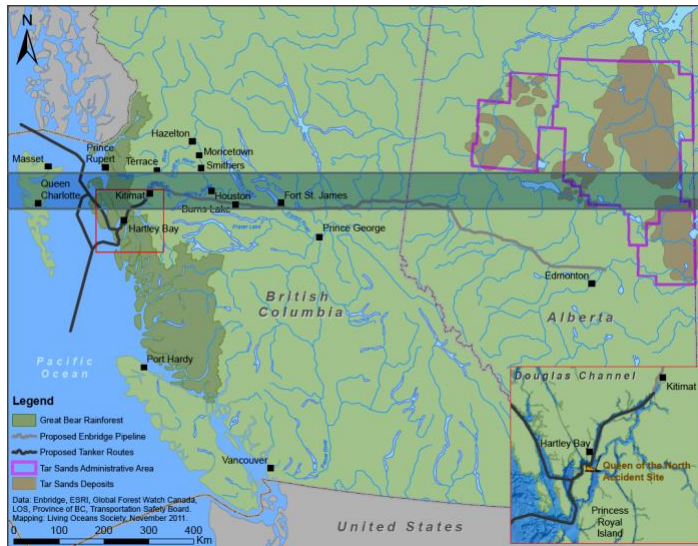


Case Study: Northern Gateway Pipeline

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Introduction



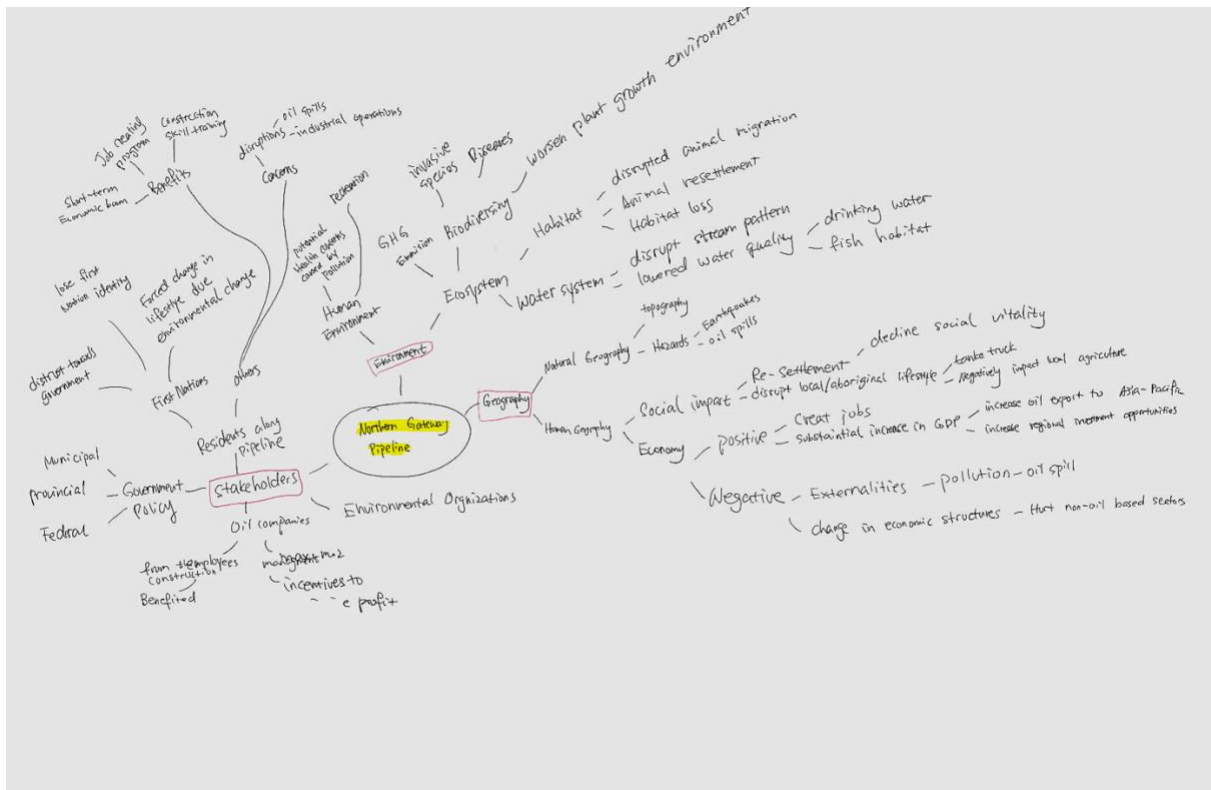
Map of the proposed pipeline route through British Columbia (National Resource Defense Council, 2011. Retrieved from http://www.nrdc.org/international/files/NorthernGatewayPipeline_map.pdf).

