time to the benefit of newcomers. These impacts were recognized to be due to the measures taken by the proponent and showed the necessity to establish a committee to avoid such difficulties for future projects. Moreover, the arrival of the forest industry in new areas had unexpected incidences on Aboriginal trapping. Finally, the authors look at the incidences of the mitigation measures.

Roquet V., Clément D., Penn A., Proulx J-R. and Tessier A. 2004. Environmental Follow-up Assessment of the La Grande Hydroelectric Complex - Human Impacts Generated in the Eastern Sector. Main Report. Rapport Final. Vincent Roquet et Associés, Archéotec, Carto-Média pour Unité Environnement, Direction Barrages et environnement, Vice-Présidence Exploitation des équipements de production, Hydro-Québec Production. 242p.

This study is summary of the human impacts generated by the building of the various La Grande Complex hydroelectric structures in the Eastern Sector of James Bay. This follow-up was part of the governmental requirements of the hydroelectric projects La-forge-2 and Brisay built in the early 1990's.

The human impacts includes impacts on the hunting, fishing and trapping carried out by Crees, on recreational or other land use activities practiced by non-Aboriginal populations, on businesses and employment in Cree communities and on the social and cultural dimensions of the land use and economic impacts which affected Cree communities. Impacts on landscape and Cree cultural heritage were also considered. The Cree

were involved in the various stages of the study from the definition of the work plan to the writing of the reports.

The infrastructures mostly affected trapping territories of the Aboriginal Cree communities of Chisasibi, Mistissini and Whapmagoostui. Consequently, a steering committee was set up involving all parties: the proponent, the Cree Regional Authority and representatives from these three communities.

This document is all the more interesting from a follow-up point of view that it assesses the efficiency of the mitigating measures since the early the beginning of the construction of the La Grande Complex in the 1980's. Hence, we can consider it as one of the longest follow-up studies done so far...The follow-up of land use in the area of the dams revealed that the reservoirs and the building of the roads (transtaïga and Route du Nord) had the most significant impacts.

The building of roads allowed for thousands of non-Aboriginal hunters to use this area, which was perceived as incompatible with Cree trapping activities. On the other hand, the road allowed an easier access to the trap lines.

The flooding of certain areas resulted as well in loss on revenue due to the loss in animals. Moreover, there was no long-term employment available to the Cree as expected originally, even if some agreements were signed to ensure that Cree would be employed preferentially. On the other hand, the arrival of outsiders allowed for the creation of Cree-owned businesses, confirming that Crees have learnt how to benefit from potential contracts by consolidating and diversifying their companies. This applies to both the construction sector and the service sector. For hunters, the Income Security Program was very beneficial because it allowed them to be paid to pursue traditional activities.

The most obvious cultural impact was the undermining of the tallyman's role. The traditional land use system has also been affected. The document concludes with a series of suggestions to mitigate the issues at stake here from the communities. This document is complete and deals with all the issues at stake in the Eastern Sector. It is an excellent example of a follow-up study.

Alliance Environment In. 2005. Aménagement hydroélectrique Perimbonka. Suivi milieu humain 2004 -utilisation des accès de pêche et chasse des travailleurs- Rapport présenté à Hydro-Québec.

This report was set within an environmental follow-up program to document hunting and fishing activities from the workers during the building of the hydroelectric infrastructure Perimbonka.

The document's introduction explains the methodology used to do the follow-up. The results showed that the workers went fishing and hunting sporadically, mostly during the summer time. Methodological issues were identified to improve the next follow-up research. This document is a typical small follow-up study.

Plourde D. and C. Vézina. 2002. Aménagement hydroélectrique de la Toulnustouc. Suivi environnemental 2002. Accès au territoire. Rapport présenté par Roche ltée, Groupe-Conseil à Hydro-Québec. 33p.

This follow-up research was done as part of the governmental conditions in order for the authorization to be issued. It was done the first year of the building of the Toulnustouc hydroelectric project. We note that previous studies to establish the terms of reference

were done. This report presents the results of the follow-up on the access to land and on fishing activities of the workers.

The road system ('Route du Lac Ste-Anne') already existed in the area before the start of the construction and was greatly improved to become a permanent road able to support the great amount of trucks that would be coming and going. It had appeared from public meetings about the project that the access to the land had to be monitored and managed. It appears that road users for leisure activities (hunting, fishing, hiking) were a majority (89%), especially during the summer months. Otherwise, workers, prospectors and Aboriginals mostly use the road. Visitors use the road to go to specific destinations, usually linked to the activities they came for (hunting etc.), and during that time of high non-Aboriginal presence, Aboriginals are not visible in the territory even though they should be there as well. Hunting and fishing by workers was not reported as significant due to their workload and work schedule. This document is similar to most follow-up studies; however, it makes a distinctive use of the terms of reference.

