



Use of significance thresholds to integrate cumulative effects into project-level socio-economic impact assessment in Canada



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ABSTRACT

A longstanding critique of project-level environmental assessment is that it is weak at addressing cumulative effects, and because of this many argue that cumulative effects are best managed at a regional scale. However, in the absence of regional management it is important that project-level assessment supports cumulative effects management as best as possible. In this paper we present case study socio-economic impact assessments of liquefied natural gas development on Aboriginal groups on Canada's west coast. The case studies use an analytical structure modified from typical Canadian practice including unambiguous and non-arbitrary significance thresholds grounded in stakeholder values to focus baselines, impact assessment, and significance determination on cumulative effects. This approach is found to be more capable of informing decision-makers on cumulative effects as well as more rigorous and transparent than typical assessments. Much of this approach is not conceptually new, but at least in western Canada such an approach is not typically used or meaningfully implemented by practitioners. As such, the case studies serve to illustrate how practice can bolster project-level assessment.

1. Introduction

A common critique of project-level environmental assessment (EA) is that it is weak at supporting cumulative effects (CE) management.² In Canada, this sentiment is perhaps captured best by Duinker and Grieg, who concluded that “the promise and practice of [cumulative effects assessment (CEA)] are so far apart that continuing the kinds and qualities of CEA currently undertaken in Canada is doing more damage than good” (2006, 153), echoing similar remarks a decade earlier both in Canada (Ross, 1998) and the US (Burriss and Canter, 1997).

Key critiques of project-level assessment with respect to CEA are that: CEA is an add-on and done with little rigour, the focus is on project effects and approval rather than cumulative stress on valued components (VCs), CEA is so challenging that it is inappropriate and/or unfair to place this burden on project proponents, CEA generally concerns issues broader than the scale of individual projects, and there is insufficient guidance and backing in law and policy (Ross, 1998;

Kennett, 1999; Baxter et al., 2001; Dubé, 2003; Duinker and Greig, 2006; Therivel and Ross, 2007; Harriman and Noble, 2008; Canter and Ross, 2010; Noble, 2010; Hegmann and Yarranton, 2011; Noble et al., 2011; Seitz et al., 2011; IFC, 2013; Olagunju and Gunn, 2015; Jones, 2016). These critics often conclude that CE management is best left to regional-scale, multi-stakeholder planning processes which have greater capacity, greater abilities to coordinate multiple parties, higher levels of authority, and broader mandates.

We also find reason to be critical of CEA in project-level EA. In our experience in western Canada, project-level EAs pay too little attention to the broader context in which project impacts will occur. Ross (1998) noted some time ago that baselines should really be CEAs of no-project scenarios, but common practice in baselines in EAs in western Canada – and perhaps elsewhere – is simply to amass data related to present conditions and not explore why VCs are in the conditions they are in. Next, considerable effort is often spent assessing a future project scenario in which the only source of stress on VCs is the project, and then

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¹ The initial case study work was completed while this author was an employee of the Gitga'at First Nation; this author is now an employee of the Metlakatla Stewardship Society.

² CEs are changes to the environment that are caused by an action in combination with other past, present and future human actions (Hegmann et al., 1999).

less effort is typically spent assessing a ‘CE scenario’ including the project as well as other sources of stress, even though it is the combined effects of all sources of stress on VCs that is central to the question of whether or not significant effects will occur. Impact assessment is fundamentally about predicting a future with and without the project under study, and thus only two scenarios are relevant: a non-project scenario in which VCs are impacted by the CEs of other sources of stress, and a project scenario in which VCs are impacted by the CEs of both the project *and* other stress (Hegmann and Yarranton, 2011). On top of all of this, the significance of predicted effects is typically poorly rationalized.

The 2014 EA of the Spectra Westcoast Connector LNG pipeline (TERA, 2014) proposed for British Columbia (BC), Canada's western-most province, provides a recent illustration of these patterns. In the assessment of the project's potential impacts on water, the proponent identified surface hydrology as a VC, and surface flow and drainage patterns as a ‘key indicator’. The baseline included a review of relevant law, policy, and land use plans, and presented quantitative information characterizing current conditions of water resources within the project footprint. However, no consideration seemed to be given in the baseline for the CEs of other sources of stress, despite government EA guidance (BC EAO, 2013) noting that baselines should reflect CEs. Further, despite noting a variety of objectives related to water the application did not identify any related thresholds, benchmarks, triggers, or other means of putting current conditions nor predicted change in VC conditions into perspective. As Ehrlich and Ross (2015) make clear, significance at its heart is about acceptability of impacts through the eyes of those affected. A ‘threshold’ was used in the Spectra application to guide significance determination but was defined simply as whether an adverse residual effect was “not reversible in the long-term, high in magnitude, high in likelihood and cannot be technically or economically mitigated” (TERA, 2014, p. 4.3–24). The threshold is ambiguous and has no apparent connection to stakeholders' values, and thus appears arbitrary. A CEA of the project and other stresses was conducted, but the same significance criterion was used (TERA, 2014, p. 4.3–29). Minimal attention to CEs is exemplified in a single page CEA of impacts on community infrastructure and services. Counter examples exist – such as the EA of the proposed LNG Canada export terminal in which specific government-established visual quality objectives are used to gauge impact significance (Stantec, 2014, p. 7.3–13) – but from what we have observed significance thresholds tend to be ambiguous and arbitrary, and CEA is generally an add-on, low-rigour exercise that informs little of VC conditions before and after projects.

