

Evaluating Impacts of Proposed Resource Development Projects on Coast Salish Tribes

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Introduction

This short report summarizes key considerations in developing a defensible and culturally appropriate approach for evaluating the potential impacts of resource development projects on Coast Salish Tribes. Coastal areas of the Pacific Northwest already have been changed dramatically by numerous past resource developments focused on forestry, fishing, and transportation of fossil fuels. Several new large-scale resource developments are now proposed, both in the United States and in Canada, for construction and operation over the coming decades. Although advocates of these developments claim they will result in significant net benefits to society, others fear that Tribes in the US (and First Nations in Canada) will bear a disproportionate share of the costs and, overall, may find that many of the proposed developments result in net losses to their indigenous societies.

The report outlines an approach to the conduct of impact assessments and analyses that will responsibly capture many of the likely costs and benefits of these new developments. It is different from standard impact assessment approaches, such as those often conducted by industry proponents or state and federal resource management agencies, because it seeks to identify the values and concerns that are important to Tribes and First Nations rather than simply the values of mainstream society. This shift in perspective is both philosophical and methodological: the hope is that Tribes will no longer be forced to participate in the evaluation of environmental, health, economic and cultural changes using assessment systems that are not their own and that fail to capture many important impacts. It is also practical, in that only by first identifying correctly the categories of impacts and understanding their relation to indigenous communities can culturally appropriate suggestions for project mitigation or compensation be made. And this shift in perspective has a strong moral and legal basis, in that it seeks to respect the rights and title of Tribes and First Nations.

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This report is written by Robin Gregory but relies heavily on work that he has undertaken over the past 20 years with his colleagues Jamie Donatuto, Doug Easterling, Lee Failing, Julian Gonzalez, Michael Harstone, Chris Joseph, Nicole Kaechele, Graham Long, Leslie Robertson, Terre Satterfield, Paul Slovic, William Trousdale, and Nancy Turner. As collaborating researchers and consultants we have had the pleasure of working closely with numerous Tribes and First Nations in the Pacific Northwest over many years. The report provides only an overview of appropriate methods; no detailed impact assessments were conducted and neither detailed community-based interviews nor original field studies and modeling were completed. The critical role of these components is shown in the proposed outline of methods, but far more work than was permitted under this contract would be required in order to (for example) assess the impacts of a specific proposed coal-port facility or LNG terminal or electricity transmission line on a specified Tribe or First Nation. To do this would also require closer connections with potentially impacted indigenous communities than were possible in the course of this short overview project. Nevertheless, it is hoped that the suggestions made here can contribute to the establishment of an impact assessment framework that encourages clear communication and meaningful consultation between two often incommensurate worlds: that of coastal Tribes and First Nations and that of policy makers and elected officials working in industry, as consultants, or as employees with state, provincial, or federal governments.

Background

The methods and approaches discussed in this report are based on four main assumptions.

1. The Coast Salish peoples of the state of Washington and the province of British Columbia have lived along the Pacific coast of North America for time immemorial and have established economic and cultural lives based on a close relationship with the sea, marine, fluvial and terrestrial environments. To the extent that this relationship – protected by treaty and aboriginal rights -- is threatened or damaged by resource developments, so too are the lives and capacity for continued cultural practices of the Coast Salish peoples.

2. Many resource developments already have taken place inland and along the Pacific coast, and numerous new large-scale resource developments are being planned for the coming decades. These include several proposed large coal ports, several oil (bitumen) pipelines, new rail and electricity transmission lines, and new infrastructure to ship liquid natural gas (LNG). Although

these developments are being advanced because they are said to provide significant net benefits to society, important adverse impacts on Tribes and First Nations have been omitted and key methodological considerations, for example related to cumulative effects and the role of uncertainty, have received insufficient attention. It thus remains questionable whether the proposed developments will result in net gains or losses to society.