The Northern Gateway Pipeline is a project proposed by Enbridge Inc. to build twin pipelines that will transfer natural gas condensate from British Columbia to Alberta in order to export diluted bitumen to the west and access international waters through the marine terminal in Kitimat. The project has promised to create more than 4,000 jobs with \$32 million flowing into the Canadian economy, as well as \$2.6 billion in tax revenues generated for the government. It further solidifies Canada's position in the oil industry by generating new possibilities of international negotiations through the transport of energy to Asia and to the West Coast of the US. Although the twin pipeline project promotes a promising outlook, it has sparked numerous controversies as the project will cross more than 50 aboriginal territories, compromising local communities that depend on the region's land and way of life.

According to the map provided by the NRDC, the route will cut through areas that are prone to destructive landslides and earthquakes. Furthermore, the project will cross 785 rivers, including the headwaters of three of the most important watersheds- Mackenzie, Fraser, and Skeena- threatening local economies depending on fisheries and forests. Potential impacts from an oil spill could devastate economically important salmon habitats, ecologically rich environments such as the Great Bear Rainforest, and marine life that depend on the coastal rivers (Swift et al., 2011). Considering Enbridge's own data of oil spills between 1999 and 2011, there has been 6.8 million gallons of fossil fuels released into the environment (Girard and Davis, 2012), which further raises concerns regarding future impacts about the environment and economy.

Framing the problem

The uniqueness, instability, low-shared values and context and scientific uncertainties of the Northern Gateway Pipeline have made the project a wicked problem in Canadian politics. The problem is hard to solve since there remain several issues regarding the project. The mind map shows that environmental concerns, economic impact, and interests of different groups are the key dimensions that frame the problem.



Mind Map

Environmental Concerns

The environmental damage associated with the project is the primary concern because it is the fundamental reason why many stakeholders oppose the pipeline. Many non-governmental organizations oppose this project due to concerns over oil sands expansion and associated risks in transportation, and opponents argue that the pipeline project will damage BC's ecosystems. It can be found in Table 1 that BC has had high occurrence of pipeline incidents and accidents like oil spills (Transportation Safety Board of Canada, 2014), and oil spills may negatively affect watershed and downstream fisheries (West Coast Environmental Law, 2012). In addition, oil contamination will threaten protected areas and larger areas are more vulnerable to the threats, and more importantly, many protected areas are actually occupied by First Nations (Service et al., 2012).

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---------------------------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|
| Accidents | 5 | 9 | 7 | 6 | 15 | 11 | 5 | 7 | 11 | 5 |
| Newfoundland and Labrador | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Prince Edward Island | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nova Scotia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Brunswick | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Quebec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ontario | 1 | 1 | 2 | 1 | 5 | 2 | 2 | 2 | 2 | 0 |
| Manitoba | 0 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| Saskatchewan | 1 | 0 | 1 | 0 | 2 | 1 | 1 | 1 | 1 | 0 |
| Alberta | 1 | 1 | 0 | 0 | 4 | 4 | 1 | 2 | 6 | 2 |
| British Columbia | 2 | 5 | 3 | 4 | 4 | 3 | 0 | 2 | 2 | 1 |
| Yukon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Northwest Territories | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Nunavut | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Incidents* | 79 | 62 | 64 | 84 | 118 | 145 | 167 | 173 | 118 | 133 |
| Newfoundland and Labrador | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Prince Edward Island | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nova Scotia | 1 | 1 | 2 | 1 | 0 | 1 | 5 | 2 | 3 | 2 |
| New Brunswick | 0 | 0 | 1 | 0 | 5 | 6 | 14 | 19 | 16 | 9 |
| Quebec | 4 | 1 | 3 | 2 | 4 | 2 | 2 | 1 | 1 | 1 |
| Ontario | 7 | 7 | 8 | 17 | 20 | 19 | 22 | 22 | 10 | 20 |
| Manitoba | 3 | 7 | 4 | 10 | 9 | 14 | 11 | 10 | 12 | 8 |
| Saskatchewan | 23 | 14 | 10 | 17 | 13 | 38 | 35 | 45 | 18 | 17 |
| Alberta | 21 | 11 | 11 | 16 | 36 | 51 | 55 | 45 | 35 | 35 |
| British Columbia | 16 | 20 | 23 | 19 | 26 | 13 | 11 | 18 | 17 | 41 |
| Yukon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Northwest Territories | 4 | 1 | 2 | 2 | 5 | 1 | 12 | 11 | 6 | 0 |
| Nunavut | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 2-pipeline incidents and accidents by province 2005-2014.

