PLANNING A SEA CHANGE: DESIGNING A ROBUST FRAMEWORK FOR STRATEGIC ENVIRONMENTAL ASSESSMENT IN NOVA SCOTIA

by

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ABSTRACT

Strategic environmental assessment (SEA) provides governments, and other organizations, a method to formally incorporate environmental dimensions into strategic planning and policy evaluation exercises. Nova Scotia is unlikely to achieve the legislated goal of developing sustainable prosperity without using a process like SEA. This thesis modifies common SEA guidance and theory to make the method more procedurally robust, consistent, and transparent. I argue that SEA requires a stable framework which adapts to evaluate a wide range of strategic actions using a standardized process. This thesis also suggests that more focus on developing rigorous evaluation criteria during scoping activities may avoid producing shallow and superficial assessments. This proposed SEA framework was designed for Nova Scotia, but may also appeal to decision-makers, process managers, and interested parties in other jurisdictions that want a consistent process for evaluating the environmental effects of strategic actions.

LIST OF ABBREVIATIONS USED

BIA	Biodiversity Impact Assessment
CEA	Cumulative Effects Assessment
CEAA	*Canadian Environmental Assessment Act*
CEAA	Canadian Environmental Assessment Agency
CDF	Critical Decision Factor
EA	Environmental Assessment
EARP	Environmental Assessment and Review Process
EGSPA	*Environmental Goals and Sustainable Prosperity Act*
EIA	Environmental Impact Assessment
EU	European Union
HIA	Health Impact Assessment
IA	Impact Assessment
IAIA	International Association for Impact Assessment
NEPA	*National Environmental Policy Act*
NPD	New Product Development
PEAT	Project, Exclusion, Authority, and Trigger
PPP	Policy, Plan, and/or Program
OECD	Organisation for Economic Co-Operation and Development
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
VEC	Valued Ecosystem Component

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CHAPTER 1 INTRODUCTION

In order to become a sustainable and prosperous society, Nova Scotia must begin to formally incorporate environmental dimensions into strategic planning, policy evaluation, and long-term goal-setting exercises. It has been well known that development projects which alter the physical landscape often have unintended environmental consequences (Bina, Wallington, & Thissen, 2011; Fischer & Onyango, 2012; Government of the United States of America, 2000; Noble, Gunn, & Martin, 2012; Partidario, 2012; Therivel, 2004). However, environmental effects do not only stem from projects carried out with pick and shovel, they also result from decisions that set the stage for later endeavours. In order to manage the human enterprise in a more environmentally responsible manner, decision-makers need tools and processes that allow them to easily integrate social, economic, and ecological understanding.

Unintended environmental consequences are not an issue which has only recently risen to prominence; rather, they have been a factor in the decline of many previous societies around the world (Diamond, 2005). Negative effects frequently occur as a result of well-meaning societal goals and deliberate policy decisions. The well-meaning goal of reducing poverty has created significant economic growth over the past few hundred years. However, this has also produced increasing harmful anthropogenic effects on the environment and is causing the human enterprise to extend past critical planetary boundaries (Costanza, Cumberland, Daly, Goodland, & Norgaard, 1997; Rees, 1992; Rockstrom et al., 2009). This is not an immaterial concern - environmental degradation hampers the flows of ecosystem goods and services upon which populations

and industries both rely, and undermines progression toward sustainable prosperity (Organisation for Economic Co-Operation and Development, 2006; World Bank, University of Gothenburg, Swedish University of Agricultural Sciences, & Netherlands Commission for Environmental Assessment, 2011). This should not be read as a critique of economic activity, but rather as an imperative call for societies to define their interpretation of prosperity using fulsome goal-setting processes. More attention must be paid to the end results of our goals, and given to back-casting appropriate trajectories that reach the outcomes preferred by interested parties (Duinker & Greig, 2007; Mulvihill, 2003; Partidario, 2012; Schwartz, 1991).

Recognition of the need to investigate the unintended effects of human activities has led to research and practice in the discipline of impact assessment (IA). The diversity of activities which have broader consequences and the various impact categories that are affected have together led to the development of several types of IA (Morrison-Saunders, Pope, Gunn, Bond, & Retief, 2014). In Canada, the type of environmental assessment (EA) that most people are familiar with is environmental impact assessment (EIA) (Gibson & Hanna, 2009; Gibson, 2012; Noble, 2006; Sadler, 2011). The Government of Canada defines the environment as "components of the Earth, and includes a) land, water, and air, including all layers of the atmosphere; b) all organic and inorganic matter and living organisms, and c) the interacting natural systems that include components referred to in …(a) and (b)" (Government of Canada, 2014, p. 10). This definition of the environment may be adequate for EIA; however, it does not fully encompass the scope pf strategic assessments which include social, economic, and ecological dimensions.

While EIA is conducted when development proposals are under consideration, strategic environmental assessment (SEA) is used when investigating strategic actions, policy decisions, and during regional planning processes. SEA theory supports the notion that strategic actions can produce effects on the environment as much as any development proposal. SEA relies on a broad conceptualization of the environment which includes more than just ecological components, and thus the rationale for conducting IA also needs to evolve. IA can do much more to contribute to a sustainable society than merely collecting ecological data before and after development projects.

My interest in tracing unintended effects back to root causes has led me to focus on SEA as a process that supports fulsome examinations of policy planning and goal-setting exercises. SEA has allowed interested parties to think strategically about their policy goals in many other jurisdictions (Arts, Tomlinson, & Voogd, 2011; Dalal-Clayton & Sadler, 2005; International Association for Impact Assessment, 2011; Organisation for Economic Co-Operation and Development, 2006; Partidario, 2012; Sheate, Byron, Dagg, & Cooper, 2005; Therivel, 2004; World Bank et al., 2011). Though the need to assess the environmental effects of tactical and strategic actions was highlighted in the foundational *National Environmental Policy Act (NEPA)* (Government of the United States of America, 2000), in practice EIA is much more widely adopted than SEA (Gibson & Hanna, 2009; Partidario & Wilson, 2011; Sadler, 2011; Sheate et al., 2005; Therivel, 2004). This has led to an overly tactical focus in EIA, broadly speaking, which fails to appropriately address other diverse environmental factors, e.g. social, economic, or health impacts (Fischer & Onyango, 2012; Noble et al., 2012; Partidario, 2012; Tetlow & Hanusch, 2012; Vanclay, 2014). This project focus on development options without

considering fundamental alternatives can result in highly contentious processes and outcomes (Geneletti, 2014; Illsley, Jackson, & Deasley, 2014; Mclauchlan & João, 2012; Reed, 2008; Sheate et al., 2005; Snell & Cowell, 2006; Therivel, 2004). Clearly, there is a need to balance tactical and strategic assessments to better assess the environmental effects which result from different planning tiers (Arts et al., 2011; Sheate et al., 2005).

1.1 ENVIRONMENTAL ASSESSMENT IN NOVA SCOTIA

The economy of Nova Scotia has relied historically on easy access to the Atlantic Ocean and the fast-growing forests along its shores (Davis & Browne, 1996; Raddall, 1965). The abundance of environmental goods and services has always brought people to coastal regions (Diamond, 2005), and it was no different in Nova Scotia. This familiarity, indeed reliance, upon a range of diverse and productive ecosystems has made environmental issues a frequent concern for the population. Various elected governments in Nova Scotia have demonstrated a firm commitment to environmental responsibility, and the Province has long required an EIA for most development projects (Government of Nova Scotia, 2013). Yet despite passing the *Environmental Goals and Sustainable Prosperity Act (EGSPA)* (Government of Nova Scotia, 2007), which mandates that the Province make sustainable and environmentally responsible decisions, there is no formal requirement to evaluate the environmental effects of government policy.

It is unlikely that Nova Scotia will achieve a prosperous degree of sustainability without a deliberate and systematic method for evaluating the environmental effects that result from government's strategic actions. Many other jurisdictions, including the Government of Canada, have adopted SEA to provide the broader context that decision-

makers require to make environmentally responsible policy choices (Dalal-Clayton & Sadler, 2005; European Parliament, 2001; Government of Canada, 2010; Sadler, 2011; World Bank et al., 2011). Adopting a formal method to investigate the environmental effects of government decisions appears to be a critical component of developing a more prosperous and sustainable society. Without SEA, Nova Scotia will be unable to meet its legislated goal of becoming a world leader in sustainable prosperity.

1.2 THESIS OUTLINE

This document synthesizes learning from various disciplines and proposes several changes to how SEA is conventionally practiced. The intended result is to make SEA more effective for smaller jurisdictions like Nova Scotia. Following this introduction, Chapter Two provides some initial context and general background on SEA and Nova Scotia. Chapter Three describes the methods and approaches used to develop the procedural guidance presented in the following chapters. Chapter Four highlights an improved evaluation process that better manages the transition points between assessment activities; this makes an SEA far more transparent. Chapter Five describes a different way to conceptualize the objectives and outcomes of scoping in SEA; this makes it more practicable to effectively focus the evaluation around high-priority decision criteria. Chapter Six provides some concluding comments and discusses opportunities for future research.

1.3 PLANNING A SEA CHANGE

There is clearly a need to better incorporate environmental dimensions at all levels of strategic planning. However, this thesis has not researched how to persuade the Government of Nova Scotia to adopt SEA in policy planning. Instead, this thesis presents a revised way of structuring and guiding the SEA process so that the evaluation appeals to smaller jurisdictions like Nova Scotia. These smaller jurisdictions have more limited geographical areas, but the main issue for our discussion is the degree to which these jurisdictions can allocate resources toward the assessment; smaller regions typically have fewer resources to assign to SEA activities.

Current guidance can often be ambiguous and confuse decision-makers who are not well-versed in SEA, or IA theory more generally (Cashmore & Morgan, 2014; Organisation for Economic Co-Operation and Development, 2006; Partidario, 2012; World Bank et al., 2011). Figure 1.1 shows a SEA process diagram that leaves readers with the idea that SEA is very complicated to design. There is no clear starting or end-points in Figure 1.1 and this can be very daunting to decision-makers with no background in EA. Understanding the transitions between each of the elements in Figure 1.1 is also quite complicated; the flowchart has only eight elements yet 32 arrowheads are used to represent the flow between activities. Determining the right pathway for each assessment thus appears to be a significant initial problem that needs to be addressed before the assessment process can begin, and this appears to be daunting for jurisdictions with less experience with SEA and fewer resources available. This thesis proposes a consistent framework which reduces the degree to which jurisdictions need to revise the process for each situation, and thus reduces costs.

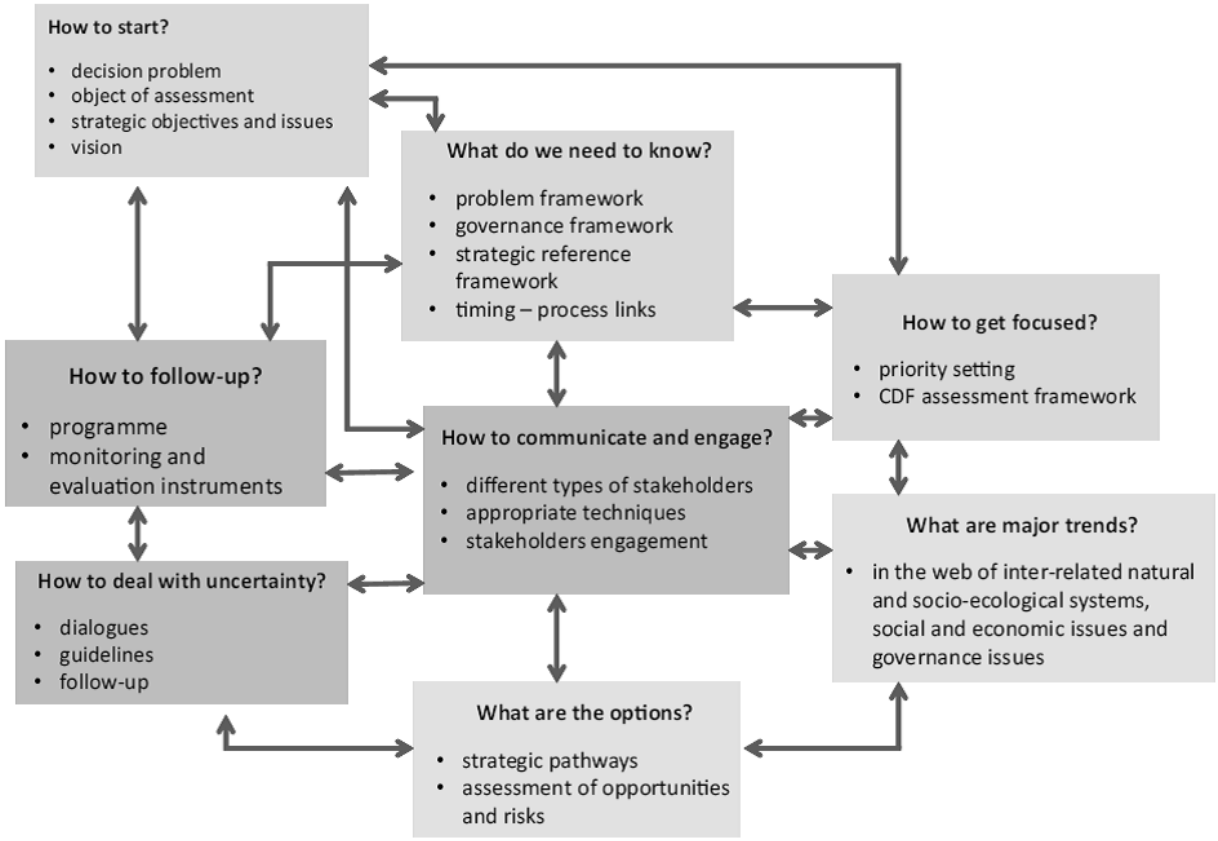

Figure 1.1 Framework diagram showing the strategic thinking model of SEA (Partidario, 2012).

Overly confusing guidance may leave some jurisdictions with the impression that SEA is more complicated and expensive than other forms of IA. The lack of clear outcomes also makes it difficult to assess the value of SEA (Bina, 2007). Thus many SEA's are conducted by, or in conjunction with, national governments and international development agencies which often contribute resources to the assessment (Bina et al., 2011; Dalal-Clayton & Sadler, 2005; Fischer & Onyango, 2012; Sadler, 2011; Sheate et al., 2005; Therivel, 2004). This situation can be observed in Nova Scotia, where most assessments are *ad hoc* and conducted in conjunction with the Government of Canada and/or other provinces within the Atlantic Region.

The goal of this thesis is to demonstrate that effective SEAs can be conducted without re-designing the basic assessment process for every new situation. SEA does not have to be complicated, and this thesis presents a simple, yet generic, SEA framework that is flexible enough to investigate a wide variety of strategic actions in jurisdictions with differing degrees of resources. This document is designed to be used by practitioners, governments, and other interested parties who are concerned with more effectively evaluating alternatives and considering the implications of strategic actions. Thus, the framework described in this document should be appealing to jurisdictions that want to reduce the amount of time, energy, and investment allocated to SEA while also improving the robustness of their assessments.

SEA needs to become a more user-friendly process that better engages the intended participants, i.e., decision-makers and various other interested parties. By developing a more nuanced understanding of various environmental effects over the course of the assessment, participants can incorporate new learning and develop their perspectives on how to best achieve long-term prosperity. Helping participants develop and mature their patterns of thought, how they frame the problem and possible solutions, is the ultimate objective of any process that tries to incorporate a multi-criteria approach to decision-making (Runhaar, 2009).

1.4 SUMMARY

SEA is evolving and shedding legacies from EIA theory, to become a more distinct form of IA. There are significant opportunities to revise common thinking about SEA procedures and objectives in order to create an evaluation process that is more

robust, transparent, and effective. This document presents a revised conceptualization of how SEA can become a more effective and robust process for evaluating strategic decisions. Demonstrating how SEA can efficiently support decision-making may encourage jurisdictions with limited resources to use the process more often. As SEA differentiates itself from EIA the value of assessing strategic actions will become more obvious and could lead to more frequent assessments. Ideally, this revised conceptualization of the SEA process will give decision-makers a consistent approach to better understand the unintended consequences of strategic decisions.

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CHAPTER 2 BACKGROUND

2.1 INTRODUCTION TO SEA

Strategic environmental assessment (SEA) is a form of impact assessment (IA), and has been developed to provide a structured process to incorporate environmental dimensions into policy and planning decisions (Bina, Wallington, & Thissen, 2011; Brown & Therivel, 2000; Fischer & Onyango, 2012; Fischer, 2007; Morris & Therivel, 2001; Noble, Gunn, & Martin, 2012; Organisation for Economic Co-Operation and Development, 2006; Partidario, 2012; Sadler, 2011; Shepherd & Ortolano, 1996; World Bank, University of Gothenburg, Swedish University of Agricultural Sciences, & Netherlands Commission for Environmental Assessment, 2011). There is no formal process requiring SEA in Nova Scotia, yet the province has legislated that sustainable prosperity is a key objective (Government of Nova Scotia, 2007, 2012). Achieving a significant degree of sustainability, let alone an agreed-upon definition, is unlikely without formal consideration of the environmental effects that result from strategic actions (Bond, Morrison-Saunders, & Pope, 2012; Croal, Gibson, Alton, & Brownlie, 2010; Fischer, 2007; Glasson, Therivel, & Chadwick, 2012; Noble, 2006; Paredis et al., 2006; Shepherd & Ortolano, 1996; Tetlow & Hanusch, 2012; United Nations Environment Program, 2009; White & Noble, 2013b). This section will provide background on SEA and its place within the suite of impact IA methods; the decision-making context in Nova Scotia will also be explored.