3. A foundation for evaluating the likely impacts of future developments must be built on a comprehensive understanding of the current situation, and this in turn must include the multiple dimensions of value that characterize the residents and culture of indigenous communities. By “value” we mean the many things that matter and that are provided to the Coast Salish and First Nation peoples via healthy marine, fluvial and terrestrial environments. These values include a wide range of environmental, social, economic, health, political, and cultural considerations. How these values are identified and defined, and how impacts upon them as a result of resource developments are estimated, is critical to an accurate evaluation of potential future changes. The role of observations and science (both conventional and indigenous) is also critical, but science alone is incapable of addressing the many difficult trade-offs that inevitably will arise as part of the consideration of new resource developments (Coglianese & Marchant, 2004).

4. The categories of value and the associated evaluation criteria should be defined by the potentially affected Coast Salish and First Nations, so that culturally appropriate impact analyses are used by decision makers to frame their choices. This is in contrast to many past and current practices, whereby Tribes and First Nations have been forced to participate in the evaluation of possible changes using assessment systems that were not their own. For the future, it is important for Tribes and First Nations to be pro-active and to carefully identify the values at risk and participate as full partners in the selection and implementation of appropriate evaluation methods.

Methods for Assessing Impacts

Many of the Coast Salish communities already have been working to understand the impacts of proposed resource developments and, to a greater or lesser degree, have begun to assemble a body of materials and reports that describe the nature of the related opportunities and threats.

A number of previous studies have helped to set a standard for the work we propose, both as models to draw from (e.g., Tobias, 2009) or as applied impact assessment methods – for example, the body of work conducted during 2010-2012 for the Gitga'at First Nation in response to threats posed by the Enbridge Northern Gateway pipeline.

Several methods have been used as the basis for assessing the impacts of resource development proposals; the literature on these approaches is vast and will only be referenced here illustratively. One of the primary techniques is probabilistic risk analysis, which accounts for the magnitude of an event and the likelihood of its occurrence along with people's perceptions of both magnitude and probability (EPA, 2004). A key consideration is the notion of acceptable risk, which implies that some level of potential costs will inevitably accompany the achievement of benefits and that decision makers, acting on behalf of society (e.g., "in the public interest"), need to address these difficult trade-offs. Unfortunately, choices concerning acceptable risk levels are often made without access to key components of information; for example, careful studies may have been conducted to estimate the predicted net benefits of an action down the nearest ten thousand dollars in predicted future value, whereas the associated cultural and social effects are presented only as being vaguely positive or negative in nature. Little additional clarity is often forthcoming because these decisions are made behind closed doors. Yet excellent tools exist for addressing trade-offs explicitly, so that all stakeholders can become informed about the ways in which different categories of benefits and costs were considered and weighed.

Another common impact assessment technique is cost-benefit analysis (CBA), widely used by both the US and Canadian governments (Boardman et al, 2011). When done moderately well, CBA identifies the primary sources of project-related gains and losses and values these in monetary terms, which means that numerous non-market impacts either are expressed in dollar-based terms (which many stakeholders find either partial or offensive) or omitted from the analysis; in particular, many cultural and ecosystem effects often are not included. When done poorly, as in the case of Northern Gateway's submissions to Canada's Joint Review Panel, the net social benefits of a project are estimated by adding up all the costs and benefits to which a monetary value can be assigned. This type of economic impact analysis is theoretically incorrect because it essentially double-counts the value of economic impacts, including what

normally are considered costs (e.g., jobs) as benefits and ignoring a variety of incremental costs imposed on governments due to the project.

When done well, as in the case of multiple account benefit cost analysis (MABCA), impacts that cannot be valued monetarily are at least partially included as part of the overall benefit-cost evaluation framework. Yet even MACBA is suspect because it fails to organize the project analysis in terms of the values declared to be of most concern by the potentially affected individuals and communities. To ensure that analyses are linked to what matters to people requires adoption of some form of Value-Focused Thinking (VFT; see Keeney, 1992). One of the most widely used value-focused approaches is structured decision making (SDM), which provides an organized way to work through tough environmental management choices characterized by multiple stakeholders, multiple dimensions of value, and controversy about factual information (Gregory et al, 2012).² The approach includes a range of techniques grounded in methods and theory from the discipline known as “judgment and decision making.” It enables assessments to be conducted in a manner that evaluates and, where necessary, generates metrics to characterize the impacts of different alternatives in terms of a small set of objectives or categories of concern. This permits the rigorous comparison of different options and the consideration of both values-based trade-offs and factual uncertainty. The approach also relies on structured deliberations and analysis, following principles for defensible decision-aiding methods (NRC, 1996).

