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Looking up, down, and sideways: Reconceiving cumulative effects assessment as a mindset

A. John Sinclair [a,*], Meinhard Doelle [b], Peter N. Duinker [c]

[a] Natural Resources Institute, University of Manitoba, Winnipeg, MB R3T 2N2, Canada
[b] Marine & Environmental Law Institute, Dalhousie University, Schulich School of Law, Dalhousie University, 6061 University Ave., Halifax, Nova Scotia B3H 4R2, Canada
[c] School for Resource and Environmental Studies, Dalhousie University, 6100 University Ave., Halifax, Nova Scotia B3H 4R2, Canada

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ABSTRACT

Despite all the effort that has gone into defining, researching and establishing best practices for cumulative effects assessment (CEA), understanding remains weak and practice wanting. At one extreme of implementation, CEA can be described as merely an irritant to the completion of a project-specific environmental assessment (EA). At the other extreme, the conceptual view is that all effects in EA should be deemed cumulative unless demonstrated otherwise. Our purpose here is to consider how we might reconceive CEA as a mindset that is at the heart of absolutely every assessment of valued ecosystem component (VEC) to ensure that we understand the relative contributions of various stressors and can decide when cumulative effects may foreclose future activities due to impacts on VECs. Conceptually, we ground the CEA mindset in the context of three lenses that must all be functioning and working together for the mindset to be operative: a technical lens; a law and policy lens; and a participatory lens. Our arguments are based on a review of the CEA, strategic effects assessment (SEA) and regional effects assessment literatures, an examination and consideration of Canadian EA and SEA case practice, and our combined professional experiences. Through using the Bay of Fundy in Canada as a case example, we establish the concept of the CEA mindset and an approach for moving forward with implementation.

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1. Introduction

Over the last twenty-five years, considerable attention has been given to cumulative effects assessment (CEA) by practitioners, academics, and legislators. Therivel and Ross (2007: 366) establish that "CEA has been required as part of many countries' project Environmental Assessment (and latterly also Strategic Effects Assessment) systems for years, and is supported by a range of guidance internationally" (e.g., Canadian Environmental Assessment Agency (CEAA), 2013a; Hegmann et al., 1999; Court et al., 1994; European Commission, 1999; Office of the Deputy Prime Minister (ODPM), 2005a, 2005b; Canter and Ross, 2010; US Council on Environmental Quality, 1997). Duinker et al. (2013), in a review of over a hundred scholarly publications and agency documents, further establish that such requirements, definitions, and frameworks for implementing CEA in these countries has only increased in abundance in the time since Therivel and Ross did their research. Yet, despite all this effort, CEA understanding remains weak, practice wanting and progress slow (Duinker and Greig, 2006; Harriman and Noble, 2008; Canter and Ross, 2010; Hegmann and Yarranton, 2011; Lawrence, 2013; Duinker et al., 2013).

At one extreme of implementation, CEA can be described as merely an irritant to the completion of a project-specific environmental assessment (EA). In this view, cumulative effects are 'assessed' as a purely legal obligation without practical merit, and the results recorded in a separate chapter — usually short — of the environmental impact statement (EIS). Invariably, the conclusion is that, if any cumulative effects at all are expected, they will be insignificant and therefore ignorable (Duinker, 2013). The Whites Point Quarry and Marine Terminal project EA in Nova Scotia (Bilcon of Nova Scotia Ltd., 2006) and the Marathon PGM-Cu Project in Ontario (Stillwater Canada Inc., 2012) are both good examples of this type of thinking regarding CEA among the many we could have noted. In stating this we recognize that there is a continuum of CEA practice and that some authors have noted that certain aspects of good CEA have been present in a limited number of cases, such as the Cheviot Mine EA (Creasey and Ross, 2009). Once assessors enter the underworld of cumulative effects, they most often exit as quickly as possible, hoping that others (e.g., EIS reviewers and decision-makers) will sympathize with their unease and agree that cumulative effects are just too difficult to grapple with in a meaningful way.

At the other extreme, the conceptual view is that all effects in EA should be deemed cumulative unless demonstrated otherwise (Duinker and Greig, 2006). CEA becomes a mindset that guides all facets of EA (Duinker, 1994; Ross, 1994). Any attention to project-

* Corresponding author.
E-mail addresses: jsincla@umanitoba.ca (A.J. Sinclair), mdoelle@dal.ca (M. Doelle), peter.duinker@dal.ca (P.N. Duinker).

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specific effects is immediately contextualized in terms of other anthropogenic stresses on the chosen valued ecosystem components (VECs). The focus is on VEC sustainability and the degree to which the human actions under assessment compromise that sustainability (Duinker and Greig, 2006). This supports the Therivel & Ross (2007; p. 365) finding that "CEA helps to link the different scales of EA in that it focuses on how a given receptor is affected by the totality of plans, projects and activities, rather than on the effects of a particular plan or project."

Our conception of CEA arises from the sustainability imperative, particularly ecological sustainability (Norton, 2005; Gibson et al., 2005; Greig and Duinker, 2011). This means that the focus of CEA should be on the condition of those elements of the biophysical environment that matter to us — in EA, these are called VECs (Beanlands and Duinker, 1983). The starting place, then, is that ecosystems and their components must be kept in good condition if proposed human activities that interact with such ecosystems and their components are to be sustainable. We plan, assess, evaluate, study, examine, and otherwise pay attention to VECs and their condition as we contemplate whether to undertake specific human activities.