2.2 ORIGINS OF ENVIRONMENTAL ASSESSMENT

The assessment of environmental effects has evolved considerably since its North American introduction in the US *National Environmental Policy Act (NEPA)* of 1969 (Fischer, 2007; Gibson & Hanna, 2009; Glasson et al., 2012; Government of the United States of America, 2000; Morrison-Saunders, Pope, Gunn, Bond, & Retief, 2014; Noble, 2006; Partidario, 2012). The drafters of *NEPA* determined that there is a requirement to systematically assess the environmental implications of society's decisions and actions. Assessing impacts is not enough to change a society's course from unsustainable to sustainable; however, the process of environmental impact assessment (EIA) is an important part of developing long-term sustainability (Beanlands & Duinker, 1984; Glasson et al., 2012; Government of the United States of America, 2000; Morris & Therivel, 2001; Noble, 2006; Partidario, 2012). EIA and SEA both provide critical information that improves societies' ability to describe sustainable or unsustainable future trajectories(Partidario, 2012). Better understanding these competing trajectories may allow societies to choose between success and failure (Diamond, 2005).

It is interesting to note that *NEPA*, as a government regulation, was originally intended to apply to strategic plans and actions (Morrison-Saunders et al., 2014; Partidario, 2000). The act was originally intended to apply to the US federal government; the wording of the act is clear and unambiguous as it mandates that government agencies:

> (A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and decision-making which may have an impact on man's environment . . . and
> (B) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on-

> (i) The environmental impact of the proposed action.
> (ii) Any adverse environmental effects which cannot be avoided should the proposal be implemented.
> (iii) Alternatives to the proposed action.
> (iv) The relationship between local short-term uses of man's [sic] environment and the maintenance and enhancement of long-term productivity, and
> (v) Any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.
>
> (Government of the United States of America, 2000)

NEPA clearly requires, in section 102 (2), that environmental effects relating to government actions should be assessed at both project and policy levels (Government of the United States of America, 2000; Partidario, 2000). While the theories underlying both tiers of assessment have evolved (Arts, Tomlinson, & Voogd, 2011; Bina et al., 2011; Fischer & Onyango, 2012; Gibson & Hanna, 2009; Noble et al., 2012; Partidario, 2012; Tetlow & Hanusch, 2012), EIA at the project level has become more widespread in general practice than SEA of policies (Glasson et al., 2012; Partidario, 2012; Sadler, 2011; Sheate, Byron, Dagg, & Cooper, 2005). Better integration of results and assessment activities across multiple tiers continues to be an issue of debate within the IA community, particularly with regard to determining the appropriate scope of assessment (Canter & Ross, 2014; Cashmore & Morgan, 2014; Greig & Duinker, 2014; Kim & Wolf, 2014; Morrison-Saunders et al., 2014; Sánchez, 2014; Vanclay, 2014).

A consensus has developed in the IA literature that some type of formalized process is required to incorporate broader ecological perspectives in formal decision-making and that SEA methods were developed to achieve the objective (Bina et al., 2011; Fischer & Onyango, 2012; Fischer, 2007; Morris & Therivel, 2001; Noble et al., 2012;

Noble, 2006; Partidario, 2012; Sheate et al., 2005; Tetlow & Hanusch, 2012; Therivel, 2004). Despite advancements in technique, there is no firm agreement on what an ideal SEA process is for all jurisdictions (Bina et al., 2011; Dalal-Clayton & Sadler, 2005; Fischer & Onyango, 2012; International Association for Impact Assessment, 2002; Noble et al., 2012; Partidario, 2012; Sadler & Dalal-Clayton, 2010). The various jurisdictions that have adopted SEA tend to practice it differently, and this diversity highlights the large inventory of tools, methods, and approaches that have been developed to assess strategic actions (Brown & Therivel, 2000; Croal et al., 2010; Fischer & Onyango, 2012; Morrison-Saunders et al., 2014; Noble et al., 2012; Partidario, 2012; Sadler, 2004, 2011; Tetlow & Hanusch, 2012).

Effective evaluation of strategic actions, whether they are policies, plans or programs (PPPs), is similar in concept to other forms of IA, and can borrow heavily from learning in those disciplines. Yet the evaluation of PPPs is sufficiently distinct from project-level IA to require the development of an assessment process that is principally designed to evaluate the environmental effects of strategic actions (Bina et al., 2011; Brown & Therivel, 2000; Fischer, 2007; Glasson et al., 2012; International Association for Impact Assessment, 2002; Noble, 2006; Partidario, 2000, 2012; Tetlow & Hanusch, 2012). Many SEA practitioners have worked to transfer methods of analysis from EIA into their work (Bina et al., 2011; Fischer & Onyango, 2012; Fischer, 2007; Glasson et al., 2012; Noble et al., 2012; Noble, 2006; Therivel, 2004). Learning from other fields of IA, such as social impact assessment (SIA) and cumulative effects assessment (CEA), has also been integrated, to varying degrees of success, by researchers and practitioners of SEA (Bina et al., 2011; Cavalcanti & La Rovere, 2011; Duinker & Greig, 2007; Fischer

& Onyango, 2012; João, Vanclay, & den Broeder, 2011; Morrison-Saunders et al., 2014; Partidario, 2012; Vanclay, 2014). This knowledge transfer has not been entirely without difficulty, as there are fundamental differences in perspectives among practitioners focused on the minutiae of project details versus those who study the broader implications of policy decisions.

This thesis discusses SEA as if it were a single type of EA, but the reality is that there is a host of types of IA which fit within the spectrum of SEA. I define SEA holistically as any assessment of a strategic action or decision that does not directly relate to a development project. Thus, any topic under consideration as a strategic action must first fail the Canadian federal government test for EIA by not classifying as a project (Government of Canada, 2014). This leaves a wide spectrum of actions, and different types of assessment have been designed to evaluate niches within this spectrum; e.g. government programs assessed using programmatic EA. Regional EA could also be considered a type of SEA provided that the rationale for conducting the assessment was a strategic action. The critical element is whether the assessment is designed to evaluate a physical development project or a strategic decision.

Though there are a distinct differences in the various assessment types within the SEA spectrum, there are also many fundamental similarities in the process of assessment. The framework proposed in this thesis is designed to help structure and integrate all of the types of assessment within the SEA spectrum. The stage-gate process discussed in Chapter 4 and the revised scoping mandate proposed in Chapter 5 are equally relevant to most, if not all, IA processes which investigate the broad environmental effects which result from strategic decisions. Broadly construing the term environment allows for

strategic assessments to integrate socioeconomic effects and create more fulsome results. A wide mandate for SEA leads to a more holistic, integrated, and ultimately strategic form of evaluation. Perhaps this could allow more time and energy to be spent on improving a single integrated tool, like SEA, than in developing numerous fragmented types of IA (Morrison-Saunders, Pope, Gunn, Bond, & Retief, 2014).

2.3 SEA IN CANADA

In Canada, EIA has been used since early in the 1970s when a cabinet directive created the Environmental Assessment and Review Process (EARP) (Noble, 2006; Sadler, 2011). EARP as well as successive directives and legislation clarified the triggers for EIA, e.g. developing public land or using public funds. In addition to describing the situations that require EIA, EARP also assigned the role of the authority responsible within the federal government for conducting the EIA (Noble, 2006). SEA was not formally provided for until 1990 as part of reviewing and codifying EARP in the *Canadian Environmental Assessment Act (CEAA)*. This recognition of SEA did not clearly describe a triggering mechanism, so SEA was still being conducted on an *ad hoc* basis through 2008 (Sadler, 2011).

EIA emerged as the primary method of formally incorporating environmental dimensions to aid in decision-making around development projects. Early EIAs were reactive and seemed focused on controlling pollution (Gibson & Hanna, 2009; Noble, 2006). After some use, there came a realization that EIA needed to better focus on issues of ecological importance rather than on creating a broad, yet somewhat superficial, level of environmental data (Beanlands & Duinker, 1984; Glasson et al., 2012; Noble, 2006;

Partidario, 2012). EIA practices have evolved and now incorporate a wider range of biophysical and ecological impacts in the analytical process; however, EIA continues to struggle with limiting the scope of assessments while still integrating diverse perspectives (Canter & Ross, 2014; Greig & Duinker, 2014; Morrison-Saunders et al., 2014; Mulvihill, 2003; Noble, 2006; Sánchez, 2014).

Over time, EIA in Canada has evolved to the point where many development projects automatically trigger an assessment (Gibson & Hanna, 2009; Government of Canada, 2012; Sadler, 2011), though recent legislation seems to be moving in the opposite direction (Gibson, 2012). Numerous authors (Bina et al., 2011; Brown & Therivel, 2000; Fischer, 2007; Gibson & Hanna, 2009; Partidario, 2012; Therivel, 2004)(Brown & Therivel, 2000; Partidario, 2000; Therivel, 2004; Gibson & Hanna, 2009; Bina, Wallington & Thissen, 2011) have observed that further developments in environmental assessment will move beyond a project focus and begin to transparently evaluate the environmental impacts associated with strategic actions and policy decisions. This is occurring in Canadian practice.

Use of SEA methods has been increasing and a SEA has recently become required for all policies that may have significant environmental effects before the proposal can be submitted for cabinet approval (Government of Canada, 2010; Sadler, 2011). Though this commitment to SEA is promising, recent changes to the *CEAA* have led some to observe that the overall practice of EA in Canada has been set back (Gibson, 2012). Regardless of recent changes to legislation, developing and demonstrating a clear value proposition for SEA will support public interest in the process and results (Bina, 2007; Partidario, 2000). Increasing public support will ultimately influence the

willingness of government actors to participate in SEA and the capacity to conduct rigorous assessments (Clarkson & Wood, 2010; E. Lee & Perl, 2003; Partidario & Wilson, 2011; Sheate et al., 2005; Slunge & Loayza, 2012).

It is likely that with Canada, and many other nations, deciding it is necessary to conduct some form of SEA, there will also be an interest to apply this type of analysis to higher-order decision-making by other levels of government as well as non-governmental groups. This trend can be observed in the work of many development agencies (Bina et al., 2011; Croal et al., 2010; Dalal-Clayton & Sadler, 2005; United Nations Environment Program, 2009; World Bank et al., 2011). Increasing demand for SEAs from all sectors of society will likely spark an interest in developing stronger processes and methods for strategically assessing the environmental impacts of the human enterprise.

The Canadian SEA triggering formula is much simpler than the formal PEAT (project, exclusion, authority, and trigger) process for federal EIA as there are only two rules that apply when deciding whether an SEA is required (Government of Canada, 2010; Noble, 2006; Sadler, 2011). The Government of Canada guidelines state that a SEA is expected when a) any PPP submitted to cabinet for approval b) may result in "important environmental effects, either positive or negative"(Government of Canada, 2010, p. 5). Canada's federal SEA formula overcomes the inherent reactivity of a rules-based formula by imposing a high degree of inclusivity. As such, the Canadian Environmental Assessment Agency (CEAA) guidelines' two-step formula, when viewed with the precautionary approach in mind (Clarkson & Wood, 2010; Dickson & Cooney, 2005; McClenaghan & Benevides, 2002; Snell & Cowell, 2006), represents a comprehensive and proactive approach that demands a SEA for every policy submitted to

the Cabinet unless all of the possible environmental effects of the PPP are shown to be unimportant. The guidelines do not explicitly state support for the precautionary principle (Government of Canada, 2010), yet they do profess an affinity for the concept. The Government of Canada has previously discussed incorporating the precautionary principle but has yet to demonstrate a significant degree of political will in implementing a precautionary approach (E. Lee & Perl, 2003; McClenaghan & Benevides, 2002; Sadler, 2011).

While there are considerable merits to taking a comprehensive approach like the Canadian government guidelines require, there are also challenges posed by assessing such a large number of PPPs. The primary concern that I have identified for smaller jurisdictions with limited resources, e.g. Nova Scotia, is that conducting a large number of SEAs will inherently generate large administrative costs both for government but also other parties who could be affected by the outcomes. There is a need to prioritize amongst the suite of strategic actions under consideration to generate the most insight with the resources available. Without prioritizing and focusing efforts, the SEAs conducted are more likely to be less rigorous and robust, which can lead to shallow and superficial assessments. In the same way that an appropriately focused scoping stage avoids creating "a vague environmental broadband" (Partidario, 2012, p. 30), appropriately prioritizing assessment topics will lead to more substantial results.

Canada addresses the potential volume of assessments by first having the PPPs undergo a preliminary scan or screening to "identify the potential for important environmental effects" (Government of Canada, 2010, p. 7). However, this step in the process suggests that SEA topics need to be evaluated for effect potential prior to the

actual assessment. This is somewhat worrying as PPPs with serious, yet less evident effects, may avoid assessment. Secondly, CEAA guidelines limit the cost of the evaluations by recommending that the assessments need not "necessarily require specialist information and skills, or a substantial commitment of resources or time" (Government of Canada, 2010, p. 6). The guidelines continue that restrictive screening and limited application of resources makes SEA practical. The end result of the Canadian SEA triggering mechanism is that while a large number of PPPs are assessed to determine their environmental effects potential, any assessments generated are potentially shallow and lack substantive scientific rigour. Unfortunately, this can reduce the benefit of the assessments and lead to increased perceptions that the process is not adding value (Bina, 2007; Gibson, 2012; Partidario, 2012; Sadler, 2011).

Recent changes to Canada's environmental assessment legislation has also caused concerns that by trying to avoid environmental bureaucracy, or green tape, in project-level EIA process, the federal government has reduced the robustness of assessment activities (Gibson, 2012). Though the changes are focused on EIA legislation, the effects will be felt across all tiers of IA in Canada. One positive change may be in appointing CEAA as a responsible authority (Greig & Duinker, 2014); however, this is one small benefit among a host of negative alterations. Though these legislative changes may cause an increased interest appropriately tiering assessments (Arts et al., 2011; Sheate et al., 2005), it is more likely an indication of a lack of political will to conduct IA processes generally and this will likely reduce SEA capacity-building in Canada (Clarkson & Wood, 2010; Holling, 1995; E. Lee & Perl, 2003; Partidario & Wilson, 2011; Partidario, 2012; Slunge & Loayza, 2012).

Though technically strong due to a wealth of techniques shared among various EA and IA processes (Dalal-Clayton & Sadler, 2005; Glasson et al., 2012; Morrison-Saunders et al., 2014; Noble et al., 2012; Noble, 2006; Sadler & Dalal-Clayton, 2010; Sadler, 2004; Sheate et al., 2005; Tetlow & Hanusch, 2012), SEA is fundamentally weakened in Canada by the lack of administrative and political support for the exercise (Clarkson & Wood, 2010; Gibson, 2012; E. Lee & Perl, 2003; Sadler, 2011; Slunge & Loayza, 2012). Not only must the capacity for SEA be increased (Partidario & Wilson, 2011) but so must the political will to seek environmental input in strategic decision-making. Strengthening the structures of government that initiate and support rigorous SEA processes supports the effort to become more sustainable and prosperous.

The Canadian SEA guidelines (Government of Canada, 2010) provide a comprehensive administrative foundation and suggest that SEA will no longer be an *ad hoc* process federally. This will assist current SEA processes to evolve beyond the character of EIA's first stage, in so far as they are often closed-door assessments with no public input or review. The Government of Canada has a duty to consult with Aboriginal people (Newman, 2009); this will increase the transparency of SEA processes more rapidly than EIA which for many years ignored traditional ecological knowledge and perspectives (Bartlett, Marshall, & Marshall, 2012; Mulvihill & Baker, 2001; Mulvihill & Jacobs, 1998; Mulvihill, 2003; Newman, 2009). Regardless whether the development of SEA mirrors that of EIA, generally following the first stages described by Gibson and Hanna (2009), it is likely that SEA will become a more public and rigorous process (Bina et al., 2011; Croal et al., 2010; Fischer & Onyango, 2012; Noble et al., 2012; Sadler & Dalal-Clayton, 2010; Tetlow & Hanusch, 2012; White & Noble, 2013a).

Governments in Canada, at all levels, have much to learn from other jurisdictions where SEA is more common and have the advantage of not being the first to use strategic assessment. There are notable cases from nations such as the Netherlands (Verheem & Tonk, 2000) and Portugal (Partidario, 2012), supranational organizations such as the UN (United Nations University, 2011), and even small villages (Canadian International Development Agency, 2011) where SEAs have been used to assist people to become aware of and mitigate the environmental impacts of their activities. The international use of SEA has created a wealth of guidance and support (Croal et al., 2010; Dalal-Clayton & Sadler, 2005; Fischer & Onyango, 2012; Noble et al., 2012; Partidario, 2012; Sadler & Dalal-Clayton, 2010; White & Noble, 2013a); even though most of these jurisdictions have different goals and procedures that govern their SEA processes and their early SEAs have met with varying degrees of success (Dalal-Clayton & Sadler, 2005; Sadler, 2004; Sheate et al., 2005; Verheem & Tonk, 2000). This mosaic of different processes and results provides researchers with a rich data set that can offer insight on how best to design and introduce a strategic assessment framework in a jurisdiction that has not used one before.

