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**ABSTRACT**

*Environmental assessment (EA) scholars have recognized the need to evaluate not only spatial and political issues, but also the institutional dynamics that complicate regional EA processes and the extent to which integration is achieved to promote effective implementation. However, there are few in-depth studies of the complex interactions among collaborating governments, institutions, industries, communities, and scientific disciplines that participate in regional EAs. This paper presents insights from the regional EA led by the Crown of the Continent Managers Partnership about how integration of EA, planning, and policy-making is achieved. Based on 12 in-depth, semi-structured interviews with key stakeholders closely involved in the case, we share insights about opportunities to integrate the three domains that include leveraging decision windows, adaptive approach, and three dimensions of social capital i.e. bridging, bonding, and linking. Lessons learned are relevant internationally for those involved in multi-jurisdiction regional EA.*

**1. Introduction**

Understanding and evaluating the dynamics of relationships among institutional actors involved in or affected by regional EA processes is of great importance to the international EA community (Folkesson et al. 2013; Bragagnolo and Geneletti 2014), particularly given the increasing role of non-EA actors in realizing certain objectives of regional EA. Folkesson et al. (2013) demonstrate that such understanding can facilitate trans-sectorial relationships as actors become aware of other agencies or jurisdictions' internal planning procedures. However, other scholars note that regional EA is sometimes a contentious process for the planners and policy-makers involved (Nitz and Brown 2001; Folkesson et al. 2013). Certain studies indicate that while regional-scale EA is desirable because it has potential to contribute substantively to sustainable regional development (Cooper and Sheate 2004; Stoeglehner and Wegerer 2006), the process and its outcomes have often been hampered by the operational and spatial divides that characterize practice in different domains (Nitz and Brown 2001).

Our goal in this paper is to investigate how institutional actors foster healthy integration across disciplinary and physical boundary divides in support of regional EA using as case study, the Crown of the Continent Regional Cumulative Effects Study—a multi-sector, multi-stakeholder regional EA initiative traversing the provinces of Alberta and British Columbia in Canada, and the state of Montana in the United States (Figure 1). The region, which covers an area of 72,000 square-kilometers, is an ecologically distinct and diverse Rocky Mountain landscape that is fragmented along the three socio-political boundaries. Stakeholders have identified the need for a cumulative understanding of human perturbations and the development of some management strategies to slow down the process. This initiative—led since 2001 by the Crown Managers' Partnership (CMP)—is a joint management effort involving over 20 government agencies across the three socio-political jurisdictions.

**2. Study Methodology**

The data collection adopted was a qualitative method of inquiry: in-depth, semi-structured interviews with 12 senior environmental managers and researchers involved in the CMP. The interviewees were from 11 agencies/institutions and spread across the three socio-political jurisdictions. A total of 21 questions were asked: six on case background; four on process management; three on managing outcomes and outputs; three on measuring performance; three on critical success factors; and two on the overall impression of the regional EA initiative. All the interviews were audiotaped and transcribed verbatim to gain a rich understanding and context of important themes, and were analysed with the aid of Nvivo® software. A thematic coding approach was employed to facilitate a systematic identification of key themes that are germane to the subject of integration in regional EA. Relevant themes across socio-political jurisdictions are used to generate the initial broader findings denoted by action words or phrases and linked with particular comments that are central to the study. Further refinements and resorting were then carried out to determine the viability of the thematic coding.