Retrieved from: <http://www.tsb.gc.ca/eng/stats/pipeline/2014/ssep-sspo-2014.asp>

Furthermore, the oil spill and GHG emission facilitated by the project will impose a large amount of external costs, and these external costs may make the project uneconomical. The environmental issue associated with the Northern Gateway Pipeline should be a primary concern because it not only disrupts BC's ecosystems, but also subsequently creates economic issues and conflict among stakeholders.

Impact on the Economy

The impact on the economy is the second issue within the project as the fundamental goal of this pipeline is to facilitate the development of Canadian economy, but the primary environmental issue subsequently reduces the benefits. The pipeline promises to provide over 4,000 job opportunities, generating around \$2.6 billion tax revenues and consolidating Canada's position within the oil industry. Wright Mansell Research Ltd. (2012) concludes that the project is a catalyst to substantially stimulate Canadian economy and a significant contributor to sustaining Canadian growth and prosperity in the long term. However, many researchers argue that the economic costs of the Northern Gateway Pipeline (NGP) project may offset the promised benefits. Lee (2012) maintains that a full consideration of costs and benefits, including damages from GHG emissions and the costs associated with likely oil spills, suggests the NGP may well be uneconomical. Similarly, Allan (2012) argues that the

economic impact of the pipeline will actually be negative for Canada, as opposed to what Enbridge predicts. Allan collects data from the Muse Report for projected economic impacts, conducted her own calculations, taking into account her belief that the cost of crude will not inflate to a massive extent based on CAPP 2009 Forecast for refinery capacity. Thus, Allan calculated a 34% decrease from the projected economic values submitted by Enbridge (Table2).

| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | Total |
|----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|
| Net Canadian Benefit Muse Report | 1471.4 | 1732.6 | 2231.5 | 2047.9 | 2485.4 | 2675.8 | 2553.7 | 2523.3 | 2642.7 | 3336.7 | 23701 |
| Net Canadian Benefit Revised | 829.8 | 1044.2 | 1462.9 | 1383.5 | 1725.9 | 1865.5 | 1702.9 | 1712.5 | 1791.6 | 2252.9 | 15771.7 |
| Difference | -641.6 | -688.4 | -768.6 | -664.4 | -759.5 | -810.3 | -850.8 | -810.8 | -851.1 | -1083.8 | -7929.3 |
| Percentage Overstated | | | | | | | | | | | 50.30% |

Table 3-Revised summary of Northern Gateway benefit calculation.

Retrieved from: www.robynallan.com/wp-content/uploads/2012/02/Economic-Assessment-of-Northern-Gateway-January-31-2012.pdf

Since the proposed fundamental goal of the project has caused considerable controversy, it is necessary to regard the impact of the pipeline on the economy as a key issue. However, the controversy associated with the impact of the pipeline on economy is mainly caused by primary environmental issue, so we rank the economy as the second key issue.

Multiple Stakeholders



(Image by Dene Moore, The Canadian Press, April 11, 2014. Retrieved from:

<https://warriorpublications.files.wordpress.com/2013/08/yinka-dene-no-pipelines-banner-april-2011.jpg>)

The conflict among different stakeholders is the third issue within the project. It is less serious than the environmental cost and economic controversy because the conflict could be minimized if the first two issues are well managed. The Northern Gateway pipeline project involves many levels of government, First Nations, industrial energy interests, the

international community, and the environment as a non-anthropocentric entity. The developer Enbridge, Inc. claims that this project can contribute substantially to local economies, and the previous federal government led by Harper has conditionally approved the project. However, the recently formed government led by Trudeau has asserted opposition to the project, and the BC provincial government (2012) stated five requirements to be addressed prior to supporting the project. Moreover, CBC NEWS (2012) reports that many aboriginal groups opposed this project. For example, a coalition of 6 First Nations groups called Yinka Dene Alliance (2014) has pledged to oppose the Enbridge Northern Gateway Pipeline. Their declaration states that they will not allow the Enbridge Northern Gateway Pipelines or any projects associated with the tar sands to cross their land.

