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The Role of Participatory Geomatics Technologies in Supporting Community-based Food Gardening Initiatives in Northern Canadian Indigenous Communities
(June 2018)

Author: Marion Macé
Employer: OHMI-Nunavik
Niqilirinik Project: Northern Community Greenhouse Project

Abstract

As a consequence of accelerated environmental changes in the Canadian Arctic, exacerbated by rapid socio-cultural and economic transition, Inuit communities in Canada are facing a major food crisis along with a high level of food insecurity. Local food production initiatives have been developed as one alternative and culturally appropriate way of addressing this issue. Several projects in Northern Canada have shown great potential in providing opportunities for local, accessible, affordable and healthy food while contributing to communities’ food autonomy and overall well-being. However, several issues with the development and management of these projects have been raised concerning the lack of local and long-term involvement, the lack of experience and technical expertise regarding food gardening and the lack of knowledge sharing support. As part of a community-based participatory project called Niqilirinik (meaning “taking care of food” in Inuktitut), in two Inuit communities in Nunavik, my research focused on the role of participatory geomatics technologies in contributing to the development and management of local food gardening initiatives that address food insecurity in Northern Canadian Indigenous communities. This report seeks to develop a critical understanding of the possibilities and limitations associated with participatory digital mapping tools. The results show that participatory geomatics has significant potential for increasing local, and more specifically youth, involvement in the development of a community-based monitoring system, and for creating knowledge sharing platforms. However, several challenges still need to be addressed such as limited access to a reliable internet connection and the need for long-term support and implementation.
Abstract

Many marine mammal species, including whales, seals, sea lions and sea otters, are at risk in Canada. Threats currently impacting these animals include underwater noise, vessel strikes, contamination of habitat and reduction in prey availability. These threats can be caused or exacerbated by development projects, currently regulated by Environmental Assessment legislation in Canada. The objective of this report is to identify legislation protecting marine mammals, threats to marine mammals, and to explore how marine mammals are considered in the Environmental Assessment procedure in Canada. First, threats were collated from the Species at Risk Public Registry. Criteria were developed to evaluate performance of the projects, based on: scoping, impact prediction, impact management, monitoring and follow-up, uncertainty disclosure and cumulative impacts. Eight designated project Environmental Impact Statements were selected for evaluation. It was found that the Environmental Assessment process partly complies with existing legislation protecting species at risk in Canada. In the projects assessed, impact management and scoping are scored highest based on criteria, while uncertainty disclosure, baseline, risk of vessel strikes, monitoring and follow-up and cumulative impacts of marine traffic scored the lowest. To address these issues, recommendations were given for these five poorly ranked areas. General recommendations were also given for increasing consideration of species at risk in the Environmental Assessment process in Canada. In conclusion, it is recommended that an increase in coordination between species at risk legislation and EA processes occur, so that these can cooperatively improve the state of marine mammals and other species at risk in Canada.
The consideration of Landscape Fragmentation and Connectivity in Canadian Environmental Assessment Practice (April 2018)

Author: Felipe Casasanta Mostaço
Employer: Ville de Montréal

Abstract

The preservation of landscape connectivity has become increasingly important for achieving biodiversity conservation goals globally. In Canada, some national and regional initiatives have been developed with this purpose. These efforts imply the need for incorporating this approach in EA regulations, as large projects are capable of creating fragmented landscapes. An analysis of the consideration of landscape connectivity and fragmentation in Canadian EA was conducted through a systematic review of ten recent Environmental Impact Statements (EISs) of projects in several development sectors. The focus was on assessing the importance given to this issue through the selection of valued ecosystem components (VECs), impact prediction and the elaboration of mitigation measures and monitoring plans. Overall, VECs are limited to the assessment of vegetation loss and alteration of the amount and quality of wildlife habitats, which do not necessarily reflect changes in landscape connectivity. Although commonly employed methodologies seem to be efficient for assessing landscape fragmentation, improvements regarding the measurement of wildlife movement and landscape connectivity conditions are necessary in order to predict impacts more properly. Presently, mitigation measures and monitoring plans do not include the creation of biological corridors, opposing to trends in conservation planning that are supported by current scientific literature. As a conclusion, it is recommended that Canadian EA legislation shift to a more inclusive approach that would effectively incorporate the assessment of impacts on landscape connectivity as a requirement for every project undergoing an EA. Better assessments will result in robust mitigation measures and inclusive long-term monitoring plans, contributing to maintaining landscape connectivity and biodiversity in Canada.
Geospatial technologies applied to the Environmental Impact Assessment of Agriculture (April 2018)

Author: Gurpreet Kaur

Employer: Dr. Angela Kross Research Lab

Abstract

Agricultural practices such as improper water management, use of fertilizers and pesticides, clearing of forests negatively impact the environment. Despite these impacts, no federal or regional framework exists in Canada to regulate or assess the environmental impacts due to agricultural activities. Environmental Impact Assessments (EIA) are normally applied to new developments and the nature of agriculture developments may have complicated the regulation of this sector. This study investigated other impact assessment frameworks and discusses the use of the Life Cycle Assessment (LCA) as a suitable framework for the assessment of historic and long-term impacts associated with the production of a crop. This report further discusses environmental indicators that can be used within the assessment frameworks and the usefulness of spatial technologies in assessing the impacts associated with different agricultural practices. A case study serves as an example of how geospatial technologies can be used within an EIA framework applied to new agriculture developments or agricultural practices, such as tile drainage systems, within existing agriculture fields. Crop yield was used as an indicator of the impact of these systems on the environment. The result of the study will be communicated through an online spatial tool which would assist the farmers in exploring potential impacts of different tile drainage systems. In conclusion, it is recommended that impacts associated with new agricultural projects should be assessed like any other major resource capitalization project. For existing projects, it could be beneficial to assess the impacts associated with the agricultural activities before they are implemented or conduct LCA to study the impacts associated with the production of a crop.
Understanding the Legislative Decision Framework of Social Considerations in Environmental Assessment: A Dual Case Study of Radioactive Waste Management in Canada (April 2018)

Author: Taline Kalindjian
Employer: Canadian Nuclear Safety Commission

Abstract

Radioactive wastes have been increasing ever since the expansion of the nuclear industry in Canada, where long-term solutions have not been applied yet. One of the challenges of radioactive waste management in the environmental assessment process is due to the lack of social considerations i.e. participation, perception about the nuclear waste management projects, and the protection of the public and the environment. The aim of this report is to explore the social challenges in radioactive waste management and analyze how public participation affects the legislative decision-making in environmental assessment. A dual case study, within which both are radioactive waste management projects, (1) the Deep Geological Repository and (2) the Port Granby Project were used to qualitatively compare the extent of social considerations against each other, and to certain criteria that were set (requirements of public participation, levels of involvement, eight key elements for meaningful public participation, and nuclear specific social challenges). The results of the study demonstrated that a gap still exists in meaningfully considering the social aspects and public participation in the environmental assessment of radioactive waste management projects. The social aspect should be further improved in the environmental assessment process for radioactive waste management to ensure transparency and openness in decision-making.
Abstract

Based on a comprehensive review of relevant literature, this essay draws out the history associated with efforts to better consider climate change adaptation within the EA framework in Quebec as well as internationally. The report builds on an understanding of the local situation with regards to the EA process and climate change impacts of concern. These background elements are necessary to develop a clear understanding of the five (5) cases selected for review: 1) Re-modeling of the Laurette River; 2) Réseau Électrique Métropolitain (REM); 3) Raglan Mine II & III; 4) Turcot Interchange; and 5) Shoreline Stabilization at Lac Saint-Jean. The criteria for analysis of the cases, which stem from the literature review, provide a preliminary assessment of the quality and the extent of adaptation considerations within the selected EAs. The findings from this study show evidence of climate change adaptation consideration in three out of the five selected studies. The extent and quality varied according to project type. For example, from the cases selected, the quality and extent on of climate change considerations was higher in the projects that involved interventions in the hydrous environment, as opposed to those in the transportation sector. Due to sample size and the sample selection method these findings cannot be generalized to the entire population of projects subject to an EA prior to the reform. The cases are however useful illustrative examples of what has been done and, in certain cases, of missed opportunities that could be useful for a Quebec-specific guide to incorporating climate change in environmental assessment (EA).
Assessing the Effectiveness of EIA in Terms of Scoping Out Biophysical Impacts Caused by Federally Regulated Pipelines: The Case Study of Trans Mountain Expansion and Enbridge Northern Gateway Pipeline Projects

(March 2018)

Author: Pavla Karaskova
Employer: Podium Energy and D&G Enviro-Group

Abstract

An increase in demand in the global energy sector has brought to light many issues. Undetected and unreported pipeline spills are becoming a commonality. According to the Transportation Safety Board of Canada, there were 101 pipeline incidents reported in 2016, 100 incidents in 2015 and record bearing 170 incidents in 2012. This study aimed to assess the effectiveness of the EIA reports of the proposed Trans Mountain and Northern Gateway pipeline projects in terms of scoping out biophysical impacts. The effectiveness assessment of the two reports was assessed based on the proponent’s capability to establish a clear purpose that proves its commitment to environmental protection, to present a realistic project alternative analysis, to establish a relevant baseline study, to thoroughly assess valued ecosystem components and successfully assess and communicate the project’s risks and uncertainties. It was found that the EIA report of the two case studies was moderately effective in scoping out biophysical impacts. This result is due to the fact that there are still concerns that need to be addressed. The purpose section of the Northern Gateway project lacked a reference to its commitment to environmental protection; the baseline studies of neither report made a reference to past conditions of VECs; neither report assessed alternatives to the project and both reports poorly communicated uncertainties. Further monitoring of pipeline EIAs needs to be implemented in order to document the needed improvements for EIA and establish universal standards for EIA effectiveness.
On the Application of Environmental Assessment to Mining in Ontario

(March 2018)

Author: Trevor Bell
Employer: Ontario Ministry of the Environment and Climate Change

Abstract

The Ontario Environmental Assessment Act (EAA) applies to public sector projects rather than to private sector projects such as mines. The Class Environmental Assessment (Class EA) is Ontario’s streamlined self-assessment process for activities with predictable and manageable impacts. Under the EAA, selected mine components (e.g. electricity transmission facilities and not the entire project) undergo Class EAs. Recently, several proponents of northern Ontario mine projects have undertaken Individual Environmental Assessments (IEAs) through voluntary agreements with the province. This report compares and assesses strengths and weaknesses of the Rainy River Project IEA and the Victor Mine Power Supply Class EA. The results of the comparison show the IEA was more stringent for numerous reasons. These results serve to inform recommendations that Ontario should create a new regulatory instrument to subject mines to the full requirements of the EAA.
Incorporating climate change considerations in the Environmental Assessment process: What Canada can do better (January 2018)

Author: Adam Pinchefsky
Employer: Pollution Probe

Abstract

Global climate change has emerged as one of the greatest environmental challenges of our time and has long term implications for humanity. This paper will examine how Canada currently uses environmental assessment (EA) to mitigate GHG emissions at the project level and how Canada can improve its current process. A thorough literature review was conducted to analyze how best to incorporate climate change mitigation in EA. The analysis of the literature identified eight recommendations for improvement in the way Canada currently addresses climate change mitigation in EAs. Canada should include climate change mitigation in the Canadian Environmental Assessment Act, which would allow for greater incorporation of jurisdictional GHG emission targets, would mandate a GHG threshold to trigger an EA, would include GHG emissions when evaluating project alternatives, and would provide stronger enforcement of mitigation measures during the monitoring stage. Canada’s guidelines for incorporating climate change mitigation in EA can be improved to clearly define GHG emissions impact significance, assign proper spatial boundaries during the scoping phase to include downstream emissions and to include a more thorough list of mitigation measures. Using a case study of the Tamarack integrated oil sands project, the use of climate change mitigation assessment in the EA process will be examined based on how well the EA followed the current federal guidelines and how it could have better assessed climate change mitigation in relation to the recommendations in this paper. The implementation of these recommendations would improve how climate change is assessed in the EA process and help Canada reach its climate goals. EA can be a useful tool for climate change mitigation if important and necessary changes are implemented.
2017
A review of Canadian Strategic Environmental Assessments regarding their extent of integration of climate change considerations (December 2017)

Author: Nour Nader

Employer: Secretariat of the Convention on Biological Diversity (SCBD)

Abstract

Climate change (CC) is one of the major challenges that the planet is facing nowadays, and solutions to fight it are more than ever in need. One reason behind this lack of progress, seems to be the rather weak performance of strategic environmental assessments (SEA) in including CC considerations worldwide. Thus, this paper has reviewed Canadian SEA reports published by several departments and agencies for their extent of integration of climate change considerations, according to the best practices in the domain. The results showed that the actual framework used in SEAs has a lot of limitations, due to its unstructured and generic nature, which is leading to a low quality of SEAs in terms of inclusion of climate change, and the non-achievement of the SEA best practices. Canada did not seem to be on track to achieve its national target for greenhouse gas emissions reduction. In order to better include climate change in SEAs in Canada, cooperation between the departments and agencies must take place, with the publication of a single SEA report for all entities. CC adaptation planning should be added to this document rather than being part of a separate report. Furthermore, Regional Strategic Environmental Assessment should be used in addition to the national SEAs in Canada. Lastly, cooperation among jurisdictions should be put in place in Canada for SEA systems to be harmonized, and in order to achieve national climate change goals.
The ongoing federal environmental assessment (EA) review is examining how the federal EA regime can be enhanced to rebuild public trust and provide more robust EAs. Many stakeholders in the review have stated that the inclusion of sustainability assessments (SAs) within EAs could be implemented to address stakeholder concerns. The objective of this report is to explore ways of effective cooperation between jurisdictions within the context of SAs and synthesize how they can be used to improve the current federal EA regime. This report centers on the following research question: How can past EAs under the former Act and EAs under the current Act inform a new sustainability regime in Canada? In order to explore this question, stakeholder comments were compiled to identify the most common concerns voiced by stakeholders with regards to the current federal EA regime. These concerns were then explored within two well-known Canadian SA cases (Voisey’s Bay and the Mackenzie Gas Project) to determine how these projects addressed these concerns. Findings of this project indicate that in comparison to past legislation, the current EA regime will require more cooperation among jurisdictions to ensure that SAs be completed successfully. Joint review panels are the best way to ensure that SAs are achieved. The results also indicate that regional strategic assessments are tools that can greatly increase the effectiveness of future SAs. More cooperation, and guidance and training is required to ensure a future federal SA regime is successful.
The Consideration on Climate Change Mitigation in Environmental Assessment
(December 2017)

Author: Katja Hetmanchuk
Employer: Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques

Abstract

Climate change is the largest and most complex environmental issue of our time. Greenhouse gas (GHG) reduction commitments have emerged as a tool to limit the effects of a changing climate. Quantifying a project’s GHG emissions and scrutinizing their effect on climate change are increasingly required in environmental assessment (EA) processes in Canadian jurisdictions. This report investigates if an EA authority’s intention for the inclusion of GHG considerations results in the implementation of these considerations into environmental impact statements (EISs) by proponents. From this investigation, the question of how the consideration of GHG emissions in the EA process influences the achievement of GHG reduction targets is explored. Fifteen projects across five Canadian EA jurisdictions were reviewed. An examination of projects at the federal level and in British Columbia, Ontario, Quebec and Nova Scotia revealed that an EA authority’s intention was not always reflected in EISs. Well-developed intentions by EA authorities did not necessarily result in proponents following guidelines for GHG consideration in their EISs due to the absence of regulation or a defined policy. Conversely, an underdeveloped intention by an EA authority sometimes resulted in EISs with thorough GHG assessments. In some jurisdictions where the EA authority intention appeared underdeveloped, there were mechanisms in the EA process through which GHG consideration by the proponent could be compelled. The examination of the five jurisdictions did not reveal how GHG consideration in EA, in its present form, assists in meeting GHG reduction targets. A GHG emissions limit imposed during the EA process could link EA to success in meeting these targets.
**Biodiversity and Indigenous Peoples: A case study on the Review of Environmental and Regulatory Processes in Canada (December 2017)**

**Author:** Cindy Bertran Cerino  
**Employer:** Canadian Environmental Assessment Agency

**Abstract**

In 2016, an independent Expert Panel engaged with Indigenous Peoples, in addition to other stakeholders and the public, as part of the review of environmental and regulatory processes in Canada. The review represented an opportunity for Indigenous groups to bring forward their views, concerns and recommendations regarding environmental assessment (EA).

This report focuses on identifying the main concerns and recommendations made by Indigenous groups from the north coast of British Columbia (B.C) to the Government of Canada regarding changes needed in the EA process, specifically related to biodiversity protection. It analyses how the Canadian EA process can be revised to address the concerns, rights and interests of Indigenous Peoples in relation to biodiversity protection.

A biodiversity-related keyword search analysis of each of the nine submissions from north coast BC Indigenous groups was employed to determine the main concerns and recommendations they had related to impacts on biodiversity and their communities. Their recommendations included: joint monitoring to address cumulative effects; implementation of strategic and regional assessments; incorporation of social and cultural components within environmental effects; adoption of collaborative management mechanisms such as adaptive management and co-management; and meaningful incorporation of Indigenous knowledge throughout the EA process.

The findings highlight the key role Indigenous Peoples play in the protection of biodiversity and the critical importance of their meaningful participation in EA processes.
A Composite Approach to Determination of Significance in Environmental Assessment: Implications for the Yukon Environmental and Socio-Economic Assessment Board (November 2017)

Author: Rox-Ann Duchesne
Employer: Yukon Environmental and Socio-economic Assessment Board (YESAB)

Abstract

The Yukon Environmental and Socio-economic Assessment Board (YESAB) does not have a clearly articulated approach to the determination of significance within its environmental assessment practice. While commonly and universally cited as the heart of environmental assessment, significance determinations are often complex, confusing and poorly understood. The aim of this report is to explore fundamental concepts of significance determination and compare key principles and challenges with current practice at YESAB. The focus is on two resounding and co-dependent notions – the consideration of impact characteristics and the consideration of impact importance – as the foundation for sound significance determination practice. The report will also zero in on approaches to determining significance as presented by Lawrence (2005, 2007). Of particular interest are the implications of adopting one of these approaches, the composite approach, to the determination of significance at YESAB.

This report will first examine the principles of and challenges and approaches to significance determination practices within environmental assessment by reviewing scholarly literature. YESAB’s current practice with respect to significance determinations and the implications of adopting a composite approach are then examined in a preliminary manner to better understand where gaps in practice may lie in comparison to best practice. This basic analysis was achieved via the author’s personal observations as well as by reviewing environmental assessment reports publicly available on YESAB’s online registry that resulted in ‘do not proceed’ recommendations. Findings suggest that YESAB’s current practice with respect to applying impact characteristic criteria is consistent with other jurisdictions. The integration of impact importance, or context, in significance determinations readily appears in the majority of recommendations reviewed. Accordingly, while improvements in documenting practice and processes are needed, YESAB seems engaged in significance determination practices that, to varying extents, meet the criteria consistent with a composite approach.
The Free Prior and Informed Consent of Indigenous knowledge: Lessons learned through Canadian Regional-Strategic Environmental Assessments

(November 2017)

Author: Dillon Crosilla
Employer: Canadian Environmental Assessment Agency

Abstract

Critics argue that amendments to the Canadian Environmental Assessment Act 2012 have weakened Indigenous involvement in the EA process. In response, some have suggested that assessments that are carried out more strategically and on a broader scale would address the lack of meaningful participation of Indigenous groups. This report seeks to determine to what extent Canadian Regional-Strategic Environmental Assessments (R-SEA) that have documented Indigenous knowledge have adhered to the principle of Free, Prior, and Informed Consent (FPIC) endorsed by the United Nations Declaration on the Rights of Indigenous peoples (UNDRIP 2007). Three R-SEA case studies were selected: the Beaufort Regional Environmental Assessment, the Great Sand Hills Regional Environmental Study and the Lower Athabasca Regional Plan. A summary table was constructed to synthesize how each R-SEA complied with FPIC. The methods used by each to engage Indigenous groups were also tabulated and assessed to determine how well they followed the principles of FPIC. The findings indicated that while the principles of ‘Prior’ and ‘Informed’ consent were respected within the R-SEAs examined, the principle of ‘Free’ consent was not. The study found that attempting to examine each FPIC guiding principle individually was problematic; any future research should investigate these principles in a more holistic way. Furthermore, a lack of transparency in the published case study reports and a lack of Indigenous perspective was a limitation on the research. Notwithstanding these issues, the study indicates that Canadian R-SEAs have the potential to create the necessary conditions to use best practice methods for documenting Indigenous knowledge and respecting the FPIC guiding principles.
Aboriginal Empowerment in Natural Resources Development: Consultation in Environmental Assessments and the Duty to Consult (September 2017)

Author: Marie-Joelle Lachance
Employer: Sierra Club BC

Abstract

Site C hydroelectric dam and Enbridge Northern Gateway Pipelines are two recent major western Canadian resource development projects that went through deep environmental assessment (EA) consultation with Aboriginal people. The federal court of appeals found that Site C fulfilled Canada’s duty to consult, while Northern Gateway did not. Yet, the joint review panels reviewing the environmental assessments found that Site C would have more significant and unmitigable impacts on the environment and on Aboriginal ways of life than Northern Gateway. This report looks at the relationship between environmental assessments, environmental impacts, the duty to consult, and Aboriginal power over natural resources. It analyses two major resource development projects in British Columbia: the Site C hydroelectric dam, and the Enbridge Northern Gateway Pipelines. Canada’s consultation does not appear to have empowered Aboriginals to have any influence over either project’s decision to proceed, and in the end, based on political actions, it seems that the projects either proceeded or were rejected for reasons more political than anything else. The process, did, however, show increased empowerment of Aboriginals in the planning of the projects compared with the pre-duty to consult era. This report found that, in order to have a more balanced and fair approach in EA consultation, the consultation process should be discussed and agreed upon with the consulted Aboriginals, the government should be legally responsible to ensure that Aboriginals’ financing is sufficient for EA consultation and negotiations, and, most importantly, EA consultation should be conducted with the goal of reaching an agreement between the Crown and Aboriginals. The assessment of how both parties worked in good faith towards reaching an agreement should be part of the legal test to assess whether consultation with Aboriginals is sufficient.
**Prioritizing placement of conservation buffers in the Shire River Basin in Malawi**

*(September 2017)*

**Author:** Yuka Makiyama  
**Employer:** Department of Forestry, the Ministry of Natural Resources, Energy and Mining in Malawi

**Abstract**

In Malawi, about 80 percent of the population directly or indirectly works in the agriculture sector; however, as a result of increased population growth, available land is becoming scarcer, food security less tenable and reforestation more challenging. Moreover, environmental disasters such as flooding and drought are increasing as a result of on-going deforestation leading to intense environmental degradation. Agroforestry, especially conservation buffers, is part of a solution to improve environmental conditions. There are different projects adopting agroforestry systems in Malawi. However, the scale and number of such projects are limited. The locations of these projects are chosen based on farmer’s preference, thus, their robustness in terms of project management is questionable. Site selection criteria for agroforestry must include physical environmental aspects because it is essential to consider both biophysical and socio-economic environment in the Environmental Impact Assessment (EIA). Additionally, the performance and effectiveness of agroforestry depends on soil nature and topology. The objective of this study was to examine appropriate sites for conservation buffers for projects planning purposes in Malawi’s Shire River Basin through analysis of sediment trapping efficiency, water trapping efficiency, wetness index, and topographic index. The results demonstrated that Phalombe, Balaka, and Machinga districts indicated higher values of sediment trapping efficiency, water trapping efficiency and wetness index, compared to Thyolo, Mwanza and Mulanje which all had lower values. These results provide valuable information for an EIA more so for decision makers examining proposed and alternative locations for conservation buffers to ensure effective planning for future agroforestry projects.