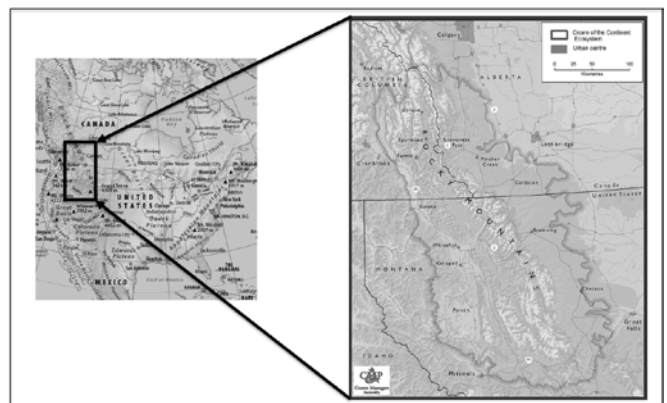


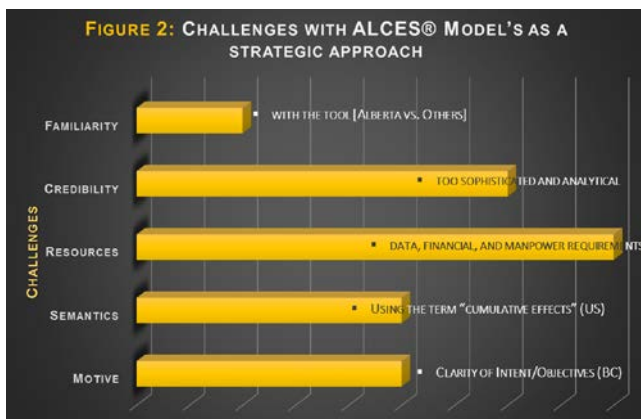
Figure 1: Crown of the Continent Map [Source: <http://www.crownroundtable.org/index.html>]

### 3. Regional EA—From A Strategic To A Reductionist Approach

#### 3.1 ALCES® Model—Strategic Beginnings

In 2001, stakeholders in the CMP adopted the ALCES® (A Landscape Cumulative Effects Simulator) model developed by Forem Technologies as a landscape management tool to support the understanding and management of cumulative effects in the Crown of the Continent. The ALCES® involved the tracking and simulation of all relevant land uses (forestry, energy, agriculture, transportation, residential etc.) using computer models. It was the first time that the model would be applied to such a large, jurisdictionally complex region and required the assembly and aggregation of large volume of data across different sectors, levels, and scales that make up the Crown of the Continent. Despite significant inputs in terms of time and resources, operationalizing the ALCES® however proved to be very challenging due to several issues.

Some immediate evidences of the difficulties with using ALCES® as a strategic approach to cumulative effects management in the region came from the interview responses (see Figure 2). In these, at least nine respondents reported that resource constraints—both human and financial—were responsible for the discontinuation of the project. But the issue of resources was also implicitly evident in responses provided by all participants and are particularly linked explicitly to the amount and extent of data required for ALCES® outputs to be meaningful and reliable. To illustrate this, there were instances in which it was asserted that the model was “inappropriate” and “notoriously difficult” because amassing data for regional EA across three different political jurisdictions, multiple landscapes, and activities, and simulating that into a single outlook is “almost impossible.” Relatedly, seven interviewees (mostly those with policy-making roles) raised the issue of credibility stemming from this “too much emphasis” on analytical aspect of regional EA. The argument is that regional EA goes beyond collecting a “fantastic amount of analytical information;” and that ALCES® does not provide for an integration of the management perspective that is required to advance regional ecosystem health.



In addition, the issue of familiarity were raised by at least two respondents. Regarding this, one respondent remarked that as of 2001 when the model was adopted “managers in Canada were comfortably familiar with it, whereas some managers in the US portion of the Crown were not.” Closely linked with this are issues of semantics and motive: these two factors were each explicitly reported by five interviewees though implicit in many other responses. On semantics, many interviewees observed that the use of the term “cumulative effects” was a strong “turn-off” for some agencies operating at the US end of the landscape, particularly the US Forest Services: “This is a very challenging area for them; they have been subjected to litigation issues (regarding cumulative effects assessment) and they have, in many instance, been found wanting in this area by the court.” Similarly, there were some misconceptions regarding the overall environmental objectives of the CMP. For example, on the British Columbia side, there was the “perception that the CMP wanted to increase the amount of protected areas in the province” because of the demand by some environmental societies for increase in allocation of lands for park purposes. The combined challenges of inadequate resources became exacerbated by other non-technical issues such as trust, familiarity, and semantics, which consequently led to the discontinuation of the model as a strategic approach to regional EA. Thus the need for a new approach became evident.

#### 3.2 Ecological Health Project: Reductionist Endings

The limitations of ALCES® model triggered the discussion of an alternative approach that can effectively support the CMP’s strategic goal of building a collective institutional capacity across agencies to effectively manage the cumulative effects of human development activities and land use practices on the entire landscape. Perhaps in a bid to overcome issues of familiarity and semantics, the idea of a Regional Landscape Analysis Project (RLAP) was initially proposed but was jettisoned for a more piecemeal approach in Ecological Health Project (EHP). The reason for this change is not evident in the interviews; however, there is a consensus among the interviewees that the EHP has the potential to overcome many of the challenges associated with the ALCES® model.