Any values-focused approach relies on clearly identifying and describing the values and practices of potentially affected communities, with impacts identified as the result of activities that might adversely affect the continuity of these practices. This distinction is critical when working with Tribes and First Nations because of the importance of community-based knowledge that is often invisible or under-represented in the decisions made by resource management and regulatory agencies. This is particularly important when uncertainty exists with respect to outcomes (as it almost always does) and when the primary short- and long-term trade-offs associated with actions need to be explicitly revealed and described. Impact analyses always will rely to a greater or lesser extent on scientific studies for information about questions of biology, ecology,

² Many applications of SDM methods have been applied in environmental and energy-related fields, including wildlife and fisheries recovery planning, water quality and watershed management, and community development planning for indigenous communities.

toxicology or nutrition and on legal studies for issues relating to rights and title, but experience demonstrates that critical information also exists in the minds and feelings of local residents and experienced resource users.

Other methods used in project assessment are drawn from cultural anthropology and ethnobiology, planning, psychology, ecosystem services and especially cultural ecosystem services, negotiation analysis, geographic information and spatial systems analysis, and applied ecology. One goal of a defensible analysis, emphasizing values-based elements, requires listening to and documenting the expressed concerns of community residents about what is important to them but also translating this information into expressions that will be understood by decision makers, resource managers, and non-indigenous communities. This information may include concerns such as the inter-generational -transmission of knowledge of relationships with the land and water, practices of using resources for daily and/or customary or ceremonial uses, different acts and meanings of place and territory; and the current ways in which all of these are embedded in Coast Salish and First Nations relationships with the natural environment.

The second goal, emphasizing science and facts-based elements, requires a careful determination of the extent to which analyses accurately estimate the anticipated consequences of actions over the lifetime of a proposed project. For a development such as a coal port or an oil pipeline, this includes calculating the anticipated volume of product to be transported (including any long-term capacity increases, once the infrastructure is in place), analyzing how it will be transported (e.g., rail vs. pipeline vs. barge), the magnitude and probability of emissions and spills from both routine operations and accidents, physical health effects to nearby human residents and to plant or animal species due to possible emissions, and any other physical impacts that have identifiable consequences for cultural or social aspects of well-being.

An important concept to keep in mind is that reducing one source of risk to a very low level may result in sharp elevations in another source of risk. One example is the dramatic increase in rail traffic carrying bitumen over the past 10 years, in part because of the difficulties faced by oil pipelines when seeking construction and operating approval for pipelines: between 2009 and 2013, for example, the number of carloads of crude oil shipped by rail in the US increased from approximately 10,800 carloads to nearly 400,000. In addition, the distribution of risks over place and over time is likely to shift as different transportation options are considered.

The factual analysis of impacts requires a close and correct evaluation of the assumptions made with respect to employment opportunities and possible revenue derived from the project. In the case of Northern Gateway, for example, erroneous assumptions made by the proponent (and not challenged by the federal government review panel) about the effects of the project on energy prices and on employment opportunities were sufficiently serious that predictions of positive economic benefits in fact should have been replaced by estimates of *negative* economic benefits (i.e., overall economic costs) had correct pricing and employment evaluations been made.

An important goal for Coast Salish would be to present study findings related to social, environmental, cultural or health effects of a proposed project in such a way that the evaluation techniques and study findings speak both to indigenous communities and to local, state, and federal resource managers, decision makers, and elected officials. In addition, all findings – including the results of interviews, workshops, models or field studies -- should be vetted by Coast Salish representatives before broader dissemination or publication. Whenever possible, it is often helpful to also submit papers to peer-reviewed journals dealing with issues of environmental risk and health assessment, both to distribute findings to a wider audience and to enhance the credibility, standing and influence of the analysis and recommendations.