Lampron M. and J. Poirier. Centrale de la Toulnustouc. Suivi environmental 2002. Impacts économiques. Rapport présenté à Hydro-Québec par Roche. 31p

This document presents the results from the follow-up studies done to establish the terms of reference of the economic context and the employment market in the 'Côte-Nord' area in order to analyze the economic impacts of the project.

The 'Côte Nord' region depends heavily on the transformation of natural resources (hydroelectricity, fisheries, pulp and paper, forestry etc.). In the past few years, construction has employed an increasing number of employees due to important hydroelectric and aluminum projects in construction in the area. Companies were encouraged to hire people from the area. Aboriginals (Innu) are employed as well but not as much as they could be due to their lack of expertise, but quotas have still been put in place. An agreement was signed with the Innu (Pesamit Agreement) to support Aboriginal development. A Committee for Economic Spillover was created to maximize economic benefits to the area through communication with the proponent.

Overall, this document examines the economic impacts for the area.

Plourde D. and C. Vézina. 2003. Aménagement hydroélectrique de la Toulnustouc. Suivi environnemental 2003. Suivi du milieu humain. Rapport final présenté par Roche Ltée, Groupe-Conseil, à Hydro-Québec. 69p.

This document presents the results of the research conducted in 2003 within the framework of the environmental follow-up program for Toulnustouc. It deals with the following themes: access to land, recreational and tourist use of the land, sport fishing by the workers, regional economy and economic spillovers.

Access to the land: the majority of the users of the road utilize it for recreational and tourist activities. Most of them (72%) come from the close city of Baie-Comeau. Then, we can encounter workers, foresters, prospectors and Innu users.

In this document, the authors followed up as well by comparing the data from 2003 to the data from the previous years. Overall, the recreational users are increasing in numbers and are present in more and more sectors of the new territories, especially as the road conditions improve.

Recreational and tourist land use: the presence of secondary houses (cabins) and fishing activities were the main reasons of the presence of the users. A small proportion visited the sector for leisure activities such as hiking. These activities are not uniformly distributed in the territory and some sectors may be mostly used for one activity.

Sport fishing by the workers- the follow-up of the fishing activities of the workers is compared to the previous years. The company actually hired a 'follow-up agent' and encouraged the workers to fill up specific forms to better understand their activities. Overall, fishing has not changed much over the years. The workers tend to have similar behaviors and to use the same fishing spot year after year, the most common one being the new reservoir. The company stocked adjacent lakes as well with popular local fish species to reduce the pressure on those lakes.

Regional economy and spillover: Regional companies have adapted to a more competitive environment and got some contracts.

A company partnering Hydro-Québec with the local Aboriginal communities was created to limit negative impacts coming from the hydroelectric project and to accentuate positive impacts, especially for the communities. One of the most important economic issues is to favor Aboriginal employment.

Overall, the project has benefited the economy of the region Côte-Nord because of the various measures taken by the proponent to ensure that contractors would be from the region or would employ preferably people/companies from the area.

G. Whiteman. 2004. The impacts of economic development in James Bay, Canada. Organization and Environment. Vol. 17(4): 425-448.

The author examines the economic impacts of hydroelectric development in Northern Quebec on local Indigenous environmental managers, *tallymen*. Traditional Ecological Knowledge (TEK) is their framework for cultural management. The author notes that the Cree accepted hydroelectric development in the James Bay area because they had no other choices, despite their attempt to go to the Supreme Court, and the fact that development had to happen in the area to support the ever-growing native population.

It is indicated that there were both positive and negative impacts derived from this development. One of the positive cultural impacts was derived from the implementation of the Income Security Program (ISP) which allowed people to pursue their traditional subsistence activities. On the other hand, the 'centralization' of people in permanent residency increased social problems such as suicide, neglect of children, and substance abuse. Moreover, the opening of the territory through the building of roads increased the need for a cash economy and reduced the proportion of people in the traditional economy. More specifically, the improved road access brought about additional development such as forestry, mining, sport fishing and hunting, some of which collided with traditional management of the tallymen, as they were no longer able to control activities in their territories.