Author: Sarah Vitulano

Employer: Natural Resources Canada

Abstract

Cumulative effects are notoriously criticized for their challenging nature in our current federal environmental assessment (EA) process. Decades of academic research has shown varying solutions to properly address cumulative effects however the many challenges in project cumulative effects assessment (CEA) application dominate over the proper execution of assessment. CEA at the project level is narrow and separate from broader planning contexts. Understanding the aggregation of an effect or impact over time and space in addition to its interactions with other impacts could be extremely difficult. This report reveals that there is a policy gap in our current federal EA system that requires attention for future EA reform. It discusses the historical and current state of cumulative effects in EA and situates them among three types of assessments; regional environmental assessment, strategic environmental assessments, and regional-strategic environmental assessments (R-SEA). British Columbia, Alberta and Saskatchewan case studies are explored to frame CEA in practice. Possible ways of how provinces can inform the federal review process are explained by comparatively assessing mechanisms and tools used in addressing cumulative effects. Scenario modelling was a major recommendation in order to accomplish regional and strategic planning. Literature, case studies, the EA Expert Panel Report and the Government of Canada’s Discussion Paper revealed that cumulative effects are best assessed at the R-SEA level. This means that CEA would still be conducted at the project level EA however would only be achieved with the appropriate and necessary policy guidance and with R-SEA as foundational pieces to overcome project CEA challenges.
Integrating climate change adaptation in Canadian Environmental Impact Assessments (July 2017)

**Author:** Kajal Patel

**Employer:** Office of the Auditor General of Canada

**Abstract**

With increasing uncertainties in climate change, it is important to address climate change adaptation at a project level through the Environmental Impact Assessments (EIA), to design and develop the proposed or existing projects resilient in nature. This would include the study of historical data and future predictions of the changing climate in and surrounding the project area as well as its mitigation measures. Canada being recognized as one of the lead countries, encourages the consideration of climate change adaptation into the Environmental Impact Assessments of projects, but has no mandatory requirements although guidance is available.

My paper includes review of worldwide guidance available to integrate climate change adaptation into impact assessments, including challenges and recommendations to integrate it. It also includes review of six Canadian case studies to determine the extent of climate change adaptation integrated into EIAs. The case studies are completed Environmental Impact Assessments carried out for various projects in different provinces under the Canadian Environmental Assessment Act, 2012. Overall, it is found that the extent to which the potential environmental risks to the project were determined varied considerably. There is no consistency among the provinces or the responsible authorities in summarizing and describing the environmental risks affecting the projects in the EIA reports. Only two case studies included detailed assessment of the historical data as well as the future predictions of the changing climate. There is room for improvement if the historical data and future predictions of the potential climate change are studied thoroughly and integrated in the design of the project, the current legislation is amended and guidelines on the extent to which it should be included in the EIA report becomes mandatory. The Terms of Reference (TOR) of a project must include this need. Moreover, there should be coordination among the project proponents, the climate scientists and the responsible agencies to get the maximum available data on climate change, to effectively integrate it into the EIA and to determine the relevant mitigation measures.
Spatial data infrastructures - building capacity for web based environmental data sharing to address spatial needs in Environmental Impact Assessment (July 2017)

Author: Reem Hamzeh
Employer: United Nations Environment Programme (UNEP)

Abstract

Spatial information are an important resource in supporting sound and reliable environmental decision making. Several organizations from the public and private sector continuously collect and produce data in this regard, however the data is stored in different places and managed by different organizations, resulting in the lack of efficient use of available data. Furthermore, problems that affect the use of spatial information such as the lack of availability, quality, organization, accessibility, and sharing are frequently encountered in the Environmental Impact Assessment (EIA) process. Spatial Data Infrastructures (SDI) propose technical and organizational measures for facilitating the access to and reuse of spatial data. This report explores what kind of SDI can improve the accessibility, availability and compatibility of spatial data for EIA.

First, data sharing and use challenges in EIA and particularly in Canada were identified. Next, a review of federal environmental assessments was undertaken to demonstrate the extent of spatial information use in Canadian EIA. The results show that the use of spatial information is indeed popular, although the applications employed are generally basic. An evaluation of international SDIs was subsequently undertaken to examine how elements from those initiatives compare to the Canadian Geospatial Data Infrastructure (CGDI). The evaluation used indicators based on the five components of SDI; data, people, access networks, standards, and policy. It was observed that the reuse of spatial information is facilitated when information about data quality, and fitness for use are provided, legal frameworks for data sharing are in place, licensing barriers are removed, consistent pricing policies and user access models are implemented, and a central portal by which nationwide data can be discovered is available.

As a result of this analysis, 6 national and 5 EIA specific recommendations were presented as strategies for improving the state of spatial information sharing in Canada. The main implication from the report was that the development of a publicly accessible web based SDI that meets the information needs of EIA stakeholders presents many challenges, but that political and social factors play a key role in realizing this feat.
Abstract

Environmental Impact Assessment (EIA) and Environmental Compliance and Enforcement (ECE) are well established standard-setting bodies in Canada. Although they are studied within their own rights, little research has been done to examine how these two mechanisms of environmental protection intersect. This report raises awareness of how the work developed in EIAs can affect the outcomes of other regulatory processes like environmental enforcement, and in other government institutions, such as Environment and Climate Change Canada’s Environmental Enforcement Directorate (EED). Based on an extensive review of the Canadian ECE-EIA system as well as my observations and experiences working with the EED, I have found that significant connections and convolutions between ECE and EIA occur in the application of a strict enforcement tool: sentencing. Notable environmental court cases, such as R. v. BHP Diamond Inc. and R. v. Teck Metals Limited were selected to contextualize the direct and indirect capacity of EIA to influence the outcomes of environmental sentencing. This report argues that the manner in which efforts of environmental assessment are interpreted in a judicial setting plays a complicated yet covert role in certain elements of sentencing, such as: the use of EIA as documentary evidence to clarify the awareness, intentions, actions, and efforts of an environmental offender; the assessment of EIA mitigating, monitoring and follow-up procedures as applications of standard of care for the sake of evidence of due diligence; and the determination of the degree of harm, foreseeability of harm, remorse, and culpability in a court of law.
Public participation plays an important role in reducing the likelihood of conflict by accommodating different interest and values as well as promoting transparency in any development project undertaking. Participation can take many forms, for example, community meetings, administrative laws, citizen advisory committees etc. Regardless of the form public participation takes, the core concept has always relied on the sharing of power among the public and the government.

In 1992, the Environmental Impact Assessment Act (Decree 86) was introduced in Nigeria, with provisions of public involvement in environmental decision-making. Public participation in Nigeria has since improved (Odemene, 2015). Public participation in environmental decision-making is a particularly crucial issue in Nigeria, where oil resource extraction projects in the Niger Delta have been operating since the 1950s with little to no regard for the local environment, which has caused devastating effect on the environment (Nzeadibe et al., 2015).

However, several major challenges still stand in the way of effective public participation in EIA in Nigeria. The Nigerian process contravenes the policy of international public participation adopted in the Aarhus Convention, which requires early public participation, full and complete access to documents and taking into account public opinions into policy-making. Lenders to mining projects, such as the World Bank, are increasingly putting pressure on proponents to implement public participation. The report focuses on the public participation in Nigerian EIAs and draws out major challenges in the way of effective public participation. Nigeria needs to adopt the principles of public participation as identified in international and regional legal instruments to ensure effective participation of the public in the environmental decision-making.
Integrating the Ecosystem Services concept in EIA Recommendations for the CEAA 2012 review (April 2017)

Author: Chloé L’Écuyer-Sauvageau
Employer: Institut des Sciences de la Forêt Tempérée, ISFORT

Abstract

The new Canadian federal government has decided to conduct a review of the Canadian Environmental Assessment Act, 2012, partly to undo the changes that had been undertaken as part of the last government’s deregulation agenda (Kinney, 2015). To undertake such a review, an understanding of the social-ecological system within which Environmental Impact Assessment (EIA) practice finds itself is necessary. Given that one of the purposes of EIA is to promote sustainable development, the use of the concept of Ecosystem Services (ES) which is at the interface of social and ecological environments is warranted. The integration of ES in EIA, as well as critiques of the current EIA process, has been the object of a number of studies, but there are few real-world examples of systematic inclusion of the concept of ES in EIA, aside from the recent experience of the International Finance Corporation and the United States Forest Service. Using these recent experiences, I attempt to determine if ES are useful to the EIA process, and if they have been meaningfully integrated in EIA reports. To undertake this analysis, a review of 85 studies submitted to the IFC and 8 studies conducted by the US Forest Service was performed. The choice of studies was based on the type of projects presented, the availability of documents and whether or not the terms “ecosystem services”, “environmental services”, or “ecological processes” were used in the reports. The most interesting aspect of the concept of ES is that it can be used as a tool to communicate and frame interrelated environmental, social and economic issues. The key impacts of this report will be to aggregate in a single document the main issues associated with the EIA practice in Canada, as well as include an analysis of the appropriateness of including the concept of ES in the EIA process.
Quick clay landslides are a dangerous mass movement occurring in hillslopes when clay formed through the deposit of marine sediments liquefies and flows downslope. The risk of their occurrence can be affected by, amongst other factors, a loss of lateral support at the base of hillslopes due to fluvial erosion of river banks. The management of fluvial systems is therefore linked to the management of this risk. Bank stabilization and erosion control are often selected as interventions to reduce the risk of these landslides occurring. However, these engineering-based solutions fail to acknowledge natural river dynamics resulting in damaging environmental impacts as well as increased vulnerability to these disasters. This report seeks to understand how river dynamics is addressed in risk assessment and management related to quick clay landslides, how policies related to fluvial systems affect this relationship and how community and environmental vulnerability are approached in relation to this risk. Two cases, a risk mapping exercise in Ontario and the response to a fatal landslide which occurred in Saint-Jude Québec, are compared in order to respond to these queries. Existing watershed management organizations, policies and procedures are well integrated into the Ontario case resulting in a good acknowledgement of river dynamics. Unfortunately, while similar watershed management organizations exist in Quebec, a lack of proper economic and political support for these institutions can partially account for the lack of integration of river dynamics into the Saint-Jude case. Ecological and community vulnerability is also addressed more successfully in the proactive risk mapping report in Ontario. Both provinces, however, could benefit from emphasizing mandatory, proactive risk assessments in order to truly reduce vulnerability to such events.
Indigenous Knowledge and Environmental Assessment: A Case Study of the Prince Rupert Export Terminals (April 2017)

Author: Jane Stringham
Employer: Canadian Environmental Assessment Agency

Abstract

Indigenous traditional knowledge (ITK) is a component to be considered in environmental assessment (EA) and management according to the Canadian Environmental Assessment Act, 2012. ITK is a body of knowledge built up by an indigenous group of people through generations of living in close contact with nature. The Canadian Environmental Assessment Agency (CEAA) is involved in allowing for proper consideration of ITK in the EA process. Allowing for proper consideration of ITK is a nuanced role that requires understanding of the history of indigenous people in Canada and the specific contexts in which ITK is generated and preserved. This report will look at three export terminal EAs in the Prince Rupert, British Columbia harbour area: the Fairview Terminal Phase II Expansion Project, the Canpotex Potash Terminal and the Pacific NorthWest Liquefied Natural Gas Project. Each of these three projects involve different proponents, but the indigenous groups consulted are all the same. In this report, the case studies are compared and subjected to a critical analysis of how ITK was considered for the Valued Ecosystem Component (VEC) of salmon. The goal is to determine examples of potential best practice. From this critical analysis, a recommendation on the scale of EA operations is presented. Specifically, there should be an adoption of regional strategic environmental assessments (R-SEA) at an ecological scale, such as watersheds, to better capture the concerns raised through ITK consultation. CEAA can support the implementation of this new scale through training opportunities for stakeholders involved in future EAs.
**Evaluating the Practice of Federal Environmental Assessment Before and After the Implementation of CEAA 2012: Case Studies of Selected Metal Mining Projects with a Particular Focus on Scope, Impact Significance, Cumulative Effects Assessment and Enforcement (April 2017)**

**Author:** Valeria Trendafilova  
**Employer:** Canadian Environmental Assessment Agency  

**Abstract**

This report examines some of the changes that came along with the Canadian Environmental Assessment Act of 2012 and how EAs from before and after this new Act compare in practice seeing that the academic field has been very critical of the changes it brought. I conclude that, within the limited scope of this report, little has changed in how federal EAs are conducted as I demonstrate through examples on significance determination and cumulative impacts assessment. While the scope of EAs has been narrowed to matters under the regulatory power of the federal government, in practice proponents continue to conduct assessments that are more comprehensive than some assessments conducted under the old Act. I provide evidence that the concerns regarding the changes in coordinating provincial and federal assessments and the removal of screening-level assessments are unfounded, based on research conducted by the Agency and provisions of CEAA 2012. I also discuss why the main strength of the new Act, the provision on enforcement, which did not exist before, shows much promise in ensuring adequate environmental protection. It must be noted that two major areas that have been touched by the changes in the new Act, legislated timelines and certain restrictions on public participation, have only been briefly mentioned here and further analysis into the effects they may have on the federal EA process is necessary in order to consider the information presented here as conclusive evidence in regards to the overall impacts of the changes introduced with CEAA 2012.
Effective marine protection around the world has faltered in part due to the complexity of marine environmental systems and our limited knowledge regarding ecological interactions. Compounding the ambiguous nature of marine biological conditions are inadequate measures in addressing social objectives in the context of marine protected area (MPA) planning. The Canadian government recently revitalized programs for marine protection across Canada since the Liberal introduction to parliament in 2015, with refocused efforts on the goals set out in the United Nations (UN) Convention of Biological Diversity (CBD). In Atlantic Canada, Fisheries and Oceans Canada (DFO), Oceans and Coastal Management Division have determined 54 Ecologically and Biologically Significant Areas (EBSAs) across the Bay of Fundy and Atlantic coasts to inform the MPA process, and have contracted community-based environmental groups across the region to participate in the consultation and research phases. This report will explore the potential for community-based involvement in MPA planning using the internship experience at Bluenose Coastal Action Foundation in Lunenburg, Nova Scotia. A critical analysis of Canada’s marine protection progress and government incorporation of First Nation perspectives during marine planning will outline current challenges and limitations by referencing the internship case study. By assessing the research and practical implications of community-based participation and engagement in the MPA designation process, this report argues the necessity of incorporating human components into ecological planning to ensure effective long-term protection and monitoring of coastal and offshore MPAs in Nova Scotia by acknowledging First Nation and local community’s involvement in the larger assessment process.
L’Evaluation Environnementale de Site (EES) est un procédé environnemental se divisant en trois parties et consistant à identifier, à déterminer et à supprimer une potentielle contamination des sols et des eaux souterraines sur un site. La phase I vise en premier lieu à effectuer une recherche de plusieurs dossiers ayant pour but de connaître l’histoire et le passé du site étudié, ainsi que d’identifier les utilisations antérieures du site et ainsi cibler les possibles polluants présents sur le terrain. La phase II, quant à elle, a pour but de confirmer les résultats trouvés lors de la phase I en identifiant et en définissant la nature et la quantité exacte des contaminants se trouvant sur le site à l’étude. Cette phase peut également servir à définir les besoins pour des actions de remédiation et d’élimination des contaminations présentes sur le terrain. Le présent rapport analyse en détail les méthodologies de l’évaluation environnementale de site phase I et II en examinant deux études de cas, ce qui permet de mettre en lumière les différentes caractéristiques de la méthodologie d’Évaluation Environnementale de Site. Ces résultats pourraient être utiles pour améliorer le processus fédéral d’Étude d’Impact Environnemental (EIE) afin de pallier certaines de ces limites, d’autant plus que ce procédé est en ce moment même en cours de révision par un panel d’experts formé par le Ministère de l’environnement et des changements climatiques. Ce rapport met en évidence l’idée selon laquelle les recherches historiques effectuées lors d’une EES-phase I pourraient être utilisées lors de l’analyse des impacts cumulatifs d’une EIE. En effet, les experts omettent souvent l’étude des activités antérieures qui auraient pu se dérouler sur le site à l’étude. Il est donc primordial, afin que l’analyse des impacts cumulatifs soit rigoureuse et pertinente, que des recherches historiques du site à l’étude et des terrains avoisinants soient effectuées afin de déceler toute contamination antérieure potentielle. De plus, les rapports d’EES pourraient constituer une source d’information importante concernant l’état des sols et des eaux souterraines d’un terrain, ce qui pourrait servir pour déterminer l’état environnemental initial du site, ce qui est nécessaire lors de l’étape de scoping d’une EIE. Néanmoins, l’EES concerne seulement la contamination des sols et des eaux souterraines, ce qui représente une infime partie du champ d’étude d’une EIE.
Using artificial neural networks as a prediction tool in EIA (January 2017)

Author: Victoria Curl
Employer: Beak Consultants GmbH

Abstract

Using artificial intelligence (AI) has a long history in environmental science. Given the general complexity and unpredictability of natural systems, environmental data is well suited for certain types of AI platforms in order to make predictions and forecasts about environmental trends. Although the use of AI for environmental science has been explored for years, there is little to no research that exists focusing on the utility of AI in environmental impact assessment (EIA). In this report, an analysis of case studies is undertaken to examine the applicability of AI to forecast environmental impacts in EIA specifically related to air pollution, water resource management, wildlife management and hazards. A mining case study that was completed at Beak Consultants GmbH is also presented. This case study demonstrates how easy and user-friendly ANNs can be when they are developed for a familiar platform and for an environmental purpose. ANNs have already been used for mining exploration, but can also be integrated for other purposes such as the analysis of future environmental impacts on the surrounding environment. As AI becomes more accessible and more user-friendly, it has the potential to become a common tool used by EIA practitioners to carry out prediction and monitoring. While AI has the potential to provide accurate environmental forecasting and save significant time and resources in the EIA process, it is not without its scientific and ethical limitations. However, with further development for specific environmental forecasting purposes, AI has the potential to be a useful technology to add to the growing number of environmental informatics resources that aid in the EIA process, especially when it comes to strategic planning of current and future developments and the analysis of cumulative impacts.
Information Disclosure as a Tool for Environmental Policy and Potential Adoption into Canadian EIA (December 2016)

Author: Natalie Devillers

Employer: ERA Environmental Management Solutions

Abstract

An environmental reporting internship at ERA Environmental Management Solutions in Montreal sparks an interest in Right-To-Know provisions due to the Toxic Release Inventory reporting due July 1st, 2016. A brief review of the Right-To-Know provisions of the TRI information disclosure program demonstrates that a company’s environmental performance is improved due to the resulting pressure, in addition the environmental burden and injustice on communities is reduced. Information disclosure is then critically evaluated and limitations addressed for the use of such programs as a substantial tool in environmental policy. The potential of information disclosure programs for use in Canadian EIA’s is discussed and contextualized within the reform of CEAA 2012 proposed by the Trudeau Government elected in 2015. It is concluded that information disclosure programs are a respected tool for environmental policy and would be an esteemed improvement to the public consultation aspect of Canadian Environmental Impact Assessments.
European & Canadian Perspectives for Alternative Mining Methods (December 2016)

Author: Kristine Brossard
Employer: G.U.B. Ingenieur AG

Abstract

Biomining practices have gained increasing interest internationally for this potential application in the mining industry. Biomining is the use of micro-organisms to extract metals from low grade ores, tailings, waste rock and contaminated sediments. The European Union (EU) is now studying the in-situ application of biomining to extract metals from low grade, deep ore deposits that cannot be extracted through conventional mining practices. This process is called deep in-situ biomining (DISB) and requires the combination of hydraulic fracturing and subsequent bioleaching for metal extraction. The aims of this report to critically analyze environmental legislation in the European Union and in Canada as well as to critically analyze the environmental implications of deep in-situ biomining. A review of environmental impact assessment reports on conventional mining of uranium was completed to compare the severity of the impacts of these methods to the potential impacts of deep in-situ biomining. These investigations found that more stringent environmental legislation with clear targets, vocabulary, objectives, timelines, incentives and reporting strategies are needed in the EU and in Canada in combination with less wasteful mining practices to address issues of sustainability in the mining sector. Overall, the risk matrix showed that the environmental impacts of DISB were lower than those of conventional mining practices. Some lessons from the EU environmental framework such as mandatory reporting could be applied in Canada to help improve transparency and compliance to environmental standards in the Canadian mining industry.
Risk Communication in Environmental Assessment: Case study of a major Canadian project, the Energy East Project (November 2016)

Author: Mohammad Amdadur Rahman

Employer: Canadian Environmental Assessment Agency

Abstract

Risk communication offers significant possibilities for building public trust and transparency in environmental assessment (EA), but it also faces challenges. Effective risk communication helps to establish a reasoned dialogue between the proponent of a project and various stakeholders that can be fruitful to all parties involved. Yet, there is a fundamental and somewhat permanent divide in the way experts present risk information and the way most people conceptualize risks. Experts tend to give equal weight to probability and consequences, whereas laypersons tend to give more weight to consequences. Risk communication often fails to discuss uncertainties associated with risk assessments which further increases public distrust in experts and policy-makers. These aspects are reflected in the case study examined here. In this report, the risk communication approach of a major energy project in Canada, the Energy East project, is analyzed based on ten essential criteria of a successful risk communication message. The analysis shows that the proponent ignored or failed to acknowledge the special nature of the risks involved and the public concerns about these risks. The probabilities of risks were communicated in a selective fashion. This can seem to portray too safe a picture and cause a loss in public confidence in the proponent’s assessments. Moreover, uncertainties in the assessments were not mentioned at all. Proponents need to address public distrust with robust risk communication approach acknowledging the concerns of the public and adopting transparency to build credibility of the risk information they want to communicate.
Abstract

Environmental assessment documents in Canada, for the past 13 years are available online to the public on the Canadian Environmental Assessment Agency (CEAA) registry. As online information sources become more and more relied on as primary sources of information by the general public, greater attention needs to paid to the quality of the written material that is made available. The assumption that environmental assessment reports should be complicated is erroneous. Rather, I advocate for environmental assessment reports that incorporate efficient communication, which proponents and other authors of environmental assessment reports can achieve by using readability tools, which measure for comprehensibility.