2.4 SEA INTERNATIONALLY

SEA has consistently lagged behind EIA in most countries which utilize IA methods, though there has been significant interest in increasing the use of SEA over the past 15 years. Notably, the European Union (EU) has mandated that SEA become a part of decision-making processes (European Parliament, 2001). This has led to a better understanding of how to structure EIA and SEA in relation to each other so that both add

value to decision-making processes (Arts et al., 2011; Sadler, 2004; Sheate et al., 2005; Therivel, 2004). The EU has the advantage of being a supranational organization, and this helps to maintain momentum when there is a lack of political will to implement SEA processes within particular member nations (Sheate et al., 2005). Due to the requirement to conduct SEA in Europe, there is an active research community focused on improving SEA practice there. Many SEA practitioners have experience in working in multiple jurisdictions and have created a vibrant research community; at the International Association for Impact Assessment (IAIA) annual convention in 2013 there were delegates from over 110 nations in attendance (IAIA, 2013).

In addition to being used by governments of all types and sizes, there are other organizations which stress the use of IA methods, including SEA. Many of these organizations are involved in international aid and development, e.g. the World Bank, OECD, or the (former) Canadian International Development Agency. Though SEA has not matured as quickly in Canada as in other locations, Canadian government agencies and academics have been active in developing SEA methods for other jurisdictions (Canadian International Development Agency, 2011; Croal et al., 2010; Sadler & Dalal-Clayton, 2010). The World Bank, of which Canada is a member, has also worked to stress SEA methods as a way of supporting borrowing nations to better govern their development activities (World Bank et al., 2011). Efforts to use SEA in other countries are creating a wealth of information and experience for Canadian SEA theorists to leverage when guiding domestic assessment activities. Many Canadian SEA practitioners are actively involved in conducting SEA and EIA processes in other countries, and are able to bring those experiences home (Sadler, 2011). Despite not

conducting many SEAs at home, Canadian practitioners are able to draw on numerous cases from other jurisdictions when developing domestic strategies.

2.5 SEA IN NOVA SCOTIA

Nova Scotia is an excellent jurisdiction to choose as a test. The province has a politically administrative mode of operation and governs in the Canadian federation with a politically administrative style (Bernier, Brownsey, & Howlett, 2005; Johnson, 2005). This administrative style of governance commonly requires some form of public policy review and often investigates special topics through independent boards, tribunals, and commissions; which suggests that SEA could be integrated with the province's standard decision processes. At the time of confederation, and for most of the province's history, the primary decision-making power rested with the Executive, i.e. the Premier and Cabinet colleagues. Over the past 40 years there has been a power shift away from the executive level and into other institutions of government, e.g. government departments, boards and tribunals; however, significant decision-making authority is still retained by the Premier (Johnson, 2005; Miljan & Brooks, 2003). Despite being a small province, by Canadian standards, Nova Scotia has 18 government departments and 97 agencies which make strategic decisions and oversee a variety of PPPs (Government of Nova Scotia, 2013). Though the total number of policies created by these 115 organizations is not published, I estimate that there are thousands of existing PPPs which have some level of environmental effect. With numerous opportunities for policy review and creation, "…the possibility of a structured, sustainability framework within which decisions could be made is quite appealing" (Davey, 1997, p. 32).

Nova Scotia has fostered IA research for decades (Beanlands & Duinker, 1983) and previous work conducted at Dalhousie University in Halifax has indicated that the province would benefit from using in-depth SEA processes (Davey, 1997). More recently, the Nova Scotia *Environmental Goals and Sustainable Prosperity Act* (EGSPA) (Government of Nova Scotia, 2007) has established many strategic environmental and economic goals and policies that could benefit from SEA. As a small province, Nova Scotia also has limited resources for any kind of assessment processes and this highlights the need for cost-effectiveness in any spending. Rather than assess all of Nova Scotia's strategic actions, possibly incurring substantial costs for limited insight, the nature of the *EGSPA* goals make them an ideal place to start identifying SEA priorities.

Nova Scotia has a unique opportunity to develop SEA methods within a provincial jurisdiction. This stems from the adoption of *EGSPA* which mandates that Nova Scotia strive to become a world leader in sustainable prosperity. The act was recently updated and renamed the *Green Economy Act* (Government of Nova Scotia, 2012). To my knowledge, there are currently no general guidelines or requirements for SEA in Nova Scotia, yet the mandates in *EGSPA* and the *Green Economy Act* imply that all government agencies need to formally consider the environmental effects associated with their strategic decisions. Providing methods to formally consider environmental effects in strategic decision-making is the primary role of SEA. Thus, in Nova Scotia, legislation has already created an indirect demand for robust SEAs which can assist the province in becoming a world leader in sustainable prosperity.

The Government of Canada now expects a SEA before any PPP can be submitted to a Minister, Cabinet, or the PCO (Government of Canada, 2010). Despite concerns

relating to transparency and sufficiently rigorous assessments at the federal level, this is a positive step toward developing SEA in Canada. These federal requirements will likely prompt public awareness of SEA, more interest in results from the assessments, and increased demand for similar processes at the provincial level of governance.

My research suggests that SEA in Nova Scotia will likely evolve in a similar fashion to the first few stages of EIA's development, as described by Gibson & Hanna (2009). For such an evolution to occur, not only must there be a demand for the results of the analysis but also new and improved tools and methods for assessing various impacts (Bina et al., 2011; Fischer & Onyango, 2012; Noble et al., 2012; Tetlow & Hanusch, 2012; White & Noble, 2013a). Such an evolution in SEA would also strengthen EIA and improve the effectiveness and efficiency of project-based assessments (Arts et al., 2011; Partidario, 2012; Sheate et al., 2005; Therivel, 2004).

For SEA to become widely adopted by Canadian provinces like Nova Scotia, the concept has to move beyond a vague definition and develop substance in the Canadian context (Hilding-Rydevik & Bjarnadóttir, 2007). I submit that there is a general desire to formally incorporate the environment and sustainability, broadly speaking, in provincial jurisdictions, and SEA processes can assist. Federally, guidelines are available from CEAA that have defined the process; however, there is no clear supporting information as to why that specific process was chosen or how its effectiveness may be gauged (Government of Canada, 2010; Sadler, 2011).

Some SEAs have been conducted in Nova Scotia. Two recent examples were an analysis of offshore oil and gas exploration on the Misaine Bank (CEF Consultants Ltd, 2005) and of establishing tidal energy programs in the Bay of Fundy (Jacques Whitford

Ltd, 2008). Though the Fundy Tidal SEA was favorably reviewed (White & Noble, 2013b), it did not consider alternatives and fell very close to EIA on the strategic spectrum. Nova Scotia needs to develop guidance to better introduce strategic thinking models (Partidario, 2012) into SEA practice in order to produce more effective strategic assessments.

Nova Scotia appears to be ready to move from conducting SEAs on an ad hoc basis and begin requiring assessments on a wide range of strategic actions. The Province has already participated in several SEAs to date, with a significant portion related to offshore oil and gas production conducted by the Canada Nova Scotia Offshore Petroleum Board (Canada-Nova Scotia Offshore Petroleum Board, 2014), as well as renewable energy production (Jacques Whitford Ltd, 2008). These assessments have been studied and discussed in the academic literature (Doelle, Bankes, & Porta, 2013; White & Noble, 2013). Additionally, the mandate in EGSPA for Nova Scotia to be a world leader in sustainable prosperity suggests that some formal process of evaluating progress is already required in Nova Scotia. SEA appears to be an ideal type of impact assessment, already in limited use, which could confirm that Nova Scotia is indeed charting a course toward sustainability.

The thesis is not intended to fully articulate the strengths and weaknesses of SEA practice in Nova Scotia. No new case analyses or comparisons between Nova Scotia SEAs were conducted during the research. Instead, the thesis focused on dealing with the fundamental threats and weaknesses identified as being pervasive within SEA (Fischer & Onyango, 2012; Noble, Gunn, & Martin, 2012; Tetlow & Hanusch, 2012). Some helpful reviews of SEAs from Nova Scotia have been published in the academic literature

(Doelle et al., 2013; White & Noble, 2013). These reviews and other case studies inform and underpin elements of the thesis, but so does research from a range of other jurisdictions.

2.6 WHY SEA?

While there is contention about the value and efficacy of SEA (Bina, 2007; Partidario, 2000; Verheem & Tonk, 2000); there is a general consensus that the tool can support decision-making by providing additional context about the environmental effects of strategic actions (Croal et al., 2010; Glasson et al., 2012; Noble et al., 2012; Organisation for Economic Co-Operation and Development, 2006; Partidario, 2012; Slunge & Loayza, 2012; Tetlow & Hanusch, 2012; Therivel, 2004; World Bank et al., 2011). For any jurisdiction to enact policies which describe sustainable and prosperous directions for that society to progress, the decisions must reflect that society's desires while keeping them grounded with real-world data and context (Duinker, Burbidge, Boardley, & Greig, 2013; Fischer & Onyango, 2012; Hilding-Rydevik & Bjarnadóttir, 2007; Hodgett, 2007; Holling, 1995; K. Lee, 1993; McDowall, 2008; Noble et al., 2012; Partidario, 2000; Runhaar, 2009). SEA makes real-world understanding more accessible to policy-makers, which can enable more successful policy outcomes (Wildavsky, 2007). Tools like SEA can assist decision-makers avoid unintended losses, which is more economically efficient than trying to mitigate losses with later gains elsewhere (Kahneman, 2011; Stern, 2007; Tversky & Kahneman, 1981). In an era of limited resources, SEA will become increasingly valued for the ability to provide critical insight

and align various decisions along prosperous trajectories of sustainability (Partidario, 2012).

SEA, and other broad forms of para-SEA (Dalal-Clayton & Sadler, 2005) such as sustainability assessment, integrated environmental assessment or regional environmental assessment (Morrison-Saunders et al., 2014), should not be considered stand-alone processes as they work more effectively when integrated with each other or with policy planning and evaluation processes outside the IA community (Arts et al., 2011; Partidario, 2012; Slunge & Loayza, 2012; Therivel, 2004; Vanclay, 2014). Integrating SEA in the planning process ensures that environmental effects become enshrined as a consideration in strategic decision-making. Unlike EIA, which is generally a regulatory exercise the outcomes of which are approvals or rejections of project proposals, SEA is designed to advise and educate. Increasing information and context should always be a boon to good decision-making, enabling a productive harmony where strategic actions can seek to "enhance quality of life while maintaining the integrity of natural systems" (Kim & Wolf, 2014, p. 1). SEA's ability to predict the environmental effects of policy choices make it a useful addition to futuring, back-casting, or scenario modeling exercises (Duinker & Greig, 2007; Mulvihill, 2003; Partidario, 2012; Schwartz, 1991). Whether conducted as an integrated or stand-alone exercise, SEA assists to frame discussions and debates around contentious aspects of policy development; this can assist participants reflect on their personal and institutional biases (Runhaar, Runhaar, & Oegema, 2010; Runhaar, 2009).

One of the key benefits of SEA is that strategic processes are better designed to evaluate options and alternatives than more tactical assessments conducted at the project

level (Arts et al., 2011; Geneletti, 2014; Gibson & Hanna, 2009; Glasson et al., 2012; Noble, 2006; Partidario, 2012; Sheate et al., 2005; Therivel, 2004). Failing to adequately assess project alternatives is a general shortcoming of EIA practice (Glasson et al., 2012; Noble, 2006; Sadler, 2004). Having effective tiers of assessment allows for appropriate assessments to investigate different types of strategic actions and their resulting effects (Arts et al., 2011; Sheate et al., 2005; Therivel, 2004). Ideally, SEAs are conducted when developments are being considered and initially planned; this increases the chance to avoid environmental effects by choosing amongst a richer suite of development options. Without the context provided by strategic assessment, EIA processes are more suited to mitigating rather than avoiding significant environmental effects. Economic analysis and common sense agree that avoidance of environmental impacts is far less expensive than mitigation (Stern, 2007).

Integrating a fulsome suite of assessment tools will allow decision-makers to apply the appropriate assessment method for each situation. Ensuring that practice is robust in all assessment tiers will allow for an overall increase of information about environmental effects while reducing redundant assessment exercises. As SEA operates at the highest tiers of IA, it is critical to ensure that context and perspective are provided for the downstream levels of evaluation. SEA also supports assessment methods, such as CEA, which operate at top tiers of the assessment hierarchy and which have also been adopted at a much slower pace than EIA (Duinker & Greig, 2006). The ability to vary the evaluation process and methods increases the robustness of SEAs by preventing the process from becoming stale or rigid, and allowing for more opportunity to appropriately assess PPPs of different nature or origin. As proposals are advanced through these levels,

the earlier assessments are evaluated and results are built upon to create greater understanding of related environmental effects.

2.7 WEAKNESSES IN SEA

Though SEA is a process that adds value to decision-making, it is not without its limitations and opportunities for improvement (Bina, 2007; Noble et al., 2012; Partidario, 2000; Tetlow & Hanusch, 2012)(Bina, 2007). As with any relatively new process, there is a need for SEA to mature and evolve, and there is considerable room for improvement (Bina et al., 2011; Fischer & Onyango, 2012; Greig & Duinker, 2014; Morrison-Saunders et al., 2014; Noble et al., 2012; Tetlow & Hanusch, 2012; Vammen, Kørnøv, & Wejs, 2012). There will undoubtedly be less-than-ideal methods and processes used in early evaluations; however, errors or omissions may serve to strengthen SEA over the longer term by indicating what needs to improve. SEA also has challenges in properly integrating with the suite of IA methods, with terminology and language, and with developing political will to conduct SEAs.

The issue of integration has recently been a topic of debate within the IA community (Canter & Ross, 2014; Geneletti, 2014; Greig & Duinker, 2014; Kim & Wolf, 2014; Morrison-Saunders et al., 2014; Sánchez, 2014; Vanclay, 2014). It is clear that the IA community has developed an extensive suite of assessment methods (Morrison-Saunders et al., 2014); however, it is not obvious how jurisdictions or practitioners should choose amongst this suite to design appropriate assessment processes. As SEA investigates not only the direct environmental and socioeconomic effects, but also the indirect and cumulative effects, the assessment needs to be able to integrate results from

many other types of IA to create a fulsome analysis. One potential future for SEA in the integration debate is to make it a conceptual meeting place where results from other forms of IA come together and merge to create deeper understanding of complex issues. If this is the case, then SEA will require more rigorous methodological guidance to appropriately integrate learning from other types of IA.

Creating an integrated language is also a challenge for SEA as it establishes itself within the wider IA community (Cashmore & Morgan, 2014). As SEA has grown out of other forms of IA, e.g. EIA, there is a tendency to use similar terms but to attach slightly different meanings (Duinker & Beanlands, 1986; Glasson et al., 2012; Noble, 2006; Snell & Cowell, 2006). Governments are also guilty of creating regionally-specific language, such that concepts like screening are defined differently by various jurisdictions. Developing a common language of SEA will take time and effort, but will lead to more consistent, replicable, and integrated processes (Cashmore & Morgan, 2014).

Perhaps the largest weakness of SEA is that it depends on sufficient political will to conduct a public self-assessment (Clarkson & Wood, 2010; Gibson, 2012; Hilding-Rydevik & Bjarnadóttir, 2007; E. Lee & Perl, 2003; Partidario, 2012; Sheate et al., 2005; Slunge & Loayza, 2012; Ventre, Maturo, Hošková-mayerová, & Kacprzyk, 2013). Governments have shown that they are more willing to create processes that industry has to use to evaluate development proposals, e.g. EIA, than to evaluate their own policy-making and evaluation processes. Processes that involve multiple jurisdictions have been shown to be more rigorous, though with their own unique challenges in execution, and could possibly explain why SEA has advanced so far in Europe over recent years (Bina et

al., 2011; Bonvoisin, 2011; Partidario & Wilson, 2011; Sheate et al., 2005; Tetlow & Hanusch, 2012).

2.8 CONCEPTUALIZING ROBUSTNESS IN SEA

The notion of robustness is not fully synonymous with rigour in the scientific sense, as I chose to define the concepts within this thesis. Rather than a measurement of the intellectual or scientific methods and underpinnings, I construe robustness to describe something's physical structure. My research suggests that for a SEA framework to be robust, it requires a habitat to exist within, a strong skeleton that supports the process, and a high degree of vitality. To translate the terminology of robustness from physical to conceptual, I propose that a robust SEA framework has a firm structure which is supported and enabled by legislation and kept vital by stakeholder engagement. Finally, for any system to be truly robust over the long term, it must be able to adapt and evolve over time in order to stay healthy and vital as new strategies or concepts emerge from the surrounding environment (Mintzberg, 1994).

The principal goal of this research into a robust framework for SEA is intended to increase the effectiveness of the overall SEA process. Effectiveness describes the degree to which the SEA incisively describes environmental effects, investigates alternatives, engages participants, and influences decision-making processes. Increased public engagement and involvement of decision-makers could be seen as being less efficient than the Government of Canada's directive that SEA be a practical assessment that doesn't "necessarily require specialist information and skills, or a substantial commitment of resources and time" (Government of Canada, 2010, p. 6). However, I

argue that the first goal must first be to build an effective process. The framework proposed in this thesis strives for efficiency by reducing or eliminating non-critical decision elements from the assessment process rather than by reducing qualified assessment personnel or compressing temporal horizons. Thus, the framework encourages extensive consultation on critical topics, which funnels resources toward the study topics and decision criteria that are essential to conduct an appropriate assessment. In a sense, the framework strives to merge effectiveness and efficiency to create what engineers or architects might describe as an elegant solution. However, the most essential element in any determination of structural elegance must be effectiveness, as any resources allocated to an ineffective process are inherently inefficient.