Our resulting conception of cumulative effects is that they arise when two or more stimuli (or agents of change, or stressors, or causes) act together to influence the condition of a VEC. For example, a fish population in a river might be simultaneously affected by waterflow regulation, industrial water pollution, and fishing. Natural processes must be considered too; for example, a big hurricane could cause major flooding of the river in question. This view of cumulative effect is consistent with the definition recently published by the Canadian Council of Ministers of the Environment (CCME) (2014): "cumulative effect is a change in the environment caused by multiple interactions among human activities and natural processes that accumulate across space and time". Based on these conceptions of cumulative effect, it seems reasonable to enter an EA process assuming that all effects of the human activities being assessed are cumulative.

To improve our collective ability to address cumulative effects satisfactorily, we argue that the impact-assessment community needs both sound CEA processes and adoption of a CEA mindset. The scholarly literature and the guidance materials on CEA abound with descriptions of CEA processes (see Duinker et al., 2013 for a selective review). While these can certainly be tweaked and improved, our stance is that the community of impact-assessment practitioners has not yet adopted a CEA mindset. Adopting a CEA mindset means that CEA should be at the heart of absolutely every assessment of VEC condition as influenced by human activity to ensure that we understand the relative contributions of various stressors and can decide when cumulative effects may foreclose future activities due to impacts on VECs (or require mitigation to make room for additional activities). Our purpose is to describe and conceptualize a CEA mindset through describing and applying three critical lenses that focus the mindset. In doing so, we outline an approach to supporting VEC sustainability that recognizes CEA not as a matter of elite practice or preference if we had the time and money, but rather as the only way to begin to understand how to adjust human activities for a sustainable future. For example, in predicting potential impacts of increased tidal power development on a harvested fish species in Canada's Bay of Fundy, application of a CEA mindset might reveal that the sustainability of a fish species is rather far more dependent on harvest mortality than on the mortality from tidal turbines.

Our arguments are based on a review of the CEA, SEA and regional effects assessment (REA) literatures, an examination and consideration of Canadian EA and SEA case practice, and our combined professional and academic involvement and experiences over the past three decades in EA, SEA and CEA implementation. This includes years of experience researching EA process and the place of CEA in it, participating in EA processes, advising EA review panels, being members of EA review panels, writing guidance material for EA, CEA, public participation, etc. and engaging in consultations around the reform of EA law in various jurisdictions. In this paper, we first provide an explanation of what we mean by a CEA mindset. We then present case materials, drawn from Bay of Fundy initiatives, to demonstrate the state of affairs with respect to applications of CEA thinking. Finally, we propose an approach for reforming EA processes and broader environmental decision-making so that a CEA mindset might be fostered, adopted, cultured, nurtured, and implemented.

In modeling the CEA mindset, we define project-level EA as assessment of a single and specific proposed human endeavor of a physical nature (see, for example, the definition of a project under the Canadian Environmental Assessment Act, and Doelle, 2008). This makes project EA distinct from REA through its focus on a specific undertaking and distinct from SEA through its focus on a physical human activity. All EAs carried out under Canadian Environmental Assessment Act (CEAA) and most EAs carried out under provincial legislation in Canada would meet our definition of project EA.

Drawing on the broad and often conflicting SEA literature (e.g., Connelly, 2011; Lawrence 2003; Lawrence, 2013; Gunn and Noble 2009) we define SEA as an umbrella for any EAs that go beyond traditional single-project EAs, but that focus on a collection of individual projects (e.g., Fisher 2007; Gibson et al., 2010). For this paper, an SEA goes beyond individual projects, but it does not necessarily consider all human activities within a given region. An SEA can involve a specific industry sector or a number of industry sectors (Harriman and Noble, 2008). If it is limited to one industry sector, it is closer to a project EA. As it approaches a full consideration of all human activities within the study area, it begins to resemble an REA (as defined below). SEAs can also be initiated to consider a proposed policy, plan or program, to fill a policy gap, or to respond to new understanding of how human activities interact with the natural world. The EAs carried out under the federal cabinet directive (Privy Council Office 2010) for SEA in Canada would meet our definition of SEA. The Fundy Tidal Energy SEA carried out in Nova Scotia would also meet our definition of SEA (Doelle, 2009; OEER Association, 2008).

The term REA has also been used in many contexts, creating confusion in the literature and among practitioners alike (e.g., CCME, 2009; Dubé, 2003; Gunn and Noble 2009; Horvath and Barns 2004). For us, an REA is as an EA whose primary or sole defining feature is its regional scope and its focus on understanding the interactions between human activities and the natural world. This means that in just about all aspects other than its spatial limitations, an REA should be comprehensive and integrated. This also means that processes such as regional integrated planning and integrated management processes are forms of REA.

Our approach also recognizes that several other environmental planning and resource management activities are relevant to the CEA mindset and should be considered in the context of project EA, SEA, and REA activities. Examples include recovery plans for species at risk that identify actions that must be taken in an attempt to ensure a species' survival and resource management plans that guide the uses of natural resources such as those developed for forest management or watersheds. So, for example, species at risk (see, for example, www.sararegistry.gc.ca) are by definition VECs and the cumulative impact of human activity on them should be an ongoing consideration of a recovery management process. Similarly, watershed planning, implemented to varying degrees across Canada, is aimed at protecting components of a regional ecosystem to maintain the quality and quantity of water available.

2. Modeling the CEA rethink — the CEA mindset

In the context of cumulative effects, a mindset would mean adopting the assumption in all environment and resource decision processes that every interaction between a human action and a VEC is characterized by cumulative effects unless demonstrated

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