A comprehensibility assessment was conducted on 141 environmental assessments using a readability tool software, which provides a grade when text is placed into the software. The grades generated represent the level of education needed to understand the excerpt submitted in the text analyzer. All the projects available on the CEAA registry from which documents available were analyzed and graded.

The resulting average education grade for environmental assessment report comprehensibility was found to be 14.6 years of education, with a mean level of readability ease of 39.2. This suggests that current environmental assessment documents are difficult to understand by the general public. Increasing the quality of written documents for environmental assessment could maximize the effectiveness and transparency of communication during the EIA process.
Health in Environmental Assessment: An evaluation of the consideration of potential health impacts in Canadian EA with a focus on road infrastructure projects (October 2016)

Author: Natasha Sarah Valavy

Employer: D&G Enviro-Group Inc.

Abstract

Human health is undeniably related to the surrounding physical and social environments, though it is rarely considered in environmental assessment (EA). The main objective of this report is to analyze the assessment of health considerations in Canadian EA, with a particular focus on assessments for road infrastructure projects. EA for road infrastructure projects was chosen as a relevant illustration in light of the considerable effects transportation is known to have on humans. The report begins with a literature review of the theory and practice of incorporating health considerations into the seven steps of EA. Decision support tools such as health impact assessment (HIA) and environmental health impact assessment (EHIA) are then discussed and compared with the practice integrating health directly into the EA process. Furthermore, known and speculated health effects associated with changes caused by road infrastructure projects are then presented in order to showcase the significance of health considerations in this context. The practice of considering health issues in EA is then examined through the case study of the New Bridge for the St-Lawrence project. The case study shows that only environmental effects that directly influence health through physical means are considered. The analysis identifies four key recommendations on how health can be better integrated into EA through: the broadening of project scopes to include physical and social dimensions in reference to health; the collaboration of EA practitioners with public health experts; the improvement of follow-up methods in order to inform similar EAs in the future; and the improvement of public participation practices throughout the EA.
**Integration of Socio-Economic Assessment into Environmental Impact Assessments (June 2016)**

**Author:** Hayat Makkee  
**Employer:** Canadian Environmental Assessment Agency

**Abstract**

The ability of social impact assessment to manage and minimize the adverse effects of the physical intervention is increasingly acknowledged by environmental assessments experts and practitioners. Potential adverse effects can be effectively identified and managed when social impact assessment is integrated into environmental impact assessment. The social and economic conditions, like biophysical environment –air, water, land and wildlife - can be influenced by physical intervention. This means human beings can be affected by the proposed project via the impacts on biophysical, social and economic changes. Therefore, environmental impact assessment should not be limited only for identifying and evaluating the effects of a project on biophysical components. It should be more comprehensive by considering the effects of this project on social and economic aspects. The main objective of the current study is to demonstrate how the direct and indirect impacts created by a proposed project can be identified, linked and assessed by incorporating social impact assessment into the environmental impact assessment process.

The study presents both environmental and social valued components that can be considered in the proposed integration process. It also shows how and when the social impact assessment can be conducted when a project causes environmental changes which lead to several socio-economic impacts. The current investigation indicates that the social impact assessment can be applied at all various stages of environmental impact assessment process not only during scoping stage. The relationship between Canadian Environmental Assessment Act 2012 and the social impact assessment is taken as a case study. The study confirms that the environmental assessment under CEAA 2012 has hitherto been limited to the evaluation of biophysical impacts and usually the social and economic effects are underestimated. Although CEAA 2012 addresses the health and socio-economic conditions, the requirements of environmental assessment concerning social-economic aspects are still vague and need more clarification. The study suggests several actions to improve and strengthen the environmental impact assessment under CEAA 2012. Finally, the current investigation illustrates that the integration between social and environmental assessments can enhance the decision making process concerning the effects of a proposed physical intervention.
"As Long as this Land Shall Last": The Role of Indigenous Counter-Maps in the Struggle for Self-Determination in Northern Canada (June 2016)

Author: Jeff Hackett

Employer: Firelight Research Inc.

Abstract

The production of maps has predominantly functioned as a technology to reinforce the political and territorial empowerment of states, industry, and elites. Here, maps reiterate the dialectical relationship between power and space, which reinforce a medium of hegemony rooted in symbolization, generalization, and classification. However, because maps depict a subjective and specific worldview rather than objective reality, maps can also be used to challenge and undermine dominant ways of conceiving the landscape and the socio-political realities they represent. Increasingly perceived as a promising technique to counter hegemonic spatial narratives, Indigenous peoples have employed counter-mapping techniques to meet a variety of needs and circumstances. While a wide range of activities have been carried out under the banner of Indigenous counter-mapping, maps have played a prominent role in attempts to defend Indigenous rights to customary land and resources. To this end, Indigenous counter-maps have become contemporary sites of struggle and resistance. The Saulteau First Nations Traditional Knowledge and Use Study undertaken for the proposed Nova Gas Transmission Ltd. North Montney Mainline Pipeline project serves as a forum to critically examine and evaluate Indigenous counter-mapping strategies to promote Aboriginal and treaty rights within the Canadian environmental assessment process. Through the critical concepts of power, indigeneity, and space, this research demonstrates how Indigenous counter-maps contribute to the resistance of large-scale industrial resource development projects, and yet simultaneously reiterate and rework familiar colonial constraints on Indigenous peoples. Without undermining the importance of Indigenous counter-maps, the research seeks to develop a more critically informed understanding of their possibilities and limitations within environmental assessment.
**Generic Sustainability Maturity Model for an Information and Communication Technology (ICT) Company (May 2016)**

**Author:** Fatima Farooq  
**Employer:** Ericsson

**Abstract**

In the recent era, there has been a tremendous boom in the Information and Communication Technology (ICT) industry worldwide. The ICT industry contributes 2% of total GHG emissions and this percentage is estimated to increase significantly in the coming years. ICT has the potential to reduce its adverse impacts considerably that are associated with its processes by sustainable management. ICT is a relatively new field and it has fewer than desired guidelines and best practices available. The following study focuses on Ericsson Montréal- one of the world’s leading ICT companies as its case study. This report discusses ICT and its relationship to the sustainable development, numerous ICT industry standards, various maturity models (such as Capability Maturity Model and Business Maturity Model) and ICT sustainability best practice case studies, which helped in the derivation of a Generic Sustainability Maturity Model. Therefore, this report will encourage and help Ericsson Montréal or any ICT company to benchmark current performance, develop initial roadmaps and devise action plans. It has the potential to provide a path for more detailed and quantitative studies in the future. In addition, it may also serve as an assessment tool for comparative analysis between similar companies. The generic nature of the model makes it useful to any ICT company and it can also be tailored according to particular needs. However, there are certain limitations to the study such as time and scope of my internship.
Performance Auditing of Environmental Impact Assessment: A public sector Tool to improve the process (May 2016)

Author: Makeddah John

Employer: Office of the Auditor General

Abstract

Environmental impact assessment has been deemed a tool for advancing sustainable development outcomes worldwide. It is unfortunately plagued by many weaknesses. Performance auditing is being proposed to facilitate improvements. Performance auditing, an independent assessment, examines policy and programmes to detect failings in performance. Most countries around the world have EIA legislation and can thus be subject to auditing. As part of this report, a review of 8 performance audits of EIAs in 5 countries and one Canadian province was undertaken to glean how various countries have undertaken EIA audits with regard to methodology, aspects investigated, findings and challenges. Two surveys, administered by the Working Group on Environmental Auditing, and a literature review were also relied upon to inform this research paper. This research determined that the three aspects of the EIA process – the institutional arrangements and public participation; quality of EIA reporting and decision-making; and impact management and follow-up – are all afflicted with issues that impede the effectiveness of the EIA process, particularly impact management and follow-up. In response, this report recommends developing three main resources for audit offices undertaking EIA audits: 1) a risk analysis using the three major aspects of the EIA process to help focus the audit where it is most needed; 2) a list of the sources of criteria available that can be used to develop the audit objective; and 3) advice on methodology such as sampling.
Evaluation of the Effectiveness of EIAs’ Environmental Management Plans - The Landscaping Project for the Liquid Natural Gas Fractionation Plant (PFLGN) (Pisco, Peru) as a Case Study (April 2016)

Author: Liana Gabriella Gonzalez Blacker
Employer: Environmental Resources Management (ERM) Lima, Peru

Abstract

In 2006, as part of the commitments assumed in the Environmental Impact Assessment (EIA) for the installation of the PFLGN, a Landscaping Project was implemented around this Plant. The intent of this project is to give continuity to the landscape of the area and to minimize the visual impact generated by the PFLGN in the desert ecosystem where it is located. For this purpose, various plant species and landscape features such as dunes, gullies, tree groves, etc. naturally existing in the Buffer Zone of the Paracas National Reserve (RNP) were introduced. The Monitoring Program which evaluates the Landscaping Project since 2011 has been able to identify that the latter would be serving as a species refuge or congregation areas. The objectives of this research center around verifying this assumption by comparing the results of the Landscaping Project against two Target Areas: the natural ecosystems from which the Landscaping Project was conceptually designed and the disturbed conditions that existed prior its implementation. The results of these comparisons for the bird and arthropod components suggest an evolution of the Landscaping Project from the initial state prior to its implementation, identifying similarities in various parameters studied with the natural ecosystems. Based on the results, it is proposed that these efforts be replicated around similar industries since they are consistent with the objectives of creating a Natural Protected Area (ANP) that rescues their landscape value.
**Abstract**

In recent years, guidance from the Council on Environmental Quality (CEQ) and the policy statements of other U.S. federal agencies have advised federal practitioners of the National Environmental Policy Act (NEPA) to consider the impacts of climate change on project development and design. The surging academic literature on climate resilience has also advised the same for the future resilience of infrastructure and to safeguard local economies. As such, are U.S. Federal agencies considering resilience to climate change in NEPA Environmental Impact Statements (EIS)?

In this report, I address this question in four ways. First, I provide a comprehensive literature review to explain the development, evolution and effective use of resilience in project development. I then use this literature review as the fundamental basis to derive a typology based on five criteria of resilience; anticipation, preparation, adaptation, withstanding and response and recovery. Second, I then use these five criteria to classify 115 federal NEPA EISs using this typology. Third, I discuss the various implications of the data collected and the derived typology. Fourth, I outline the limits of my analysis and the potential implications for future research in this area.

Although 37% of EISs were classified into anticipating climate change, only 16% of EISs successfully made project design adaptations to climate change. However, I found no EIS that considered the last two classifications of resilience, withstanding or response and recovery in project design. The results vary widely because some agencies consider climate change resilience much more than other agencies. For example, the United State Army Corps of Engineers (USACE) showed an 85% increase in the number of EISs that considered climate change from 2012 through 2015, while the Federal Railroad Administration (FRA) had much fewer in the same time period. In sum, I find that resilience is increasingly being considered in EISs but there are many barriers, which hinder its proliferation. I discuss these barriers in turn.

Author: Alexandra Iliescu

Employer: Environment Canada

Abstract

The Canadian Federal government has developed an elaborate management program for federal contaminated sites. Although the primary purpose of contaminated sites rehabilitation or risk management is to protect the environment and promote sustainable development, changes brought about by CEAA 2012 eliminated the requirement to conduct a formally structured EA for rehabilitation projects.

The ability of federal contaminated sites management processes and practice to be truly protective of the environment and to promote sustainable development was evaluated using twelve criteria that reflect EA best practice. The evaluation was done in the form of a table, in which the same criteria were also used to evaluate the EA processes for designated and non-designated (Section 67) projects under CEAA 2012. The weaknesses and strengths of the federal contaminated sites management process, as well as those of the federal EA processes for designated and non-designated (Section 67) projects were assessed, and the comparative analysis permitted to determine whether Section 67 requirements can fill gaps where criteria are not adequately fulfilled by federal contaminated sites management (CSM). Information for the analysis was collected through literature review, interviews with two government employees involved in CSM; and a rehabilitation project case study.

The analysis revealed that, although federal CSM process and practices can fulfill some criteria that reflect EA best practice, they lack some of the necessary tools to carry out an acceptable evaluation of the potential environmental impacts of site remediation or risk management approaches and projects. The federal CSM process performs well in terms of early information gathering and incorporation into project planning, the relatively integrated assessment of a broad range of environmental components, its use of scientifically sound methods and data, and its flexibility/adaptability. However, federal CSM framework does not provide for the assessment of cumulative impacts, is not capable of ensuring on its own the adequate or any assessment of alternatives, public involvement, impartial and transparent decision-making, and follow-up and compliance. These shortcomings mainly result from the fact that federal CSM is not founded in legislation, and the analysis indicates that current federal EA processes cannot fill in those gaps.

In light of these findings, the principal recommendation is that a legislated EA requirement similar to that (or an improved version) of the screening-type EA under the former CEAA, should be reinstated in federal EA for smaller projects. Furthermore, it is recommended that CSM practices shift away from using solely conventional risk assessment methods in order to adopt a comprehensive and precautionary approach that is more realistically, environmentally protective. Finally, an important lesson that federal EA can draw upon from the analysis of federal CSM practices and the case study is that the EA process should require the inclusion of project need in the project proposal in order to facilitate the assessment of alternatives to the project. Other recommended improvements for the current federal EA process are also suggested in the concluding remarks.
Abstract

In the US, inadequate environmental assessments often lead to litigation and project delays. The Council on Environmental Quality (CEQ) is the federal government agency that oversees the American environmental assessment law known as the National Environmental Policy Act (NEPA). To aid in NEPA compliance, the CEQ periodically releases guidance documents clarifying certain key policy issues. These guidance documents are intended to improve the efficiency and consistency of federal environmental reviews. The CEQ has been moving slowly towards establishing guidance for consideration of climate change under NEPA since the late 1990s. The most recent draft of a CEQ guidance document addressing greenhouse gas (GHG) emissions and climate change under NEPA was released for public comment in 2014. In this paper, I provide an overview of the NEPA process and the rationale for considering GHG emissions and climate change within the NEPA framework. By examining the case of Mid States Coalition for Progress v. Surface Transportation Board, I explore how CEQ guidance on GHGs could have helped the Surface Transportation Board (STB) meet its NEPA requirements and avoid project delays. In this case, the STB was brought before the US Court of Appeals to defend its failure to consider GHG emissions in the environmental review of a coal transportation project. The court ruled that the STB must consider emissions impacts of increased coal consumption that would result from the proposed action. Many of the assumptions that predicated the STB’s failure to assess the greater climate change implication of the project are addressed in the CEQ GHG guidance. I discuss how the multi-year project delay resulting from the lawsuit could have been avoided if this guidance had been available to STB at the time, and find that CEQ guidance on consideration of GHGs and climate change would have a positive impact on the NEPA process.
**Coherence and equity in the treatment of industrial and water related projects: A case study in Quebec (April 2016)**

**Author:** Emmanuelle Galeotti

**Employer:** Ministère du Développement Durable, de l’Environnement et de la Lutte contre les Changements Climatiques (MDDELCC)

**Abstract**

The Direction générale des évaluations environnementales et stratégiques (DGEES), the EIA unit within the Ministry of Environment (MOE) of the province of Quebec (MDDELCC), has for mandate the execution of the EIA process according to the section IV.1 of the chapter 1 of the Environment Quality Act. Within the DGEES, the Direction of environmental assessments of industrial and water related projects (DEEPHI) assesses and makes recommendations to the decision makers for projects whose activities are complex and very diverse.

These recommendations concern projects’ impact management and translate into mitigation measures requirements deemed necessary by analysts and experts to make a project acceptable at both the environmental and human levels. The DEEPHI’s supervisors must ensure that the measures required as conditions or engagements from the proponents are coherent and equitable from one project to the other.

Two aspects are addressed based on six cases studies. The first one is operational and concerns the development of a toolkit to facilitate a consistent and fair treatment of the various projects DEEPHI officers are in charge to assess. The second one is procedural and uses a comparative analysis to evaluate the coherence and the equity of the conditions and engagements required among the projects studied. The results show some inconsistencies in the way requirements are formulated and communicated by the DEEPHI, and suggest that coherence and fairness in the treatment of projects do not only depend on the assessment team’s approach, but also on the resources available for the analysis and on the quality of the negotiations with the proponents.
Abstract

Environmental emergencies such as ship-sourced hydrocarbon spills can adversely impact environmental components in a marine environment. Environmental Sensitivity Mapping is a geospatial assessment method commonly used to help identify the sensitive environmental (biological, socio-economic and physical) components of a receiving area. At Environment Canada’s National Environmental Emergency Centre in Montreal, sensitivity maps are a crucial output generated by environmental emergencies officers. These maps compile and present essential data for marine hydrocarbon incidents and help decision-makers design response techniques for pollutant recovery and the mitigation of negative environmental effects. A shortcoming of sensitivity mapping is related to the large amounts of geospatial data that can be compiled to produce outputs; the compilation process to determine priority areas is often complex and for the untrained user it can be difficult to quickly discern which areas are the most prone to adverse environmental effects. This report concentrates on the research and development for strategic identification of the factors that influence biological sensitivities to hydrocarbon spills in a marine environment by using a study area in southern Vancouver, British Columbia. Using strategic Environmental Sensitivity Mapping, Environmental Impact Assessment and Geographic Information Systems frameworks, a selection methodology is designed. The method produces maps of convergence areas of biological sensitivities – hot spots – that can help decision-makers prioritize areas for preparedness and response to marine environmental emergencies in Canada.
Environmental Performance Rating Systems: An Effective Tool for Increasing Compliance with the Canadian Environmental Assessment Act, 2012? (January 2016)

Author: Jonathan Ruse
Employer: Canadian Environmental Assessment Agency

Abstract

The Canadian Environmental Assessment Act, 2012 (CEAA 2012) provides regulatory authority allowing the Minister of the Environment to issue legally binding decision statements establishing conditions with which a proponent must comply. The Canadian Environmental Assessment Agency (the Agency) is currently developing a Compliance and Enforcement Program in order to promote and verify compliance with CEAA 2012 and specifically, conditions in decision statements. An Environmental Performance Rating System (EPRS) is a system where companies are rated by regulators based on their environmental performance in order to encourage improvement through public scrutiny and market incentives. This paper provides an overview of three EPRSs – the PROPER program, the GreenWatch Program, and the AKOBEN program – in order to evaluate those programs and how an EPRS might impact the Agency. Results indicate that all three programs have resulted in a significant increase in compliance resulting in effective reductions in pollutants harmful to the environment. An EPRS for CEAA 2012 could help increase transparency in the environmental assessment process and provide incentives for proponents to go beyond compliance and implement best practices in environmental management. It may also help to remedy current flaws in the pre-assessment phase, in the assessment phase, and also the post-decision phase. However, the success of such a program depends on the ability to create a fair rating scheme across a variety of projects, on taking into account other environmental legislation, and on supporting the program with a legislative base. Determining whether or not an EPRS is a viable approach to increase compliance with CEAA 2012 will ultimately depend on accurate program performance evaluation, and would therefore be more suitable as a long-term initiative, requiring the resources and input of multiple federal authorities.
Abstract