Proposed General Impact Assessment Study Framework

A general proposed study framework for conducting an impact assessment of a proposed resource development project on Coast Salish Tribes would have six main phases. Following these six steps, which also underlie the decision-making context as outlined in a SDM process, helps to ensure that decisions are informed by stakeholders' values and that factual information is processed in a logical manner. This enhances the ability of stakeholders and residents to participate meaningfully in the decision-making process, reduces the risk of misunderstanding, and increases the legitimacy of the assessment's conclusions.

Phase 1: Clarifying the decision context

The first step is to carefully define the problem. This is not trivial, and if not done correctly all subsequent steps will be ineffective. For example, it requires that explicit decisions be made

concerning the focus of the analysis: if fossil fuels are to be shipped from Canada to a US port, for example, to what extent will carbon emissions (and effects on global climate change) be evaluated and to what extent will associated life-cycle costs (e.g., including the recycling of materials and the risks or benefits experienced by the end-user of the product) be included in the analysis? Clarifying the decision context includes making sure that the legal responsibilities of all parties have been addressed (e.g., has the proponent's "duty to consult" been adhered to?) and that past history and experience with similar issues is not forgotten. It also requires correctly identifying the key participants and decision makers and deciding whether the impact assessment should be conducted on behalf of each Tribe or whether some joint evaluations can be done (which might decrease costs and increase visibility). In many cases clarifying the decision context requires setting a time line for the conduct of the impact assessment – 10 years? 40 years? 100 years? – and identifying a geographic boundary for the conduct of analyses; both considerations can dramatically affect the ability of the analyses to account for cumulative effects (e.g., the influence of other projects and actions on the risks associated with the proposal under consideration). It also involves clarifying a realistic baseline, which includes the present as well as a range of most likely scenarios for the future, against which any revisions to the proposed alternative can be assessed.

Phase 2: Understanding values and key measures

This step involves understanding how members of a selected Coast Salish community are most likely to be affected were a proposed resource development to go forward. Not all community values will be affected (either positively and negatively) and, if impacts do occur, not all impacts will be of equal significance.

Because these are values-based questions, it is essential to conduct Interviews with a representative group of community members, either as one-on-one conversations or as small groups, to identify those values most likely to be impacted. Although the affected values will vary across different contexts and communities, they are likely to include (but are not limited to):

- Economic effects: including income levels, employment during construction and operations, and both market values and non-market values (Satterfield et al, 2013)

- Environmental effects: including the abundance, distribution, resilience, and diversity of both terrestrial and marine species as well as the amount, timing, and probability of routine or accidental emissions to water, land and air. Species of concern for a large energy project on the west coast are likely to include salmonids, halibut, whales, shellfish, prawns and shrimp, and migratory birds along with a variety of sensitive estuarine plant and animal species (Gaydos & Brown, 2011). Key questions include the severity and likelihood of impact, the source of information, the confidence of experts in their assessments, and the ease and expected effectiveness of mitigation strategies along with the duration of residual exposures and effects (Harwell et al, 2006). Greenhouse gas emissions also can be an important impacts component, particularly for communities facing changes due to climate change.
- Social effects: including sharing and participation among community members at the level of the community, family, and individual and any special effects on youth or elders as well as the anticipated duration of these impacts (Palinkas et al, 1993). The potential for conflicts within a Tribal community, due to members' differing perspectives on a proposed resource development project, also needs to be considered.
- Cultural effects: including sharing of traditional knowledge, the continuity of cultural practices, ceremonies of special significance for social and/or spiritual reasons, and effects on keystone species or places (Turner et al, 2008). Key questions involve the pathways by which cultural impacts are expected to occur: for example, it is important to identify the degree of importance of the species to the community, the nature of the anticipated significant cultural effects, and whether the impacts may result in irreversible or devastating cultural impacts (see the description in Satterfield et al, 2013). Potential project effects on the range of development opportunities is also important, for example if future eco-tourism is compromised due to project impacts.
- Health effects: including worry/stress, contamination of wild foods, and effects on diets or nutrition in addition to conventional measures of physical health such as effects on mortality and morbidity, obesity, or diabetes (c.f., Bokak et al., 2000; Marmot et al., 1997; Santiago-Rivera et al., 2007).