Because there are so many stakeholders with their own ideas about what is most important, it is difficult to get everyone at the table in a fair way, and much harder still to come to a decision. However, if the developer can prove the positive impact of the project on Canadian economy and efficiently reduce the environmental damage associated with the pipeline, the conflicts among the stakeholders then are likely to be minimized.

Governance Framework

There are a few competing groups with the power and organizational capability to influence decisions around the Enbridge Northern Gateway Pipeline.

Colonial Governance

First, the Federal government sets the agenda for policymaking on the national level. The *Canada Oil and Gas Act* “established a federal regime for petroleum resources,” effectively controlling petroleum development at the federal level (Thompson, 2006). Until recently, the Harper Conservatives prioritized the development of energy capacity in Canada, especially through the tar sands in Alberta. Literature has identified that maximizing conditions for resource exploitation is a key Canadian value (Hessing, Howlett, and Summerville, 2005); this priority led to streamlined avenues for resource development, sometimes to the detriment of other important groups such as First Nations, despite important considerations at the provincial and municipal levels. The National Energy Board, a reviewing board tasked with regulating the construction and operation of pipelines and other energy resources, is a key federal office in the pipeline approval process. The federal government must also consider foreign governments and corporations as a result of multinational agreements such as the North American Free Trade Agreement (NAFTA) and Foreign Investment Promotion and Protection Agreements (FIPAs).

Provinces are important to keep in mind as they do hold a critical place in the development of energy policy, including the implementation of carbon tax schemes and environmental controls. In all of Western Canada, for example, “provincial governments are by far the largest owners of undeveloped natural-resource rights” (Thompson, 2005). Also, municipalities often are left to their own devices to deal with local impacts of federal and provincial decisions. Fort McMurray is one such example, where Wingrove (2015) has documented the city’s boom-and-bust cycle as federal investment waned, oil prices slid, and the city has fallen into a very precarious political situation. That being said, Canada has been fortunate that due to its large size, it has been able to avoid many municipal problems which typically arise with resource extraction near urban environments (Hessing, Howlett, and Summerville, 2005); this trend

notwithstanding, municipalities are important cogs in the governmental machine, which may suffer disproportionate impacts from the proposed pipeline.

First Nations

First Nations land claims are also incredibly important to consider, as the pipeline will cross more than 50 indigenous traditional territories. The Idle No More movement has brought public attention to First Nations issues, and they are increasingly important to consider in a legal framework as well. Many First Nations groups, including Idle No More, have strongly condemned the Enbridge pipeline and have announced their opposition.



(Image by Steve348, licenced under Creative Commons; Retrieved from https://en.wikipedia.org/wiki/Idle_No_More#/media/File:Idlenomore2012ottawa.jpg)

The Supreme Court of Canada recently supported Tsilqot'in land title claims to 1700 square kilometers (CBC News, 2014). Gilbert notes that the Tsilqot'in ruling will almost certainly affect resource extraction projects moving forward (Gilbert, 2013). As the current system is one in which "Canada's relationship with First Nations is intimately tied to its ongoing search for resources" (Slowey, 2007, p.14), looking at Aboriginal rights and land claims is increasingly important to examining governance frameworks around pipeline projects and other extractive projects. We know that "historically, [resource extraction] by colonial Europe typically took place at the expense of indigenous welfare, often resulting in the disintegration, and often decimation, of cultures" (Hilson, Gilberthorpe, 2014, p.2). There are governance practices forming which contain "remnants of colonial and post-colonial phases of resource extraction" (Hilson, Gilberthorpe, 2014, p.3). The logical result of these ongoing governmental and extractive practices means that extractive industrial projects almost always have the same effects, especially "environmental pollution and consequent community backlash[...], new forms of poverty and inequality; and local-level grievances stemming from perceived minimal contributions to local economic development" (Hilson, Gilberthorpe, 2014, p.1).