Follow-up has long been acknowledged as an important component of the Environmental Assessment (EA) process. Broadly understood as the umbrella term encompassing all post-approval EA activities, follow-up is a valuable project-management instrument with a wide-range of functions. These include improving the environmental performance of projects, identifying unforeseen impacts, verifying compliance, raising public awareness, increasing citizen participation, and ultimately, bettering future EA practice. While such benefits are widely accepted, follow-up remains a generally weak area of EA that is either poorly implemented or ignored altogether. In view of this deficiency, the present report aims to shed light on how to conduct adequate EA follow-up using a two-fold approach. First, the theory behind follow-up is described and best-practice principles from the EA literature are identified. Secondly, two case studies, drawn from the Canadian nuclear sector, are examined and potential strengths, weaknesses and areas for improvement in follow-up are highlighted. Results indicate that there is still much room for improvement with respect to how EA follow-up is conducted. Based on the Canadian nuclear sector’s experience, a number of recommendations are put forward to improve follow-up in Canada. Key lessons learned call for a wider scope, more opportunities for public involvement, further consideration of local knowledge, better access to documentation, and a clearer definition of roles and responsibilities in EA follow-up.
A case study about energy consumption and recommendations for future energy conservation plans (December 2015)

Author: Xiaojuan Li
Employer: Vanier College

Abstract

Vanier College presently has a level one Cégep Vert Certification from Environment Jeunesse. The first Environmental Assessment was done five years ago. It was necessary for Vanier College to do the second Environmental Assessment after these five years in order to reach a level two environmental certification also with Environment Jeunesse. The purpose of Vanier College’s second Environmental Assessment is to gauge if their institution is improving or deteriorating in terms of impact on the environment. This paper presents the situation of a case study on the energy performance of Vanier College. Factors that are influencing energy performance are: 1) the lack of efficient sensors for lighting and temperature; 2) the lack of thermal walls, which are used to pre-heat the buildings, especially in the winter months; 3) the lack of double glazing on windows, which will affect not only the room temperature, but also the indoor air quality as well. The purpose of this study is to assess the current situation of energy consumption, indoor air quality and the Life Cycle Assessment for the buildings’ energy saving in Vanier College. Included in this study are the evaluation and determination existing problems, the shortage and drawbacks of actual energy usage, the absence of proper legislative measures for energy efficiency and finally, to generate suitable suggestions and recommendations depending on this current case study.
Environmental Assessment and Ship-mediated Species Introductions in Northern Canada (October 2015)

Author: Gina Senko
Employer: Office of the Auditor General

Abstract

Climate change and the associated reductions in sea ice coverage present an opportunity for increased economic development, resource extraction and greater marine access in northern regions. This opportunity raises concerns, however, as international economic activities, such as shipping, can have profound impacts on ecosystems and the societies who depend on them. Ship-mediated species invasions, in particular, have had considerable environmental, economic and social impacts around the globe. To minimize the risks associated with ship-mediated species introductions, Environmental Impact Assessments have an important role to play. Using Baffinland Iron Ore Corporation’s Mary River project as a case study, this report examines the manner in which a project proponent and regulatory agencies present the risks and consequences. A review of the project along with changing ballast water regulations highlights both the potential and responsibility Environmental Assessments have in managing the threat of invasive species in northern Canada. General and project-specific recommendations propose ways in which Environmental Impact Assessment can better address and mitigate the risks and impacts associated with ship-mediated nonindigenous species introductions for the future. Those recommendations include; the consideration of upcoming regulations in the design of onboard ballast water treatment systems, impacts of treatment methods, inclusion of environmental risk assessments for predictive modeling in all phases of a project and in transboundary assessments, rigorous baseline and monitoring studies, regulatory oversight and redundancy, inclusion of hull fouling as a vector of species introductions for vessels and floating infrastructure, use of detailed variables when calculating risks of hull fouling, impacts of hull cleaning discharge, consideration of cumulative effects in phased-in project development, and the need for a clear and legally binding international regulatory framework.
Abstract

Electricity is a central sector targeted in efforts to reduce greenhouse gas (GHG) emissions in the United States, with a specific focus on increasing renewable energy generation. In order to track generation and sales of electricity, a new commodity was formed – the Renewable Energy Certificate (REC) – which represents the environmental attributes associated with 1 megawatt-hour (MWh) of renewable energy generated. Since this time two markets for RECs have formed, both of which are important drivers of renewable energy adoption. At the same time, states have introduced a variety of policies to encourage renewable energy adoption, all of which impact RECs to varying degrees. This paper explores the overall regulatory environment within which REC markets operate and introduces Regulatory Impact Assessment (RIA) as a tool to bridge the gaps created by incongruent policies. A number of factors are identified that contribute to REC market integrity – including the degree to which policies lead to double counting of RECs, ambiguous REC definitions, and vague REC ownership. Seven of the most prominent renewable energy policies are evaluated in terms of their impacts on these identified factors. While no legislation is found to be inherently at odds with REC markets, the implementation of popular policies in certain ways can lead to unintended negative consequences on REC markets. RIA is a cost-benefits analysis tool that could be used to ensure proper consideration of the potential impacts of proposed regulation on REC markets. RIAs require that alternative policy options by considered and that a thorough cost-benefit analysis is undertaken. The cost-benefit analysis could easily incorporate impacts on REC markets and renewable energy legislation. Performing an analysis that takes into account the full regulatory landscape would make it possible to identify potential inconsistencies before a policy is implemented – preventing undue burden and negative impacts.
Abstract

The Environmental and Social Impact Assessment (ESIA) framework aims at predicting, managing and monitoring environmental and social impacts of a project or a policy. Resource extraction projects, though, require years and sometimes decades of exploration work. Details about project background in the ESIA are usually taken from the feasibility study, which occurs at the very end of the exploration phase. Since ESIAs are generally done so late in a project’s life, they not only fail to alter project planning, but they also fail to account for environmental and social impacts that occur during exploration phase. If the environmental impacts of a mine are relatively predictable and manageable, the social impacts are much more intangible and dependent on a multitude of external factors. Environmental and Social Risk Assessments (ESRA) done in the context of project due diligence, on the other hand, are often done several times during the exploration phase. While much smaller in scope, an ESRA can help identify and manage potential impacts before the ESIA comes into play.

This case study will focus on the ESIA application to the extractive resources industry in the developing world. It illustrates the fact that the ESIA framework is not adapted to identify and manage social impacts on a mining project. Social impacts that are caused by influx, for example, can only be mitigated if identified early and monitored with an influx management plan. To be effective, such a plan needs to be implemented before the start of construction or even before the start of feasibility study during the advanced exploration phase. In some cases, project finance requires a due diligence process that involves an environmental and social risk assessment while the project is in its exploration phase. This case study, however, will conclude that the identification of social impacts was made possible because of IAMGOLD Corporation’s management beliefs in the Social Licence to Operate (SLO).
Abstract

This internship report seeks to determine whether joint ownership arrangements of resource projects between Aboriginal groups and industry engender meaningful participation for indigenous communities. This is accomplished through the application of Stewart and Sinclair’s meaningful participation principles to an analysis of Manitoba Hydro’s Keeyask Electric Generation Project. This hydroelectric project was developed through a collaborative effort between Manitoba Hydro and four Cree First Nations, operating collectively as the Keeyask Cree Nations. The two parties negotiated the terms of their relationship in the Joint Keeyask Development Agreement (JKDA), where the Aboriginal groups involved were able to secure numerous benefits and insurances, including the option of dissolving the project.

As project proponents, the responsibility of conducting consultation fell on band leadership, who strove to ensure that all community members had a voice and understood what was being agreed to. The internship report’s primary conclusion is that the Keeyask Electric Generation Project demonstrates Aboriginal groups’ resilience in the face of an encroaching capitalist system. The Aboriginal communities were able to derive economic benefits from the project, incorporate traditional Aboriginal knowledge into its development and negotiate provisions in their contract with Manitoba Hydro that serve to safeguard their culture from erosion. However, the provisions related to Aboriginal employment and training for other proposed projects serve to entrench the Keeyask Cree Nations deeper into mainstream Canadian society by making them reliant on natural resource exploitation for a sustained livelihood.
Lake Sturgeon and fish passage at hydroelectric dams (September 2015)

Author: Laxmi Koirala Pandit

Employer: Department of Fisheries and Oceans Canada

Abstract

Lake Sturgeon (Acipenser fulvescens) is a large bottom feeder and long lived freshwater fish species that travels long distances between spawning and suitable rearing habitat. Lake Sturgeon is found in North America. More specifically, they are well distributed in the Mississippi River drainage basin south to Alabama and Mississippi; Great Lakes and east down the St. Lawrence River; and also the Detroit River to the limits of fresh water. In the west, the species reaches Lake Winnipeg and the North and South Saskatchewan Rivers. In the north, it is found in the Hudson Bay Lowland. Historically, the species was widespread with high abundance in its range but a decline in population was observed recently. Overexploitation was a major threat in the past, but recently, habitat fragmentation and degradation have now been considered to be the current major issue. Re-establishing and re-connecting river systems has been considered as an effective and efficient technique for protection, recovery and population management. Establishing connectivity in river systems can be achieved by removing barriers or by providing effective and efficient upstream and downstream fish passage over the barriers. Removing barriers is not feasible in most cases, therefore the most suitable and desirable alternative is to reinstate the river connectivity by providing effective and efficient fish passage to native fish species. Fish locks and elevator, trapping and trucking, and fishways (fish ladders) are the most common techniques that are used to provide fish passage at a barrier. Fishways are widely used at hydroelectric facilities to provide upstram and downstream fish movement. However, successful fish passage depends on the location and design of the fishway or fish passage and the swimming performance of the fishes. Several fishways exist in the distribution range of Lake Sturgeon; however, most of these fishways were designed for salmonids and may not be efficient for the Lake Sturgeon. Due to the biological and morphological differences between salmonids and Lake Sturgeon, the fish seem to have faced difficulties to pass through the existing fishways, resulting in overall low fish passage efficiency for the Lake Sturgeon. Poorly designed fish passage with respect to Lake Sturgeon could not only affect its migration but ultimately it will affect the Lake Sturgeon population and its recovery plan by blocking its access to spawning grounds. Thus, for successful Lake Sturgeon passage, fishway designers need to consider swimming ability and behaviour of Lake Sturgeon and space requirements for the species.
Corporate Sustainability and Risk Management: An assessment of tools to manage material environmental, social and governance (ESG) risks and issues (August 2015)

Author: Nico Ahn
Employer: Bombardier Aerospace

Abstract

It is increasingly important for corporations to manage the risks they face from environmental, social and corporate governance (ESG) concerns. In our current economic and legal system, any action to reduce ESG concerns should be undertaken to primarily support either or both elements of corporate responsibility: increasing or protecting the value of the corporation to stakeholders and complying with legislation and regulations in the jurisdictions where the firm operates. A corporation should nevertheless be mindful of its stakeholders and their concerns and requirements. Understanding these concerns will help a corporation what environmental and social risks it faces and allow it to take action to reduce such ESG risks, which have the potential to undermine the business’s bottom line and compliance efforts.

A variety of tools, including for example environmental impact assessments, environmental management systems and sustainability reporting exist today that can enable corporations to manage ESG risks before these turn into financial risks. This report first provides and overview of such tools, and then compares and contrasts how they can be used within a corporation.

As all sustainability tools cover different risks and address different aspects of the corporations’ ESG concerns, it is important to choose an appropriate set of tools that fit the corporate risk management objectives. The report concludes by proposing the use of a ISO 31000 risk management system to frame the ESG risk management efforts of a corporation.
A comparative analysis of EIA and CSR: transferable lessons between two disciplines (April 2015)

Author: Gilles Couturier

Employer: Quebecor Media

Abstract

Environmental Impact Assessment (EIA) and Corporate Social Responsibility (CSR) reporting are tools to measure and disclose environmental impacts from projects and private sector activities yet both have been treated independently in the scientific literature. This thesis aims to fill this gap by comparing and contrasting the disciplines in order to find relevant transferable lessons.

This analysis reveals a number of similarities. Firstly, EIA and CSR reduce environmental and social harm while offering financial benefits to the proponents through the use of scientific methodology. Secondly, stakeholder engagement aims to give legitimacy to the processes. Finally, the success of EIA and CSR can be measured by the amount of institutional dynamics they have fostered, from internal culture change to new relationships with NGO’s and increased transparency from a review process.

This thesis also highlights a number of differences. Firstly, the two differ in their approach. Projects in EIA are screened and mandated by an external party whereas CSR is voluntary. Secondly, the two are philosophically different. In EIA, impact reduction is the goal while CSR is used to reduce costs and risks. Mandating CSR spending ensures that companies invest in impact reduction even during low profit periods. Finally, EIA and CSR have operational differences. The definition of the environment used in CSR is much more restrictive than in EIA and CSR fails to evaluate long term and cumulative impacts from its activities, a fact which could be improved through government oversight. Finally, EIA must develop its monitoring practices, notably the disclosure of information to relevant parties.
Abstract

Research Question: Do adaptive management strategies (Water Use Planning) provide an effective platform for project proponents (BC Hydro) to conduct monitoring studies required to satisfy Environmental Assessment Certificate commitments in BC?

The Water Use Planning (WUP) process was developed in British Columbia (BC) as a mechanism for resolving jurisdictional conflict between the BC government and Fisheries and Oceans Canada (DFO). The conflict stems from fish entrainment and mortality within BC Hydro hydroelectric facilities along major water systems in BC. The WUP process acts as an interdisciplinary consultative platform for several managerial functions in BC, including hydroelectric water use management, mitigation of fish entrainment and mortality, and monitoring environmental impacts of BC Hydro hydroelectric facilities. In BC, project environmental assessment (EA) is carried out through the issuance of an environmental assessment certificate (EAC). The EAC is issued with several commitments that the proponent must satisfy; many of these commitments require implementing monitoring studies. The WUP process provides a platform for implementing these monitoring studies. In my report, I examine Western Toad monitoring (CLBMON-58) as a case study. I perform a review of academic literature on adaptive management and environmental monitoring. I evaluate the WUP process against the academic literature on adaptive management and determine that the WUP process does constitute adaptive management. I evaluate the WUP monitoring studies against the academic literature on environmental monitoring and determine that the WUP process is conducive to environmental monitoring as it is defined in the academic literature. I argue that the WUP process characterizes an adaptive management approach that provides an effective platform for BC Hydro to conduct the monitoring studies required to satisfy EAC commitments in BC.
An Examination of Canada’s offshore oil and gas EIA process: Does it adequately consider effects on marine species? (January 2015)

Author: Ian Martin

Employer: Secretariat for the Convention on Biological Diversity

Abstract

The main objectives of the Convention on Biological Diversity (CBD) include conserving biodiversity, ensuring the sustainable use of biodiversity and the equitable sharing of the benefits arising from the use of biodiversity. One target of the Convention is to ensure that terrestrial and marine ecosystems are protected. In the case of marine ecosystems, the specific target is to reach protected area (PA) coverage of 10%. Canada has fallen some way short of this target, with approximately 1% of its marine territory under some form of protection. In light of Canada’s poor record in creating marine protected areas, this report examines the role environmental assessment (EA) plays in protecting biodiversity and reducing environmental risk and damage, with a focus on the offshore oil industry. Indeed, EIA and SEA (Strategic Environmental Assessment) are recognized by the CBD as tools for avoiding and mitigating negative impacts on biodiversity, and are processes meant to promote sustainable development and resource use. Given the potential for environmental damage in the exploitation of offshore oil and gas and the looming possibility of opening the arctic to offshore production, it is important to evaluate the extent to which EA helps Canada fulfill its commitment to the CBD and promote sustainable development generally. A review of literature and an examination of EIA reports reveal that Canada’s EA process is not well suited to delivering positive biodiversity outcomes, and that the tools of EIA and SEA are not used to their full potential in promoting sustainable development.
Community-led Environmental Monitoring in Eeyou Istchee: A New Approach to EIA Follow-up (January 2015)

Author: Ronald Strangway

Employer: Secretariat for the Convention on Biological Diversity

Abstract

Due to the temporal and financial limitations imposed upon EIA practitioners, follow-up monitoring often receives little attention in the EIA process. In an attempt to make projects more sustainable, and the practice of EIA more effective, robust environmental monitoring is required to inform the adaptive mitigation management process. Additionally, regional and national standards for consulting impacted communities exist to ensure local interests are recognized and accommodated within the EIA process. In order to satisfy the requirements of robust environmental monitoring, as well as fulfill consultation and accommodation standards, this report proposes the facilitation of locally-led environmental monitoring initiatives within an EIA follow-up context.

By ensuring a place for locally-led monitoring within the EIA follow-up phase, the effectiveness of mitigation management decision-making is improved through a diversification of participating epistemologies, and an improved understanding of a project's complex socio-ecological system. Mitigation management decision-making also becomes more contextually-relevant with the inclusion of local perspectives, and gains validity among impacted communities. Additionally, opportunities for cooperative partnerships and power-sharing between proponents and impacted communities emerge through the development of consultation mechanisms required for collaborative interpretation of monitoring data and information. Savings of temporal and financial resources can be realized through the leveraging of local expertise, and social acceptability of projects and environmental management programs can be enhanced, thereby making such locally-driven ventures beneficial for both proponents and communities. Drawing upon lessons learned while assisting the Voluntary Anadromous Cisco Catch Registry Program in the Cree community of Waskaganish, this report presents the voluntary registry as a case study for potential application both within and outside of the field of EIA.
Abstract

The Environmental Assessment (EA) regime in the Northwest Territories (NWT) is embedded within a co-management framework. Two different frameworks exist in the NWT, one in the Mackenzie Valley that falls under the Mackenzie Valley Resource Management Act (MVRMA) and one in the Inuvialuit Settlement Region (ISR) that falls under the Inuvialuit Final Agreement (IFA). Environment Canada (EC) is a registered external party in all of the NWT EAs and provides guidance and recommendations to the co-management boards. The overarching goal of this internship report is to address the collaborative function of the co-management system. Specifically, the objective is to evaluate the degree of inclusion of EC’s advice in the board’s decision-making process, particularly in environmental assessment. To do so, two case studies, one in each of the regions, will be analyzed. The first case study is the Gahcho Kue Diamond Project and the second case study is the Inuvik to Tuktoyaktuk Highway. The analysis conducted for the report determines that EC provides relevant expert advice on a wide range of subjects such as water management, wildlife/bird management, spill contingencies and other construction management issues and that, for the most part, EC’s outstanding issues were resolved through the environmental assessment process. This was possible because both co-management boards allow for exchange between the proponent and external reviewers before final recommendations are issued. This is beneficial for both parties as the proponent benefits from expert advice and EC is allowed to fulfill its mandate. Finally, collaboration was analyzed using themes from Armitage (2005) and it was found that the EA regime does foster collaboration.
2014
Adapting Cumulative Environmental Assessment to Ensure Climate Change and Greenhouse Gas Emissions are Considered in Oil Sands Assessments: A Review of Four Surface Mines in Alberta, Canada (December 2014)

Author: Arran Gregory
Employer: Office of the Auditor General

Abstract

For the last five years Canada has been under scrutiny its approach to climate change and greenhouse gas (GHG) emissions, with much attention directed at Alberta’s oil sands projects. While documents such as Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners have existed since 2003, their application to environmental impact assessments (EIA) of oil sands projects has been limited. This paper suggests the incorporation of climate change and GHG emissions mitigation into the cumulative environmental assessment (CEA) portion of EIA as the impacts by the project and on the project are cumulative and interactive by their nature. The paper is presented in four sections. The first provides a discussion of CEA’s origins, the benefits derived from its use, and how climate change and GHG emissions are well suited to be incorporated into CEA, while outlining the challenges that need to be surpassed in order to make the process more effective. The second reviews Canada’s climate change commitments – internationally and nationally – and how oil sands projects impact the ability to meet the goals established through international conventions. The third section evaluates four surface mines EIA’s which were approved between 2004 and 2011, with an additional discussion on international unconventional oil projects. The fourth section provides conclusions and recommendations for encouraging climate change considerations (CCC) and GHG emissions management of oil sands projects. Overall, the findings from the case studies indicate that oil sands proponents apply climate change documents in a random fashion. Greenhouse gas emissions management plans are not designed to meet Canada’s climate change commitments but global corporate strategies instead. Beyond recommending a moratorium on oil sands development, the restructuring of CEA in order to integrate CCC and GHG emissions management specifically for oil sands projects may contribute more to meeting Canada’s CCC abroad and at home.
Integrating Resilience-Based Theory and Approaches into Species at Risk Management in Canada (October 2014)

Author: Charles Cameron
Employer: Office of the Auditor General

Abstract

Biodiversity is widely acknowledged as an important systems indicator. It underpins the capacity of ecosystems to adapt and continue to provide the services upon which humans depend. Resilience theory has advanced transformative concepts that can refine the management of biodiversity. This report examines Canada’s effort to protect biodiversity through species at risk management, by using a resilience, systems-based approach. It builds on ideas proposed for more effective species at risk protection and recovery in the United States using the Endangered Species Act (ESA), and assesses the means by which the recommendations may be integrated into the Canadian equivalent Species at Risk Act (SARA). It argues that the integration of resilience-based approaches can improve the implementation and effectiveness of SARA by taking steps to enhance resilience by attending to a more complete systems view, acknowledging the importance of back-loop dynamics in the adaptive cycle, and by advocating for and properly using adaptive management to navigate collapse and reorganization. The emergent narrative promotes future research by using the adaptive cycle as a framework to conceptualize the Act itself.
Legislative Cooperation within Water Governance: Discovering linkages between the Ontario Environmental Assessment Act and Clean Water Act. (September 2014)

Author: Samuel Mason
Employer: Office of the Auditor General

Abstract

Since the Walkerton Tragedy of 2000, Ontario has experienced a heightened awareness to environmental health, especially concerning drinking water quality and quantity. Following recommendations from Justice Dennis O’Connor, the provincial government introduced the Clean Water Act, which establishes the development of source protection plans (SPP) throughout Ontario’s most populous areas. Designed by local actors on a watershed basis, the SPPs are significant in their potential to change drinking water protection in the province. As the first of these plans gain provincial approval, there are apparent procedural linkages with the environmental impact assessment process. This paper seeks to determine what are the opportunities, advantages and challenges in reforming environmental legislation to exploit these linkages. Previous research of this subject matter has found possible advantages in collaboration between similar legislations. For this study, the Ontario’s Environmental Assessment Act (EAA) and Clean Water Act (CWA) were investigated, and several procedural linkages were determined. Some of the benefits to synergizing the processes within EAA and CWA include policy efficiencies, resource savings, stakeholder cooperation, knowledge sharing, capacity building and the increased promotion of environmental sustainability. Much of the exposure to this area was gained through an internship with the Auditor General of Ontario, through working on a value-for-money audit on the Source Protections Programs Branch of the Ministry of the Environment. The audit findings are to be released in October 2014.
Application of the Ecosystem Approach to Environmental Assessment: Issues and Suggestions (August 2014)

Author: Iffat Huque

Employer: Environment Canada

Abstract

Canada is committed to the application of the ecosystem approach as a management paradigm, through various policies and strategies. The ecosystem approach is defined by the Convention on Biological Diversity (CBD) as “a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way”. It is guided by twelve principles which emphasize: balancing conservation and use of biodiversity, conservation of ecosystem structure and function, ecosystem services, a holistic view interrelating different temporal and spatial scales, involvement of relevant sectors of society, adaptive management and integration of best available science and local knowledge.