The proponent had a follow-up monitoring program held in the area from the beginning of the building of the hydroelectric infrastructures. However, the follow-up studies were not as systematic for socio-cultural impacts as it was for biophysical impacts. Besides, the emphasis was on positive rather than the negative impacts.

The author intended to understand from the tallymen's point of view what the impacts had been, since they were the prime guardians of TEK. The most important issue to

them was the shift in power and loss of control over natural resource use. Another issue was the community-wide problem of loss of natural resources. Because of these changes, they were no longer to practice traditional management and to teach younger generations. Consequently, the cultural respect for the tallymen was lost. Overall, the tallymen were the ones that experienced the most impacts from the economic development and they were able to trace it down directly to the beginning of hydroelectric development in their area.

The author felt that these results were important to take into consideration as further economic plan continue in the area. She also felt that information on tallymen was all the more important that they would be the ones most directly impacted, while their ecologically embedded management approach should be used.

Société d'Énergie de la Baie James and Hydro-Québec. 2005. Aménagement hydroélectrique de l'Eastmain-1. Étude de suivi de chasse et pêche sportives par les travailleurs en 2002 et 2003. 37 p.

This report was done in partnership with the Cree Corporation Weh-Sees Indohoun to assess the impact of workers sport fishing and hunting activities on the Cree traditional fishing and hunting activities and the possible overexploitation of the land. This potential impact was determined during the EIA and required follow-up studies all throughout the construction of the infrastructures and the presence of the workers. The results showed that workers do not practice sport hunting much but they do a lot more sport fishing. Most of the fishing is done in trap lines close to the camps and close to roads, reflecting how access to the land was an essential factor. It was not determined at this point, the impact it had on Cree traditional activities due to a lack of information and the authors recommended creating a formal register to determine this impact.

McIntosh, W.K. (2005). Case Study 10. Sustainable relationship through collaborative approaches: BC Hydro and BC Aboriginal Fisheries Commission; MB Hydro and York Factory First Nation. In Building Sustainable Relationships: A Compendium of Leadership in Aboriginal Engagement and Sustainability. Published by Canadian Business for Sustainable Responsibility. Available at www.cbsr.ca: p. 81-92.

This document deals with the involvement of both BC Hydro and MB Hydro in Aboriginal initiative in their hydroelectric development. Both companies have a significant number of hydroelectric structures and more projects to come and they need to deal with the impacts on Aboriginal groups.

Manitoba Hydro partnered with the York Factory Learning Institute (YFLI) in the creation of the Hydro Northern Training and Employment Initiative, which is used to prepare Aboriginal residents in employment and economic opportunities linked to hydrodevelopment. Manitoba wants to support and promote Aboriginal community development in the following areas: equity ownership, procurement, other businesses, employment and training.

The bidding started in 1990 but the regrouping of all the stakeholders did not take place before 2003-2004. The Northern Training Initiative helps the Aboriginals to take advantage of the upcoming projects (Wuakwqatin and Gullp. It is as well, a community-based training program in which the community chooses the adequate training to become a full part of the economic community.

Within this framework, BC Hydro started a significant public consultation leading to building a trust-based relationship with the Aboriginal, and to competing interests put together.

APPENDIX V – Summary of reviewed documents – oil and oil sands sector

Timilsina, G.R;, Leblanc, N.; Walden T. 2005. Economic Impacts of Alberta's Oil Sands: Volume I. Prepared for the Canadian Energy Research Institute. 101 p. Available online at http://www.ceri.ca/Publications/documents/OilSandsReport-Final.PDF.

Alberta's oil sands reserves are second only to Saudi Arabia's crude oil reserves—and the economic spin-offs are spread much wider than Alberta's borders. Oil sands might be more expensive to develop than Saudi light oil—more capital investment needed and much higher supply costs—but that very fact means there is a greater *multiplier effect* on the Canadian economy.

Besides, increasing world oil prices, rapidly growing global demand for oil, and continuing advances in technology are all helping to reduce those cost differences. The increasing production levels of both crude bitumen and upgraded synthetic crude oil (SCO) are already—and will continue for many, many years—stimulating the economies of Canada and all its provinces, as well as economies abroad.

CERI has analyzed the potential economic effects of the ongoing development of Alberta's oil sands, and presents its findings in this recently completed two-volume report. The study spans the period 2000-2020—although the impacts continue well beyond. Three main impact areas are analyzed—gross domestic product (GDP), employment (including labour income), and government revenues—in several scenarios and with various sensitivities.