To assist in capturing and keeping insights regarding robustness from my literature reviews top of mind, I created a series of topic points. These points would often expand and merge until the process distilled a series of statements that resonated as principles of robust SEA processes. These statements provided guidance at all stages of developing the framework. Some of the guiding principles which strongly resonated were to:

- provide an evaluation of policy options, not a pass/fail assessment of a single proposal;
- aid decision-making by eliciting preferential outcomes;
- recognize that preferences, priorities, and environmental conditions will all change over time;
- create dialogue and engage participants, without relying on results from closed-door proceedings and negotiations;

- mandate firm assessment stages, but prevent rigidity by allowing for flexibility within the stages;
- create results that are replicable and transferrable;
- integrate concepts and ideas from diverse industries and stakeholders to create better solutions;
- avoid rather than mitigate environmental effects; and
- support the process with enabling legislation and creation of an administrative foundation within the decision-making structure.

2.9 SUMMARY

This research into SEA in Nova Scotia has highlighted the value of formally incorporating environmental effects in strategic decision-making processes. With legislative requirements to become a world leader in sustainable prosperity (Government of Nova Scotia, 2007, 2012), there is need to define these terms in a way that successfully balances economy and environment. A robust SEA process is a critical aid to decision-makers trying to develop and maintain this sense of balance in Nova Scotia. I have developed significant insights into framing a robust SEA process for Nova Scotia, and these insights will be further highlighted in the following chapters.

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CHAPTER 3 METHODS

3.1 TOPIC SELECTION

Strategic environmental assessment (SEA) was a topic of significant interest during classes taken as part of my Master of Environmental Studies (MES) degree. Though an interesting concept, this approach to incorporating environmental dimensions in strategic planning appeared to be under-utilized in Canadian practice (Gibson, 2012; Government of Canada, 2010, 2012; Sadler, 2004, 2011). With the support of various academic advisors within the School for Resource and Environmental Studies (SRES), my thesis research focused on creating guidance for SEA at the provincial level. As Dalhousie University is located in Nova Scotia, and since the province had recently demonstrated a firm commitment to environmental sustainability in legislation (Government of Nova Scotia, 2007, 2012, 2013), an early decision was made to ground my research in the provincial governance context.

3.2 COMMITTEE SELECTION

Within SRES, Dr. Peter Duinker has the most experience in environmental assessment (EA) and became my first choice as a potential supervisor (Beanlands & Duinker, 1984; Duinker, Burbidge, Boardley, & Greig, 2013; Duinker & Greig, 2006; Greig & Duinker, 2011, 2014). I began consultations with Dr. Duinker, and we decided to work together on the topic of SEA. We agreed that Dr. Peter Tyedmers, also a SRES faculty member, would be a good fit as a committee member. Dr. Tyedmers' research into ecological economics also stresses incorporating environmental dimensions in

decision-making (Smith et al., 2010; Tyedmers, Watson, & Pauly, 2005; Wilson, Tyedmers, & Pelot, 2007), though not within a SEA structure.

3.3 INITIAL RESEARCH APPROACH, OBJECTIVES, AND METHODS

Having established a general study topic and academic support, the next stage in my research activity was to appropriately structure my investigation. During this process, the advice and guidance provided by my thesis committee was invaluable. This was a collaborative process aimed at suggesting a reasonable scope of activities and objectives for my research into SEA.

A considerable body of literature has developed around conducting effective literature reviews (Arksey & Malley, 2007; H. Cooper, 1998; Corbin & Strauss, 2008; Creswell, 2003; Levac, Colquhoun, & Brien, 2010; Marshall & Rossman, 1999; Onwuegbuzie, Leech, & Collins, 2012; Wolfswinkel & Wilderom, 2011). I conducted an initial scan of this research to assist in developing an appropriate method or methods to investigate SEA. It became apparent that the first task was to conduct a preliminary investigation into SEA to support the design of an appropriate research plan. I focused my preliminary survey on the guidance documents suggested by the International Association for Impact Assessment (IAIA) (2011). I also reviewed a thesis that had previously investigated SEA in Nova Scotia (Davey, 1997).

My initial investigation concluded that a general investigation of SEA in Nova Scotia would be too broad and unfocused for an MES thesis (Croal, Gibson, Alton, & Brownlie, 2010; Davey, 1997; Organisation for Economic Co-Operation and Development, 2006; Partidario, 2012; World Bank, University of Gothenburg, Swedish

University of Agricultural Sciences, & Netherlands Commission for Environmental Assessment, 2011). Rather, this research should approach the topic of SEA in Nova Scotia by initially codifying methodological guidance from the SEA literature to design a structural framework. During this research, the strategic thinking model of SEA proposed by Partidario (2007, 2012) resonated strongly as an anchor point. This methodological guidance provided an initial way to structure my framework. I was fortunate to study under Dr. Partidario at a SEA workshop provided by the IAIA at its 2013 annual convention in Calgary, AB, Canada. This workshop gave me a unique opportunity to review my research with the originator of the strategic thinking model of SEA.

The official research objective became the design of a robust framework for SEA in Nova Scotia. The project goal was to create initial guidance for decision-makers and process managers who want to incorporate SEA in policy formulation and evaluation. A secondary goal was to identify insights that may be relevant to the wider SEA community.

3.3 LITERATURE REVIEW METHODS

My early research indicated that designing a robust framework for SEA would have to include investigations that ranged across the spectrum of IA types as well as various policy- and decision-making domains. After investigating a series of different options for conducting literature reviews, scans, and scoping studies (Arksey & Malley, 2007; Cameron, 2011; H. Cooper, 1998; Creswell, 2003; Levac et al., 2010; Marshall & Rossman, 1999; Onwuegbuzie et al., 2012), I determined that I would use an inductive

approach, inspired by grounded theory, to analyze my results (Corbin & Strauss, 2008; Glasser & Strauss, 1967).

A grounded theory approach appealed to me for numerous reasons. With a professional history as a business consultant, I was comfortable in the position of being an outside observer making constant comparisons and allowing theories to develop organically from the data (Corbin & Strauss, 2008; Glasser & Strauss, 1967). As I would be reviewing numerous bodies of literature, the grounded theory concept of theoretical sampling allowed me to follow research threads to their natural conclusions without feeling diverted or distracted.

However, grounded theory has weaknesses I wanted to avoid. Principally, I wanted to avoid a pure inductive analysis of the literature. A fulsome literature review was necessary, but alone could not adequately support the development a robust SEA framework. This led to the realization that a deductive research effort would be required to operate in tandem with the inductive process. These two efforts would iterate back and forth as new bodies of literature were included in the research efforts and learning was integrated with other topics.

In practice this process followed a simple series of steps when investigating a new research topic:

- Initial review of background and general reference sources
- Conduct an inductive literature review, inspired by grounded theory
- Integrate learning and theories back with core SEA understanding
- Conduct a deductive analysis to uncover any specific information gaps
- Follow-up literature reviews to fill gaps and answer specific questions

- Final deductive effort to synthesize learning into a robust model of SEA

This approach has allowed me to explore the intricate nuances of incorporating environmental effects in decision-making processes. The inductive element supported the requirement to follow research threads across diverse fields of study. The deductive component helped bring all the learning together and uncover what ideas or topics were missed during initial research. This combination of inductive and deductive processes allowed for a more fulsome synthesis of the literature and distillation into a robust SEA framework.

3.4 BODIES OF LITERATURE REVIEWED

My MES research is highly conceptual and relies extensively on various bodies of scholarly literature. As Nova Scotia has a limited history of SEA, the ability to gain insight form other jurisdictions, and scholars from other disciplines, was essential to develop an understanding of the potential of SEA in the Nova Scotia context. This section will describe the diverse literature sources reviewed during my investigation and discuss how this background supported the development of a robust framework for SEA in Nova Scotia.

The first goal of the literature review process was to gain a basic grasp of SEA theory and practice (Croal et al., 2010; Dalal-Clayton & Sadler, 2005; International Association for Impact Assessment, 2002; Partidario, 2000; Therivel, 2004). This was essential for identifying relevance in my wider research efforts. As the research progressed, this body of work was continually re-visited to update the importance of various findings and effectively integrate insight in the design process. This ongoing re-

visitation of the SEA literature over time also supported the internalization of basic SEA structures and activities.

My wider literature review efforts began with contextualizing SEA within the larger family of impact assessment (IA) methods and approaches (Arts, Tomlinson, & Voogd, 2011; Morrison-Saunders, Pope, Gunn, Bond, & Retief, 2014; Sheate, Byron, Dagg, & Cooper, 2005). Key citations recommended on the IAIA website formed the first portion of my research (International Association for Impact Assessment, 2011). Efforts initially focused on forms of IA which, like SEA, explicitly evaluate or predict the biophysical effects of the human enterprise, e.g. environmental impact assessment (EIA), cumulative effects assessment (CEA), and biodiversity impact assessment (BIA).

SEA is not only ecologically but also socioeconomically grounded (Croal et al., 2010; Hilding-Rydevik & Bjarnadóttir, 2007; Partidario, 2012; Runhaar, 2009; Sadler, 2011). With a better understanding of how SEA fits within the suite of ecologically informed IA methods (Canter & Ross, 2014; Geneletti, 2014; Greig & Duinker, 2014; Morrison-Saunders et al., 2014), research goals shifted to contextualizing SEA as a form of socioeconomic assessment, e.g. social impact assessment (SIA), economic assessment, and health impact assessment (HIA). This provided multiple perspectives on how SEA fits within the hierarchy of IA planning tiers.

Having situated SEA within the family of IA tools, there was a clear need to review the wider literature on the subject of strategic planning and decision-making (Buchanan & O'Connell, 2006; Mintzberg, 1994; Schwartz, 1991; Wildavsky, 2007). SEA is often discussed as a type of IA that works well when integrated with policy planning and evaluation processes (Morrison-Saunders et al., 2014). Understanding how

these general processes are structured and supported was critical to designing a process that integrated well with existing policy-making theories and practices. This ultimately led to an investigation of decision-theory (Gaertner, 2009; Joyce, 1999; Kahneman, 2011; Kørnøv & Thissen, 2000; Meier, 2006; Schick, 1997; Seip & Wenstop, 2006; Tversky & Kahneman, 1981).

Developing a more nuanced understanding of how strategic decisions are made from a general perspective highlighted the need to investigate Nova Scotia's decision-making context. I integrated this understanding with my background in political science. This portion of my inquiry examined scholarly research on Nova Scotia's political structure, history, legislation, and environmental planning processes (Bernier, Brownsey, & Howlett, 2005; Bonvoisin, 2011; Davey, 1997; Johnson, 2005; Kelly & Manfredi, 2010; Lee & Perl, 2003; Savoie, 2010; Wilson, 2002).

At this point, the first tier of research was complete. I had internalized the basics of SEA theory and situated the process within the wider IA community, general policy-planning practices, and the Nova Scotia context. Certain insights had begun to appear, and guided additional investigations into specific topics. This next level of research would focus on stage-gate processes used in new product development (NPD) (R. Cooper & Edgett, 2003; R. Cooper, 2008, 2011), scoping theories and practices (Canter & Ross, 2014; Greig & Duinker, 2014; Koornneef, Faaij, & Turkenburg, 2008; Mulvihill & Jacobs, 1998; Mulvihill, 2003; Snell & Cowell, 2006; Tsuji, McCarthy, Whitelaw, & Mceachren, 2011), and scenario modeling and futuring exercises (Duinker & Greig, 2007; Mintzberg, 1994; Schwartz, 1991).

Based on my previous experience with the stage-gate concept used in NPD processes, I was immediately struck by how similar the stages in the standard IA framework were to those used by companies to evaluate new products and service offerings (R. Cooper, 2008; Kagioglou, Cooper, Aouad, & Sexton, 2000; Karlstrom & Runeson, 2005; Walkup & Ligon, 2006). Extensive research was required to determine whether stage-gate thinking could fit with the philosophy underpinning the SEA process. This research provided an opportunity to investigate how stage-gate thinking had been adapted and customized by different industries with different product development priorities, timelines, and resources, all of which built on my background in using this mechanism to design and launch new products.

Scoping in IA practice was identified during the first tier of literature review as an area that required additional guidance to close gaps between theory and practice. This awareness led to a further investigation around how to identify and bridge gaps in the academic literature and in specific reviews of IA performance (Snell & Cowell, 2006; Tsuji et al., 2011; Vammen, Kørnøv, & Wejs, 2012). Particular attention was paid to sources which discussed or presented examples of re-conceptualized and re-designed scoping activities (Mulvihill & Jacobs, 1998).

Scenario models, and other futuring exercises, are interesting tools that are gaining popularity in SEA and other forms of IA. Further research was conducted on this topic to better understand the evolution of these methods and how they could be best applied to SEA. My investigation assisted the development of guidance for creating scenario models and for presenting predicted impacts in a manner that allows for discrimination between similar policy trajectories.

3.5 DEVELOPING THE SEA FRAMEWORK

After completing reviews of the relevant literature, the final step was to apply that learning to develop a robust framework for SEA in Nova Scotia. The first part of the literature review had distilled insights regarding robust SEA methods and approaches into a series of topic points. The effort to refine and codify key learning also relied on extensive discussions with colleagues and SEA practitioners. This nuanced understanding assisted in developing criteria to evaluate structural elements and activities which are common to IA processes. Repeated iterations of deductive and inductive exercises were used to amalgamate a series of robust assessment elements that would form the core of the SEA framework.

3.6 REFERENCES

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CHAPTER 4 TARGETTING THE TRANSITIONS: APPLYING STAGE-GATE THINKING IN STRATEGIC ENVIRONMENTAL ASSESSMENT

4.1 ABSTRACT

Strategic environmental assessment (SEA) practitioners have a tendency to emphasize assessment phases more than the linkages between the phases. Explicitly addressing the transitions between stages could add rigour to SEA processes and make them more structurally robust. There is a considerable body of research on project management practices used by corporations during new product development (NPD). The stage-gate model is presented as a specific example of a successful and innovative NPD approach that is widely used in a variety of industries, and which focuses on the connections between assessment phases. Stage-gate theory treats the linkages between project stages as gates which must be passed. The philosophy behind the stage-gate model is explored as macro-process that could support current best practices in SEA and better structure impact assessment (IA) processes more generally. Possible opportunities to adapt stage-gate thinking to SEA practice are discussed, as are some pitfalls to avoid. The stages and gates designed for a proposed Nova Scotia SEA framework are presented to better show how stage-gate thinking can be adapted for use in SEA processes. The chapter concludes that SEA processes could become more efficient and effective by integrating a philosophy of gated assessments.

4.2 INTRODUCTION

In most flow-charts, there are arrows that connect the boxes to each other. These box-and-arrow diagrams usually demonstrate the route through a process. Many graphical representations of environmental assessment (EA) processes rely on arrows to connect stages or elements in the process. Because practitioners tend to focus on the activities represented by the boxes, the activities required to transition from one stage of assessment to another are often overlooked. Currently, there is no clear guidance for SEA which codifies the steps taken by practitioners as they exit one stage and enter another (International Association for Impact Assessment, 2002; Noble, Gunn, & Martin, 2012; Partidario, 2012). This chapter looks at the role of these transition points and discusses ways to increase the rigour and robustness of EA processes by incorporating management techniques used in product development processes.

There is little discussion in the SEA literature on how a development proposal enters or exits the conveyor belt that carries it from stage to stage, nor what happens to a proposal between stages (Bina, Wallington, & Thissen, 2011; Fischer & Onyango, 2012; Noble et al., 2012; Partidario, 2012; Tetlow & Hanusch, 2012). We contend that EA practitioners can improve the robustness and rigour of their assessments by better appreciating the importance of, what seems like casually placed, arrows that lie within their procedural flow-charts. Rather than blindly moving proposals through the process, these arrows should be thought of as a chance to critically reflect on both the proposals and the assessment process in a structured fashion.

The idea of incorporating stage-gate thinking in SEA practice occurred to us while we were investigating the structure of a robust framework for SEA in Nova Scotia.

Like many jurisdictions, Nova Scotia has legislated that long-term sustainability must be considered in public-sector decision-making (Government of Nova Scotia, 2007, 2012, 2013). However, the provincial government has not described the process of defining and evaluating sustainability in a tangible way. There are requirements for EA but not for SEA (Government of Nova Scotia, 2013), though some SEAs have been conducted on an *ad hoc* basis (CEF Consultants Ltd, 2005; Jacques Whitford Ltd, 2008; White & Noble, 2013). We felt that Nova Scotia would benefit from a consistent SEA framework to evaluate the environmental effects of the province's strategic decisions and start defining sustainable prosperity. Ideally this framework, and the insights which resulted from its creation, could also be used by other jurisdictions with a similar desire to define and effectively choose among trajectories of sustainability.

The ideas presented below have arisen from fruitful discussions between us whereby we have discovered the synergy arising from our complementary perspectives. Chris Whynacht, a graduate student in environmental studies and previously a business person, is familiar with the stage-gate processes used in product development. Peter Duinker, a veteran scholar of EA, is familiar with a wide range of assessment processes as applied to environmental decision making (Beanlands & Duinker, 1984; Duinker, Burbidge, Boardley, & Greig, 2013; Duinker & Greig, 2006; Greig & Duinker, 2011, 2014).

4.3 DISSECTING THE BOX-AND-ARROW DIAGRAM

The box-and-arrow diagram is often used when discussing stages or steps in any kind of process, and thus they are often used in strategic planning, project management

and environmental assessment (Cooper, 2008; Koberg & Bagnall, 1974; Mintzberg, 1994; Partidario, 2012). Predominantly the focus is on the boxes, as they are meant to contain the main activities required to complete the process. Process developers assemble flow-charts with different activities and order the boxes differently, all with an eye to define and describe effective and efficient ways to meet process objectives.