An initial understanding of the range of values likely to be impacted by a proposed action depends on the alternatives under consideration and their anticipated consequences, the focus of subsequent assessment phases. It also depends on how values are expressed. Under an

SDM framework the initial articulation of a fundamental value at risk is linked to its expression in terms of a specified measure, which varies based on the type of concern and the problem context: natural measures (e.g., dollars of cost or miles of road) are used when possible, but often proxy measures (e.g., salmon returns as a proxy for abundance) are needed due to measurement difficulties. In many cases a third type of measure, a constructed scale, is also helpful; these are quantitative or qualitative measures (e.g., 1 to 5 or good to bad) that describe changes in hard-to-measure values that lack standard means of representation, such as community pride or the quality of ceremonial foods.

One example comes from a Nation engaged in discussions to increase water levels and fish habitat in a managed river that for many years has experienced greatly decreased flows. One important concern is the Nation's stewardship responsibility to the long-term ecological health of the river system. Three core components of stewardship were identified: on-ground outcomes with respect to ecological performance, an appropriate level and quality of participation by those affected, and a long term commitment to oversight, monitoring and capacity building (Failing, Gregory & Higgins, 2013). The first concern was addressed in the overall decision framework via several ecological endpoints—salmon, river health, and riparian health. The other two elements were addressed through development of a *Stewardship Scale*, a five-level constructed measure as shown below:

Level 1 (Poor): One or more of the key parties are not included in active participation and stewardship opportunities are limited.

Level 2 (Fair): All of the key parties are involved but stewardship opportunities are limited.

Level 3 (Good): All key parties are fully involved, and there are moderate opportunities for active stewardship by key parties and affected communities.

Level 4 (Very Good): All key parties are fully involved and there are significant opportunities for active and collaborative stewardship, but with limited long-term financial and institutional commitment.

Level 5 (Excellent): All key parties are fully involved, there are significant opportunities for active and collaborative stewardship and there is a commitment to active and on-going oversight, monitoring and capacity-building.

This stewardship scale was used to help frame restoration actions and to aid the Nation in the incorporation of concerns important to them as part of a formal water-flow agreement with government regulators (Failing, Gregory & Higgins, 2013).

Phase 3: Developing alternatives

Working with a group such as the Tribal governing council, the next step would be to walk through the problem definition and values articulated by community members and then to construct one or more best-case and worst-case scenarios were the proposed development to proceed. It is important at this stage to remember that the no-project alternative does not mean that there will not be risks (e.g., saying no to a pipeline may increase the number of railroad cars traveling through Tribal territories carrying fossil fuels).

Most impact assessments are deficient in terms of generating and evaluating alternatives; instead, a proposed action is described and minor possible changes are then noted. However, this is usually done without reference to how each alternative affects the fundamental objectives of stakeholders. This simple notion – that alternatives are relatively better or worse to the extent they address objectives --is conveyed through development of a consequence table. The illustrative example shown in Table 1 reflects an increase in fish returns to an indigenous community: management alternatives are presented in the columns, objectives or concerns and their measures are shown in the rows, and the entries in each box provide illustrative estimates of the associated consequences. In this example, economic impacts are tracked using a natural measure, social impacts are shown using a constructed scale, and cultural effects are shown using a proxy measure.

Table 1: Illustrative (partial) consequence table

<i>objective</i>	<i>description</i>	<i>measure</i>	<i>Alt A</i>	<i>Alt B</i>	<i>Alt C</i>
Economic	reduced cost of replacement groceries (\$ per year)	reduction in food costs (\$ thousands/HH)	2	2.5	1.2
Cultural	new opportunities to teach, learn, share about fish	number of days of new opportunities (#)	35	12	20
Social	number of, and community participation in, gatherings	isolation vs. working together (1 – 10)	7	3	5

The range of alternatives can include different ways to reduce or avoid the negative impacts of an action (how can mitigation and design changes reduce adverse effects?) or ways to enhance its positive benefits of the proposed project (if new jobs are likely, are there other ways to obtain more or better jobs?). This requires that the concerns of community members are linked

to the opinions of experts – for example, experts in marine transportation may be called on to develop mitigation options that reduce the risk of oil spills from tankers to migrating whales, or experts in cultural practices (including Tribal members) may be called on to suggest ways in which specific cultural practices or the language of an indigenous community could successfully be preserved. Compensation options also merit attention, including the recognition of what types of risks and events may be considered sufficiently severe or even catastrophic that no form of compensation is possible.