Moving Forward

The potential set of solutions for the Enbridge Northern Gateway pipeline project is incredibly complex and is currently being decided upon. However, a major, and frankly, the most realistic solution to this wicked problem is the scrapping of the project all together. There are other possible solutions that have been proposed in the media such as re-routing the project through the more northern coastal city of Prince Rupert (Penty and Van Loon, 2014) or transporting a more refined/less toxic grade of petroleum product in the pipeline (Shannon,

2012). These proposed solutions are not supported by our research however. Drastic changes in the ideologies of key stakeholders caused by electoral majority victories by the Liberal Party of Canada federally and the New Democratic Party of Alberta provincially have likely hammered the final nail into Northern Gateway's coffin.

Triangulation

The scrapping of the Northern Gateway project will indeed have a multidimensional effect spanning a large range of stakeholders. The primary benefactors of this solution are the natives of pipeline land including First Nations and citizens of pipeline route communities. Scrapping the project is the desired outcome of the majority of first nations of northern British Columbia. Aboriginals along the pipeline route have been "steamrolled" in terms of their governance rights of their land with regards to the project (Walden and Rozhon, 2012), (Kane, 2015). Thus, a Vancouver federal appeals court overturned prior approval of the pipeline on October 8th 2015 (Omand, 2015). Further beneficiaries include environmentalists, coastal fishing communities around Kitimat B.C., and eco-tourists as possible environmental damage due to crude oil spillage would be entirely avoided (Gutzman, 2012), ("West Coast Environmental Law", 2012).

The negative impacts are also plentiful in the case of cancellation of the project. First and foremost, Canada would not receive the economic stimulus of \$300 billion over the 30-year operation. Further to that the planned 3,000 jobs required to build and operate the pipeline in BC would not be created ("gatewayfacts", n.d.), (Lee, 2012). Furthermore the scrapping of the project greatly affects Asian oil markets, which will not benefit from direct super tanker transport of Alberta Oil.

Aim

The aim of ending the Northern Gateway project is simple; protect the environmentally sensitive northwest coast of British Columbia and the land governance rights of Aboriginals along the pipeline route. Since ground has not been broken on the project, there is no damage to repair and all environmental alteration can be completely avoided.

Timeframe

As stated in the introduction to this section, the timeframe to implement this solution is now. On June 17th 2014 the Canadian federal government which was then a Conservative majority approved the pipeline project with 209 conditions. In the time since however a federal appeals court has overturned the approval citing the fact the Enbridge Inc. disregarded BC aboriginals land governance rights. Further to this, the new Liberal majority federal government and NDP majority Alberta provincial government have vowed to scrap the project (Killen, 2015), (Laanela, 2015). Thus, the decision to go with this solution and scrap the project currently hangs in the balance and a final decision could emerge in very short order in terms of months.

Looking Forward

The solution of scrapping the Northern Gateway project has immediate environmental benefits now and into the future as risk of oil spillage is eliminated. However going with this solution could have a substantial negative effect on the Canadian economy looking forward. Canada's economy is greatly influenced by our exportation of petroleum products. Therefore lack of expansion in this industry could lead to substantial downturn in our GDP. An alternative

solution for Canada however is pursuing the proposed Energy East Pipeline project. This project involves a combination of converting existing pipeline while also extending it with new pipeline. It would run from Alberta to the oil refineries in eastern Canada then to a terminus port in St. John's Newfoundland. The project is estimated to bring a 36 billion dollar stimulus to the Canadian economy. This project seems more realistic as it provides a substantially lower risk shipping port and the expansion of an already in use pipeline ("Trans Canada Energy East Pipeline", 2015). The federal government has yet to fully support or oppose this proposition (Laanela, 2015).

Is the Solution Realistic?

The solution of scrapping the Enbridge Northern Gateway in its entirety is absolutely realistic. This solution preserves First Nations land governance rights and it protects British Columbia's environmentally sensitive northern coastline. The process of scrapping this project would obviously be a major disappointment for Enbridge itself and for Asian oil markets. However, with all aspects considered including extreme environmental opposition, current governmental opposition, and the recent overturning of project approval, this solution is incredibly realistic and is likely to be in place shortly.