Most process diagrams depict the arrows as merely conveyors that effortlessly transport those involved, along with their project proposals, from one stage to another. However, for many process managers in new product develop (NPD), the arrows are truly transition points in the process where they pause and critically reflect on the assessment. We decided that by better structuring these transitions, we could help provide structure and rigour to SEA processes.

Researchers in NPD who have investigated the linkages between project stages have concluded that they are natural decision points (Cooper, Edgett, & Kleinschmidt, 2002; Cooper & Edgett, 2003). One model used commonly in product development is called the stage-gate process (Cooper, 2011; Kagioglou, Cooper, Aouad, & Sexton, 2000; Karlstrom & Runeson, 2005; Walkup & Ligon, 2006). In this theory of project management, the arrows so common in project management flow-charts are replaced with gates which actively manage the transition points between procedural steps. Because stage-gate thinking is a macro-level management model that overlays the micro-process of each individual assessment (Cooper, 2008), it can provide new insights for conducting SEAs as well as other types of development projects (Kagioglou et al., 2000; Karlstrom & Runeson, 2005; Walkup & Ligon, 2006).

4.4 THE STAGE-GATE PROCESS

The stage-gate process was advanced by Robert Cooper and Scott Edgett, who have since trademarked a specific product-development model. They have actively engaged the product-development community and their methods have become widely used among businesses across the world since first introduced in 1986 (Cooper, 2011). In addition to the product-development process, Cooper and Edgett have also promoted the concepts and ideas behind the stage-gate philosophy in books, presentations, and through their organization The Product Development Institute. The work done by Cooper and Edgett built on ideas underpinning the phase-gate processes that were used by NASA in the 1960s (Cooper, 1994), but stage-gate thinking has since evolved with application by hundreds of companies developing thousands of new products (Cooper et al., 2002; Cooper, 2011).

The basic concept behind the stage-gate model is simple to understand. There is often a series of consistent procedural elements to accomplish when working to assess alternatives and complete a project, whether that project is conducting a research study, building a home, or developing a new product. These linked elements, the boxes in box-and-arrow diagrams, are the stages in the stage-gate process. This is analogous to the concept of life-stages that organisms go through: birth, maturation, reproduction, senescence, and death. The stages of building a home are different than the stages of life; there are no life-stages which require a foundation, floor, walls, or roof. However, in both cases the stages are linked like a chain that connects the beginning to the end in a series of discreet and well-defined steps. NASA recognized this thinking when it used a

first-generation phase-review process in the 1960s to evaluate how to take astronauts to the moon and bring them safely back to Earth (Cooper, 1994).

The analogy of downhill skiing may help people with no background in the stage-gate or phase-review start thinking about the process. People commonly say that project management can be likened to climbing a mountain, but we want to suggest it can also be imagined as descending a mountain. Most alpine races are contests to see who can get to the bottom of the mountain in the least time; the contest is an objective measure of ability and efficiency. Gates are used to structure the descent, differentiate the different types of races, and make them appropriate for each venue. Gates are set along the course and the contestants must successfully pass through each set of gates to complete each stage and prevent being disqualified. The gates are set differently for various disciplines such as slalom and giant slalom, and each event organizer will have personal perspectives on how the gates can be set to make for a better contest. Not all racers complete the race; some fail by missing gates along the way while others fail or quit for different reasons. Those who complete the courses in the fastest time are the winners, and are viewed as being objectively better than the other contestants. Evaluating multiple proposals can be viewed the same way a racing organizer views a specific event, as an opportunity to create a fair contest that determines a winner.

Stage-gate thinking can be applied to manage construction projects just as easily as product development (Kagioglou et al., 2000). Steps in the project process get linked by gates which provide opportunities to reflect on and evaluate the output of the previous stage before advancing. In the example of building a home, the foundation stage could be considered complete when the contractor and building inspector check the work. The

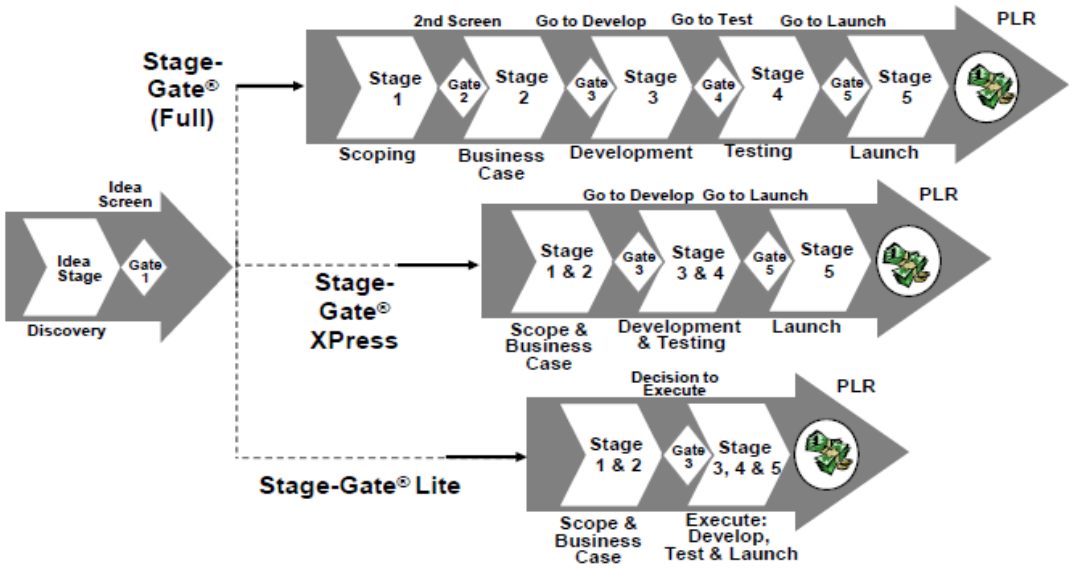
inspection becomes the gate and the contractor and inspector are the gate-keepers. The gate can be viewed as the success requirement to complete a stage and the gate-keepers verify that requirements have been met (Cooper, 2008). Though all homes require a foundation, whether they are checked, how extensively, and by whom, differs from jurisdiction to jurisdiction. For example, some inspection-gates may require exhaustive testing before proceeding to the next stage of construction, while others may be satisfied with only a cursory inspection or a self-assessment by the building team. The inspection can be legislated or conducted as part of good practice, but either way there is a gate to pass which marks the completion of the foundation stage. Realizing that all projects transition between stages, and taking advantage of these natural opportunities to assess the output of the previous stage, is at the heart of stage-gate thinking.

The typical stage-gate process follows a standard structure that can be easily adapted by different organizations and industries (Cooper, 2008; Kagioglou et al., 2000; Karlstrom & Runeson, 2005; Walkup & Ligon, 2006). The stage-gate product development process consists of five key stages: Scoping, Build Business Case, Development, Testing & Validation, and Launch. These stages are preceded by a discovery stage and followed by a post-launch review.

Though the language is different, these stages are strikingly similar to the stages in a typical EA process. Before the stage-gate process recommends the launch of a proposal, issues to be considered are scoped into the assessment, rigorous research is conducted to holistically describe the project details and justifications, ideas are tested, and stakeholder insight in sought. There is even a follow-up component, the post-launch

review, similar to what is needed to add rigour in EA processes (Morrison-Saunders & Arts, 2004; Partidario, 2012).

Figure 4.1: The Stage-Gate New Product Development Process



(Cooper, 2008)

In Figure 4.1 we see a different graphical metaphor to represent the stage-gate process than is used in standard EA flow-charts. Markedly, in most EA diagrams the stages are represented as square shapes and the movement between elements is indicated by connecting lines or arrows. In the stage-gate flow-chart, we see that the background image and stages themselves convey a sense of movement without connecting lines. Indeed, the connecting gates are shown as diamonds that allude to the different directions a proposal can take following the gate-keeper's decision. Figure 4.1 also clearly shows how the stage-gate process can be scaled up or down as appropriate by modifying the gates while still examining proposals using a similar stage structure.

4.5 GENERIC STAGE STRUCTURE

Regardless of the nature of each individual stage, some common features and activities are shared by all stages in the Cooper and Edgett model (2003). All stages have a research and learning component that provides information to the project team. The team then analyses the results of the activities and the information gathered in order to prepare a stage summary that would guide decision-makers and gate-keepers who must evaluate the results in the gate-meeting (Cooper, 2011). The deliverables from each stage should provide the information required to make a good decision at the next gate.

This discussion will not delve deeply into the work conducted in assessment stages, as we contend that this is already the focus of considerable research within the SEA community. There are numerous guidance documents which support SEA practice during procedural stages (Croal, Gibson, Alton, & Brownlie, 2010; International Association for Impact Assessment, 2002; Noble et al., 2012; Partidario, 2012). Stage-gate thinking would only slightly modify standard stage practices, most notably by requiring reports and summaries of stage activities for analysis in the inter-stage gates.

The real value of stage-gate thinking for SEA practitioners is to make their processes more transparent and effective by adding decision gates between appropriate stages. We feel this type of macro level management process could help answer the question of "how to make 'good' methodological choices in SEA" (Noble et al., 2012, p. 145). Specifically, this is a way of governing SEA in a consistent fashion without a one-size-fits-all framework. Stage-gate thinking could assist in structuring the linkages between SEA stages, without changing the nature of the stages they connect and thus make assessment processes more rigorous and robust. Stage-gate thinking may also

assist in providing decision-makers with context earlier in the assessment process, aiding their ability to make better decisions when the assessments final results are reported.

4.6 GENERIC GATE STRUCTURE

Though the substance of the work is completed in the stages, it is the way gates link project stages that makes the stage-gate model so compelling. Gates can be more or less rigorous to fit project circumstances appropriately. However, all gates share some common characteristics. Principally, gates provide an opportunity to evaluate the previous stage's deliverables in a fulsome manner and direct how those deliverables become inputs to other stages.

There is considerable guidance which supports the decision-making processes that occur between stages (Cooper et al., 2002; Cooper & Edgett, 2003; Cooper, 2011; Kagioglou et al., 2000; Karlstrom & Runeson, 2005). This guidance has shown that rigorous gating can make assessments more efficient, timely, transparent, and cost-effective (Cooper & Edgett, 2003). Gate meetings are the actual decision points in the stage-gate process. At these meetings, the project team that has been overseeing the stage activities presents the stage results to the gate-keepers (decision-makers) who are responsible for advancing or recycling the proposal under consideration.

Gate-keepers can be senior decision-makers or other stake-holders, which in business includes key suppliers and customers. In an SEA, the gate-keepers could be cabinet members, senior bureaucrats, and key stakeholder representatives. Stage-gate thinking has provided significant guidance for gate-keepers to assist them in running better gate-meetings (Cooper, 2011). Gate keepers often develop scoring criteria to

remove personal biases and objectively assess each proposal. Types of criteria are discussed in stage-gate theory. The first are *must-meet criteria* which are judged on a pass/fail basis (Cooper, 2008). If any proposal fails to meet one of these essential criteria, it cannot pass and go on to the next stage. The second type of scoring rates *should-meet criteria* (Cooper, 2008). This second type of evaluation rates each proposal on a numerical scale which is then used to assign priority and preferences amongst competing proposals. Other research has shown that using criteria-based algorithms is an effective method for ensuring accuracy while reducing personal biases during decision-making, significantly when there are high degrees of unpredictability and uncertainty (Kahneman, 2011; Tversky & Kahneman, 1981).

The gate-meeting converts the outputs from the preceding stage into the inputs that flow into the next appropriate stage. Gate-meetings do not necessarily result in a decision to advance a proposal; this is, after all, a decision point in the process. Rather, there are four distinct options, alluded to by the diamond graphic in Figures 4.1 and 4.2, which a proposal can take after encountering a gate (Cooper, 2008). The four classic options gate-keepers have when assessing progress in a process are: *GO* - advance to the next stage, *HOLD* - at the current stage, *RECYCLE* - to a previous stage, or *KILL* - remove from the process all together. These options allow the linear processes described in box-and-arrow diagrams to behave in a more iterative and complex manner during actual practice. The concept of a decision gate allows for processes to be streamlined and resources to be used as efficiently as possible (Cooper & Edgett, 2003), while anticipating the need to deviate from the standard path as circumstances arise. Gates are a structural element which supports the incorporation of emergent strategies (Mintzberg,

1994) into strategic planning, thus allowing for realized strategies to be more transparently determined and monitored.

4.7 APPLYING STAGE-GATE THINKING TO SEA PROCESSES

SEA is fundamentally different than many other forms of EA. In most project-level assessments, there is only one main proposal which focuses EIA investigations to direct impacts and mitigation options; this often leads to a fairly direct line of investigation. An assessment of strategy is quite different. In an SEA there is often a wide variety of alternatives that must be considered and researched to best inform decision-makers who will choose among them. In order to keep SEAs from becoming bloated by excessive effort and expenditure, there is a need to constantly re-focus the assessment on desirable scenarios and appropriate strategies. Similar to product development processes that act more like a funnel than a tunnel (Cooper, 2011), SEA processes strive to home in on the best policy options and strategic alternatives. Throughout the SEA process, evaluations should continuously be made to ensure that resources are being focused on the most appropriate options and strategies under consideration.

Without changing the substance of the assessment process, incorporating robust gating practices can strengthen SEA processes in a number of ways. Stage-gate thinking can add transparency to assessments, provide clear milestones and timelines, reduce non-critical research and reporting, make processes more cost-effective, and deliver better results. As we investigated the structure of an SEA framework for Nova Scotia, we

considered these advantages and decided to develop and propose a gated assessment framework.

4.8 NOVA SCOTIA SEA FRAMEWORK

In the Nova Scotia context, we felt that SEA guidance was required for decision-makers and stakeholders who were inexperienced with using this approach to assessment. The tool also had to be flexible and adaptable in a wide spectrum of potential applications. Though Nova Scotia has legislated requirements for EA at the project level, there is no such obligation to evaluate strategic actions or policy decisions. This realization highlighted that SEA had to demonstrate value over short and long time horizons in order to be more widely adopted in Nova Scotia. For the government to start conducting SEAs on a regular basis, there was a need to describe the benefits of SEA and show how such assessments could be cost-effectively structured.

4.8.1 NOVA SCOTIA SEA STAGES

Our framework describes eight distinct stages that would structure the standard SEA process. To make the framework more approachable, we proposed elements similar to the EA structure commonly used in Nova Scotia. To highlight that SEA is a learning tool, we converted research into scenarios as part of a futuring exercise that could advise decision-makers without preordaining a superior solution (Schwartz, 1991). By involving ultimate decision-makers as gate-keepers, they are more active participants in the process and consequently gain a richer understanding of the issues. The stages in our NS SEA framework are: 1) triggering document, 2) options and alternatives, 3) scoping,

4) research, 5) scenario modeling, 6) stakeholder preferences, 7) final report and recommendations, and 8) monitoring. (See Figure 4.2).

Stages one and two structure how proposals enter into the SEA process. The middle stages make up the core of the assessment process, which is completed when stakeholders have examined the options and decided which they prefer. The final stages describe how the assessment concludes and moves into a watchful hibernation phase. Though these stages may change over time, we decided that these were appropriate to start framing a common SEA process in Nova Scotia. As it is likely that most IA practitioners are familiar with this type of staged process, we now turn attention to how we linked these stages with a series of decision gates.

4.8.2 NOVA SCOTIA SEA GATES

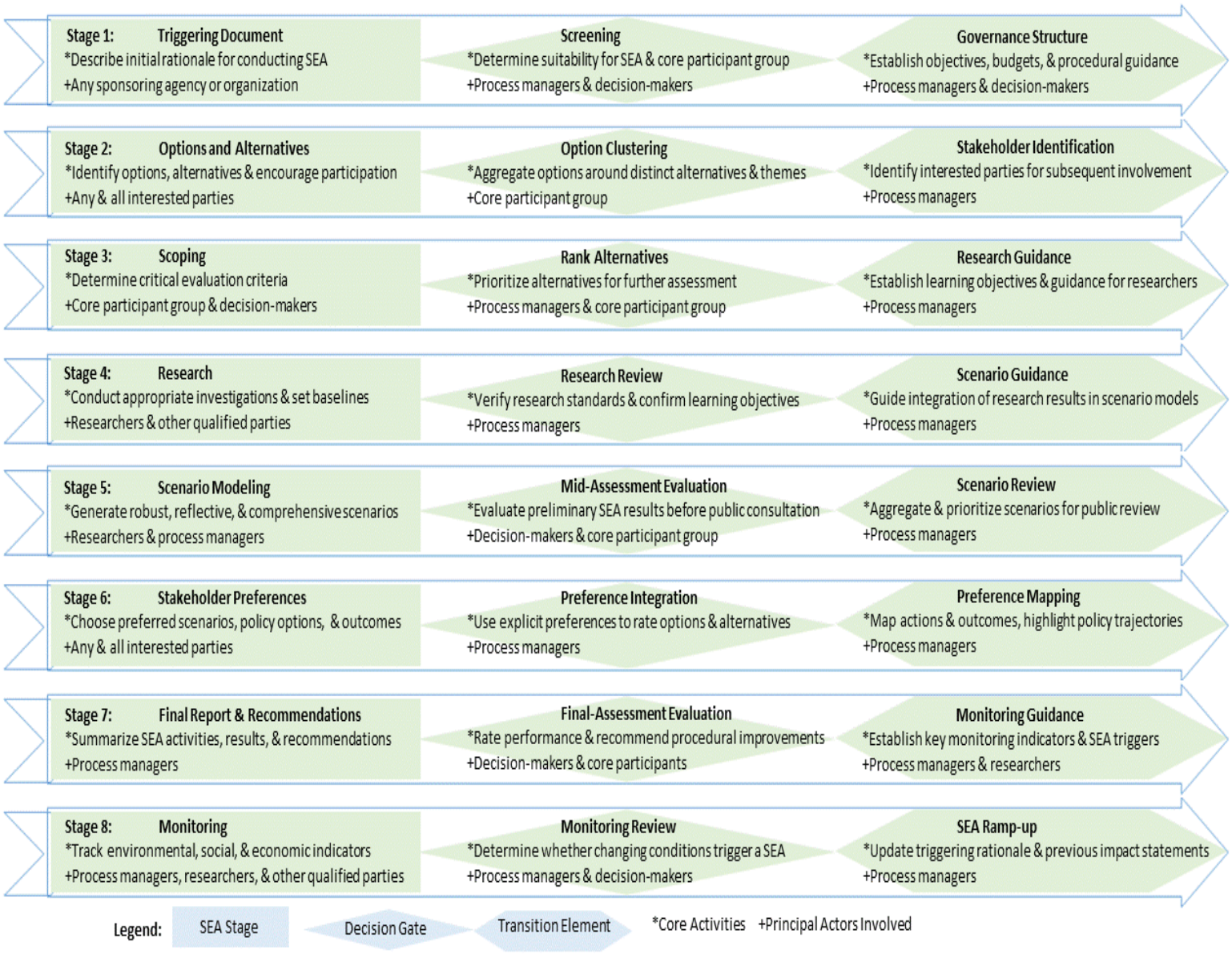
We instituted learning from stage-gate theory to create a series of gates that paralleled the eight stages in our framework. Each of our gates was designed with two distinct functions in mind. The first function is generally to render decisions in the style of the classic four-directional decision gate described above. The second function assists in transforming stage outputs into inputs for subsequent stages.