The EHP involves that the CMP delineates all regional landscape issues into a set of seven key indicators of ecosystem health based on concerns expressed by stakeholders in the CMP (see Figure 3). These are: landscapes, biodiversity, water quantity and quality, air quality, climate change, aquatic and terrestrial invasive species, and lastly, culture, which was recently added to address the concerns of the First Nations’ and Native American tribes regarding indigenous resource use in the region. The EHP is based on the assumption that when the whole indicators have been dealt with independently, and

issues analysed and understood in relation to the landscape features of the Crown of the Continent, an effective, outcome-based cumulative effects management arrangements can be easily operationalized. In other words, environmental outputs of a given indicator could thus be compared across jurisdictions and integrated for a strategic understanding of the entire landscape scenario.



Figure 3: Indicators identified for the Ecological Health Project

The objectives and parameters required for the EHP are the same as those required for the ALCES® model. However, the former is perceived to be less data-intensive as focus is placed on data that the stakeholders “felt was key in understanding overall health of the ecosystem.” The EHP commenced with the Aquatic Invasive Species (AIS) indicator; specialist committee for each of the indicators was also set up e.g. for landscape and climate change indicators. Depending on availability of funding and progress on ongoing studies, members negotiate which kind of indicator should receive the next attention.

For the AIS, Alberta was chosen for the pilot project due to availability of funds and capacity, while much of the science was provided by Montana. Monitoring protocols were jointly designed by the CMP stakeholders, the research community, and existing policy and planning institutions in Alberta. Key agreements were reached on the inspection stations, outreach pattern, educational programs, legislative policies, and planning controls to achieve the outcomes. The AIS project, piloted in southwest Alberta, is now adopted as a provincial-wide program, and an integral part of many regional plans including the South Saskatchewan Regional Planning initiative. This success is also being proposed for relatively larger regional landscapes such as the Great Northern Landscape Conservation Cooperative. With this reductionist approach, as indicated by interviewees across all the jurisdictions, time-wise, it is less costly; inter-jurisdictional dichotomies are less evident; capacities are well managed; and outputs more agreeable and implementable. Unlike ALCES®, the EHP has recorded more success and attracted high-level support across all jurisdictions.

#### 4. Lessons from the Case Study

At least three lessons can be derived from the evolution of the CMP’s approaches to regional EA. First, regional EA stakeholders can (and should) leverage pressing regional socio-political/environmental dynamics to advance integration of assessment into the regional planning and

policy processes. The concept of *decision windows*, which is based on connecting “solutions that are ready to be implemented to problems that become paramount due to change in the political constellation” (van Stigt et al. 2013, p.19) offers a potential tool for mainstreaming planning and policy institutions into the agenda for regional EA. In the EHP reductionist approach, an issue-based perspective was adopted to support cumulative effects management in the region and help collaborating agencies/institutions to focus on a mutually beneficial, systematic exploration of key indicators of regional health. The second key lesson is that regional EA process should emphasize an *adaptive approach* (i.e. reductionist vs. strategic) that embraces change and openness to learning. Through such experimental approach, both social and scientific uncertainties are addressed, and the objectives as well as the expected outcomes of the initiatives are better refined to suit stakeholders’ interests. Third, regional EA stakeholders need to invest in *social capital*: shared norms, values, understanding, and interactions that facilitate cooperation within and among actors and agencies. Social capital encompasses what Putnam (1995) and Szreter and Woolcock (2004) describe as *bonding* (connection within a group’s network); *bridging* (connections among dissimilar groups’ networks); and *linking* (interaction between individuals and formal institutions). As exemplified in the EHP, these dimensions help actors from a range of sectoral or institutional positions (both internal and external) transformed from being passive spectators to key actors in the CMP regional EA process.

#### 5. Conclusion

The evolution of the CMP over the past 15 years has provided its stakeholders to learn some skills and knowledge that are important in managing uncertain, complex environmental systems, and enhance internal capacity for cumulative effects management through experimentation with different ideas. As noted by Allan and Stankey (2008), actors in new environmental initiatives often have a limited understanding of the procedural and methodological challenges involved, and thus an experimentation with different approaches can increase awareness of best-of-fit strategies that can promote the understanding and management of the landscape. It should be noted that the case study is a transboundary initiative between the Canadian and United States’ stakeholders, which in itself adds some complexity to the nature and extent of integration challenges that may not be applicable elsewhere. Nevertheless, an important implication of the study is that regional EAs could benefit from paying attention to key non-technical issues. Rather than focusing on methodological sophistication of the regional assessment—which is very fundamental—, assessments can pay closer attention to factors such as decision windows, adaptive approach, and social capital, which in turn, can help facilitate explicit integration of assessment into larger policy and planning frameworks especially in a transboundary context.

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