Environmental Assessment (EA) is potentially a powerful tool in implementing the ecosystem approach as it allows consideration of ecological consequences of, and societal choices in making decisions about local developments. This study documents the perception of environmental assessment professionals on the extent to which EAs apply the principles of the ecosystem approach, and identifies priority actions for implementation of the approach. A survey, a consultation with EA managers and investigation of six EA reports show that there are many weaknesses and hurdles in the application of the principles in EA. In the context of the ecosystem approach, EAs are found to be weakest in the assessment of impacts on ecosystem services, consideration of biodiversity impacts, understanding and consideration of limits of ecosystem functioning, consideration of long term impacts and trade-offs between short term benefits and long term goals. For better implementation of the approach, emphasis should be given on Regional Environmental Assessments and developing regional baseline information to support project decisions. Priority should be given to develop guidance and training for proponents, experts and reviewers on: (i) assessing impacts on ecosystem services, (ii) defining the limits of ecosystem functioning, and (iii) assessing impacts on biodiversity.
Two major pipeline projects are planned for Eastern Canada in order to relieve the transportation infrastructure bottleneck occurring in Western Canada and export tar sands oil to international markets. According to some groups, these projects will increase health and environmental risks for Canadians living nearby the selected routes. This proposition, combined with the increasing number of disastrous oil transportation accidents, suggests that questioning our rights as Canadians in regards to our health and safety should be addressed in a most urgent manner. Recognizing the right to a healthy environment (R2HE) therefore becomes a meaningful discussion to be had. This report seeks to study the foundation of the R2HE and to highlight its application to pipeline development. In order to achieve this, an extensive literature review was undertaken exploring numerous sources varying from newspaper articles, to project submissions, peer-reviewed literature, and books written by R2HE experts. The theoretical foundations are explored and an examination of the relationships between the R2HE and human rights, sustainable development, and environmental justice, is undertaken. The status of the R2HE is then investigated in an international and Canadian context, and its relationship to the environmental impact assessment (EIA) process. Finally, the application of the R2HE in a pipeline development context is analyzed by exploring all key stages of pipeline development. This analysis highlights the fact that the two proposed projects for Eastern Canada greatly increase the health and environmental risks for Canadians living nearby the selected routes, most especially in the transportation phase, and that the R2HE could help protect Canadians and the environment in all stages of development. Supporting tar sands development by increasing transportation infrastructure would further discourage the recognition of the R2HE for Canadians by heightening environmental risks without appropriate compensation and protective measures. Consequently, recognizing the R2HE in Canada’s constitution should therefore become a priority if protecting the health of Canadians and the environment are priorities.
Are biodiversity offset policies practically feasible? A critical analysis of Wetlands Compensatory Mitigation in the United States and the Fish Habitat Policy in Canada (August 2014)

Author: Nicolas Gosselin

Employer: Canadian Environmental Assessment Agency

Abstract

Not available
Green infrastructure as framework to conserve and enhance urban biodiversity (May 2014)

Author: Valérie Tremblay-Gravel

Employer: Secretariat of the Convention on Biological Diversity

Abstract

In recent years, unprecedented migration towards cities and intensifying biodiversity losses create complex challenges and opportunities for environmental urban planning. Planning approaches that can enhance urban biodiversity are likely to benefit ecosystems and human populations. This paper explores how urbanization and biodiversity can be reconciled through the concept of green infrastructure (GI). GI refers to a green space network that supports an environmentally sound approach to the design and management of urban areas. This paper elaborates five strategies to conserve and enhance biodiversity in GI. These strategies are based on a review of best practices in urban planning and environmental management literatures and then applied to analyze a case study, Toronto’s ongoing waterfront revitalization project. The analysis suggests that strategies were for the most part integrated in the project’s rationale and that it contributes to the integration of biodiversity in Toronto’s GI. The project engages new ideas in environmental urban planning and recognizes GI functional and experiential benefits. However, the word biodiversity was never mentioned throughout the project’s literature, suggesting that planning for biodiversity is still at the early stage of its conceptualization. This paper concludes that the GI approach has great potential to address the tensions created by urbanization and biodiversity conservation.
A TEIA Agreement Between Canada and the US: Challenges and Opportunities (April 2014)

Author: Olivia Collins
Employer: Commission for Environmental Cooperation (CEC)

Abstract

In the last century, Canada and the US have coordinated their efforts and signed many bilateral agreements that help manage and reduce pollution in the border regions. Despite the successes of these agreements, many of them still fail to adequately address transboundary environmental impact assessment (TEIA), leaving large gaps in their management approach. This report attempts to determine whether it is feasible for Canada and the US to sign a TEIA agreement in the future by first looking at the legal, political and historical context of the TEIA process. Following this, two existing agreements are examined and used as models for a TEIA agreement between Canada and the US. The evidence in this report points to the need for and feasibility of a future agreement to improve transboundary environmental management.
Abstract

My internship at Assessment and Abandoned Mines (AAM) provided me with valuable experience in working in the field of Environmental Assessment. Among my responsibilities at AAM, I was required to develop a plan for the monitoring and implementation of socio-economic mitigation measures, which will apply to the mine remediation projects for which AAM is the proponent. This task presented me with an excellent opportunity to develop my case study for this internship report.

The literature review portion of this report discusses socio-economic effects assessment including compliance and enforcement, implementation of mitigation measures, and follow-up activities. Social, cultural, and economic components of society are often some of the most important to consider in the assessment process as adverse effects upon these components can reduce the intended benefits of the project (i.e. the need/purpose of the project) thereby undermining its viability (UNEP, 2002b). Socio-economic effects assessment is often focused on the effectiveness and accuracy of predicting impacts; however, increased emphasis should also be applied in preventing impacts through the implementation of mitigation and management measures (Sánchez & Gallardo, 2005; Noble & Storey, 2005).

The Socio-economic Mitigation and Management Plan guide presented in this report was written to assist AAM in developing a management plan which will help ensure that socio-economic mitigation measures are implemented and to verify that those measures are effective.
Abstract

The Canadian nuclear industry has faced social acceptability challenges since the 1950s. Social impact assessment (SIA) is a form of environmental assessment (EA) that focuses on evaluating potential social, economic and cultural impacts from proposed projects, practices and programs. SIA has been suggested to be a best practice tool to assess the true impacts of development projects. While SIA is present in Canada at lower levels, there is however a need for its inclusion at the Federal level. Meanwhile, as nuclear waste is one of the main problems associated with nuclear energy in Canada and across the world, proposed projects to manage nuclear waste require social acceptability and in turn adequate SIA assessment prior to approval. This report examines SIA best practice, nuclear projects that have been proposed in Canada, the EA processes that ensued, progress made, and areas of possible improvement.
An Environmental and Economic Assessment of Commercial Microalgal Biofuel Production in Open Ponds (April 2014)

Author: Ardeshir Vafadari

Employer: Secretariat of the Convention on Biological Diversity

Abstract

In recent years, microalgae have attracted much attention as a new and promising source of biofuel. This paper analyzes the environmental and economic implications of biofuel production from microalgae grown in large scale open ponds. This is done through an extensive and analytical review of the available scientific literature, and by applying the findings to a case study: a commercial microalgae cultivation plant located in the province of Bushehr, Iran. The key factors that affect the environmental and economic performance of microalgal biofuel production are the lipid content and the growth rate of the microalgae, the harvesting and oil extraction methods, and the source of water and CO² input. Most studies show that, environmentally, microalgal diesel compares favorably to conventional diesel and other energy crops. However, only a few of the reviewed studies estimate that microalgal fuels are economically competitive with conventional fuels. The case study was found to be using efficient technology, suitable and low impact inputs and a very potent microalgae strain. Consistent with the literature, the use of efficient methods and appropriate inputs have significantly reduced the potential environmental impacts of the case study. These factors alongside the highly suitable location, where the case study is situated in, are expected to result in a very economical production process (relative to other projects found in the literature). Nevertheless, monitoring and follow up are essential for the case study to ensure the effectiveness of the mitigation measures that are in place (such as the water filtration system). Overall, the literature review and the case study confirm the potential of microalgal biofuels, subject to the use of energy efficient cultivation methods, low impact inputs and high capacity microalgae strains.
This paper relates my internship in ecological field data collection with Bird Studies Canada to the study of ecological impact assessments. More specifically, government regulations and standardized methodologies that apply to migratory birds are used to analyze an environmental impact assessment for a project in Saskatchewan. In Canada, protection for migratory bird species and species at risk is provided through legislation, management planning, and thorough ecological impact assessments for new development. Government guidelines are available to enable and promote sustainable development. However, sustainable development can only be accomplished with enforceable legislations that support those ambitions. Guidelines and survey standards and effort are lacking because they are not mandatory and inadequately enforced. Furthermore, when an information deficiency exists, risk and impact significance is insufficiently assessed. The case analyzed in this paper exemplifies some of these common problems with ecological impact assessment. This paper demonstrates the need to implement rigorous standardized monitoring to adequately assess risk to wildlife and ensure more sustainable development.
Wildlife species as valued ecosystem components: examining the use and effectiveness of the yellow rail as an indicator in EIA (January 2014)

Author: Matthias Bieber

Employer: Bird Studies Canada

Abstract

Scoping is used in environmental impact assessment (EIA) to direct an assessment toward the most important issues and parameters. Valued ecosystem components (VECs) are aspects of the environment considered important from various viewpoints. In ecological assessment, these are often particular wildlife species to focus the monitoring efforts of costly field studies. Various criteria are used to select wildlife VECs including conservation status, population and habitat health indicators, socio-economic and ecological importance and umbrella species. There is no one prevailing VEC selection criterion; rather a complementary combination of case-appropriate VEC criteria and species should be considered and these should be easily and reliably monitored, well-studied and have suitable ecological attributes for their given role.

During my internship with Bird Studies Canada, I participated in follow-up monitoring for the Fishing Lake conveyance channel in Saskatchewan, which is directed toward the assessment of project impacts on the yellow rail, a sensitive and federally listed species requiring specific wetland habitat. This paper investigates the use of wildlife VECs in EIA and analyzes the effectiveness of the yellow rail as a VEC by examining three EIAs from Alberta and Saskatchewan in which yellow rails are used as VECs. Each assessment was evaluated based on the criteria used to select wildlife VECs and the yellow rail survey methods, impact prediction and mitigation measures utilized.

It was determined that the examined EIAs used diverse sets of criteria to select wildlife VECs but did not conduct adequate yellow rail monitoring. The results show that yellow rails are not particularly well-suited as either health indicators or umbrella species due to existing knowledge gaps and unsuitable ecological characteristics. In conclusion the yellow rail may be an effective VEC as an indicator of graminoid wetland habitat health if appropriate monitoring tools are utilized, but should be used in conjunction with other wetland-associated species to represent a diversity of wetland habitats.
Indo-Pacific humpback dolphins have historically inhabited the northern waters off Lantau Island, Hong Kong; however their numbers have been significantly decreasing over the past decade, while human pressure is simultaneously increasing. Based on a rigorous and critical use of a Geographic Information System (GIS), this study aims to assess the cumulative human impacts on this dolphin population since 1996. Discussed in the first sections of this paper are the multiple approaches, difficulties, and limitations to cumulative effects assessment (CEA) methodology. The following sections outline our proposed CEA methodology, which involves analysis and mapping of anthropogenic marine impacts throughout space and time in relation with historical dolphin distributions in the area. Local scale results show evidence of a relationship between the implementation of new high-speed ferry (HSF) routes and the decrease in dolphins near the Brothers Islands. Despite certain approximations in our methodology – like in any GIS based CEA model - our findings shine new light on the understanding of cumulative impacts on cetacean populations and suggest that the increasing level of HSF traffic is a likely contributing factor to the decreasing dolphin abundance in North Lantau.
Using environmental assessment to promote biodiversity conservation in Canadian National Parks: Opportunities and challenges (January 2014)

Author: Samantha Sabo

Employer: National Capital Commission

Abstract

Widespread biodiversity loss has occurred worldwide as a result of increasing development pressures. Protected areas management and environmental assessment are two sustainable development strategies that aim to conserve biodiversity and minimize impacts to the environment. The present paper will examine how the use of environmental assessment has and can be used as a tool to support the conservation of biodiversity in protected areas in Canada, with a particular focus on national parks. The analysis identifies that many steps of the protected areas management and environmental assessment process are complementary, and that their integration will lead to better biodiversity conservation outcomes. Using a case study of Gatineau Park in Gatineau, Quebec, the integration of environmental assessment and protected areas management is examined in practice. The paper makes several recommendations that will aid in the conservation of biodiversity through a collaborative approach between protected areas management and environmental assessment. Strengthening the environmental assessment requirements for projects located near protected areas, that share a watershed with a protected area, or that are located in important ecological corridors between protected areas is necessary. Cumulative effects assessments need to better evaluate transboundary impacts to protected areas. A standardized mechanism for the sharing of baseline biodiversity data needs to be created in order to better inform conservation and environmental assessment studies. Finally, a shift in the recognition of the importance of biodiversity is required at the national level in order to create policies that promote a conservation ethic across Canada.
Additional Challenges to Meaningful Aboriginal Consultation in the Context of Large-Scale Resource Projects and Outstanding Aboriginal Claims: A Case Study of the Northern Gateway Pipeline Project (January 2014)

Author: Élyse Maisonneuve

Employer: Canadian Environmental Assessment Agency

Abstract

The Duty to Consult (DtC) is based on the judicial interpretation of section 35 of the Constitution Act of 1982 that recognizes and affirms Aboriginal and treaty rights of the Aboriginal peoples of Canada. The DtC with Aboriginal peoples arises when the Crown contemplates conduct that may adversely impact potential or established Aboriginal or treaty rights. This paper argues that fulfilling the DtC with Aboriginal peoples is especially challenging in the context of large and complex projects because of the time required to consult meaningfully. In British Columbia, where there is a lack of clarity surrounding Aboriginal rights due to outstanding aboriginal claims, the challenge of fulfilling the DtC is compounded. A critique of current governmental practices concerned with fulfilling the DtC, and based on relevant academic literature, is presented, and then applied to the case of the Northern Gateway Pipeline (NGP) project. My findings indicate that the NGP is much larger in size and complexity and also affects a significantly larger number of Aboriginal groups compared to previous pipeline projects reviewed by the Agency. Three main recommendations to improve the current situation are provided: 1) that additional time and resources be invested in Aboriginal consultation; 2) that the BC Treaty Commission (BCTC) must be substantially changed to create the proper avenue for fair treaties and reconciliation; and 3) government communication with Aboriginal groups be improved, specifically, sharing information and engaging in open and transparent discussions about asserted rights and strength of claims.
2013
Can Federal Legislation and Policy Improve the Practice of Cumulative Environmental Effects Assessment in Canada? (December 2013)

Author: Natasha Anderson

Employer: Canadian Environmental Assessment Agency

Abstract

According to the Canadian Environmental Assessment Agency (the Agency), Environmental Assessment (EA) is a process which predicts and mitigates adverse environmental effects of development projects in support of sustainable development. Cumulative Environmental Effects Assessment (CEA) is a component of EA that assesses the environmental effects of a development proposal in combination with other physical activities. Some have argued that CEA is the most important aspect of EA, because all environmental effects are inherently cumulative. The practice of CEA in Canada has faced rampant criticism from academics and practitioners since its conception in the late 1970’s. In 2011, the Office of the Auditor General of Canada recommended that the Agency update its policy guidance for assessing cumulative environmental effects. With the coming into force of the Canadian Environmental Assessment Act, 2012 and based on the recommendations from the Office of the Auditor General of Canada, the Agency released a new Operational Policy Statement (OPS) for CEA in May 2013. This report examines whether this recent federal legislation and policy has the potential to improve the practice of CEA at the project level in Canada. The investigation reveals that the new policy and legislation is likely to have a positive impact regarding how the CEA is carried out at the project level in Canada. However positive the benefits of improving the CEA, it remains to be seen whether this would alter ultimate development decisions.
An Evaluation of Recovery Planning under Species at Risk Act (December 2013)

Author: Anila Tahiri
Employer: Office of the Auditor General

Abstract

The Species at Risk Act (SARA), was created to help the federal government meet its commitments under the Convention on Biological Diversity and under the 1996 Accord for the Protection of Species at Risk. There has been much public scrutiny as to the effectiveness of SARA, and to the capacity of federal organizations in meeting their obligations under the Act in publishing recovery documents within established timelines. The purpose of this study is to determine whether Environment Canada (EC) as the department responsible for the overall administration of SARA is complying with the Act in preparing timely recovery strategies, action plans and management plans, as well as identify what the associated time delays have been. The results indicate that by the end of December 2012, EC had managed to prepare recovery strategies for only 34% of the species under its custody, while failing to prepare timely recovery strategies for the other 66% of the species. Approximately 62% of the recovery strategies were finalized at least 2 years or more past the deadline. EC was lagging behind also in preparing timely management plans and action plans with a finalization rate of 23% and 10% respectively. It was concluded that EC was not complying with SARA in preparing recovery documents within prescribed timelines. The backlog inherited with the enactment of SARA, a lack of financial and human resources, lack of political will and a lack of clear policy and guidance documents were considered as the roadblocks to the effective implementation of SARA.
EIA and green technology development: An analysis of EIA effects on green technology emergence in new markets (November 2013)

Author: Karolina Apland

Employer: Terragon Environmental Technologies Inc.

Abstract

Environmental impact assessment (EIA) is a means to forecast and evaluate the biophysical and social effects of a project on the environment. From its origins in the 1970 US National Environmental Policy Act (NEPA) it has grown into an internationally practiced environmental management tool. Logically, EIA should serve as a tool that supports the development of green-technologies since the immediate aim of EIA is to move society toward more sustainable project development practices and green technologies are a means to reach that end. However, the role of EIA in green technology development has not been analyzed to date. This paper provides the case study of a new green-technology, Terragon’s Micro auto gasification system, MAGSTM, developed for the on-site treatment of waste with energy recovery in the form of hot water. Terragon’s attempt to break into Quebec’s biomedical waste treatment market has been met with bureaucratic red tape. The biomedical waste market can currently be characterized as being oligarchic in nature, plagued with high waste treatment costs and dominated by large-scale incinerators. MAGS is a potential solution to these common biomedical waste treatment issues. Using a framework published by the International Association of Impact Assessment, the procedural substantive and transactive weaknesses present in Quebec’s EIA process are uncovered in the context of green-technology development. A solution in the form of technology assessment over environmental impact assessment to study the environmental effects of new technologies is suggested to correct the current problems associated with EIA procedures in Quebec.
Investigating the Environmental Impacts of Bioremediation: A Life-Cycle Assessment of the Remediation of a Decommissioned Fossil Fuel Processing Facility (September 2013)

Author: Patrick Marcoux
Employer: Stantec Inc.