These gates are 1) screening and governance structure, 2) option clustering and stakeholder identification, 3) rank alternatives and research guidance, 4) research review and scenario guidance, 5) mid-assessment evaluation and scenario review, 6) preference integration and mapping, 7) final-assessment evaluation and monitoring guidance, 8) monitoring review and SEA ramp-up. As the concept of gates is a new addition to our

framework, we will now discuss how each gate operates and structures the assessment process.

The initial gate, screening and structuring, is a secondary check on whether an SEA need occur and sets some initial parameters for the SEA process. This gate pre-supposes that a policy has been identified as having likely and significant environmental effects and that such a finding has triggered an assessment process designed to inform decision-makers. Gate 1 assists in determining whether an SEA is the appropriate choice of evaluation approach, and the degree of rigour for the subsequent assessment process. This is also when the core participant group is nominated; these individuals will be called on to be active participants and represent a wide variety of interested parties. This group, ideally of three to seven members, is more of an advisory council than a steering committee. Once the proposal has been evaluated as to its suitability for SEA and preliminary core group established, the gate-keepers would then determine the initial assessment structure. Structural issues to be determined could include, but are not limited to, the: time frames, budgets, infrastructure, resources, degree of public involvement, and/or personnel required to conduct an appropriately rigorous assessment. The final activity of this SEA phase is to prepare guidance for all interested parties who wish to contribute to the process.

Figure 4.2 Proposed Stage-Gate SEA Framework for Nova Scotia



The second gate, option clustering and stakeholder identification, takes the different possibilities uncovered in the alternatives stage and codifies them into a more rationalized package of strategic choices. The goal of the gate is not to decide which options are more relevant; that comes after scoping. Rather it is to streamline the number of options to assess further by aggregating them around common themes and strategic trajectories. These trajectories are each a description of a series of policy decisions that work in conjunction to bring about a desired outcome. One of the other benefits of conducting a search for alternatives early in the process is that it helps identify key stakeholders for later inclusion in the scoping and preference stages. This gate acts as the close of the initial structuring aspects and leads into the principal research work of the assessment.

The third gate uses the output of the scoping process, the identified critical evaluation criteria, to rank and assess the options that were previously rationalized. These rankings are then used to determine and prioritize various indicators for further investigation during the research stage. Other indicators may emerge during the research or scenario modeling stages, but this gate is designed to focus initial investigations on high-priority areas and to increase the volume of productive research that is conducted or synthesized during the assessment period.

The fourth gate, research review and scenario guidance, synthesizes all of the research conducted to try to develop a coherent report that summarizes what was learned during the previous stages. A decision has to be made as to whether the research is sufficiently fulsome to populate such a coherent report and support the creation of useful

future scenarios. Should the research be complete, then this gate helps prioritize which scenarios will provide a sufficiently wide suite of options to choose amongst.

The fifth gate provides an opportunity to evaluate the assessment at a critical point in the process. At the end of the modeling phase, the options provided by stakeholders have been researched and synthesized. As the SEA process goes public again in the next stage, this gate is a final check to make sure that options have been explored at sufficient resolution to provide stakeholders with a rich enough suite of scenarios to choose amongst. Once the scenarios have been selected in the first half of this gate, they must then be packaged and prepared to properly inform stakeholders about each hypothetical future. The goal of this gate is to provide a full suite of equitable scenarios and to reduce bias during stakeholder evaluations. This gate also supports reducing the number of scenarios to a manageable suite for interested parties to choose amongst.

The sixth gate marks the end of the SEA process's core research and evaluation exercises. At this point, the scenario options should be sufficiently balanced and integrated to allow for strategic preferences to emerge. These preferences can then be used to rank and recommend options and alternatives discovered earlier in the SEA. Ideally, this gate acts to verify that the SEA is sufficiently complete to provide decision-makers with a richer context and understanding of critical issues with which they can justify a final policy choice. Should the process determine that the SEA has provided sufficient resolution, this gate then helps to map these results to provide as fulsome an understanding of the options and rationales so that future strategic actions can be evaluated. By identifying short-, medium-, and long-term policy preferences this

exercise reveals preferred strategic trajectories and provides context to support better decision-making.

The seventh gate acts to finalize the intensive assessment process. This is an opportunity to evaluate whether critical SEA objectives were met and to gain formal buy-in from the core participant group and final decision-makers who sponsored the assessment process. At this point, SEA participants can also reflect on the process and recommend suggestions for improving the assessment process, structure, methods, or activities. The second phase of this gate provides guidance for the monitoring stage and determines what monitoring criteria will trigger another iteration of the SEA process. The gate marks the end of the intensive SEA process and serves to usher in the continuous monitoring phase.

The final gate in our SEA process acts as an ongoing check of conditions and indicators against the triggering criteria previously established. In the parlance of Cooper (2011), this gate acts as the post-launch review. The review component can also provide ongoing monitoring of changes in public opinion or environmental indicators against agreed-upon criteria. This gate could determine that SEA preferences need to be updated using previous scenarios (e.g. by recycling through stages 6 & 7) or that the entire process must begin from first assumptions. Should it be determined that the process must reiterate, this gate would structure the outputs of the previous process to support the creation of a triggering document to kick-start the next SEA.

Our goal in this section was to describe how SEA decision gates would operate; and provide some insight as to how these formal decision-points could improve the timeliness of results, reduce costs, and increase the transparency of the SEA process.

Rather than waiting until the conclusion of the process to gain a richer understanding of critical issues, the decision-makers who will be using the final-results of the assessment process occasionally participate as gate-keepers. In this way, decision-makers are better informed on stage results as they occur, making information transfer more timely and relevant. Evaluating proposals as they move through the assessment process ensures that effort will be focused on appropriate options and alternatives, and reducing unnecessary costs. The narrowing of options as the assessment continues means that expensive research and public engagement activities are focused on the best options and not wasted on investigating alternatives that are less likely to be effective. By making SEA more of a funnel than a tunnel, we hope that the process provides a consistent flow of information to engage interested parties and decision-makers while reducing unnecessary expenditure of time, effort, and resources.

4.9 CONCERNS ABOUT ADAPTING THE STAGE-GATE METHOD FOR EA PROCESSES

Though there are insights that EA practitioners can learn from stage-gate theory, we do not believe that the macro-process can be seamlessly adopted for use in EA. One immediate concern issue for EA practitioners regards the language used by Cooper and his collaborators. However, just renaming terms is insufficient to fully address the needs of SEA theorists who are interested in utilizing stage-gate thinking; over the longer-term, new understanding has to be brought to bear so that appropriate roles and responsibilities can be clearly established. Eventually, guidance around setting and governing the gates between stages can be created specifically for IA processes.

As an example of this type of challenge, consider our adaptation of stage-gate thinking to the SEA framework for Nova Scotia. The business development community has a tendency to use confrontational and/or aggressive language when describing activities and results. It is unusual to read terms like *killer-innovation* and *doom-loop* in EA processes, but these kinds of terms are commonly found in business literature (Collins, 2001). We frequently hear of business professionals reading Sun Tzu and Machiavelli to gain the upper hand in business dealings and this has had a significant influence on business language and corporate culture. In SEA processes, the emphasis is often on conciliating opposing view-points and leveraging common interests to find consensus positions (International Association for Impact Assessment, 2002).

In addition to limiting inflammatory language, stage-gate thinking has to be adapted to the type of work done in IA and project appraisal contexts. Ultimately the end goal of a stage-gate process in the SEA context is not launching successful new products, but instead to objectively provide information to decision-makers about which policy and project proposals are appropriate for implementation. Furthermore, additional research is required to determine how to best establish and govern a gated EA process. Who are the gate-keepers in this context: is this a role for stakeholders, government, or both? Who is responsible for setting the gate-criteria: the decision-makers who are requesting the assessment, or the project team which has potentially greater understanding of the process and proposals? When modifying the concept of gates to fit EA contexts, are four potential decisions enough or do we need additional options, i.e. a shunt which directs proposals into other assessment processes? These questions indicate the need to determine best practices and create guidance to assist in bringing stage-gate thinking into

the world of IA. This chapter serves as a call to begin considering ideas from stage-gate thinking, but does not claim to have all the answers on how best to integrate these new concepts.

4.10 CONCLUSIONS

The stage-gate approach defines clear stages and decision points that occur when turning a fuzzy idea into a successful new product. However, the philosophy behind the process is highly adaptable to different situations and jurisdictions when viewed as a macro-level assessment model. It is not a one-size-fits-all process; rather, it is a structuring technique that assists in managing all manner and scale of assessments, projects, or processes. By adjusting the success requirements on a case-by-case basis, the gates flex and adapt to changing needs and situations.

SEA can be designed to guide decision-makers and stakeholders who are inexperienced with the process. The structure also has to stay flexible and adapt to a wide spectrum of potential applications in order to see more widespread adoption of SEA. Stage-gate thinking can be used to guide the development of an easily understood structure that shows critical decision points, rather than arrows, as the transition points between assessment elements. A gated method of evaluation provides transparency and provides structural guidance by clearly describing the transitions between stages in the assessment process.

Stage-gate thinking has become dominant in product development circles due to its ability to assist decision-makers make unbiased assessments of new strategic initiatives, construction projects, and product proposals. The tool has been proven

successful and has assisted organizations to better manage their risk and achieve greater rewards. This proven track record can reassure jurisdictions where there is concern that SEA processes could be an ineffective and inefficient use of resources. Though considerable work is needed to adapt stage-gate techniques to suit IA, there are clearly opportunities for cross-learning.

This chapter highlights an opportunity for EA theorists to re-evaluate how proposals enter and exit the stages in SEA processes. The arrows in SEA flow-charts should not be thought of as conveyor belts that blindly advance proposals, but rather as opportunities to pause and reflect. There are further opportunities to learn from product development research, which could improve the structural robustness and intellectual rigour of impact assessments. Actively involving decision-makers as gate-keepers could help integrate SEA into policy planning processes and assist in making assessments more strategic. Incorporating formal decision gates could assist in transparently governing EA processes. Stage-gate thinking supports stakeholders and decision-makers as they critically reflect on development proposals and strategic actions, which aids the realization of prosperous trajectories of sustainability.

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CHAPTER 5 RECONCEPTUALIZING THE OBJECTIVES AND OUTCOMES OF SCOPING IN STRATEGIC ENVIRONMENTAL ASSESSMENT

5.1 ABSTRACT

Scoping theory is creating unrealistic demands that impact assessment practitioners are unable to fulfill. A fundamental re-conceptualization of scoping theory is required, particularly for strategic environmental assessment (SEA). The core objectives of scoping in SEA should move toward establishing criteria that evaluate alternatives rather than enumerate study topics. Scoping activities should be teased apart and ordered more effectively using clear language. A well-defined set of assessment criteria is discussed as the outcome of scoping, to allow SEA to adapt as required to address diverse strategic issues and focus the evaluation on the most pertinent topics.

5.2 INTRODUCTION

Scoping is a common element in the impact assessment (IA) process that consistently has gaps between theory and practice (Canter & Ross, 2014; Greig & Duinker, 2014; Lyhne & Kørnøv, 2013; Mulvihill & Baker, 2001). These gaps are causing fundamental challenges for practitioners seeking to improve IA performance and align activities with theory (Fischer & Onyango, 2012; João, Vanclay, & den Broeder, 2011; Mclauchlan & João, 2012; Mulvihill, 2003; Noble, Gunn, & Martin, 2012; Vammen, Kørnøv, & Wejs, 2012). Scoping theory, and criticisms of practice, are common themes in the scholarly literature (Koornneef, Faaij, & Turkenburg, 2008; Lyhne & Kørnøv, 2013; Mulvihill & Baker, 2001; Mulvihill & Jacobs, 1998; Mulvihill,

2003; Partidario, 2012; Snell & Cowell, 2006; White & Noble, 2013b). A recent spate of articles discussing integration in IA have noted scoping as an example of an assessment activity that could be better structured and integrated with evaluation objectives and other tiers of assessment (Canter & Ross, 2014; Cashmore & Morgan, 2014; Geneletti, 2014; Greig & Duinker, 2014; Morrison-Saunders, Pope, Gunn, Bond, & Retief, 2014; Sánchez, 2014; Vanclay, 2014). This chapter tries to move away from complicated requirements and jargon, and instead focuses on clarifying key objectives and processes in clear language.

Despite the intention to assess both strategies and projects under the *National Environmental Policy Act (NEPA)* (Government of the United States of America, 2000; Morrison-Saunders et al., 2014), SEA has lagged behind environmental impact assessment (EIA) in common practice (Bina, Wallington, & Thissen, 2011; Dalal-Clayton & Sadler, 2005; Fischer & Onyango, 2012; Noble et al., 2012; Partidario, 2012; Sadler, 2011b; Sheate, Byron, Dagg, & Cooper, 2005; Tetlow & Hanusch, 2012). This has caused theorists to rely heavily on EIA practice when designing guidance for SEA (Canter & Ross, 2014; Glasson, Therivel, & Chadwick, 2012; Lyhne & Kørnøv, 2013; Morris & Therivel, 2001; Noble, 2006). This has not always been beneficial for SEA, and many of the challenges that are faced by EIA can also be identified in SEA (Partidario, 2012). Obviously, if scoping practices are unable to adequately address options and alternatives at the project level, then they will continue to have difficulty providing a mechanism for discrimination at the strategic level.

To fully realize the potential value of this assessment element, scoping needs to be fundamentally redeveloped with a tighter core focus, fewer extraneous activities, and

clear guidance. This chapter will initially discuss the evolution of scoping in EIA and identify weaknesses and opportunities for improvement. The discussion will then explore further opportunities to improve the effectiveness of scoping practices in SEA.

Scoping theory needs to differentiate between the objectives of EIA and SEA. We suggest that tactical assessments should investigate a wide range of diverse effects across a small number of options, while strategic assessments should investigate a fulsome suite of alternatives with a narrow range of indicators and evaluation criteria. These different tiers of assessment need to investigate effects in similar ways, but using opposing philosophies. As assessments shift focus along the spectrum between tactical and strategic objectives, practitioners can then determine an appropriate degree of investigation for each unique situation by varying the degree to which they balance these competing philosophies.

This research resulted from an effort to design a robust framework for SEA in Nova Scotia. Changes to the SEA scoping process were modified and evaluated to determine whether they were appropriate for the local context. This Canadian province does not require SEA, but has conducted assessments on an *ad hoc* basis previously (CEF Consultants Ltd, 2005; Government of Nova Scotia, 2013; Jacques Whitford Ltd, 2008; White & Noble, 2013a). There is considerable experience with the use of EIA methods and processes in Nova Scotia (Davey, 1997; Government of Nova Scotia, 2013; Nova Scotia Department of Environment, 2009); however, this could pose challenges in overcoming legacy mindsets. Specifically, there is a need to clearly articulate the differences between EIA and SEA as certain elements seem similar but are, in fact, quite different (Davey, 1997; Glasson et al., 2012; Noble, 2006; Partidario, 2012).

Our work has led to a revised conceptualization of scoping in SEA that may prove useful in other jurisdictions. Our proposed Nova Scotia SEA framework divides common assessment activities that are often conflated in the scoping phase and re-orders them elsewhere in the process. The objectives, activities, and results of the scoping stage are designed to support and structure other evaluation activities by creating evaluation criteria. Scoping, in the Nova Scotia SEA framework, serves to support the assessment by clearly articulating the criteria that will be used to discriminate among potential policies.