The CERI research team—led by Dr. Govinda Timilsina—has used sophisticated Input-Output models for Alberta, Ontario, Quebec, and the rest of Canada. The assessment uses CERI's *expected* and *potential* oil sands supply outlook cases, and a series of sensitivity analyses.

Dr. Timilsina comments that, *"in CERI's relatively conservative base case scenario, investment of approximately $100 billion directly generates oil production worth about $570 billion—and in the process creates GDP increases of $885 billion, 6.6 million person years employment, and $123 billion of government revenues".*

He also adds, *"these benefits are spread wide and far—Ontario, Quebec, other provinces, municipalities, and the various levels of government in Canada, as well as to other countries—and across many sectors of the economy".*

Given that the spin-offs from oil sands development in Alberta accrue widely to all parts of Canada and abroad, few, if any, governments and organizations can afford to ignore the issues CERI has examined and analyzed, if they want to position themselves to take advantage of the business opportunities presented.

Storey K. and B. Noble. 2002. Increasing the utility of follow-up in Canadian environmental assessment: a review of requirements, concepts and experience. Prepared for the Research and Development Monograph Series, 2002.

This is an excellent document that provides an overview of follow-up in Canada, using case studies as examples. In the first part, the authors describe their objectives, then move on to background information on follow-up in the second part. An interesting element of monitoring has to do with Impact and Benefits Agreements (IBA). Usually, when IBAs are signed between project proponents and affected groups, then monitoring

has to occur to ensure that both parties respect all elements. This is of particular interest for us, as monitoring is increasingly done under those types of agreements.

Then, they show the difficulties linked to the notion and value of predictive accuracy, as required when done in follow-up and monitoring. For example, many impacts cannot be tested or are not statistically verifiable, which makes the monitoring intrinsically difficult.

Lawe L.B., J. Wells and Mikisew Cree First Nations Industry Relations Corporation. 2005. Cumulative effects assessment and EIA follow-up: a proposed community-based monitoring program in the Oil Sands Region, Northeastern Alberta. Impact Assessment and Project Appraisal. Vol 23(3):205-209.

In this document, the authors explain why the Mikisew Cree First Nation (MCFN) decided to intervene in the regulatory hearings of two recently proposed oil sands developments: Canada Natural Resource Limited and Horizon Project Jackpine Mine Phase 1. Their intervention stem from their concern about cumulative effects to water resources. To alleviate these concerns, the authors describe the community-based monitoring that was recommended to the MCFN. One of the current concerns regarding the monitoring programs already in place is that it is controlled by the development proponent's EIA license requirements, so that collaborative follow-up is not occurring effectively. The research exposed here showed that there are currently extensive gaps in the current monitoring programs initiatives. Some of the gaps included the inadequate community involvement in designing monitoring programs, the lack of integration of Traditional Ecological Knowledge (TEK); lack of involvement of volunteers in undertaking monitoring, and lack of scientific research to enable MCFN environmental questions to be addressed.

These concerns are primarily environmental ones, but the consequences of these concerns have social impacts such as the lack of trust in the current organizations in charge of doing the monitoring. The most important issue at stake in the case of oil development in Western Canada appears to be linked to public involvement. The authors define community-based monitoring as "a forum that allows effective and meaningful integration of TEK into a multi-stakeholder institution". They stress the fact that TEK should be more integrated in monitoring programs as it has better potential to bring recent information into the monitoring program so it can be updated. They recommend to use Environment Canada's CCMN (Canadian Community Monitoring Network) as a model for greater local involvement and leadership in decision-making. The goal would be to increase trust and credibility of the programs as local residents participate as well in the monitoring. One of the main issues at stake for First Nations in oil development is their lack of trust regarding cumulative effects. The authors recommend the CCMN as a way of reinstating this trust.

Storey K. and B. Noble. 2005. Socio-economic effects monitoring: toward improvements informed by biophysical effects monitoring. Impact Assessment and Project Appraisal. Vol 23(3): 210-214.

The authors describe briefly the Canadian context of post-decision effects follow-up, especially the fact that it focuses mostly on biophysical effects rather than on social effects. If human impacts are indeed studied, they do not have the same well-developed and rigorous methodological process than their biophysical counterparts. If they recognize the complexity of the lack of knowledge regarding social follow-up, the authors express their concern about the lack of good practice in social follow-up studies and want to propose a standard method, using the case of the Hibernia oil offshore platform. To do so, they compared the biophysical effects monitoring program to the socioeconomic ef-

fects monitoring program (SEEM). The authors outlined some problems among others: the monitoring objectives of the SEEM were inappropriate, there was a lack of commitment and responsibility due to no governmental requirements, the variables and indicators selected were not appropriate and not collected usefully due to no rationale behind the data collection, and the analysis was never done. It appears clearly to the authors that social impacts follow-up has to be significantly improved with a more rigorous methodology to be more efficient for future projects.