Abstract

Environmental remediation strategy is traditionally developed according to regulatory and economic criteria, with limited consideration of the impacts the remediation process may have on the environment itself. In the present study, the secondary impacts of soil remediation are evaluated using a Life Cycle Assessment-based evaluation tool, and are contrasted with the observed effects of biopile-based rehabilitation. An LCA was performed using an open source modeling program, openLCA, in order to estimate the impacts of resource investment required for the first remediation of a decommissioned oil processing facility. The resource inputs considered include diesel fuel, electricity, and chemical amendments (NPK). The resulting Life Cycle Impact Assessment inventory indicates that the principle outputs include CO2 (4.4kt), N2O (21.6kg), CH4 (10.0kg), CO (980.3kg), (NOX) 4700kg, SOX (978.0kg) and unspecified particulates (195.5kg). The associated impact categories include significant increases in Global Warming Potential, Human Toxicity Potential and Acidification Potential. LCA results were compared to overall bioremediation performance during the first phase of treatment, which indicated an approximate contamination decrease of 60% over 12 weeks. Average rates of contaminant breakdown were 60.6 mg/kg•day and 3.1 mg/kg•day for TPH and PAH compounds, respectively. Preliminary assessment of associated risks suggests that secondary impacts of remediation activities are much less significant than the potential impact of a zero-action plan, wherein existing contaminants would be left in place on the site. Onsite evidence indicates the strong possibility of groundwater and eventual surface water receptor concentration if soil decontamination is not completed. The impacts of bioremediation stated in the LCA do not pose a risk of acute harm to human or environmental health, but rather are shown to be contributors to ongoing chronic impacts to global systems. As the scope of environmental impact assessment generally does not extend beyond the primary impacts of remediation, damages generated from the secondary impacts are not taken into account in EA. In the current case, local environmental integrity was privileged over contamination released into the atmosphere. A carbon credit system could potentially reduce secondary impact generation with minimal added cost towards responsible authorities and corporate entities.
Regional Environmental Assessments and Aboriginal Participation - A Case Study Analysis of the Lower Athabasca Regional Plan (August 2013)

Author: Heather Rasmussen
Employer: Transport Canada

Abstract

The Supreme Court of Canada ruled in 2004 and 2005 that the Crown has a constitutional ‘duty to consult and, where appropriate, accommodate’ Aboriginal people if an action has the potential to negatively impact potential or established Aboriginal or treaty rights. The predominant tool the Crown uses to consult is Environmental Impact Assessment (EIA). Many Aboriginal people, groups and communities, as well as non-Aboriginal Canadians, EIA practitioners and academics, have criticized the role of Aboriginal people in decision-making processes at the project level and the ability of EIA processes to protect Aboriginal and treaty rights. Other limitations of project level EIA are argued to include deficiencies in mitigation and follow-up measures as well as inadequacies of cumulative effects assessment. Regional Strategic Environmental Assessment (RSEA) is increasingly used to assess cumulative effects at a regional level and as a tool for land-use planning. While government and academic literature exists on the use and benefits of RSEA, this is predominantly process based and there is little detail on Aboriginal participation. The focus of this report is to analyze the potential of an RSEA approach to address identified barriers to the meaningful participation of Aboriginal people in the Canadian EIA process at the project level and to analyze and exemplify through a case study analysis how and potentially why such an approach can fail at this. The potential barriers are identified through a comprehensive literature review and are analyzed using a framework developed by Kieran O’Faircheallaigh and relate to: the goals, purposes and mandates facilitating Aboriginal participation; the structures regarding decision-making; the financial resources made available for potential participants; the (in)ability to gain and share expertise and knowledge; the processes used to facilitate participation; and the recognition and standing given to the importance of Aboriginal participation and legitimacy of their concerns. An in-depth analysis of the Lower Athabasca Regional Plan in North Eastern Alberta, which uses an RSEA approach and fails to address these potential barriers, is conducted using the above framework. As the use of RSEAs in Canada is increasing, such an approach can be used to facilitate double loop learning, or learning from ‘past mistakes’. Recommendations are made to the federal government regarding the processes used for Aboriginal participation in RSEA as well as the transparency of such processes.
**Review of the legal framework and environmental assessment process for the salmon industry in Canada (August 2013)**

**Author:** Edwin Correa Arce  
**Employer:** Secretariat of the Convention on Biological Diversity

**Abstract**

This paper shows an overview of the regulatory framework in the salmon aquaculture industry and a comparative study with Norway that highlights the complexity of the process of establishing a new development and explains in part the stagnation of Canadian aquaculture in general.

Recent changes in basic regulations such as the Fisheries Act and the Canadian Environmental Assessment Act (2012) have created uncertainty about the future consequences on salmon farming sustainability. It is unclear how the elimination of aquaculture projects from the list of designated projects requiring EIA under the new CEAA altogether with controversial changes in the Fisheries Act will affect the salmon industry.

The creation of an Aquaculture Act is expected to consolidate these regulatory gaps, but there has been little public consultation. When compared with Norway, Canada needs to improve performance in areas such as the effectiveness of authorization systems, fish movement including GMO salmon, and food safety pointing out how some provinces have better structured regulations for aquaculture. It is urgent for the salmon farming industry to design a sound environmental framework including an SEA or some sort of management plan for water bodies.
A Better Approach to Outcomes Statements for EA at Environment Canada (July 2013)

Author: Alex Pinheiro
Employer: Environment Canada

Abstract

Over the last decade strategies for environmental management have been substantially changed by reforms that mandate more self-regulation by proponents. These changes, emphasizing speeding up the process, will necessarily diminish rigor if the EIA cost is not increased, and thus any strategy that represents a reasonable compromise between these two goals has great value. Environment Canada staff at the Environment Protection and Operations Directorate (EPOD) are in the process of developing Outcomes Statements for EA. When completed, these statements should function as a set of performance expectations that proponents will adhere to, and are agreed upon during the EA process. While this may be a worthy endeavour, it has yet to be shown whether or not Outcomes Statements can deliver on these promises. As of the end of 2011 they are not fully developed, tend to be mismanaged, and are poorly understood by EPOD staff. Rather than provide a cohesive way forward, they are a point of disagreement and are subject to unrealistic expectations. This paper will examine the different views of EPOD staff members on the development and employment of Outcomes Statements, point out problems both with the policy and within the department, as well as identify the best way to proceed with the strategy of proponent-led assessments.
Abstract

The Crown’s (federal and provincial governments) duty to consult Aboriginal groups is founded in Section 35 of the Canadian Constitution Act 1982, which recognized and affirmed both Aboriginal and Treaty rights. Subsequently the Supreme Court of Canada (SCC) has provided greater clarity on what the duty means in practical terms for the Government of Canada. The SCC has indicated that the Crown must consult and potentially accommodate Aboriginal groups when Crown conduct may have an adverse impact on potential or established Aboriginal and/or Treaty rights. Aboriginal consultation (AC) is most often conducted at the project level, commonly in conjunction with an environmental assessment (EA). Project consultations through project-EAs have a limited scope and often fall short of addressing the concerns of affected Aboriginal groups meaningfully. The shortcomings of project level consultations can potentially lead to frustrations among affected groups and has at times led to conflict. This paper argues that Aboriginal consultation is better suited for the strategic planning level of government and explores the possibility of using strategic environmental assessment (SEA) as a potential mechanism for the meaningful consultation of Aboriginal groups. In order to explore the potential for strategic consultations through SEA, a thorough literature review was conducted. It was discovered that strategic consultations could help address many of the identified limitations of project level consultations; however, the present SEA framework in Canada has a number of limitations of its own that prohibit it from being an effective mechanism for meaningful AC at this time. Two case studies were examined to demonstrate practical examples of the benefits of strategic consultations in the Canadian context. Furthermore, in order to compliment the literature review and case studies examined, a qualitative questionnaire was provided to volunteer federal government employees in order to ascertain their expert opinion and insight on the viability of consulting Aboriginal groups at the strategic level through SEA. The responses from the questionnaire are integrated in the discussion of the paper and informed potential solutions to address the identified limitations of SEA as currently practiced in Canada. Future directions for research on the practical application of strategic consultations were also explored.
Strategic Environmental Assessment as a tool for supporting resilience in social-ecological systems (April 2013)

Author: Kimberly Milligan

Employer: Secretariat of the United Nations Convention on Biological Diversity

Abstract

Strategic environmental assessment (SEA) is a sustainability-focused practice that assesses the potential impacts of policies, plans, and programs. This paper argues that SEA is a highly suitable approach for supporting resilience in social-ecological systems. To support this argument, the aspects of resilience thinking to which SEA is particularly complementary are explored. First, the potential of SEA to address complex adaptive systems and social-ecological systems is assessed. Second, the ability of SEA to promote the resilience of social-ecological systems through good governance is explored. Third, the extent to which SEA can incorporate key principles of adaptive management is considered. Three case-studies are examined to identify practical examples of the ability of SEA to support resilience in social-ecological systems. My findings indicate that despite theoretical support for the potential of SEA to address resilience, there has been limited success in this regard in practice. This is a field that has received little attention until very recently, despite its potential to contribute to the protection of increasingly sensitive global social-ecological systems. Ways in which this can be remedied are considered, including future directions for the SEA community.
Abstract

Hospitals have significant negative environmental impacts that not only affect the physical environment but ironically human health as well. This paper analyses a proposed three step process to environmental sustainability as a solution to decrease the environmental impacts of hospitals in the most effective way. This report details out the main impact areas of Canadian hospitals and some of the individual projects that have been implemented to mitigate some of the negative effects of each impact area. The main incentives for these sustainability projects currently stem from governmental regulation, healthcare association support, and the potential for cost savings.

The paper builds off of a baseline assessment conducted as part of an internship position at JGH. The three step process is designed to progress away from the current status of individual sustainability projects to a more effective system of an overall sustainability strategy. The three step process includes conducting a baseline study, developing an environmental management system from the opportunities and gaps from the baseline data, and developing a sustainability plan from the processes developed by the environmental management system. In order to successfully implement a sustainability plan at JGH and receive approval from upper administration, a multi-stakeholder green team should be implemented at the hospital and all proposed projects within this plan should be linked to the hospital’s business plan.
Health Impact Assessment: Identifying challenges and exploring the potential role of the UN Convention on Biological Diversity in overcoming them (April 2013)

Author: Jennifer Garard
Employer: Secretariat of the United Nations Convention on Biological Diversity

Abstract

Health impact assessments (HIA’s) are a tool increasingly recognized and used to assess the impacts of policies, programs and projects on human health outcomes. However, HIA’s are not as widely used as other forms of impact assessment and there are unique obstacles to their development. This report explores the history and current best practices in HIA as well as challenges facing its use. Challenges were organized into three major categories: a disconnect between the health and environment sectors, the question of whether HIA should be integrated with other forms of assessment, and issues with specific steps in the HIA process. The potential of the Health and Biodiversity Cross-Cutting Initiative at the Convention on Biological Diversity (CBD) to help overcome these challenges was discussed. Furthermore, since learning is a documented outcome of HIA, this report also explored the possibility that the CBD could even benefit from directly promoting HIA. Suggestions for how this could be done are provided, including integrating HIA into workshops, publications and high-level meetings. The case study of the Ekati diamond mine in Northwest Territories, Canada demonstrates the HIA best practices and challenges determined from the literature in a real-life setting, as well as emphasizing the potential role of the CBD in advancing HIA practice.
Lessons from a Baseline Study of a Garry Oak Ecosystem for Environmental Impact Assessment in the Face of Biodiversity Loss and Climate Change (April 2013)

Author: Undiné Celeste Thompson
Employer: Galiano Conservancy Association

Abstract

This report is based on a systematic baseline assessment of Retreat Island, an almost three hectare (seven acre) area near Galiano Island, British Columbia, that is covered with plants from the coastal Douglas fir biogeoclimatic zone and its sub-communities of the environmentally and socially significant Garry oak meadows. Garry oak ecosystems are important within a variety of areas of interest within environmental assessment, including climate change, biodiversity and coping with biodiversity loss, and ecosystem modelling. Garry oak ecosystems are of particular interest because of their predicted positive responses to climate change, but only if the biological diversity of these ecosystems is maintained. This is poignant given that one of the predicted consequences of climate change is significant biodiversity loss. The issues of climate change and biodiversity loss pose distinct challenges to the process of environmental impact assessment (EIA). In order to better incorporate climate change and biodiversity loss into EIA, many researchers cite adaptive management as a key tool. This report uses adaptive management theory, ecosystem theory, and risk society theory to look at the baseline study of an island ecosystem and to also look at the concept of valued ecosystem types such as Garry oaks and the need for their incorporation into the environmental process. It then discusses the importance of these baseline reports as well as the challenges that exist when creating a baseline study. The Garry oak baseline study is then looked at for the possible lessons that we can learn from for the improvement of EIA and our adaptation to climate change.
Abstract

Strategic environmental assessment (SEA) was developed so as to help inform policy decisions in an effort to produce better decision-making choices. It was long assumed that decision-making followed a rational scheme whereby the provision of better information (good scientific evidence) would lead to better decisions. The process of decision-making, however, is not so simple. In order to determine some of the limitations to present day SEA practices, various decision-making theories were examined, as well as the differences that exist between scientists and policy-makers which often inhibit their ability to effectively work together. A recent European project, the LIAISE (Linking Impact Assessment Instruments to Sustainability Expertise) Network of Excellence, was then evaluated in order to determine how effective such a network is at bridging the science-policy divide. The results from the analysis are then used to demonstrate how networks such as LIAISE could aid in integrating SEA within the PPP-and decision-making processes. This paper suggests that if real progress is to be made in integrating SEA into decision-making, the science and policy professionals, along with consultants, planners and other stakeholders, will need to develop a shared understanding of what constitutes quality SEA. Along with this shared understanding, researchers and decision-makers must agree on the overall objectives of SEA, and the criteria to be used to determine whether these have been achieved. Only once this has been accomplished can the two groups work together to determine which methodologies would be best suited to attaining their shared goals.
Resource developments that occur near traditional Aboriginal territories have had overwhelmingly negative effects on the culture of Aboriginal peoples. This paper examines the potential environmental effects of mining from the proposed New-Prosperity Gold-Copper Mine Project and how they degrade the culture of the Tsilhqot’in Nation in the Cariboo-Chilcotin region of British Columbia. As these effects act cumulatively with impacts from the past, present, and future, the cumulative effects gradually erode culture further. Without acknowledging and addressing this issue, the result may be complete local devastation of an Aboriginal culture. This paper suggests that the Canadian Environmental Assessment Agency has the power to, and must, prevent further losses to Aboriginal culture in Canada, and recommendations have been made that may be adopted by the Agency in order to prevent continued cultural loss.
Aboriginal Consultation: Using the Canadian Environmental Assessment Agency to Fulfill the Crown’s Duty to Consult (January 2013)

Author: Brenna Belland

Employer: Canadian Environmental Assessment Agency

Abstract

In 2007, the Canadian Environmental Assessment Agency was mandated to be the Crown Consultation Co-ordinator (CCC) for all federal environmental assessments (EA), in order to fulfill the Crown’s Duty to Consult with Aboriginal groups. The Crown’s legal duty to consult arises when it becomes aware of any Crown project or activity that may have potential adverse impacts to an Aboriginal group’s asserted or established Aboriginal or Treaty rights. To the extent possible, the Aboriginal/Crown consultation process is now integrated into the EA process. My report aims to provide an overview of the legal and policy context from which the Duty to Consult emanates, as well as to highlight some key issues that may occur during the consultation process. Using the Northern Gateway Pipeline (NGP) project as a case study, I argue that Aboriginal consultation is a very complex process, particularly when carried out by an independent advisory body such as the Joint Review Panel (JRP). As a result most Aboriginal groups are required to use limited financial resources to hire outside consultants and/or lawyers. Using submissions from some of the Aboriginal groups contributing evidence to the JRP process, I argue that many lack the necessary funding and capacity to participate meaningfully in the consultation process. While funding is provided to groups on a project to project basis, many groups lack the capacity within their own communities to adequately participate in the JRP process. If Aboriginal groups are to participate meaningfully in EAs, communities need capacity building and infrastructure to support their participation.
Abstract

The world of policy is faced today with two conflicting realities: an increasing desire to base decisions on evidence, and reluctance to use the tools designed for this very purpose. LIAISE (Linking Impact Assessment Instruments and Sustainability Expertise) - an EU-funded network of excellence which I evaluated during my internship in Berlin - aims to bridge this gap by creating an impact assessment (IA) toolbox. Several other IA toolboxes already exist, and I selected two of them to determine to what extent they may solve current issues in impact assessment. To do so, I developed a logic model of an “ideal toolbox”, derived a set of indicators and evaluated as many indicators as possible (based on temporal resources and confidentiality issues) for both toolboxes. I determined that both toolboxes provided much useful resources for policy-makers, but fell short of creating a real interface between science and policy. Nonetheless, it appears that toolboxes have the potential to solve many recurring problems in the field of EIA.
Abstract

Aboriginal Consultation is increasingly a requirement within the Environmental Assessment process, especially since the Supreme Court established the Duty to Consult (DtC) Aboriginal peoples as a legal requirement when the Crown contemplates conduct that could potentially have adverse impacts on their rights. An initial review of the literature identifies weaknesses of how aboriginal consultation is handled within the EA process as well as strengths and weaknesses of Impact Benefit Agreements (IBAs). It suggests that IBAs could provide an opportunity for Aboriginal communities to gain more from the development of their traditional lands as well as compensating them for potential negative impacts; however, this is not consistently the result. This analysis is then used to assess the Northwest Transmission Line (NTL) case study to examine how the EA process was affected by IBAs. One of the main advantages of the IBAs was the provision of adequate funding to each affected Aboriginal community to support their engagement in meaningful reviews of the various EA documents. This also allowed the regulatory requirements, such as the completion of the EA itself and the DtC, to be met. The IBAs agreed upon after the regulatory approvals also provided a good mechanism for clarifications and confirmations of previously agreed upon commitments although this cannot be confirmed due to the confidential nature of the agreements. It is too early to judge the long-term effects of IBAs; whether the ultimate winners of these agreements will be aboriginal communities or non-renewable resource development corporations has yet to be determined. Maintaining a close watch on their evolution may however help steer them in a positive direction, where all parties may hopefully obtain net benefits.
Mainstreaming the Biodiversity-Health Nexus in Policy-Making: An Ecohealth Approach to Strategic Environmental Assessments (January 2013)

Author: Cristina Maria Romanelli

Employer: Secretariat of the United Nations Convention on Biological Diversity

Abstract

This paper will examine the urgent need and complex task of mainstreaming biodiversity and human health considerations into national and regional policies and integrating them in the early stages of decision-making by incorporating them in strategic planning processes such as Strategic Environmental Assessments (SEAs). It argues that the combined consideration of the under-valued intersections between biodiversity and health issues – known otherwise as the “biodiversity and health nexus” -- must be incorporated systematically in policy development. This integrative approach supersedes the more common action of merely relegating these issues to isolated projects that consider only options derived from project-based Environmental Impact Assessments (EIAs) or Health Impact Assessments. In recent years, the links between the promotion of human health and the conservation of biodiversity have been made in different contexts whether it be through scholarly works, through the World Health Organization (WHO) and other international organizations, or select national policies, plans or programmes. However, national policies and the SEAs on which they are sometimes based rarely explicitly or systematically recognize or reflect this important reality, often addressing these two variables through distinct mechanisms for evaluation post facto in the decision-making process.

I have played a key role in administering and implementing a new initiative at the United Nations Secretariat for the Convention on Biological Diversity. It has involved a concerted effort to mainstream biodiversity in the health sector, and to mainstream human health in the environment sector. This is a logical extension of the CBDs ultimate purpose of conserving biodiversity, stressing its intrinsic value for human society. The CBD has pursued this project through several venues, including regional capacity-building workshops; the organization of international meetings such as the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) and Conference of the Parties (COP) and parallel events; the joint publication, with the WHO, CBD, UNFCCC and UNCCD of Our Planet, Our Health, Our Future: Biological Diversity, Climate Change and Desertification; and the development of a broad range of awareness raising and e-learning tools, most notably in the context of implementing the Strategic Plan for Biodiversity 2011-2020 and its 20 Aichi Biodiversity Targets. In spite of the progress achieved since 2011 when these activities were initially formalized at the Secretariat, much work remains to be done to achieve the effective integration of the health-biodiversity nexus on national, regional and global levels. The paper ends with a prognostic and prescriptive discussion of how Strategic Environmental Assessments can be utilized to better reflect the importance of the biodiversity-health nexus.
Cumulative Effects Assessment and the Increased Involvement of a Central Regulating Authority: A Realization of Potential (January 2013)

Author: Michael Farrell

Employer: Ontario Ministry of the Environment

Abstract

Cumulative Effects Assessment (CEA) in Canada represents an area of environmental regulation with a lot of unrealized potential. The current paradigm of including CEA as a part of a proponent’s environmental assessment report is restrictive and limits the understanding of a project’s effects when considered in the context of past, present, and future projects in an area of concern. The undertaking of a CEA by an individual proponent generally results in a focus on smaller scale impacts and project approval. Moving the responsibility of a CEA from a proponent to a central regulating authority (i.e. the provincial government) will improve the quality of CEAs and ease the regulatory process. The utilization of already existing monitoring and reporting frameworks by the central regulating authority allows for a much more representative understanding of specific project influences on cumulative environmental effects. Increased access to information, facilitated lines of communication and the authority to implement and ensure compliance with a mitigation strategy are all benefits that could be gleaned through increased involvement of a central regulating authority in the CEA process. Changing the CEA process has the potential to greatly improve our understanding of environmental systems and the manner in which our projects interact with and affect those systems on a cumulative scale. An improved understanding of cumulative effects results in more effective mitigation plans that reduce our environmental impacts in a movement towards no net effect.
2012
Abstract

Aquaculture is the fastest growing food industry in the world and it makes a very important contribution to the Canadian economy. However, it has been a very challenging sector to regulate and it will be increasingly difficult in light of the recent changes to federal EIA requirements under CEAA 2012. Aquaculture regulation in the absence of EIA threatens to decrease regulatory efficiency and sustainability within the sector. However, a review of aquaculture regulation in twenty-nine countries form around the world shows that there are other effective regulatory tools that can be used and in fact they have been more appropriate for the sector. These include permitting processes, zoning, codes of conduct and best management practices. In order to overcome the emerging regulatory gap, Canada will have to focus on implementing a more streamlined approach to permitting, enhancing federal aquaculture law, developing national codes of conduct that are aligned with international standards and integrating the use of zoning at the provincial level. The changes made to Canadian Environmental Assessment will be challenging for the aquaculture sector, but it has put the Canadian government in a unique position to re-evaluate the way they regulate aquaculture and enhance their approach.
The Role of Strategic Environmental Assessment (SEA) in a Green Growth Strategy for Developing Countries (December 2012)

Author: Dominique Croteau

Employer: Stockholm Environment Institute (SEI)

Abstract

Based on the internship work on resource nexus and green economy, the current report analyses the role of Strategic Environmental Assessment (SEA) in a green growth strategy for developing countries. Green growth is found to be an intermediate stage between business-as-usual and the overarching concept of sustainable development. This view is contrasting from others who argue that green growth is simply the sustainable development concept repackaged differently under a new name. Although green growth is in fact related to sustainable development, it does not assess economic growth and environmental protection separately but instead strive to combine both by decoupling growth from environmental degradation.