5.3 CURRENT ISSUES IN EA SCOPING PRACTICE

The first issue we encountered when researching scoping in IA is ironically one of scope. The term IA encompasses a broad family of assessment tools (Morrison-Saunders et al, 2014). This discussion of scoping focuses on types of IA that directly investigate environmental effects, which we will label environmental assessment (EA). We have included into our EA analysis many tools which are appropriate to investigate narrow definitions of environment, as well as social, economic, or health impacts, e.g. EIA, SEA, and cumulative effects assessment (CEA). These tools integrate learning from both the scientific and policy domains to support a more balanced, and ideally effective, decision-making process (Holling, 1995; K. Lee, 1993; Mintzberg, 1994; Morris & Therivel, 2001; Morrison-Saunders et al., 2014; Partidario, 2012; Sadler, 2011b; Schwartz, 1991; Wildavsky, 2007).

5.3.1 SCOPING THEMES IN EA

Research into scoping in EA indicates serious gaps between objectives, guidance, and results (Canter & Ross, 2014; Glasson et al., 2012; Koornneef et al., 2008; Mulvihill & Baker, 2001; Partidario, 2012; Snell & Cowell, 2006; Tsuji, McCarthy, Whitelaw, & Mceachren, 2011). The gaps between theory and practice suggest that some common expectations of scoping in EA could be unrealistic. Basing an assessment on impractical expectations creates significant challenges when setting objectives, developing guidance, and evaluating results. This problem is exacerbated by confusion around the differences among various shared EA processes. For example, screening can refer to an evaluation conducted prior to an EA, as part of scoping in EA, or a type of EA (Duinker, Burbidge, Boardley, & Greig, 2013; Koornneef et al., 2008; Mclauchlan & João, 2012; Noble, 2006; Sadler, 2011a).

Our research identified five common elements in EA scoping activities: decision criteria, options and alternatives, temporal boundaries, spatial boundaries, and context. These are regularly discussed aspects of scoping activities, though they may not encompass all elements of scoping in every situation (Glasson et al., 2012; Morris & Therivel, 2001; Noble, 2006). Investigating these scoping themes helps to provide insight into common gaps between theory and practice.

5.3.1.1 DECISION CRITERIA

A common element of scoping processes is the establishment of principal decision criteria on which to base the assessment, though the language used differs. In EIA, the focus is generally discussed in terms of valued ecosystem components (VECs)

(Beanlands & Duinker, 1984). In a strategic thinking model of SEA, the core focus of scoping moves away from indicators to focus more on critical decision factors (CDFs) (Partidario, 2012). The language used to describe decision criteria in EA can often be ambiguous or confusing. For example, some guidance suggests that scoping focus on areas of significance (Glasson et al., 2012; Noble, 2006; Snell & Cowell, 2006), yet other guidance suggests that significance cannot be determined until the end of the assessment process (Duinker & Beanlands, 1986; Duinker et al., 2013; Lyhne & Kørnøv, 2013). These observations support the contention that scoping in EA must return to first principles; this includes increased focus on developing clear objectives and mechanisms to achieve them (Canter & Ross, 2014; Partidario, 2012; Tsuji et al., 2011).

5.3.1.2 OPTIONS AND ALTERNATIVES

The inclusion of options and alternatives is also a fundamental element of scoping theory (Beanlands & Duinker, 1984; Glasson et al., 2012; Noble, 2006). Though these terms are often used synonymously, we want to clarify their use within this chapter. The term *Options* is used to describe different means of implementing a proposal and are often related to mitigation, e.g. situating a wind-turbine to avoid avian mortality. On the other hand, the term *Alternatives* will be used to describe various possibilities to the development proposal, e.g. whether solar power is a better way to generate renewable energy. Alternatives are more likely to avoid some types of environmental effects, though they can often cause other types of impacts elsewhere.

The failure of EIA processes to adequately investigate alternatives is frequently discussed as a rationale for more strategic forms of assessment, i.e. SEA (Bina et al.,

2011; Fischer & Onyango, 2012; Geneletti, 2014; Glasson et al., 2012; Illsley, Jackson, & Deasley, 2014; Noble et al., 2012; Partidario, 2012; Sheate et al., 2005). The failure to properly investigate and evaluate options may be partially attributed to how alternatives are addressed by scoping activities. While theory indicates that scoping should support unbiased evaluation of options and alternatives, the reality of EA practice is often quite different (Geneletti, 2014; Glasson et al., 2012; Snell & Cowell, 2006).

5.3.1.3 TEMPORAL AND SPATIAL BOUNDARIES

Scoping in EA is often discussed as an exercise in setting boundaries (Croal, Gibson, Alton, & Brownlie, 2010; Glasson et al., 2012; Government of Nova Scotia, 2013; João, 2007; Koornneef et al., 2008; Noble, 2006; Organisation for Economic Co-Operation and Development, 2006; Worthen, Sanders, & Fitzpatrick, 1997). As EA is directly focused on quantifying environmental effects, this suggests the need to set hard boundaries that can be used to guide the assessment. However, both direct environmental impacts and related cumulative effects are often difficult to contain within specific temporal and spatial boundaries (Duinker et al., 2013; Duinker & Greig, 2006; Therivel & Ross, 2007). Setting a precise, yet generic, boundary that encompasses all decision criteria ignores ecological realities. Landscapes and ecosystems do not conform to precise political or jurisdictional boundaries. Attempting to avoid the consideration of environmental effects which cross commonly observed planning boundaries creates the potential for serious impacts to be ignored by the assessment process (Bonvoisin, 2011; Environmental Protection Agency - Ireland, 2012; E. Lee & Perl, 2003; Sheate et al., 2005; Therivel & Ross, 2007) Understanding and quantifying how any resulting impacts

are manifested is a significant portion of subsequent assessment activities and is hampered by inappropriate boundaries (João, 2007; Lyhne & Kørnøv, 2013). Creating appropriate temporal and spatial limits is a significant challenge as EA becomes more strategic and addresses the extended implications of cumulative effects (Duinker et al., 2013; João, 2007; Therivel & Ross, 2007).

5.3.1.4 DEVELOPMENT CONTEXT

A final theme that we identified as being common to most EA scoping processes is the development of appropriate context (Cavalcanti & La Rovere, 2011; Croal et al., 2010; Dalal-Clayton & Sadler, 2005; Gibson & Hanna, 2009; Hilding-Rydevik & Bjarnadóttir, 2007; Noble, 2006; Runhaar, 2009; Wilson, 2002). EA processes do not operate in a vacuum; rather, they are often intended to integrate multiple viewpoints to develop appropriate context (Greig & Duinker, 2014; Morrison-Saunders et al., 2014; Mulvihill, 2003; Partidario, 2012; Vanclay, 2014). This outward-looking component is what allows EA to situate the development proposal within a more holistic perspective.

The context theme amalgamates efforts to broadly situate a proposed development within a wider economic, social, and ecological context. Setting context is critical for robust futuring exercises which frequently use scenario models to back-cast preferred trajectories of sustainability (Duinker & Greig, 2007; Partidario, 2012; Runhaar, 2009; Schwartz, 1991). The incorporation of context is a reasonable proxy of the degree to which the assessment could be said to be tactical or strategic. Recent observations that SEA needs to have a more strategic focus suggest the need for better scoping of the wider context which surround the proposal (Noble et al., 2012; Tetlow & Hanusch, 2012).

5.4 GAPS IN EA SCOPING

Gaps between the theory and practice were identified amongst the scoping themes that we identified above. These differ amongst jurisdictions; some processes and practitioners seem more successful at closing gaps than others (Dalal-Clayton & Sadler, 2005; Fischer & Onyango, 2012; Glasson et al., 2012; Noble et al., 2012; Partidario, 2012). However, our investigation has led to preliminary identification of typical gaps in scoping elements (summarized in Table 5.1).

Though evaluation of the environmental effects that result from both tactical projects and strategic actions were required in *NEPA*, they have had quite different evolutions and patterns of adoption (Gibson & Hanna, 2009; Morrison-Saunders et al., 2014; Partidario, 2012). EIA at the project level has advanced much faster in terms of common use. This has led to SEA theorists actively borrowing from EIA, and other IA tools, when designing appropriate guidance to assess strategic actions (Bina et al., 2011; Croal et al., 2010; Fischer & Onyango, 2012; Noble et al., 2012; Noble, 2006; Partidario, 2012). Indeed, this has certainly been the case with scoping theory and guidance.

Such borrowing may provide opportunities for SEA to avoid some of the missteps made in the evolution of EIA theory and practice, but it also allows for common issues in EIA to cross over to SEA. Currently, we see gaps similar to those found in EIA developing between SEA theory and practice (see Table 5.1). This is to be expected, given the view of some theorists that scoping in EIA and SEA is fundamentally the same process (Noble, 2006).

Table 5.1 Summary of gaps between theory and practice in EIA and SEA

	EIA		SEA	
Themes	**Theory**	**Practice**	**Theory**	**Practice**
Decision Criteria:	Narrow slate of possible criteria; high profile	Too many components; questionable value	High order, high buy-in of relevancy	Too many factors; components are overly tactical or vague; inconsistent agreement on critical issues
Options & Alternatives	Fundamentally diverse tactical options; some consideration of alternatives	Most options eliminated in project planning; seldom considers alternatives; flimsy in practice	A large number of fundamentally diverse strategic alternatives	Too narrow and unimaginative; too tactical; overly focused on options
Temporal Boundaries	Long term; unique to each criterion; layered; address both resolution and horizon	Short term; generic time horizons; omits resolution	Long term; unique to each criterion; scenario orientation; addresses both resolution and horizon	Short term; generic time horizons; not scenario focused; omits resolution
Spatial Boundaries	Multiple spatial zones tied to unique VECs; layered; addresses both resolution and horizon	A small set of generic project boundaries; focus on site footprint; omits resolution	Expansive; unique to each criterion; layered; addresses both resolution and horizon	Overly restrictive; little graduation at boundaries; omits resolution
Context	Rich in local detail; provides perspective into strategic and cumulative effects	Broad and shallow investigation of local perspectives; little or no attention to strategic or cumulative effects	Broad; integrated with planning processes; cumulative effects	Narrow and shallow; stand-alone; scant attention to cumulative effects

Though some SEAs have used the VECs as decision criteria, this has led to the shallow investigation of alternatives common in EIA. Research into more strategic

models of SEA has suggested that the scoping process focus on decision issues rather than components (Ayuso, Rodríguez, García-castro, & Arino, 2011; Croal et al., 2010; Partidario, 2012; Shepherd & Ortolano, 1996). Though Partidario's (2012) process for establishing CDFs is better able to focus the assessment on important decision factors, there is still uncertainty as to the means of appropriately teasing these factors apart to set research priorities and learning objectives. Thus we have a situation where ambiguity in scoping occurs in EIA as a result of being too fragmented, whereas scoping in SEA can clump issues too tightly together. Both situations serve to exacerbate procedural gaps. Despite their differences, these EA processes have difficulty in determining the relative utility of various indicators to provide information that relates to decision-making criteria (Beanlands & Duinker, 1984; Duinker & Beanlands, 1986; João, 2007; Lyhne & Kørnøv, 2013; Therivel & Ross, 2007).

The gap analysis above suggests that SEA suffers from many of the same scoping issues as EIA. There are common issues in choosing appropriate boundaries and adequately evaluating various possibilities. EIA and SEA both struggle with appropriately focusing on the most meaningful decision criteria and this makes it difficult for these processes to prioritize assessment activities. Without proper prioritization, it is difficult to establish boundaries or determine whether appropriate context is being considered.

5.5 EXPLORING EA SCOPING GAPS

In order to create possible solutions to bridge the gaps we have identified, we had to develop a more fulsome understanding of the root causes. These gaps can be viewed

as the result of an arms race in IA (Cashmore & Morgan, 2014). As EIA guidance suggests increasingly focused assessments, processes are being forced to become more broad and expansive. This arms race is reminiscent of the Red Queen scenario found in many natural and social systems, where individuals have to run as fast as they can to stay where they are (Bertels & Peloza, 2003; Hauert, De Monte, Hofbauer, & Sigmund, 2002; Jackson, 2010; Rice & Holland, 1997). EA practitioners must constantly restrict or focus assessments to counteract the considerable pressures to make processes more inclusive and expansive. This kind of Red Queen scenario is very common for firms, many of which participate in EA processes and wish to become, or stay, socially and environmentally responsible (Bertels & Peloza, 2003; Hall & Wagner, 2012).

Our assessment of gaps in scoping revolved around the contention that scoping in SEA, as well as the general IA context, is a process that should focus the assessment (Canter & Ross, 2014; Croal et al., 2010; João, 2007; Mulvihill & Baker, 2001; Organisation for Economic Co-Operation and Development, 2006; Snell & Cowell, 2006; Therivel & Ross, 2007; Worthen et al., 1997). EIA theorists concur that scoping is a process that focuses, and thus limits, the investigation (Beanlands & Duinker, 1984; Glasson et al., 2012; Morris & Therivel, 2001; Noble, 2006). Theorists have suggested that restricting assessments has many positive benefits, e.g. as a way to increase the effectiveness or value of EA (Bina, 2007; Duinker & Beanlands, 1986; Mulvihill & Baker, 2001; Mulvihill & Jacobs, 1998; Narayan & Steele-johnson, 2012; Partidario, 2000, 2012). By focusing on critical issues, EA can become a more incisive investigation of environmental effects as opposed to a process that merely creates baseline information by compiling environmental data; what Partidario (2012, p. 30) calls a “vague

environmental broadband." Yet, despite the urging of theorists to make scoping more effective at focusing assessments, the scope of EIA processes is being driven to become more broad and inclusive (Glasson et al., 2012; Koornneef et al., 2008; Mulvihill, 2003; Sadler, 2004; Sheate et al., 2005; Snell & Cowell, 2006). Some examples of how EA is being forced to become more expansive include the following.

5.5.1 EA LEGISLATION AND CHECKLISTS BECOMING INCREASINGLY BROAD

EAs are invariably triggered by legislation rather than a proponent's commitment to social and environmental responsibility (Bertels & Peloza, 2003; European Parliament, 2001; Gibson, 2012; Hall & Wagner, 2012; E. Lee & Perl, 2003; Sheate et al., 2005). This creates requirements for proponents to meet the mandatory requirements of the legislation (Government of Canada, 2010, 2012; Government of Nova Scotia, 2013; Government of the United States of America, 2000; Noble, 2006). In an effort to be comprehensive, checklists are often created to ensure that all potential decision criteria are considered in the assessment process (Lyhne & Kørnøv, 2013; Noble et al., 2012; Organisation for Economic Co-Operation and Development, 2006; Paredis et al., 2006; Therivel, 2004). As scoping practice is forced to consider ever-expanding generic checklists and regulation, it moves away from the theorized determination of a unique and appropriately focused scope for each development proposal.

5.5.2 INCREASING EXPECTATIONS

Scoping is also being driven towards inclusiveness by ever increasing expectations of EA. The challenge of managing expectations which continuously expand is not unique to EA and can be seen in many other forms of socially motivated activity, i.e. in corporate social responsibility and community economic development (Bertels & Peloza, 2003; Hodgett, 2007; Meier, 2006; Organisation for Economic Co-Operation and Development, 2006; Slunge & Loayza, 2012; World Bank, University of Gothenburg, Swedish University of Agricultural Sciences, & Netherlands Commission for Environmental Assessment, 2011). Though theorized as an activity that restricts research, the participatory nature of EIA scoping processes constantly pushes the boundaries of the assessment outward (Mulvihill, 2003); there are insufficient mechanisms to prioritize among a host of decision criteria. Expectations are also not always aligned and different actors, e.g. developers, governments, NGOs, the courts, other IA practitioners, and individuals who are immediately or tangentially implicated in the EIA fail to align diverse goals, objectives, or perspectives (Glasson et al., 2012; Noble, 2006). Failing to meet participant expectations can make it more difficult for interested parties to modify their viewpoints over time (Runhaar, Runhaar, & Oegema, 2010; Runhaar, 2009).

5.5.3 AMBIGUITY IN LANGUAGE AND PROCESS, THE EXAMPLE OF VECS

One of the most fundamental reasons for gaps between EA theory and practice is a lack of clear language (Cashmore & Morgan, 2014). Without clear language, it is difficult for practitioners to understand the goals of the assessment activity or how to best

achieve them. This issue is not restricted to scoping, it pervades IA. Not only is there confusion about the content of EA, but also the process.

An interesting example of confusion arising from language and process relates to the term VEC – valued ecosystem component (Beanlands & Duinker, 1984). When this concept was introduced, EIA was evolving beyond a focus on pollution control and was beginning to investigate wider ranging effects on the environment (Gibson & Hanna, 2009). VECs provide a way to conceptualize effects on natural systems using ecological components (Beanlands & Duinker, 1984). However, the determination of value results from the careful and transparent application of criteria to a list of potential natural indicators. These criteria provide the specific mechanism to restrict or focus EA, and we contend that they are at the heart of the scoping process.

Initially selecting a limited number of VECs did reduce the degree to which EIAs investigated esoteric topics. As EIA has become more widely adopted, various participants, law-makers, and courts have required that increasingly diverse VECs be considered during EIA processes (Glasson et al., 2012; Noble, 2006; Sheate et al., 2005; Snell & Cowell, 2006). Adoption of scoping checklists served only to exacerbate this issue. This situation has resulted in an ever-expanding list of study topics of questionable value and undermined efforts to appropriately use decision criteria to restrict EA. As cherished ecological components are allowed to bypass processes which rigorously and transparently evaluate decision criteria, EA will continue to suffer from an increasingly irrelevant and esoteric list of study topics driven by perceived value rather than demonstrable utility.