Phase 4: Estimating consequences

Once an initial set of alternatives has been defined, a more detailed estimate of their anticipated consequences can be provided, with estimated outcomes (positive and negative) described either in terms of best estimates or (rarely) in terms of the predicted best-case and worst-case scenarios. In the typical case³ this results in a summary of predicted impacts similar to that shown in the following illustrative table of potential project consequences, usually estimated in terms of Net Present Value (NPV) monetary summaries (i.e., discounted over time).

Table 2: Illustrative typical dollar-based multiple accounts consequences summary

Account	Impact	Summary evaluation
Economic	Construction employment benefits	NPV: \$ xxxxxxxx
	Operations employment benefits	NPV: \$ xxxxxxxx
	Government revenues	NPV: \$ xxxxxxxx
Environmental	Ecosystem goods and services	NPV: \$ xxxxxxxx
	Air pollution	NPV: \$ xxxxxxxx
	Greenhouse gas emissions (if included)	NPV: \$ xxxxxxxx
Health & safety	Mortality & morbidity: workers	NPV: \$ xxxxxxxx
	Mortality & morbidity: public	NPV: \$ xxxxxxxx

³ For example, the 2014 submission by TransMountain to twin the Kinder Morgan oil pipeline includes detailed information concerning economic and environmental effects but declines to provide corresponding information about social and cultural impacts because the latter are considered intangibles and therefore too difficult to evaluate. A similar decision was made by Enbridge in the case of the proponent’s impact assessment for the Northern Gateway pipeline.

	Psychological: stress and worry	-
Cultural	Traditional practices	-
Social	Conflict and opposition	-
Summary NPV		\$ xxxxxxxx

The immediate effect of a presentation such as this – because only the economic and (to a lesser extent) environmental effects are expressed quantitatively -- is to devalue the negative effects on cultural, social, and non-physical health impacts that are predicted to be experienced by the Tribe. Economists have made limited progress in expressing these non-market effects, either in dollar terms (e.g., through the use of contingent valuation methods, which are both partial and misleading) or through stated-choice and conjoint methods (which employ multiple attributes but make many simplifying assumptions). Decision-aiding methods such as SDM make use of natural, proxy, and constructed scales (as noted in the Phase 2 description) and provide a more defensible basis for assessing impacts because the anticipated ecosystem services, social, cultural and health impacts are expressed using summary descriptive measures that reflect the language and experience of the concerned populations (Gregory et al., 2012; Satterfield et al., 2013).

At this stage key sources of uncertainty also need to be identified; for example, Table 2 could include a fourth column (to the right) that shows low and high estimates at a specified confidence interval (i.e., covering 80% or 90% of the estimated probability distribution). These expressions of uncertainty – which can involve physical, chemical, biological or economic phenomena – should include documentation of experts’ confidence in their predictions (e.g., how sure are experts regarding the forecasts they provide?) along with recognition of the extent to which there exists agreement or disagreement with regard to these judgments. When the uncertainty associated with an estimated consequence is thought to be important for the decision at hand, it is often helpful to convene a small panel of experts who can share their views and deconstruct a more complex problem into its simpler component parts. The goal is not to establish who is right or wrong but rather to develop a careful assessment of the issue that encourages discussion and helps to promote a shared perspective; such “expert judgment” elicitation are an important tool for promoting understanding, for encouraging effective

consultation, and for helping to steer scarce project funding into those key areas where reductions in uncertainty will provide the most important benefits.