Strategic Environmental Assessment (SEA) is seen to be a process where its practice tends to diverge from the theory, leading to the realisation that SEA is in continuous evolution and not confined to definitions constructed from previous Environmental Impact Assessment (EIA) experiences. It is found that SEA is a mainstreaming tool for the green growth concept in order for the latter to gain legitimacy in developing countries. It is also found that SEA should be the actual focus for the inclusiveness aspect associated with a green growth / green economy strategy. Through the use of valuation tools for ecosystem services and biodiversity (TEEB, REDD+, etc.), SEA can effectively monitor the impacts of a green growth strategy and ensure that its primary objectives are achieved.

It must be emphasized that both SEA and a green growth strategy are not sufficient to successfully reach sustainable development and additional elements will be needed such as political will.
Does Outdoor Air Affect the Particulate Matter Concentration in the Montreal Subway? (December 2012)

Author: Allison Lapierre
Employer: Health Canada

Abstract

This internship report was developed as a result of a work term completed for Health’s Canada’s Air Health Science division that took place during the winter of 2011. The internship involved the data collection portion of a study conducted to assess the known pollutants of the subway environment in major Canadian cities. While conducting the data collection a temperature variation between subway station platforms was noticed. In response to this observation a question was developed: does the temperature of the subway platform correspond to the level of air flow between the outdoors and the subway environment? It was also hypothesized that the higher the air flow between the two environments the lower the concentration of particulate matter would be on the subway platforms. The average particulate matter concentration was found to be higher indoors 34μg/m3 than outdoors 27μg/m3. Twelve of nineteen stations’ linear regressions, for each subway station, between the differences in particulate matter concentration and difference in temperature of the indoor and outdoor environments, had a positive relationship. Overall the relationship between the two variables had a statistically significant positive relationship in the summer and a negative relationship in the winter, though the latter was not statistically significant. Through the use of variance partitioning it was determined that relative humidity is more important than temperature difference in affecting particulate matter concentration of the subway environment. Further analysis is necessary to determine whether a relationship does exist between the air flow through the two environments and the particulate matter concentration.
**Blowing in the Wind: An Investigation of EIA’s Role in the Growing Wind Power Industry (September 2012)**

**Author:** Jonathan Moorman

**Employer:** RES-Canada

**Abstract:**

The recent growth of the wind energy industry has been accompanied by its share of controversy over social, economic and environmental implications; public resistance, cost issues, and environmental effects have all played a part in impeding to a certain degree wind’s penetration into the global energy market. While environmental impact assessment (EIA) has traditionally been used as a reactive tool, recent theory suggests that it could move into a proactive role in the wind industry, promoting growth rather than simply minimizing adverse effects. Given appropriate methods, EIA practitioners could overcome each obstacle to wind energy by using a specific function contained in the EIA process. This paper uses a literature review to identify the obstacles, the EIA-based solutions, and the conditions under which these solutions could most effectively operate. A case study contextualizes the theory and an analysis then attempts to answer the question: can EIA be used as a tool to promote growth in the wind industry? The analysis suggests that the public participation component of EIA, given appropriate application, can be highly effective; that SEA, while potentially useful, is underdeveloped; and that although the impact prediction and mitigation function of EIA may promote industry by gaining official project approval, is not well enough defined to comprehensively preclude all environmental damage.
**Implementing effectively an ecosystem approach to environmental assessment practices, from a policy perspective (August 2012)**

**Author:** Liliana Andrea Sanabria  
**Employer:** Environment Canada

**Abstract**

This report is the product of an Internship at Environment Canada’s Environmental Assessment Policy Group, which purpose was to identify, though an internal research initiative, priority areas of the Environmental Assessment process where an ecosystem approach could be implemented. In this report, the results from the research are analyzed, taking as a framework the 12 principles of an Ecosystem approach formulated by the Convention on Biological Diversity, which include considering natural ecosystems’ limits, complexity and interconnections, at proper spatial and temporal scales. The implications of Bill C-38, Growth and Long-term Prosperity Act, on the possible implementation of the approach are also analyzed, due to the significant changes that the enforcement of the Act will introduce to current Environmental Assessment legislation.

The method used in the research had two components, a Likert Scale or rating scale survey, that was applied to 16 Environment Canada’s EA practitioners to measure their perception of current Environmental Assessment practices, and a subsequent consultation round with 5 regional managers, consisting of a selection of 5 out of 40 potential actions to implement an ecosystem approach. The results showed that the main areas of concern for practitioners are the need for managing ecosystems in an economic context, in a way that proper spatial and temporal limits of ecosystems are set, and that current EA practices are adapted to those limits, accordingly, adequate guidance on how to apply this in practice needs to be defined. Despite the intention of Environment Canada to go on with the implementation phase, Bill C-38 will pose additional challenges to it with major changes in EA-related legislation, giving priority to economic development, and ultimately reducing the possibility of giving a step forward to more ecosystem-based EA practices.

Author: Ken Okumura

Employer: Japan International Cooperation Agency (JICA)

Abstract

Transport projects like railway construction sometimes require involuntary resettlement of people whose homes and businesses are located in the right-of-way and adjacent zones. The Environmental and Social Impact Assessment (ESIA) study of Karachi Circular Railway (KCR) revival project in Pakistan revealed that more 4,800 households would have to be relocated. 23,000 people who live in the illegally-built houses would have to be resettled even before construction begins. Using a review of involuntary resettlement practices in other places, the ESIA study is critically analyzed and recommendations are made. This paper concludes that while resettlement is treated as an externality in the ESIA study, it should also be seen as an integral part of the development process. Applying international financiers’ safeguards in some countries is problematic due to structural and political constraints. This is particularly true in countries, like Pakistan, Bangladesh and India, where vestiges of the colonial legal system present obstacles for project sponsors and project lenders alike. Given these realities and the weak regulatory structure in Pakistan, international aid agencies can play a role in encouraging the Government of Pakistan and local implementing agencies to act more responsibly through the rigorous application of international safeguards. Such international safeguards in financing can have a great influence on how development projects are planned, designed, constructed, and operated. This can eventually lead to less severe negative environmental and social impacts and overall enhancement of the positive impacts.
The Role of Public Participation in Managing the Beauport River Basin: Education and GIS (April 2012)

Author: Yosef D. Robinson
Employer: Groupe d’éducation et d’écosurveillance de l’eau (G3E)

Abstract

Public participation is an important mechanism of bottom-up watershed management, allowing the public to contribute to the decision-making process. The literature claims that bottom-up management is more efficient, transparent, and decentralized than top-down watershed management. It has been required by Quebec government watershed policy since 2002. The Quebec watershed policy, in fact, advocates mostly the bottom-up approach, but there is some room for the top-down approach. The paper briefly reviews why and how the bottom-up model of watershed management works better than the top-down model. And examines two potentially effective ways of furthering community-based watershed management – environmental education (including student-scientist partnerships) and participatory GIS (including Geoweb tools like Google Earth) – are examined in the context of an internship carried out with the “Conseil de bassin de la rivière Beauport” (CBRB), a non-profit organization in Beauport, Quebec. Specifically, this report examines how scientists and educators from the Groupe d’éducation et d’écosurveillance de l’eau (G3E), a sister organization of CBRB, have educated groups of local schoolchildren on the importance of protecting their watershed. G3E’s student-scientist partnerships (SSPs) are strong, but could be made even better with more resources, and could be connected to large, international SSPs like GREEN. The report also explores the potential of GIS and the Geoweb as tools for involving the public more effectively in managing the Beauport River Basin.
Using risk assessment in managing intentional alien species introductions – A case from Australia (March 2012)

Author: Anita Ogaa

Employer: Secretariat for the Convention on Biological Diversity

ABSTRACT

International trade of live animals for the pet trade, food and agriculture can facilitate the spread of potentially invasive organisms which can cause serious environmental, social and economic harm. Managing the effects of invasive alien species (IAS) is challenging and requires strategy at the national level. The Convention on Biological Diversity (CBD) guidelines for a national strategy on invasive species recommend a transparent, science-based risk assessment as one of the most important tools in the management of intentional alien species introductions. Risk assessment evaluates the risks associated with contact with alien species and informs risk management decisions regarding the introduction of potentially invasive organisms and the allocation of resources in their control. This paper discusses five main characteristics associated with effective risk assessment today; namely, that it is science-based, requires reliable data, manages for uncertainty, prompts legislation and educates the public. The Australian Risk Assessment Model for Exotic Vertebrates, which uses a quantitative approach to predicting the risk that species will pose if introduced into Australia, is examined as a case study to gauge how well it satisfies the current standards of risk assessment. The model is used by the Bureau of Rural Sciences and other agencies dealing with importation of live animals to Australia. The main conclusion is that while there is room for growth and development with the model in all five areas, it serves as an adequate and useful resource in assessing the import and keeping of alien species, and satisfies the CBD criteria for a useful risk assessment protocol.

Key words: Risk, Risk assessment, pre-import risk assessment, invasive alien species, intentional introductions, Australia
The recent emphasis on adaptation in the management of climate change and its impacts on EIA in Canada (February 2012)

Author: Bastien Fournier-Peyresblanques

Employer: Climate Risk Management Limited, trading as Acclimatise

Abstract

Since the Intergovernmental Panel on Climate Change (IPCC) published its first report in 1992, the field of environmental management (EM) has evolved. Although mitigation is still the main priority against climate change, the ability to adapt ourselves in a changing climate is growing to be prominent. In order to enable environmental practitioners to develop this adaptive capacity, the EM tools they used should be reviewed to avoid becoming obsolete. As both a planning and decision-making tool, EIA should allow its users to answer climate change considerations and help them develop the adaptive capacity of their projects. Canada has been recognized by a study on EIA commissioned by the OECD as a leader in integrating climate change considerations into their EIA procedure. This paper examines whether or not this statement is true and if the same can be said for the implementation of adaptive management. By examining the measures taken by the Canadian Environmental Assessment Agency (CEAA) and the Canadian Environmental Assessment Act (CEA Act) I was able to establish where Canada stands on these matters. Then, through the case study of EIA in the UK, I was able to place the advancement of Canada in a larger context. Finally, the case studies of Canadian companies and the research I did during my internship allowed me to demonstrate what should be Canada’s next steps and more importantly why they are essential for Canada’s future.
2011
Les enjeux que représentent les examens préalables sous la Loi canadienne sur l’évaluation environnementale : Analyse des performances de Transports Canada sur l’évaluation des effets cumulatifs et la surveillance environnementale (December 2011)

Author: Jean-François Marsan

Employer: Transports Canada

Sommaire

Les examens préalables jouent un rôle essentiel sous la Loi canadienne sur l’évaluation environnementale. En effet, les examens préalables correspondent à plus de 99 % de tous les types d’évaluations environnementales amorcées sur une base annuelle au Canada. Il est donc primordial que ces examens préalables soient menés d’une manière adéquate. L’objectif de ce rapport est d’évaluer les performances des rapports d’examen préalable produits par Transports Canada en ce qui concerne l’évaluation des effets cumulatifs et la surveillance environnementale. Un audit a été effectué sur 50 rapports d’examen préalable, basé sur des critères légaux et des critères de qualité. Les critères légaux ont été déterminés par les dispositions de la Loi canadienne sur l’évaluation environnementale tandis que les critères de qualité ont été déterminés en fonction de la littérature scientifique. Les résultats de cet audit démontrent que la pratique des examens préalables de Transports Canada sur ces deux aspects d’un examen préalable est inadéquate. Afin de pouvoir améliorer les performances de Transports Canada, de nombreux changements devront être apportés. Non seulement des améliorations devront être apportées sur les pratiques de Transports Canada, mais également sur la Loi canadienne sur l’évaluation environnementale.
Investigating the Relevance of the ISO 14001 Standard in the Development of Canderel Management’s Environmental Sustainability Program (September 2011)

Author: Patrick Culhane

Employer: Canderel Management

Abstract

The past 15 years have seen a growing number of companies make a concerted effort to evaluate and to pro-actively mitigate the negative environmental and social impacts of their core activities through Corporate Social Responsibility (CSR) programs (Auld et al., 2008). In developing these programs, many organizations leverage outside frameworks to define and establish their initiatives. For those firms seeking to develop their environmental programs in particular, ISO 14001 is one prominent framework. In this paper, the applicability of the ISO 14001 program in developing Canderel Management’s (a Montreal based commercial real estate company) sustainability program is considered. The spirit of the ISO 14001 standard was adhered to in the development of Canderel’s sustainability program; however, those elements which were deemed unnecessary for the company’s needs were left aside (Boiral & Sala, 1998). Other areas which were not wide enough in focus, such as the Initial Environmental Review (IER) were expanded upon. By undertaking a modified version of an IER Canderel was better able to identify the market, legislative and internal forces driving the need for a sustainability program, thereby providing the company with a clearer sense of the environmental aspects the program should focus on. Given the prominence of industry specific building certification programs such as LEED and BOMA BESt, and the resources and costs associated with attaining ISO 14001 certification at Canderel could not be justified.
The Environmental Petitions Process:

Enhancing environmental governance through transparency, public participation and accountability (June 2011)

Author: Liohn Sherer

Employer: Office of the Auditor General, Commissioner of the Environment and Sustainable Development

ABSTRACT

Measuring the effectiveness of sustainable development policies and programs is a challenge for governments worldwide. The aim of this paper is to contribute to the measurement of Canadian efforts to achieve sustainable development by evaluating the Environmental Petitions Process (EPP). The EPP allows Canadian citizens to submit questions and requests regarding the environment and sustainable development to the Federal Government. The evaluation is based on three pillars of effective environmental governance: transparency, public participation, and accountability. Definitions of the concepts are developed with reference to the environmental governance literature, and their complex interrelationships are explored. The EPP contributes to transparency by providing the public with a mechanism to access a wide variety of information about decision-making rationales, processes and impacts. The public can use the EPP to directly influence decisions and to feed information into Government decision-making systems. Finally, the EPP gives both Parliamentarians and citizens the information they need to hold the Government accountable, and gives citizens a mechanism for doing so by requiring Ministers to respond to the public’s questions. Despite the effective design and strong potential, the EPP’s effectiveness is dependent on the participation of the public. Few petitions are received (the number peaked at 47 in 2008) and participation is declining (only 19 were received in 2010). As such, the value of the EPP’s outputs is questionable at best. Further research is recommended to measure the extent of its contribution to sustainable development in Canada.
**Citizen Science: Assessing its contribution to environmental monitoring (May 2011)**

**Author:** Ashley Lauren Caya

**Employer:** The North American Commission for Environmental Cooperation

**Abstract**

Effective public stakeholder engagement in planning and monitoring is an essential component of successful environmental management (EM) and environmental impact assessments (EIA). Facilitating effective public engagement involves informing citizens of the potential impacts of development, and providing them with opportunities to participate, share knowledge and have input into decisions that affect them. This paper addresses the contributions of citizens to environmental monitoring in the context of EM and EIA. Informed by experience gained through an internship with the North American Commission for Environmental Cooperation (CEC) in Montréal, Québec, this report discusses the opportunities and constraints for citizen monitoring and volunteered knowledge, referred to as ‘citizen science’, to support decision-making, for habitat and species conservation. More specifically, this report provides a detailed overview of a growing body of literature and empirical evidence supporting the contribution of citizen scientists as monitors for a volunteered source of scientific information. A case study of the North American Monarch Conservation Plan (NAMCP) is provided to explore a specific experience with citizen science. Managed by the CEC, the NAMCP supports and coordinates citizen monitoring through local data observation and data collection to better inform decisions on species conservation on the continental scale.
A comparative Evaluation of Control Operation and Management of Gypsy Moth (Lymantria dispar)(L.), Gorse (Ulex europaeus) and Scotch Broom (Cytisus scoparius) in Canada and New Zealand (May 2011)

Author: Ashvin Ramasamy

Employer: Secretariat for the Convention on Biological Diversity

Abstract

Invasive alien species (IAS) are species that migrate from one environment to a non-native one, where interaction with the receiving environment leads to significant economic losses while harming biodiversity (Pimentel et al. 2005). IAS have the capacity to cause irreparable damage to ecological communities by changing the species composition or the abundance of indigenous species. The present study focuses on gypsy moth (Lymantria dispar (L.), scotch broom (Cytisus scoparius) and common gorse (Ulex europaeus); all three are pernicious pests in both British Columbia (BC) and New Zealand, two areas with similar climates, but where the strategies pursued vary in breadth and depth. The Case Study aims to support the nascent Canadian experience by examining the more successful approaches adopted by the latter country. In New Zealand, management practices owe much of their success to the Biosecurity Act, 1993, a unique legal tool which requires administrative regions to analyse the costs of intervention as well as the costs of adverse economic effects by pests of varying risk levels, in addition to structuring prevention, eradication and control plans for deleterious species. Control has been more effective in New Zealand than in BC, as the latter has operated under a fragmented management system. Recent developments in BC, however, suggest an increased interest in holistic approaches to control that rely more on adaptive management principles. The New Zealand approach represents a robust model that can be integrated in the merging Canadian initiatives such as the Canadian Invasive Plant Framework and that could support plans and programs that follows the Invasive Alien Species Strategy for Canada (2004-2010). Further, intergovernmental organizations stand to gain from assessing the effectiveness of their IAS management guidelines against the New Zealand approach.
More than just a load of rubbish: an analysis of a waste assessment conducted for the YMCAs of Québec (April 2011)

Author: Aaron Baxter

Employer: YMCAs of Québec

Abstract

Over the summer of 2010, I was hired as an intern by the YMCAs of Québec to carry out a waste assessment of all of their 11 centres located on the island of Montréal. The internship mandate was also the first concrete step taken by the organization to scrutinize its own environmental performance – a first step towards an improved environmental management system (EMS). Using a mixed methodological approach, including both qualitative and quantitative data-gathering tools, the aim of the assessment was to collect information about both the amount and character of the waste being generated, as well as the organizational reasons for which this waste was being produced. Through the process of conducting the assessment, however, a number of unintended effects were produced that also contributed significantly to an improved environmental performance. By drawing from social theory on power/knowledge and framing/overflows as well as on the theoretical literature on EMSs, this paper analyzes the particular methodology used for this waste assessment and shows how it benefited the YMCA and ultimately contributed to an improved EMS of comparable quality to ISO 14001. Insodoing, this analysis contributes to the literature on EMS through addressing the impacts and unintended effects of the process of implementing an EMS which had hitherto not been specifically discussed.
Abstract:
The purpose of this report is to explore how stakeholders are enlisted to participate in public consultation forums held by project officials, and how this process ultimately defines who counts as the public in public participation. This is important because public participation is used as a mechanism for reaching consensus on many of the final decisions that govern our daily lives.
Two methods are explored to help understand which stakeholders are enlisted to participate in public consultations. The first is a method of selecting and inviting stakeholders, the second is a method of engaging stakeholders through social media. A case study from the Commission for Environmental Cooperation (CEC) then demonstrates how these two methods are put into practice and as a result leads to a public community composed of expert stakeholders. This report concludes that each public community is unique and composed of specific stakeholders depending on the methods of engagement used by officials and the time and resources available.
Therefore it is revealed when using public participation as a mechanism for final decision making we are actually gathering the opinion of the stakeholders who were enlisted to participate by those in charge rather than a representative opinion of the greater society.
EIA and Project Finance in India: Challenges in Implementing International Environmental Standards (April 2011)

Author: Andrew Sanford

Employer: Export Development Canada

Abstract

This paper, written after a four month, full-time internship at Export Development Canada (EDC), examines the Environmental Impact Assessment (EIA) process in India and identifies challenges associated with the implementation of international environmental standards for project finance transactions that take place in the Indian context. The first part of the paper contains a brief explanation of EDC and the roles and responsibilities that were associated with the internship. The body of the report begins with an examination of the literature relating to emerging international trends in project finance and EIA in India, discussing the recent trend toward responsible lending and identifying environmental challenges that currently exist in India. An investigation of India’s environmental laws, policies, enforcement, and EIA procedures then provides an understanding of the regulatory structure that is currently in place. Finally, the report contains a detailed analysis of the International Finance Corporation’s Performance Standards on Social and Environmental Sustainability that contains country-specific issues related to social and environmental assessment and management systems, labor and working conditions, pollution abatement, community health and safety, land acquisition and involuntary resettlement, biodiversity conservation and sustainable natural resource management, indigenous peoples, and cultural heritage in the Indian context.
Integration of Wildlife Issues in Federal Environmental Assessments: A Case Study of Environment Canada’s Responsibilities (September 2010)

Author: Stephanie Titman

Employer: Environment Canada

Abstract

Canada’s unique expanses of wilderness and countless wildlife species are highly valued as symbols of Canadian culture, important elements of healthy ecosystems as well as economically. Legislated species-at-risk protection is a relatively new concept in Canada under the Species-At-Risk Act, 2002 (SARA). Federal wildlife protection is also mandated under the Canadian Environmental Protection Act, the Migratory Birds Convention Act, the Canada Wildlife Act and the Fisheries Act. Under the Canadian Environmental Assessment Act, approval from Environment Canada, mandated as either a responsible authority or a federal authority, is required for a proposed development project to be accepted in the environmental assessment (EA) process. There have been concerns about perceived delays caused by wildlife protection issues in EAs. This research examines how federal wildlife concerns, including species-at-risk, are dealt with in the EA process considering twenty projects that have undergone panel review and comprehensive study assessments since 2003. The SARA requirements for EA are meant to help proponents identify the risk their projects pose to federally protected species-at-risk. Results indicate that wildlife concerns do not hold up the assessment process, but that the process is not effectively protecting wildlife due to narrow project scoping, inability to ensure mitigation, information deficiencies and process/capacity constraints. Recommendations, both at a broad scale and specific to Environment Canada, are given to improve the federal EA process.
Abstract