Unforeseen Consequences

The objective of our solution to this project is to minimize unforeseen consequences. If the project is scrapped, future environmental risks of pipeline leakage and oil tanker spillage in environmentally sensitive areas will be prevented. It is hard to say whether this solution will have a major negative effect on the oil and gas industry and the Canadian economy as a whole. If the oil and gas industry does not receive stimulus through the building of a major pipeline project it is uncertain whether its current decline will continue, or if there will be a bounce back. However, with the limited supply of global oil decreasing and increasing dependence on unconventional reservoirs, researching renewable energy sources must be a priority. Although our proposed solution, as in the case of any wicked problem, does not satisfy every stakeholder we believe the scrapping of Northern Gateway does more good than harm overall.

References

Peer-Reviewed Articles

Bocking, E. (2012). Enbridge Too Far (Statistical Data). *Alternatives Journal*, 38(3), 5-5.

Annotation: This source is a one page statistical infographic. However it is published in a peer reviewed journal. The source for this article's data is unlisted. Since this journal is not widely cited and the article does not list its references, it is hard to attribute much validity to this source. I am simply using the numbers from this article in terms of comparison and will not base my arguments off it.

Hotte, N., & Sumaila, U. (2013). How much could a tanker spill cost British Columbians? *Environ Dev Sustain Environment, Development and Sustainability*, 16, 159-180. doi:10.1007/s10668-013-9468-7

Annotation: This peer reviewed article examines the total local economic impact in the case of an oil tanker spill on BC's north coast. The economic impact in the case of a medium spill and a large spill are both examined. The values are calculated by taking a baseline impact

from prior research and further examining the impact of a spill on several local industries. This study provides further evidence of the economic impact a spill can have. Since the tanker spills are the most likely among possible total spills, the economic impact of such case must be studied. This is a peer reviewed journal article and thus can be considered a credible source of information.

Le Billon, P., & Vandecasteyn, R. (2013). Connecting alberta's tar sands and british columbia's north coast. *Studies in Political Economy*, (91), 35.

Annotation: This peer reviewed journal article discusses the procedures of decision making about the pipeline in regards to natives of the pipeline land. This is primarily a literature review however some empirical evidence was collected on a canoe trip through native lands. This paper argues that oil industries are seeking to bypass a variety of review processes and the voices of natives along the pipeline route. This paper is relevant to my research as Enbridge claims the pipeline will stimulate the local economy for natives and a large percentage are in favor of the project. This paper offers insight as it is contradictory to those claims. This is a peer reviewed article and can be considered credible.

Service, C. N., Nelson, T. A., Paquet, P. C., McInnes, W. S. S., & Darimont, C. T. (2012). Pipelines and parks: Evaluating external risks to protected areas from the proposed northern gateway oil transport project. *Natural Areas Journal*, 32, 370-372.
doi:dx.doi.org/10.3375/043.032.0404

Annotation: This is a peer-reviewed article to evaluate how the proposed Northern Gateway pipeline may threaten the protected areas that are located downstream from the pipeline. This article is noteworthy that it provides significant information to determine which parks most urgently require oil spill response plans. Based on the results found in the article, oil contamination will negatively affect protected areas and larger areas are more vulnerable to the threats, which strongly supports my argument that "the Northern Gateway pipeline project will have negative impacts on BC's ecosystems". The research used a GIS approach to derive a risk index to incorporate both the probability of oil – once spilled – contaminating a park and the consequence of such occurrence. However, the risk model only use the highest water flow rate to estimate oil flow, while it ignored some other important factors such as water temperature, shoreline vegetation characteristics and stream patterns, which may reduce the accuracy of the model. This reference is reliable because the article is peer-reviewed and published in a professional journal, and the authors are the scholars from those well-known universities.

Government Documentation

How Prices are Determined. (2013, June 11). Retrieved October 11, 2015, from <http://www.nrcan.gc.ca/energy/fuel-prices/4611#crude>

Annotation: This is the government of Canada's webpage which explains how the price of oil and gasoline is determined in Canada. It is simply for background knowledge as being aware of the mechanics of oil pricing is helpful toward my research. This information should be considered credible as it is posted on the federal government's webpage.

Popular Media

Lee, M., desLibris – Documents, Canadian Electronic Library (Firm), & Canadian Centre for Policy Alternatives BC Office. (2012). *Enbridge pipe dreams and nightmares the economic*

costs and benefits of the proposed northern gateway pipeline. Canadian Centre for Policy Alternatives BC Office.