Storey K. and P. Jones. 2003. Social impact assessment, impact management and follow-up: a case study of the construction of the Hibernia offshore platform. Impact Assessment and Project Appraisal 21(2): 99-107.

This paper focused on anticipated social impacts associated with the employment in the Hibernia offshore oil project, as they emerged during the assessment phase, their importance in the decision process and the actual during its development. In the EIA, the proponent (Mobil Oil Canada Ltd.) examined among other things, demographics, traditional lifestyles, community employment, with an emphasis on public involvement through consultation to find out what the best mitigation measures would be for them. This was useful because it allowed to proponent to and deal with the fear from the communities associated with oil development. The proponent used the recommendations from the community to reduce the potential social impacts. All throughout those different processes, a follow-up was done. Mobil used impact management planning to deal with the uncertainty common in large-scale construction projects and adopt a contingency approach.
The authors identified several elements standing out for this SIA and project: the context and the public involvement, the scoping of the issues through public consultation, the acknowledgement of uncertainty in such complex project, impact management and follow-up.

The authors concluded by saying that Hibernia had few negative social impacts on the social area. They believed it was due to the SIA (and follow-up) and the willingness to meet the management objectives identified by the affected communities.

McIntosh, W.K. (2005). Case Study 2. Syncrude Canada and Fort McKay First Nation: Partnering for success. In Building Sustainable Relationships: A Compendium of Leadership in Aboriginal Engagement and Sustainability. Published by Canadian Business for Sustainable Responsibility. Available at www.cbsr.ca: p.7-18

This document describes the involvement of the oil company Syncrude in Aboriginal development. Syncrude developed Aboriginal Development Programs training in corporate leadership, employment, business development, education, community development and the environment. These programs have been developed throughout the building of the relationship between the company and local Aboriginal First Nations. Until the collapse of fur trade in the 1980's, Aboriginals were opposed to the development of oil sands in the Athabasca area. However, they decided after that to become part of this development in order to get new opportunities while protecting their traditional culture and values.

In 1988 the Athabasca Tribal Council (ATC) which regroups five First Nations was created, to be used as a forum to make new policy on common issues and to negotiate with industry. This was the beginning of the development of very effective and respective regulatory mechanisms. The creation of the Athabasca Regional Issues Working Group (RIWG) in 1997, was initiated when a number of large and smaller tar sands mining and refining operations companies regrouped. The new organization was to deal with main

issues in the community: human infrastructure, physical infrastructure, environment and economic development. The RIGW mandate is to provide information to all stakeholders and to do a cumulative social impact assessment of all oil sands projects. Following this initiative, the Core Agreement was signed in 2003 by Tribal Council Chiefs, industry representatives and three levels of government to provide the Athabasca First Nations with the proper tools for capacity building, and industrial development. The forum of the Core Agreement, regrouped all stakeholders to identify issues, mitigate their negative impacts and increase opportunities for the communities. Syncrude has shown his leadership in providing Aboriginal with employment and education. The fly-in program has been very successful as it allowed Aboriginal pursuing traditional activities while remaining in an income-based economy. The company intends to provide the Aboriginal with the proper tools to become competitive on the marketplace and to be a full part of the oil sands development in the Region.
This document shows some of the ways by which social impacts can be mitigated or avoided through strong relationships between the industry and the Aboriginal communities. This can only be done in an atmosphere of trust and of commitment from all parties. Some of the tools may be used as models for other communities or other industries.

McIntosh, W.K. (2005). Case Study 4. Encana Corporation and Métis Nation of Alberta and Saddle Lake First Nation: Partnership to Make a Difference. In Building Sustainable Relationships: A Compendium of Leadership in Aboriginal Engagement and Sustainability. Published by Canadian Business for Sustainable Responsibility. Available at www.cbsr.ca: p. 27-33.

This is a chapter in a book dedicated to Aboriginal involvement with the industry. The author explains how the company Encana helped its neighbouring Aboriginal communities become part of the local economy through a Joint Venture. Encana offered to the Métis Nation of Alberta to get involved in a drilling partnership, and it helped this group get the contract. Before accepting, the Aboriginal partner brought a number of issues to the table: long-term profit potential, band member employment, job security.