The influence of other parallel events (e.g., resource developments creating local or regional cumulative effects) also needs to be addressed when considering the likely consequences of actions. Developing credible scenarios for the worst and best cases requires consideration of the range of effects (what are credible low and high impacts) along with estimation of their probabilities (e.g., different magnitudes of rail-line crashes) and the significance (low/medium/high) of these consequences to the Coast Salish community members. As always, the range of impacts should reference the economic, environmental, and health impacts defined in Phase 2 along with any possible changes to cultural and social practices.

Phase 5: Evaluating trade-offs

Discussions can now take place with community members or with a representative group (e.g., Tribal Council) that lead to an analysis of the most important value trade-offs among key components of the alternatives. This analysis should include identification of any thresholds that Coast Salish participants have articulated: for example, the loss of 10 hectares of riparian habitat may be considered negligible but nothing over 50 hectares should, under any circumstances, be permitted due to concerns about adverse effects on juvenile fish.

In many cases this step will involve working with a governing council or other group within the community to either rank or weight values, starting with those of individual members and proceeding to a representative set of value weights that are agreed upon by the group as a whole (Gregory & Trousdale, 2009). With reference to the Table 3 impact summary, the assumption that the different rows can be added to provide an overall summary presumes that all impact categories are weighted equally. In fact, it is nearly always true to different impacts are weighted differently by the various stakeholders: government resource management agencies may place a high weight on preventing negative environmental effects, the proponent may emphasize economic impacts, and Coast Salish members might place the highest importance on the avoidance of adverse cultural or social impacts. These different value weights be evaluated and (in some cases) aggregated in a variety of different ways; the important point, in terms of developing a defensible impact assessment, is that the most important values in any

given context should be weighted most highly and, often, the consequence information for these categories also should be given priority and held to higher standards.

Table 3: Illustrative value (importance) weights (%)

Account	Stakeholder 1	Stakeholder 2	Stakeholder 3	Stakeholder 4
Economic	10	30	05	20
Environmental	40	10	25	20
Health & Safety	25	10	15	20
Cultural	05	40	30	20
Social	20	10	25	20

It is recognized that the explicit consideration of trade-offs can be difficult, particularly in light of the many connections that exist among the different valued components. However, this balancing step of the overall impact assessment – sometimes referred to as weighing the “public interest” – is too often determined behind closed doors, on the basis of implicit or invisible criteria and with the approval of only a small number of decision makers. By agreement to make explicit trade-offs across possible impacts, the various stakeholders are provided with a direct means to share their preferences and to communicate with decision makers about what matters most to them. Making trade-offs transparently is thus about power as much as it is about the balancing of different impact categories.

Phase 6: Monitoring and learning

Once these steps are completed it is important for the community to ask not only--what do we think about the proposed project (e.g., accept, reject, accept only with significant modifications)? But also: What have we learned in the course of this impact assessment that will assist us in future project evaluations? This perspective is important for Coast Salish Tribes because in many cases they are faced with a series of potential projects: not one rail-line expansion or marine oil-tanker proposal or new transmission line but rather a sequence of proposed development projects. Key questions therefore include the following:

- What are the potential impacts for which more information is needed before reasonable decisions can be made? This question assumes that, if this added knowledge were

available, key aspects of a proposed project could be altered. It most commonly applies when there is substantial uncertainty about how well specified aspects of a proposed plan might work.

- What types of monitoring need to be in place to provide this information? For example, if new corrosion-detection instruments are installed to increase pipeline safety or if local residents are for the first time given a place on a management board, then these aspects of an implemented plan should be monitored carefully.
- Is uncertainty sufficiently high that small-scale or pilot tests of actions should be conducted to determine which of several alternative approaches is best? Adaptive management plans can be a helpful means to reduce uncertainty, although their use is more limited than often presumed. In addition, impact assessments often suffer from an “optimism bias,” which assumes that plans will work out as described in reports, so careful monitoring can be essential in the face of inevitable surprises due to natural variations or to human error (Gunderson & Light, 2002).
- What are expected to be the cumulative effects of the combined projects? These impacts include not only impacts on previously highlighted concerns -- environmental, cultural, economic, social, and health – but also issues related to capacity and the ability of the Tribe to (a) adequately assess the impacts of each proposed development, both individually and combined, as well as to (b) effectively consult with proponents and governments in terms of preferred mitigation options. Both aspects of addressing cumulative effects require skilled personnel and funding. In addition, to the extent that Tribal members are engaged in activities related to impact assessment they will necessarily be less engaged in other, more traditional activities – so there is an opportunity cost associated with the ongoing need to deal with a sequence of proposed resource developments.