5.6 DIFFERENTIATING BETWEEN SCOPING IN EIA AND SEA

Though we have been discussing issues with scoping in EA as if they are similar across all assessment tiers, it is obvious that there are fundamental differences among assessment types (Glasson et al., 2012; Morris & Therivel, 2001; Noble, 2006; Partidario, 2012). This suggests that there could be a benefit from approaching the scoping process at the strategic level completely differently than at the project level. The key to re-conceptualizing the scoping process in the NS SEA framework was to highlight the different objectives and outcomes of EIA and SEA.

There are several basic differences in perspective between EIA and SEA, yet the processes share many of the same types of assessment activities (Brown & Therivel, 2000; Glasson et al., 2012; Morris & Therivel, 2001; Noble, 2006; Partidario, 2000). Functionally, though most assessments at the project level are designed to either pass or fail a development proposal, SEAs are often conducted as an advisory process that complements existing policy evaluation and planning processes (Croal et al., 2010; Partidario, 2012; Sadler & Dalal-Clayton, 2010). SEA is more suited to evaluating alternatives, which suggests that the process be structured like a funnel, not a tunnel (Cooper & Edgett, 2003; Cooper, 2008). Additionally, while EIA often has a standardized process, SEA processes are not one-size-fits-all and are uniquely designed to fit the circumstances of application (Bina et al., 2011; Noble et al., 2012; Partidario, 2000; White & Noble, 2013b). Thus, we suggest that the focus of SEA is to evaluate a wide range of alternatives using a narrow band of criteria, while EIA directs attention onto a limited option set with a broad array of indicators (see Figure 5.1).

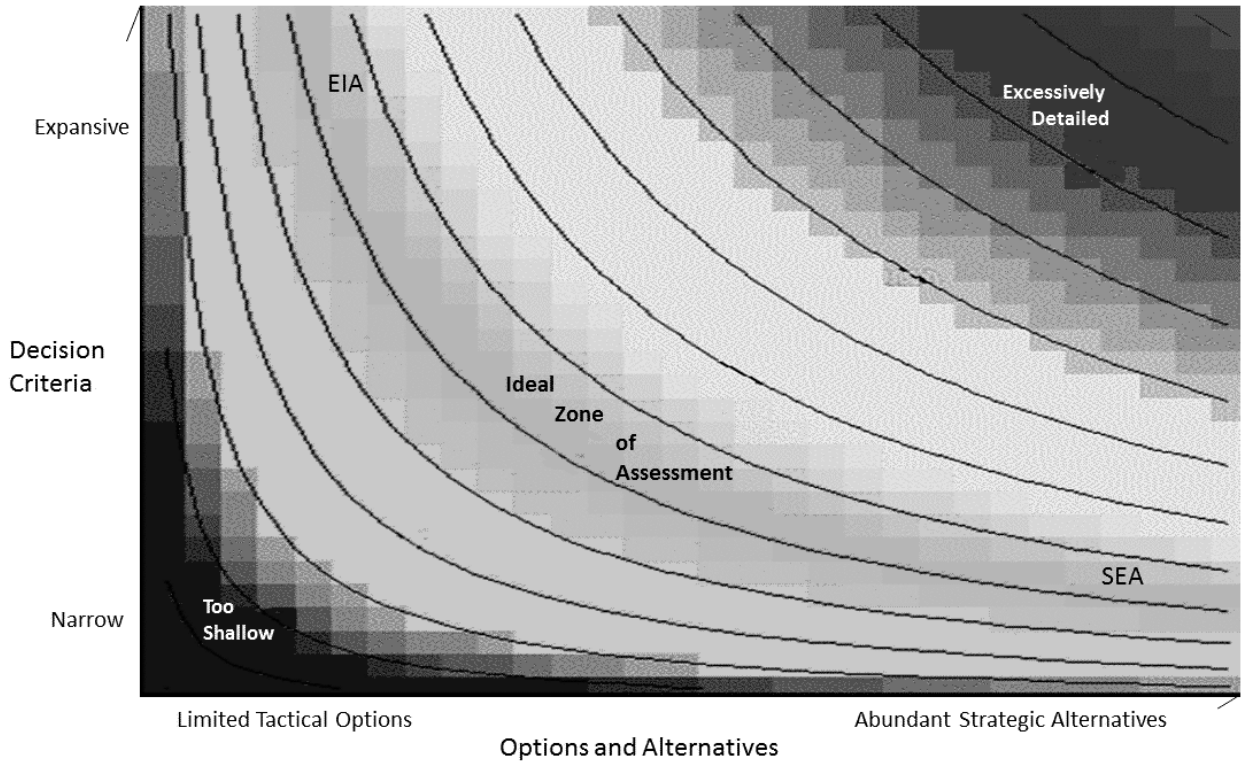

Figure 5.1: An illustration of differing zones of investigation in EIA and SEA

A clear way to differentiate between tactical and strategic assessments is provided by the perspectives used to evaluate environmental effects, as highlighted in Figure 5.1. In the case of a development project, there is usually a single proposed initiative and a limited number of options to evaluate. EIA has been designed to focus on the specific environmental effects of various project activities (Glasson et al., 2012; Koornneef et al., 2008; Noble, 2006; Sheate et al., 2005). This tends to suggest a more tactical assessment that describes the physical effects of specific development proposals. The evaluation of policy is more strategic and seeks to assess immediate policy alternatives and long-term trajectories (Bina et al., 2011; Fischer & Onyango, 2012; Partidario, 2012; Sheate et al.,

2005; White & Noble, 2013b). This suggests that while EIA and SEA both assess environmental effects of proposed activities, the objectives and rationales for conducting these assessments differentiate them.

5.7 REVISING SEA SCOPING

With revised scoping objectives focused on better using indicators to discriminate between options, there are changes in scoping outcomes. Rather than creating a list of potential study topics, scoping now focuses on determining how to discriminate between alternatives. The outcomes become the decision criteria to be used in subsequent assessment activities to establish research priorities, rate and rank various alternatives, and generally focus the SEA. With this new understanding of ideal objectives and outcomes, various assessment activities can be removed from the scoping process and re-ordered in the assessment process (See Chapter 4).

Identifying options and alternatives are vital assessment activities, but we contend that they may not be appropriate to include in an overly generalized scoping stage (See Chapter 4). Teasing apart scoping activities allows for a specific re-ordering of SEA elements and the transitions amongst them. This helps identify opportunities to change the language of SEA by reducing ambiguity and increasing transparency. Now, scoping can clearly focus on determining the decision criteria that will be used to evaluate alternatives, not the collection or identification of alternatives.

To appropriately determine decision criteria, the scoping process needs to find better ways of incorporating multiple perspectives. Consultation in the scoping stage should focus on why things matter, not what matters. By shifting the debate away from

enumerating specific study topics and toward determining decision criteria, scoping structures the assessment without conducting the ultimate analysis. By removing the need to specify ecological components for later study, many of which have associated anchoring biases among participants, those involved in scoping are more able to focus on the issues that matter most.

Focusing on decision criteria assists in closing other gaps identified in our analysis of scoping themes. Rather than setting precise generic boundaries, scoping criteria can better categorize immediate, tangential, and distal implications of strategic actions. This understanding assists in determining what context is relevant and appropriate to include in the SEA. Focusing on criteria allows participants to better discriminate amongst alternatives which then highlights preferential policy trajectories.

5.8 DISCUSSION

Ultimately, any investigation into assessment or evaluation processes connects with research in decision theory (Gaertner, 2009; Joyce, 1999; Kaplan, 1996; Schick, 1997; Seip & Wenstop, 2006). Two fundamental types of conflict which occur during decision-making relate back to ambivalences and quandaries (Schick, 1997). By focusing on establishing decision criteria and reducing conflated expectations, our framework reduces the quandaries that result when incorporating environmental dimensions in strategic planning. Quandaries occur when it is difficult to maintain an understanding of the options and alternatives, determine how to think about them, or what to care about (Schick, 1997). We hope that our framework clearly guides SEA practitioners to identify alternatives before scoping begins. This provides a clear and

stable understanding of the possibilities under consideration. With the alternatives to be evaluated clearly framed, scoping practitioners are freed to focus on how to differentiate amongst various choices, and also better identify why participants care.

Further research is required to describe the best way to deal with ambivalence during the establishment of criteria and the categorization of options and alternatives. Ambivalence describes the conflict of determining how to weight, evaluate, and ultimately adjudicate among contrary criteria (Schick, 1997). For example, research into establishing robust decision criteria needs to better incorporate the notion that losses loom larger than gains (Kahneman, 2011; Tversky & Kahneman, 1981) when trying to balance short-term economic benefits against long-term environmental damage.

There will likely be some who opine that a SEA should avoid a narrow range of decision criteria, and instead more broadly investigate the implications of strategic action. This belief misses the obvious fact that any rational investigation of a real-world decision, especially one involving environmental effects, "is always *massively* under considered [sic]" (Joyce, 1999, p. 73). Furthermore, this may not be a disadvantage. Kahneman (2011) has discussed how evaluating alternatives using a small set of robust criteria can often lead to the same decision as a broad evaluation, but in less time and while using fewer resources. Thus, we can suggest that using the fewest number of criteria, which are yet sufficient to rate and rank all alternatives, is the most efficient way to structure an effective SEA.

5.9 CONCLUSION

Scoping is a topic in EA that is often discussed yet commonly misunderstood. Too much is commonly expected of scoping activities. There is a lack of consensus among jurisdictions and practitioners concerning what should constitute an appropriate scope for various types of EA. Scoping occurs early in the process and is potentially the most important stage in structuring the assessment. This makes scoping an element of EA that is easy to criticize. It is easy to attribute real or perceived weaknesses in later assessment practice to the scoping stage; both the guidance and the execution can become the subject of intense scrutiny. As the process of scoping has become more conflated with jargon and objectives over time, it has become increasingly difficult to appropriately focus EA processes.

Our re-conceptualization of SEA reduces the scoping stage to narrower objectives and outcomes. In the Nova Scotia framework, scoping activities are solely focused on establishing a limited set of robust evaluation criteria to discriminate among alternatives. It is conceivable that some participants may feel that specific concerns they have raised are being overlooked, but the object of SEA cannot be to assess all possible environmental effects. Specific effects are best assessed in EIA processes, where detailed project proposals can be evaluated. At the strategic level, the scope of the assessment must be driven by the suite of alternatives under consideration. Determining appropriate criteria to assess strategic actions is sufficiently complex without adding conflating more to the process. Scoping in SEA must be restricted to establishing robust criteria that allow decision-makers and other implicated parties to evaluate alternatives. Establishing effective decision criteria will focus future assessment activities and close

the gaps between theory and practice, hopefully making SEA a more effective and valuable tool in the suite of IA processes.

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CHAPTER 6 CONCLUSIONS

I draw two primary conclusions from this analysis of strategic environmental assessment (SEA) in Nova Scotia. The first is that the Province needs to officially adopt a consistent method of investigating the environment effects of policy and planning decisions. The second is that SEA guidance needs to become more effective and better support robust assessment practices. This will make SEA more appealing to jurisdictions, like Nova Scotia, which have a legislated mandate to become more environmentally responsible or sustainable. This document serves as a call-to-action for Nova Scotia to consider adopting an innovative framework for conducting SEA.

6.1 SEA IN NOVA SCOTIA

This thesis has clearly identified SEA, despite any current weaknesses in practice, as an ideal method of incorporating environmental considerations into decision-making processes (Bina, Wallington, & Thissen, 2011; Bina, 2007; Dalal-Clayton & Sadler, 2005; Fischer & Onyango, 2012; Organisation for Economic Co-Operation and Development, 2006; Partidario, 2012; Sheate, Byron, Dagg, & Cooper, 2005; Tetlow & Hanusch, 2012; World Bank, University of Gothenburg, Swedish University of Agricultural Sciences, & Netherlands Commission for Environmental Assessment, 2011). The Government of Canada now requires a SEA before a policy proposal can be made to cabinet (Government of Canada, 2010; Sadler, 2011). Numerous other governments are also using SEA during policy-making processes to better understand the environmental effects of their strategic actions (Dalal-Clayton & Sadler, 2005; Sheate et al., 2005). The

adoption of SEA internationally and domestically suggests that Canadian provinces are likely to follow suit and provides a wealth of guidance to draw from in developing appropriate guidelines.

The framework described in this document revises current procedural guidance and supports decision-makers who seek a better way of incorporating environmental dimensions. A strategic-thinking model of SEA will become increasingly effective as governments begin evaluating preferential outcomes and the policy trajectories that achieve these goals (Noble, Gunn, & Martin, 2012; Partidario, 2012; Tetlow & Hanusch, 2012). Better understanding of the objectives, process, and value of SEA will provide impetus for Nova Scotia to adopt a SEA strategy that is robust, effective, and transparent.

6.2 MAKING SEA MORE EFFECTIVE

The primary conclusion, that Nova Scotia will adopt an innovative form of SEA, hinges on my second main conclusion that SEA can evolve to become a more effective process. This thesis has identified, and proposed solutions for, several fundamental issues that need to be addressed to make SEA more attractive for Nova Scotia. This section highlights several of these conclusions.

The idea that there is no one-size-fits-all solution in SEA has led practitioners and theorists to believe that the process of SEA should change at whim to suit individual cases (Bina et al., 2011; Dalal-Clayton & Sadler, 2005; Organisation for Economic Co-Operation and Development, 2006; Partidario, 2012; World Bank et al., 2011). Yet, I feel there has been some confusion around this language; different sizes do not imply different designs. I contend that the main reason to modify an already robust and

effective assessment process is to better integrate with other planning activities. However, as a stand-alone process, I contend that SEA must be based on a stable linear series of steps and stages that highlight preferential alternatives. Rather than adjusting basic assessment elements to adapt to various situations, better management of the transitions between stages is a more-effective solution. A stage-gate approach allows for a consistent linear process that better manages the transitions between common elements to adapt to assess any strategic action without modifying common assessment stages (Cooper & Edgett, 2003; Cooper, 2008).

Assisting decision-makers, and other interested parties, to understand the environmental implications of a fulsome suite of alternatives is a primary objective of SEA (Arts, Tomlinson, & Voogd, 2011; Partidario, 2012; Sheate et al., 2005). If the process is to rate, rank, and ultimately prioritize attention on preferential alternatives, more attention must be placed on selecting robust decision criteria. I have proposed that this should be the focus of scoping activities in SEA. Setting generic boundaries to limit the scale of investigation is ineffective. Rather than creating a vague environmental scan of a limited area, focusing on robust decision criteria allows for assessments to prioritize investigations on the most pertinent themes and locations.

SEA cannot deliver its results like a verdict; rather, decision-makers and other interested parties need to develop understanding and insight throughout the process. Making SEA more transparent may better engage participants and make the process more effective. Ongoing engagement with critical learning processes makes it easier for participants to understand the intricacies of the decision, as they have time to gradually internalize new information (Mintzberg, 1994; Schwartz, 1991; Wildavsky, 2007). This

allows participants to integrate learning with previous mindsets, which can fundamentally reframe their internal discourses (Runhaar, Runhaar, & Oegema, 2010; Runhaar, 2009). Ideally, incorporating environmental dimensions in decision-making processes enable interested parties as they shift their perspectives and work to develop and describe shared preferences on the topics of sustainability and prosperity. Making SEA more transparent will support more buy-in around assessment objectives, activities, and results, all of which may lead to a more inclusive process that better addresses the various concerns of participants.

If SEA can become a process that funnels attention and resources on preferential alternatives, then an obvious implication is that SEA cannot study everything of importance to everyone. Rather, the focus must be on studying what best differentiates amongst alternatives. This means that many of the specific environmental concerns that participants have cannot be addressed in the SEA unless they are necessary to help determine preferential alternatives. SEA should include all interested parties, but cannot include all of the ecological components that may be affected by the strategic actions under consideration.

6.3 OPPORTUNITIES FOR FURTHER RESEARCH

This document has discussed the evolution of SEA from a broad perspective, yet only offers a limited array of possible solutions. There are numerous opportunities to further explore how SEA could be utilized in Nova Scotia. Obviously, there are opportunities to further this work and develop more comprehensive and detailed methodological guidance. However, there has been no investigation into the degree to

which Nova Scotia's government, business, and civic leaders understand SEA or their attitudes toward the process. Additionally, while several SEAs have been conducted in Nova Scotia, they have not been put yet to a critical comparative analysis to assess their overall utility and effectiveness in moving Nova Scotia along a sustainability path.

The concept that SEA should funnel toward preferential alternatives using a limited set of decision criteria requires further exploration. Additionally, more research on managing the natural decision points between stages of SEA activities could be required to demonstrate the value of this approach. Likewise, in terms of scoping, more research is required to appropriately guide the establishment of the decision criteria that will focus the assessment on the most pertinent topics.

More broadly, this document echoes calls in the IA literature to reduce ambiguous language and excessive jargon in theory, guidance, and practice. Yet, this process of cleaning up the language will uncover differences of opinion regarding facets of IA practice. Specifically, the practitioners of SEA need to resolve any fundamental disagreements regarding the goals and principles which define the process. Reaching a consensus on the core objectives and process of SEA will allow all practitioners to use the process more appropriately and effectively.

6.4 CONCLUSION

My work in investigating elements of a robust framework for SEA in Nova Scotia has highlighted how to begin formally incorporating environmental effects in strategic decision-making processes. With legislative requirements to become a world leader in sustainable prosperity, Nova Scotia must define these terms in a way that successfully

balances environmental, economic, and social dimensions. Adoption and implementation of a formal SEA process, or another method of assessment similar to what I have discussed in this document, is critical to aid decision-makers in developing and maintaining this balance.

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