Comparison of alternatives is an important element in the environmental impact assessment (EIA) process. Multi-criteria analysis (MCA) is a practical tool in aiding the evaluation of alternatives. The project plan of transforming the Bonaventure Expressway in Montreal into an urban boulevard, derived from the internship experience at the Direction de Santé Public, provided an opportunity to investigate the MCA used to select a dedicated bus corridor. The objective of this report is to perform a comprehensive review and critique of the MCA approach used by the proponent, Société du Havre de Montréal, to select the dedicated bus corridor. I will highlight strengths, misuses, weaknesses and limitations of MCA. The main question that this internship paper will attempt to answer is: Does this multi-criteria analysis have sufficient and appropriate human and sociological environmental impact considerations? This paper contends that it does not. I constructed a modified more transparent MCA using the same data as the proponent to demonstrate that adding environmental components air quality and noise separately, two of the three corridors have small differences corridors in both score and weighted score. These closely aligned results are therefore potentially more prone to manipulation, as is demonstrated in this paper by applying small changes in scoring to affect and change the corridor choice. In its final report, the SHM should recommend a corridor that suits its needs while also satisfying environmental health considerations.
The Making of Toxicity: The Case of the Canadian National Management of Textile Mill Effluents (September 2010)

Author: Nicole Becker

Employer: Environment Canada

Abstract

In 2001 textile mill effluents (TMEs) were subject to an in-depth risk assessment as part of the Canadian government's Chemicals Management Plan (CMP) where they were determined to be 'toxic' and added to the Canadian Environmental Protection Act (CEPA) List of Toxic Substances. As a result, the Canadian government outlined risk management objectives for the substance and decided on a risk management tool to control the toxic substance and the risk it presents. Through this program, determination and management of risks and toxicity are presented as objective, real, and uncontested. However, I contend that risk is a contested subject and that determination and management of risks and toxicity are in fact highly contradictory and contingent processes which reflect a particular construction of the world. I show this by first analyzing the CMP and demonstrating how it operates through a discourse of 'modern risk' and employ's strategies of the 'modern risk' paradigm, and secondly, by narrating my embodied experience as an intern at Environment Canada (EC), I illustrate the contingent and contradictory nature of determination of risks and toxicity. by showing how they are given form and substance and become meaningful objects. I argue that risk and toxicity are created, they are given form and substance and become meaningful objects, rather than risk and toxicity being pre-existing, real things, as the modern risk paradigm asserts.
The quality of scientific methodologies in environmental assessment: strengths and weaknesses of the EA for the reconstruction of the Turcot interchange in Montreal, Quebec, Canada (August 2010)

Author: Robert J. Moriarity

Employer: Landscape Ecology and Environmental Impact Assessment Laboratory

Abstract

The adequate detection of current and predicted environmental impacts from road projects cannot be achieved without valid and rigorous scientific methodologies. These impacts are important to detect so decision-makers can come to optimal decisions in order to protect surrounding human populations. This study has found that the quality of testing and scientific methodologies in the Turcot reconstruction environmental assessment report (Turcot EA) is weak when compared to similar road project EA reports. Methods and rationale used for noise level measurement and air and water sampling are diffuse, unclear and in some cases entirely absent. Baseline monitoring and monitoring design are weak for the environmental components examined, as are the scales of space and time in environmental models. Continued investigation revealed the evaluation of alternative project options is absent from the Turcot EA entirely and is therefore critically weak. Overall, the proposed Turcot reconstruction is based off a poorly written EA report with little scientific validity. In light of the findings from the literature and other EA reports, eight recommendations are proposed for a revised or new version of the Turcot EA.
Investigating the Consideration of Cumulative Environmental Effects and Climate Change in the Environmental Assessments of Canadian Mining & Processing Industry Projects from 1997-2010 (May 2010)

Author: Erica Brown

Employer: Environment Canada

Abstract

The assessment of cumulative environmental effects and climate change considerations under the Canadian Environmental Assessment Act, and their contribution to sustainable development, are of considerable interest at present. The assessment of cumulative environmental effects is regulated under the Canadian Environmental Assessment Act; however, the extent to which they are to be assessed is not. Climate change considerations, on the other hand, are not legislated for. Here, environmental assessment reports from four Canadian mining and processing industry projects between 1997 and present day (Cheviot Coal; Voisey's Bay; Galore Creek Copper-Gold-Silver; and Kerr-Sulphurets-Mitchell) are examined for their assessment of cumulative environmental effects, climate change considerations, and contribution to sustainable development. From the literature and lessons drawn from these case studies ten recommendations with regard to cumulative environmental effects and climate change are proposed for the 2010 Canadian Environmental Assessment Act review.
Determining Impact Significance of Wind Farm:

A comparative Approach (May 2010)

Author: Meaghan Ferguson

Employer: Natural Resources Canada

Abstract

Climate change and the burden of current energy sources are at the forefront of current environmental concerns. Cost-effective, carbon-free technologies are needed to encourage the production of renewable energy. Wind energy has shown tremendous potential, as it is both abundant and economically viable. However, research has shown that despite its clean image, wind energy does have a negative impact on the environment. Environmental impact assessment (EIA) is a regulatory tool used to mitigate the environmental effects of project development. Impact significance is a key component in EIA as it involves making judgments about the importance and acceptability of impacts. A review of the academic literature on wind energy identified the following valued ecosystem components (VECs) as having the most negative impacts on the environment: noise, visual effects and birds and bats.

Six environmental impacts statements (three from Canada, three from the United States) were compared using the VECs (noise, visual effects, birds and bats) discussed in the literature review. A comparison was drawn between the two countries in order to determine if 'best practices' in evaluating impacts through the environmental assessment of wind farms could be established. The analysis determined that for evaluating the visual effects of wind farms the US had stronger evaluation criteria, however Canada had stricter guidelines for noise. Lastly, the assessment tools used in evaluating impacts of birds and bats were similar in both countries. Recommendations on improving environmental assessment of wind energy in Canada are also discussed.
The Role of Thresholds within the Adaptive Management Component of EIA Follow-up and Monitoring (April 2010)

Author: Elham Ghamoushi-Ramandi
Employer: Parks Canada

ABSTRACT

The follow-up and monitoring stage of Environmental Impact Assessment (EIA) is crucial for the integration of project outcomes into the on-going EIA process. This report presents a comprehensive review of recent literature as well as a detailed examination of a particular case study from Saskatchewan. The theory section of the literature review examines key objectives of EIA follow-up and the importance of both implementing mitigation and determining its effectiveness. In particular, this report focuses on the role of thresholds within the adaptive management component of EIA follow-up. It is concluded that the adaptive management approach, through both theoretical and practical suggestions, is the best way to improve the environmental assessment process because it allows flexibility when identifying and implementing new mitigation measures or when modifying existing ones during the life of a project. The case study examined in this report provides an example where three specific mitigation effectiveness indicators from the Grasslands Grazing Experiment Follow-up Program were used to analyze the role of thresholds. The indicators in the analysis included: Road and Trail Monitoring, Spatial Distribution of Cattle, and Riparian Health Assessments. The monitoring of these key indicators provided a warning of unanticipated adverse impacts or sudden changes in impact trends, thus allowing decision makers to act before irreversible impacts occur.
Integrating strategic environmental assessment into the planning process:

Identifying the factors in effective SEA implementation and addressing the constraints in current Canadian practice (April 2010)

Author: Kevin Oliver Lopez

Employer: Agriculture and Agri-Food Canada

Abstract

In contrast to environmental impact assessment (EIA), which is popularly recognized as the assessment of individual projects on a case-by-case basis, strategic environmental assessment (SEA) is the systematic and comprehensive process of evaluating the environmental effects of a policy, plan or program (PPP) and its alternatives. Canada has been recognized as one of the most prolific contributors to the field of SEA and it has committed itself through a set of sustainable development strategies to pursue environmental sustainability, using tools such as SEA. However, for the most part, the application of SEA within the PPP development process has been criticised as simply EIA being applied to PPP, not taking advantage of the benefits that a strategic assessment process can offer. This paper is written from the perspective that the SEA can be more effective in promoting environmental sustainability if it is utilized as a decision-making tool and not simply an impact assessment tool. The author argues that in order for practice to shift towards this ambitious approach, it must be well integrated within the PPP development process. The factors described for effective implementation are identified through a literature review of recent research into SEA. Furthermore, the structural, political, and cultural constraints that hinder this implementation are illustrated through a case study from the department of Agriculture and Agri-food Canada.
Wind Energy Development and Wildlife protection: Navigating between necessities (April 2010)

Author: Frédéric Gagnon

Employer: Helimax Energy

ABSTRACT

This report is an outcome of an internship at Helimax Energy, a wind energy consultant based in Montreal. The internship was conducted in the Environment and Permitting department, and consisted in contributing to the environmental impact assessment of wind energy projects in Ontario and Quebec. Research has shown that the main environmental impacts of wind farm are bird and bat fatalities. As the demand for wind energy grows, so does the risk of potential impacts to birds and bats, including species protected by provincial and federal wildlife laws. Understanding the laws and regulations protecting sensitive species and how they apply to wind farms was a subject of research during the internship and is the objective of this paper.

A literature search was conducted to identify information on bird and bat fatalities related to wind farms, and species protection legislation for Canada, Quebec, Alberta, the U.S, California and West Virginia, as well as examples of the application of these wildlife laws.

Three examples were examined. The heavily studied Altamont Pass Wind Farm case and the recent Beech Ridge Wind Farm case show that bad siting is perhaps the main contributor to both bird and bat fatalities, that the threat of a lawsuit under the Endangered Species Act is enough to entice owners to cooperate in finding mitigation solutions, and that public involvement is important to wildlife protection in the United States. The Syncrude case shows that the Migratory Bird Convention Act is not a sufficient motivator to persuade the oil industry to adopt environmental-friendly measures, and that the Canadian government, not the public, is the main instigator of the case. This case will test the resolve of the Act in protecting endangered species.
The lack of cases in Quebec where wind farms were brought to court under a wildlife protection law may be due to three factors: 1) a lower presence of endangered species in areas where wind farms have been placed is possible but doubtful, 2) a project review with a thorough environmental evaluation process and effective post-construction monitoring, 3) the issuance of incidental take permits which create a loophole in the intent of protected species laws in the name of sustainable development.

Suggestions to help wind farm owners deal with impacts to protected species include: better planning of wind farm location and turbine siting through thorough environmental assessments, application of present knowledge regarding bird and bat fatalities, continued research for practical and effective solution, improved cooperation between governments, owners, and the public.
Barriers to a Multi-Barrier Approach to Drinking Water Management in Small Community Systems (April 2010)

Author: Sylvia McIntosh
Employer: Health Canada

Abstract

Threats to water quality and quantity can have a profound impact on health, the environment and the economy. As such, society should not be complacent about drinking water safety and needs to invest the required technical, financial and managerial resources. Historically, the quality of drinking water was determined almost entirely through compliance monitoring however, in recent years, there has been a shift from a reactive approach to a proactive approach. The multi-barrier approach is a modern concept of drinking water management that is widely accepted and applied in developed countries. The approach breaks down the drinking water system into three main components: the water source, the treatment system and the distribution system, and implements preventative actions at each step to reduce the likelihood of contamination. It also stresses that numerous procedures and tools related to system operations and management need to be in place such as: legislative and/or policy frameworks; guidelines and standards; science and technology solutions, and consumer awareness and involvement. In Canada, the majority of drinking water systems are small community systems including remote and rural supplies in both First Nations and Non-First Nations communities. Due to financial, social, and operational challenges, communities with small systems often have difficulty implementing the multi-barrier approach and ensuring safe drinking water. Small systems are required to meet the same health-based water quality standards as larger systems, however they lack the same resources and economy of scale. Although no approach will guarantee a 100 percent protection, the goal is to reduce the risk of contamination through prevention and control measures, and to increase the effectiveness of remedial action when incidents do occur.
Is Canadian SEA successful? A three tiered investigation into SEA success within Canada (March 2010)

Author: Katheryne O'Connor

Employer: Environment Canada

Abstract

The upcoming review of the Canadian Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals has attracted much attention to current strategic environmental assessment (SEA) practice within Canada. Presented here is an evaluation of SEA success framed within three distinct methods. The first method reviews current academic literature to obtain and identify the objectives of SEA and to investigate how SEA contributes to sustainable development (SD) and decision making (DM). The second tier of evidence is based on two previous evaluations conducted by Canadian Government, which also serve as case studies. The final measure of success is an independent analysis of six SEA obtained from the Canadian International Development Agency (CIDA) that are evaluated against three sets of criteria related to SEA procedural performance. These Criteria were obtained from the International Agency of Impact Assessment, the Privy Council Office, and the CIDA. The literary analysis found that SEAs are currently heavily reliant on outdated assumptions of rational DM, and complex SD theories. These issues must be addressed if SEA is become procedurally successful and effectively integrate into DM, therefore contributing to sustainable policy plan and program initiatives. The grey literature focused more on process to support SEA within the federal government and found that there is a lack of compliance within departments due to insufficient enforcement of the Directive, lack of capacity, rushed reports and insufficient political will. The final procedural evaluation resulted in poor overall performance of SEAs at meeting the selected criteria and a clear lack of focus on fundamental SEA issues such as SD, DM and alternatives. Overall SEAs within Canada are not successful in their current form, and do not meet academic, national or departmental standards. Once these shortcomings are addressed then SEA can evolve into a more intergraded DM tool contributing to the pursuit of SD.
Aboriginal Consultation in the Northwest Territories (January 2010)

Author: Lesley Johnson

Employer: Environmental Assessment and Monitoring Unit of the Government of the Northwest Territories

Executive Summary

The following report reflects on the author’s engagement in the topic of Aboriginal consultation during her internship at the Environmental Assessment and Monitoring Unit of the Government of the Northwest Territories. During this time, the author drafted an Aboriginal consultation training course for the government.

Aboriginal consultation has resulted from the Crown’s legal obligation to protect Aboriginal and treaty rights as defined under s. 35 of the Canadian Constitution Act, 1982, and also serves as a tool to right the historic inequalities dealt to the Aboriginal peoples of Canada. Consultation often arises from the environmental assessment (EA) process, as adverse impacts can potentially cause infringement to Aboriginal rights. EA in Canada has been criticized for marginalizing Aboriginal people from participating in the process. In the Northwest Territories (NWT) a new EA regime, the Mackenzie Valley Resource Management Act (MVRMA), has emerged. The MVRMA mandates considerable Aboriginal participation.

Aboriginal and treaty rights have a long history of jurisprudence in Canada, beginning with the Royal Proclamation of 1763, and were recently further defined by a series of court cases in the 1990s. Comprehensive land claim settlement and self-governance have recently been determined as an inherent right in many cases. The NWT has five settlement regions, which in part created the MVRMA to replace the Canadian Environmental Assessment Act (CEAA) in the territory. The MVRMA fosters Aboriginal participation in the EA process; however, it is ultimately the Crown’s responsibility to ensure proper consultation has occurred. Case law stemming from EA has informed the principles, and the content or extent of the Crown’s duty to consult and accommodate. The Ka’a’Gee Tu First Nation v. Canada court case is a case study that demonstrates the commitment to upholding the consultation process and principles in the NWT, throughout the EA process.

The free-market mineral leasing regime in the NWT is in conflict with the concept of Aboriginal title. Differences between the goal of the Department of Indian and Northern Affairs Canada’s (INAC) free-market regime land licensing system and the various co-management boards goal to protect the environment and Aboriginal values of the territory often come into conflict. The NWT is recommended to review the licensing process to consider Aboriginal title. A second recommendation is to implement community-based consultation protocols, furthering Aboriginal decision-making and self-determination in the process.

Follow-up is often a weak area in EA frameworks. Effective follow-up protocols and promoting Aboriginal participation can be mutually reinforcing concepts. A final recommendation is to create mandatory follow-up programs that include Aboriginal consultation and participation for certain types of activities, such as for mineral or petroleum projects that have undergone EA.

Author: Melanie McCavour

Employer: USDA Forest Service

ABSTRACT

It is widely expected that the ongoing emission of greenhouse gases will increase temperature and decrease water availability, and have net negative impacts on plants, animals, and human society. Facilitated adaptation may be necessary for plant species that cannot move or adapt rapidly to these changes; this adaptation may be through artificial dispersal, genetic conservation, and breeding and engineering programs. One way to mitigate anthropogenic carbon dioxide release to the atmosphere is by sequestering carbon in tree plantations on previously unforested land (afforestation). A variant of this would be genetically engineered (GE) trees capable of rapid growth on non-arable land; these trees can be used as woody feedstock for bioenergy. Projects such as this can help mitigate global change and satisfy international GHG reduction goals and commitments, while at the same time providing renewable energy and a sustainable source of jobs for rural communities. A major impediment to the use of GE trees as biofuel is opposition to GE in general. A case study examined here involves the application by a private company to field test a GE Eucalyptus hybrid capable of rapid growth. The Environmental Assessment (EA) indicated that little impact was expected because of stringent safeguards (e.g. reducing the capacity of the GE variety to produce pollen), and thus the project has been approved by the USDA Animal Plant and Health Inspection Service. It is argued here that much of the public opposition to using GE plants for biofuel, especially in Europe, is due to an unwillingness of regulatory agencies to be transparent and lack of public trust in science.
Inter-Governmental and Multi-Jurisdictional Environmental Impact Assessment: Options for Harmonization in Canada (December 2009)

Author: Jaron Dyble

Employer: Canadian Environmental Assessment Agency

ABSTRACT

Given the existence of environmental impact assessment (EIA) legislation at the federal, provincial, and territorial levels, major development projects are increasingly subject to more than one regulatory and EIA process. The application of multiple environmental assessment (EA) requirements creates procedural and regulatory complexity and uncertainty. Consequently, there is a growing demand from proponents, the public, as well as regulators to further cooperate, coordinate, and harmonize regulatory requirements. The following is an examination of how the complexities surrounding inter-governmental and multi-jurisdiction EIA are handled within a collaborative federalism framework. Four different approaches to multi-jurisdictional EIA are explored, including coordination, substitution, delegation, and consolidation, and recent case studies are analysed with respect to the costs and benefits associated with multi-jurisdictional coordination. Furthermore new opportunities for harmonization are presented. My findings suggest that while coordination presents the most feasible and successful model for inter-governmental and multi-jurisdictional EIA, a consolidated model in which the Canadian Environmental Assessment Agency acts as a central administrative and decision-making entity for federally administered EAs offers appealing advantages over the current self-assessment model. The conclusion is that opportunities for consolidation should be explored and considered by federal policy-makers while concurrently pursuing improvements to current harmonization agreements and legislation.
Streamlining the environmental assessment and permitting processes for mining project proposals (December 2009)

Author: Meaghan Hoyle

Employer: Canadian Environmental Assessment Agency

Abstract
The federal regulatory review process in Canada comprises of two process: an environmental assessment and subsequent permitting. The two processes are inherently related in mining project proposals because environmental assessments (EAs) are often triggered by licences, authorizations, amendments, or permits that are issued during the permitting process. The scoping stage of the federal EA process under the Canadian Environmental Assessment Act is fundamental to the entire process because it determines how an EA will unfold, and the information that will be required by a proponent. Further, scoping identifies which statutory or regulatory approvals a proponent will need during permitting. A specific mining proposal, the Prosperity Gold-Copper Mine Project, is used as a case study to demonstrate the scoping procedures in a mining EA, and the lack of consistent standards regarding information requirements between the EA and permitting processes. This lack of consistent standards, along with other issues such as late triggering and timeliness, are being addressed through streamlining initiatives by the Canadian government. These recent government initiatives, including the creation of the Major Projects Management Office, are attempting to remedy apparent inefficiencies within the process. Weaknesses are still apparent however, prompting a discussion of changing the entire federal regulatory review process framework to that of a centralized model.

Key words: scoping, mines, federal regulatory review process, environmental assessment, Canadian Environmental Assessment Act, Major Projects Management Office.
Follow-up programs under the Canadian Environmental Assessment Act: a snapshot analysis of Wind Farms in Canada from 2003 to 2009 (November 2009)

Author: Angela Goodfellow  
Employer: Canadian Environmental Assessment Agency

Abstract

Follow-up programs under the Canadian Environmental Assessment Act (CEA Act) is mandatory for all comprehensive studies and review panels, but is discretionary for screenings. Wind power farms are typically assessed through screenings, but many have follow-up programs required due to their permitting process. As part of the Quality Assurance program at the Canadian Environmental Assessment Agency, the present study investigated the quality of several wind farm follow-up programs from 2003 to 2009. Two programs from 2003 demonstrated methods and results that were scientifically weak but that took advantage of the tools available at that time. Improvements were made to programs in 2006-2007, where much of the same methodology was used and made reference to earlier programs and research in the field of impacts on birds and bats. The most recent plan for the Wolfe Island wind farm was the most comprehensive program studied. It followed the protocols developed by Environment Canada for monitoring impacts of wind turbines on birds and it went further to develop an adaptive management plan for dealing with any unanticipated effects. Due to the proliferation of wind farms in recent years, monitoring of impacts has evolved substantially and has reached a point where plans are being developed that are in line with theoretical principles for effective follow-up. It serves as a good example of how follow-up should be performed under the CEA Act.