This pattern is presumably in part a function of the regulatory regime. The Canadian federal and BC provincial EA processes are both focused primarily on projects' direct effects and CEs only secondarily.³ The fact that EAs using the previously mentioned methods continue to be approved provides at least a tacit signal that current methods are acceptable, though recent new government guidance (BC EAO, 2013; CEA Agency, 2014; CEA Agency, 2015) suggests a desire for improvement. New guidance discusses how significance thresholds can and might be used and how CEs should be assessed, and promotes the notion that EA should be ‘value-focused’. What is needed now are models for how such ideas might be implemented.

In this paper, we present case study examples of socio-economic impact assessments conducted in 2013 and 2014 that use a modified analytical structure and unambiguous, value-based significance thresholds to shift the focus onto CEs while still informing of project effects. The case study approach first examines how VC conditions are impacted by CEs in a non-project scenario and then in an alternative future scenario examines the combined effects of the project and other stress.

³ The term ‘direct effects’ is used to distinguish project effects from CEs that stem from project effects interacting with the effects of other projects.

At the heart of our approach is attention to limits of acceptable change as communicated by significance thresholds. The underpinning is that what really matters is understanding how VC conditions are responding to effects wherever they stem from (Duinker and Greig, 2006; Greig, 2008; Greig, 2012), and that there are VC conditions that are generally considered acceptable by stakeholders and conditions that are not. With such an orientation, one can focus baselines and effect assessment on the CEs of the project in question and those of other stresses relative to these limits, and one can more rigorously judge significance because one has something tangible with which to put forecasted effects in perspective.

For clarity, our use of the term ‘significance threshold’ compares to what others have called *management triggers*, *management thresholds*, *management objectives*, *regulatory limits*, and *decision thresholds* – the point at which one feels that action must be taken to prevent unacceptable degradation of a VC's condition (Kennett, 2006a; Antoniuk et al., 2009; Johnson, 2013; Compass and REM, 2015). Significance thresholds may or may not be the same as *system thresholds* (which signify when a biological, ecological, social, or other type of system shifts equilibria or in some other way substantially changes its mechanics or nature (Duinker and Beanlands, 1986; Duinker and Greig, 2006; Johnson, 2013; Jones, 2016)), or *pressure thresholds* (which signify substantial changes in factors within systems (Weclaw and Hudson, 2004)), because significance is deeply connected to stakeholders' views about what level of change is acceptable (Thompson, 1990; Wood, 2008; Ehrlich and Ross, 2015).

The notion of using significance thresholds in project-level EA, and the broader approach we describe, is not new. In Dubé's (2003) three-step approach, ‘effects-based’ assessment is first conducted focusing on how CEs of existing pressures affect VCs, ‘stressor-based’ assessment is then done focusing on the specific additional effects of a new project, followed by monitoring to measure effects after development, all the while system thresholds and stakeholder perspectives on acceptable levels of change are used to ground the two assessments. However, rarely in our observation are approaches like this meaningfully implemented in EA practice.

We suggest that the approach that we illustrate in this paper demonstrates that CEA in project-level EA can be done much more meaningfully. These findings are important because, at least in Canada, project-level EA is presently the main tool for planning major project development and managing associated CEs. These findings are relevant to assessments of all types of VCs and should be useful around the world wherever there is interest in CE management and enhanced rigour in EA.

2. Case study background

Natural gas development began in BC in the 1950s, but to date all gas has either been consumed within the province or exported elsewhere in North America. In recent years BC has begun to pursue the Asian market, and at time of writing 20 different liquefied natural gas (LNG) export terminals are proposed (BC, n.d.).

Due to the legal structure of Canada's constitution, and because treaties with most Aboriginal groups in this part of Canada (referred as First Nations) have never been signed, First Nations play a substantial role in EAs of major projects. To support the Metlakatla and Gitga'at First Nations' participation in EAs of LNG development, the first three authors of this paper were hired in 2013 and 2014 to conduct independent EAs of several LNG projects (Table 1).⁴ Both First Nations number about 1000 people and have reserve communities on the BC coast near proposed developments. Our studies were conducted in

⁴ The fourth and fifth authors of this paper were the EA coordinators for the Metlakatla and Gitga'at First Nations at the time and in doing so played instrumental roles shaping the studies.

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