After negotiation, the group managed to build their own company funded in part by the Department of Indian and Northern Affaires Canada (INAC). A training program was launched for the Métis Nation. Encana needed those new employees because of the shortage in certain essential areas in mining.

The Aboriginal are now in a strong position for work and for negotiation, which open them to new opportunities. The process used by Encana gave to Aboriginal communities the proper tools to better take advantage of the new economic opportunities opening in the area.

APPENDIX VI - Summary of reviewed documents – gas, LNG and pipelines sector

Directions de santé publique Chaudière-Appalaches et Capitale-Nationale (2007) Projet d'implantation d'un port méthanier et d'infrastructures connexes (Rabaska) à l'Est de la Ville de Lévis : Perceptions de la population des territoires limitrophes. Sainte Marie, Direction de la Santé Publique et de l'évaluation, Agence de la santé et des services sociaux de Chaudières-Appalaches, 55 p.

This report is the final submission of the two above-mentioned health authorities of Quebec regarding the LNG project Rabaska. The project is located in the east sector of the city of Lévis, facing the city of Quebec. The report examines the rationale for the project, the location which was very controversial and the concerns that the project raised related to public health. The psychosocial aspects as well as the social acceptability of the project were measured by a survey conducted among local populations.

Natural Resources Canada (2006) Canadian LNG Import Projects: Status as of September 2006, Natural Gas Division, Petroleum Resources Branch, Energy Policy Sector.
http://www2.nrcan.gc.ca/es/erb/CMFiles/LNG_Web_September_2006209LQB-01092006-7930.pdf.

Natural Resources Canada (2006) Canadian LNG Import Projects: April 2006 Update, Natural Gas Division, Petroleum Resources Branch, Energy Policy Sector
http://www2.nrcan.gc.ca/es/erb/CMFiles/LNG_Update_April_2006209OFE-27042006-9532.pdf.

These are both Government of Canada's short periodical reports on the state of Canadian LNG terminals proposed. Information on the status of EIA process for each project is provided. It can be consulted on-line.

APPENDIX VII – Summary of reviewed documents – other sectors: Aluminium

Alma's aluminium smelter is a particular case study because of the long-term socioeconomic monitoring. A team from the Groupe de recherche et d'interventions régionales (GRIR) (Regional Research and Intervention Group) of the Université de Québec à Chicoutimi (UQAC), proposed to the project proponent (Alcan) the elaboration of a five years social impact follow-up model. This summary encompasses data from a whole set of documents and articles that were produced in the context of the follow-up studies of this project.

Previous to the construction of the aluminium smelter and of related industrial infrastructures by the multinational Alcan on Alma Island (Quebec, Canada), environmental monitoring (EM) and public hearings were done (1997). During those events, a number of questions were raised, among which impact follow-up was considered. Follow-up was the object of particular attention from the promoter as well as from regional contributors that have been engaged in creating multipartite committees, notably for regional economic impacts follow-up.

Follow-up in Alma was identified as essential to:

- Make environmental monitoring processes more efficient;
- Validate what was expected/planned in impact assessment studies versus what actually occurred;
- Anchor establishment and management project planning, in a sustainable development model.

This program was used to train researchers in environmental monitoring (EM) within a framework of regional development studies at masters and doctorate level. The project constitutes a strategic innovation because EM is essential world-wide for experts and decision-makers. Moreover, impact follow-up is considered by academics as a promising avenue and yet is insufficiently developed in the perspective of EM validity and sustainable development

In the medium and long term, the research program targeted the following objectives:

- Develop an impact follow-up model of Alma's aluminium smelter
- Generate applied knowledge concerning:
    - Economic characteristics of study zones;
    - Citizen perceptions concerning quality of life and the environment;
    - Expected social and economic impacts before, during and after construction of the smelter;
    - Assessment methods and impact follow up models;
    - Processes, modes and analysis of public and community participation.
- Set up a geo-referenced database for urban, environmental planning and management
- Propose, if needed, preventive and mitigation measures during the plant's set up
- Generalize results in regards to the set up of future similar projects in Quebec
- Increase expertise in the field of EM and regional development.

This research as a whole involves a triple challenge:

1. Integrating the results generated by essays, theses and specific research operations, such as a questionnaire on quality of life and for reference portrait;

2. Transforming the results into appropriate and concrete planning and management tools for stakeholders;

3. Identifying and measuring social impacts with their complexity and their diffuse effects.