Annotation: This source is a book written by Marc Lee with the Canadian Centre for Policy Alternatives. It outlines in very basic terms a variety of factors that summarize the total economic impact of the Northern Gateway Project. It clearly identifies pros and cons related to the project by identifying both the profits as well as the possible costs of spills. This book is very relevant to my research as it is a good statistical starting point to compare other data with. The source seems relatively unbiased and is produced by an independent research company in Vancouver. Although this report may not have been subject to a peer review process, the source appears to be reliable.

Grey Literature

Allan, R. (2012). An Economic Assessment of Northern Gateway. Retrieved from: <http://www.robynallan.com/wp-content/uploads/2012/02/Economic-Assessment-of-Northern-Gateway-January-31-2012.pdf>

Annotation: This source is a private report written by an economist living in Whistler, BC that was submitted to the National Energy Board review panel. Allan argues that the economic impact of the pipeline will actually be negative for Canada opposed to what Enbridge predicts. Data is collected from the Muse Report for projected economic impacts. The author then makes her own calculations, taking into account her belief that the cost of crude will not inflate to a massive extent based on CAPP 2009 Forecast for refinery capacity. Thus she calculates a 44% decrease from the projected economic values submitted by Enbridge. This is very interesting in regards to my research as it offers a differing prediction for the pure economic impact of the pipeline. This source must be carefully evaluated as it is raw data derived by an individual with a clear bias against the project and is not peer reviewed. However, the author is an economist and her calculations can be considered. Using this source as a supplement to other research is valuable as it provides an altering prediction for economic impact.

Boulton, M. Environmental Law Center. (2010). *Financial Vulnerability Assessment: Who Would Pay for Oil Tanker Spills Associated with the Northern Gateway Pipeline?*. Victoria, British Columbia.

Annotation: This source is a report written by the University of Victoria's Environmental Law Center for the Living Oceans Society. It is purely a research review of Canada's government policies in the case of a coastal oil tanker spill. This report outlines how much money the Canadian government is required by law to contribute to the cleanup of coastal oil spills and how much the oil company itself is liable for. Boulton predicts these figures pale in comparison to what would actually be required if a spill actually happened in the tight corridor surrounding the Kitimat harbour. This report is very relevant to my research as it outlines the economic impact of a spill along BC's north coast. This is a crucial issue with Northern Gateway environmentally and economically. The source should be reliable as it is published by a well-respected institution.

Gateway Facts. (n.d.). Retrieved from <http://www.gatewayfacts.ca/>

Annotation: This website is created by Enbridge to promote the Northern Gateway Project. It does list statistics about the economic benefits of the project. This source however must be carefully scrutinized as it has a clear and obvious bias. It is a promoter for the project

and not intended to be impartial. I will use these statistics in my research only for comparison.

Gunton, T., & Broadbent, S. (2013). *A Spill Risk Assessment of the Enbridge Northern Gateway Project*.

Annotation: This report is an evaluation of Enbridge's spill risk analysis. The researchers examine Enbridge's spill risk criteria against the Canadian Environmental Assessment Act (CEAA) and determine that it is largely not met. This report takes into account all areas of possible spills including tanker traffic, port operation and pipeline operation. This is valuable to my research as one of my major points is the economic impact a spill would create. The report is published by a Simon Fraser University professor and thus can be considered credible.

Honarvar, A., Rozhon, J., Millington, D., Walden, T., & Murillo, C.A. Canada Energy Research Institute. (2011). *Economic Impacts of Staged Development of Oil Sands Projects in Alberta (2010-2035)* (No. 125 – Section I.). Calgary, Alberta.

Annotation: This report published by the Canada Energy Research Institute analyses the economic impact case by case of the Keystone XL pipeline, the Northern Gateway pipeline, and the Kinder Morgan pipeline of Canada's economy. Economic impact is computed through CERI's proprietary US-Canada Multi-Regional I/O Model (*UCMRIO 2.0*). This information is very useful to my research as it provides a detailed dataset of economic predictions for the project. The source is a private research company based in Calgary so there may be bias towards the projects going through. Information must be carefully considered from this source.