Experience also shows that incorporating lessons learned is often difficult due to the natural rigidity of institutions (e.g., who wants to admit that their predictions have been wrong?) and the difficulties encountered in enforcing environmental management strategies effectively. This is a particular concern when trust is low because of a past history of conflict or mismanagement. As a result, flexibility and adaptability in the face of new information, both within external

resource management agencies and within the Tribal organization itself, can be difficult to achieve in practice.

Conclusion

This report presents a brief introduction to some of the key considerations relevant to a defensible impact assessment. Its fundamental message is that any analysis of the likely impacts of a proposed new resource development action starts with the values of those whose lives and activities may be affected. If important effects are omitted from the analysis then it lacks validity. If trivial effects are included in the analysis, then it can become a smokescreen that obscures the true costs (or benefits) of the undertaking. If the magnitude or severity of likely impacts is misrepresented, then the ability of the community to adapt successfully to the project is compromised.

How the impact assessment is conducted is equally important to its content. A successful impact assessment will involve all parties at an early stage, to help scope the impact categories and to help design the assessment studies. From the Coast Salish perspective, it is essential that the full range of potential impacts is considered and that community members are consulted throughout as sources of information regarding potential effects. For consultation to be meaningful, Coast Salish also need to play a key role in how information about impacts is presented: in some cases quantitative data will be available, but in many other situations impact information will be in the form of narratives (e.g., interviews with elders or Tribal resource users) or visual images. Rather than being consigned to a Traditional Use study or hidden as part of a multiple-account analysis whereby different types of impacts (e.g., economic, social, environmental) are each presented as part of separate accounts, this important information needs to be included as part of an integrated, formal analysis of alternatives.

Any impact analysis is subject to two main types of uncertainty. One relates to values: when addressing future scenarios and speaking on behalf of future generations, it is not possible to know with certainty how events will transpire or how people will feel about these different outcomes when they do occur. The second type of uncertainty relates to facts: predictions of the future impacts of an initiative are conditional upon the current level of knowledge and how the action unfolds (Are managers vigilant or forgetful? Are ocean conditions calm or stormy on a particular night?) as well as how related events influence those in question (e.g., Will the

economy be booming in 20 years so that resource prices are high or will demand be low? Will emerging clean-up technologies succeed so that it is easier to control an oil spill on land?). In both cases, the description of uncertainty is an essential component of the impact assessment, in terms of the analysis itself and in terms of how uncertainty is communicated and discussed.

It is also essential to remember that impact analysis methodologies are subject to approval by both the community they are intended to serve and the decision makers who ultimately will give a green or red light to a proposed action. If the community does not embrace the proposed methods then key information will be lost, residents' participation will drop off, and the analysis becomes indefensible. If the decision makers do not consider the suggested methods to be defensible then the results of the analysis will lack standing, in the court of public opinion as well as among academics, regulators, and government managers.

Finally, the good news is that these requirements of a defensible impact assessment require no more effort or resources than those of conventional, indefensible assessments. In most cases, the required resources will be far less: by identifying the values at risk early in the process and by prioritizing those impacts that are most important or for which additional information is most likely to make a difference, the impact assessment process becomes far more efficient. The goal is not to obscure important effects under mountains of irrelevant or semi-relevant information but rather to highlight, and carefully evaluate anticipated changes in, those beneficial or adverse impacts that are most likely to make a difference to the potentially affected Coast Salish communities. By carefully structuring assessments around the decisions to be made, and by paying attention to the multiple sources of information regarding both values and facts, it is possible to address those concerns most in need of attention while simultaneously conserving Tribal resources.

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