Harding, D. (2013). *Environmental Rhetoric: A Framing Analysis of Stakeholder Claims Surrounding the Northern Gateway Pipeline* (Masters Dissertation). Retrieved from Spectrum Research Repository, Concordia University. (977122)

Annotation: This is a peer reviewed Masters thesis that examines the way rhetoric is used to influence public opinion on the Northern Gateway Project. The study examines how stakeholders frame their own ideas and try to discredit the opposing views. The study looks at media portrayals of the pipeline by stakeholders and environmentalists, and concludes that public opinion is solely based on how effectively one side can discredit the other. This is important to my research because this debate is economically driven. In turn public opinion has a large impact on whether the project will eventually go through or not so in reality it can be considered the most important factor in my economic discussion. This is a peer reviewed thesis and thus can be used as a credible source.

Swift, A., Lemphers, N., Casey-Lefkowitz, S., Terhune, K., & Droitsch, D., (2011). Pipeline and tanker trouble: the impact to British Columbia's rivers, and Pacific Coastline from tar sands. Retrieved from: <http://www.nrdc.org/international/files/PipelineandTankerTrouble.pdf>

Annotation: The report points out social, economic, and environmental costs of the Northern Gateway Pipeline, including the risks of oil spills and potential dangers of bitumen transport. According to the report, residents of the area's life will be greatly compromised as their well-being depends on the region's land that will have an immediate effect on the area if an oil spill were to happen. Some of the key concerns include: "impacts to the Skeena and Fraser Rivers' salmon and habitat, impacts to the endangered Nechako White Sturgeon, and

impacts to shellfish and other seafood from the mainland coast to Haida Gwaii” which are particularly crucial for the sustenance and identity of the indigenous way of life.

West Coast Environmental Law. (2012). *Enbridge Northern Gateway Pipeline risks for downstream communities and fisheries*. Retrieved from: <http://www.wcel.org/resources/publication/enbridge-northern-gateway-pipeline-risks-downstream-communities-and-fisheries>

Annotation: This is a grey literature, and it mainly describes how the proposed Northern Gateway pipeline project will pose threats to downstream communities and fisheries. This reference is useful because it provides insights into how the pipeline constructions and oil spill may threaten fisheries and downstream communities. I can use the reference to demonstrate the influence of the Northern Gateway pipeline project on watershed in detail. The article has the strengths that it not only describes how oil spill may affect the watershed, but also illustrates the influences of the pipeline constructions on fisheries. Moreover, it provides some examples to verify the negatively impacts of oil spill. However, the article has the weakness that the author provides few data or physical evidence to show how significantly the fisheries and the communities will be affected. In addition, the reliability of this reference is limited because there is no formal reference list in the article, and it lacks quality control.

Data Source

Girard, R., & Davis, T.R. (2012). Mapping Enbridge’s web of pipelines: a corporate profile of pipeline company Enbridge. Retrieved from: http://www.polarisinstitute.org/enbridge_profile

Annotation: The profile states that “According to Enbridge’s own data, between 1999 and 2010, across all of the company’s operations there were 804 spills that released 161,475 barrels (approximately 25.67million litres, or 6.8 million gallons) of hydrocarbons into the environment.” The data provided on oil spills have raised concerns, further, when considering that the Northern Gateway Pipeline will be crossing remote areas, it raises questions as to whether a leakage from a fracture can be reacted to immediately, and if not, what ways are there to limit the damage to the ecologically rich environment?

Transportation Safety Board of Canada. (2014). Pipeline accidents and incidents by province 2005-2014. *Statistical Summary Pipeline Occurrences 2014*. Retrieved from: <http://www.tsb.gc.ca/eng/stats/pipeline/2014/ssep-sspo-2014.asp>

Annotation: This is a data reference including the pipeline incident and accidents by province during 2005-2014 in Canada. This reference provides noteworthy information about the occurrences of pipeline accidents and incidents in different provinces in different years. It tells the public how close we are near the pipeline incidents. According to the data, it can be found that BC has high occurrence of the pipeline incidents and accidents, so I can use this data reference to demonstrate the risk of the Northern Gateway pipeline project. This source is reliable because the data is collected by a federal organization. However, this data also has certain weakness since it only include the accidents and incidents to federally regulated pipeline, many occurrences are not formally investigated, and information recorded on some occurrences may not have been verified.

Grey Literature

B.C First Nation along pipeline route officially rejects Northern Gateway plan. (2014, April). *Warrior Publications*. Retrieved from: <https://warriorpublications.wordpress.com/2014/04/11/b-c-first-nation-along-pipeline-route-officially-rejects-northern-gateway-plan/>

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