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Article

***1 Adaptive Management in Canadian Environmental Assessment Law: Exploring Uses and Limitations**

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Adaptive management is a process-based and experimental approach to environmental management that enables the continuous improvement of management practices by learning about their outcomes. Although most commonly applied in the field of resource management, increasingly it is being applied in the context of project-specific environmental assessment and management, including under the Canadian Environmental Assessment Act (CEAA). In this context, adaptive management is being invoked for its potential to reduce uncertainties associated with proposed mitigation measures so that these can be taken into account when making determinations about a project's likely environmental effects. This article examines the use of adaptive management in this way to date and explores the limitations that CEAA may impose on such use.

***2 1. INTRODUCTION**

2007 was an important year for federal environmental assessment (EA) in Canada. From an environmental lawyer's perspective, the most significant development was the Federal Court's decision in *MiningWatch Canada v. Canada (Minister of Fisheries & Oceans)* [FN1] wherein Justice Martineau essentially turned the established jurisprudence with respect to the *Canadian Environmental Assessment Act* [FN2] on its head. [FN3] It was also probably the only year on record in which two federal-provincial review panels, the first respecting the proposed Kemess North Copper-Gold Mine in British Columbia and the second respecting the proposed Whites Point Quarry and Marine Terminal Project in Nova Scotia, recommended against approving those projects. [FN4] In the latter case, this recommendation, or perhaps more accurately the federal and provincial governments' subsequent acceptance of it, has also landed Canada in the cross-hairs of another environmentally-related investor challenge pursuant to Chapter 11 of the *North American Free Trade Agreement*. [FN5]

2007 was important for yet another, albeit more obscure, reason. Hidden away in the Whites Point Quarry (WPQ) panel's report was a less glamorous but more fundamental recommendation than the mere rejection of the project. Citing apparent confusion and a range of differing opinions about what adaptive management (AM) requires in the context of environmental assessment, the WPQ panel recommended that the Canadian Environmental Assessment Agency (the Agency) develop a guidance document on its application in the federal EA process:

... The review process revealed a range of opinions about what adaptive management requires. Interveners argued that adaptive management can *3 work only when basic conditions of scientific knowledge and environmental management are met. The Proponent used the term more loosely to suggest a process

of incremental adjustment based on learning from experience.

The Panel concluded that participants in environmental review processes require greater clarity from government on what adaptive management means; an agency like CEAA could assist the environmental assessment process by producing guidance documents on adaptive management. [FN6]

That AM was the subject of some confusion by this EA Panel could be viewed as both alarming and yet understandable. It is alarming because AM has been invoked by proponents in the context of what are often large-scale industrial projects with considerable environmental impacts for well over a decade. [FN7] It is even the subject of its own jurisprudence which, while still nascent, has nevertheless developed to the point where a Federal Court judge recently described AM as a “guiding tenet” in the interpretation of the CEAA. [FN8]

It is also understandable, however, because like the precautionary principle (or approach), [FN9] AM is vulnerable to varying interpretations. At their core, both are responses to the uncertainty associated with the environmental effects of human activities and the environment generally. If the precautionary approach can be distilled down to “better safe than sorry,” [FN10] AM, on the other hand, is about embracing uncertainty in order to learn from it.

Of course, as with the precautionary approach, such simplification masks considerable nuance, which, in turn, has led to misinterpretation, misuse, and abuse. [FN11] *4 Using a spectrum, one could place what was described by the WPQ panel as a “loose” approach -- which is not really AM at all [FN12] -- on the one end, and its rigorous conception, characterized by strict adherence to scientific principles and limitations, [FN13] on the other.

Where the choice between these two approaches is based upon considerations of a scientific or environmental management variety, leading AM practitioners will unanimously support the more rigorous conception. To the extent that AM is increasingly being relied upon by project proponents to satisfy statutory requirements imposed by CEAA, however, relatively little consideration appears to have been given in Canada to the legal implications of its use and -- more importantly -- misuse. [FN14] The Agency's recently published Operational Policy Statement (OPS), “Adaptive Management Measures under the *Canadian Environmental Assessment Act*,” [FN15] while clearly leaning towards a rigorous approach and having some legalistic undertones, is primarily practical in nature and does not appear intended to address any legal issues, *per se*.

As a starting point, AM is a process that involves the modification of management actions (“mitigation measures” in the context of CEAA), or the implementation of new ones, in response to new information about the environment. As in most other contexts, AM in the context of CEAA is being invoked where there is considerable uncertainty, especially with respect to the effectiveness of a proposed management action. [FN16] However, under CEAA it is also being used to try to help satisfy a legal requirement, namely, the test that a project is not likely to result in *5 significant adverse environmental effects. [FN17] In this context, it appears that AM is being offered up as a kind of warranty where the effectiveness of proposed mitigation measures may be viewed as too uncertain, thus clearing the way for these mitigation measures to be taken into account in making the ultimate environmental effects determination.

The purpose of this article is to explore the limits that CEAA may impose on AM being used in this way. It begins with a primer on AM (Part II), and then examines AM's present role in Canadian environmental law (Part III). Part IV explores the legal issues raised by the use of AM in the CEAA world and concludes that, much like in the natural world, there are limitations to such use.

Simply put, without clear and measurable objectives, indicators, hypotheses, thresholds, and commitments with respect to monitoring, follow up and adjustment, which is to say rigorous AM, there would appear to be little to no basis for concluding that the uncertainty associated with proposed mitigation measures will actually be reduced, let alone that these measures will prove effective and that significant adverse environmental effects will be mitigated. Similarly, a clear and legally enforceable commitment to the AM process appears necessary in order for a responsible authority (RA) to discharge its CEAA-imposed duty to ensure or be satisfied that such adaptive mitigation measures will actually be implemented. Under such circumstances, where regulatory compliance is measured by effectiveness rather than technical conformity, it is proponents who may stand to benefit the most from ensuring a rigorous approach to AM in order to maximize their learning and avoid unnecessary costs caused by poor AM design.

2. A PRIMER ON ADAPTIVE MANAGEMENT

Originally coined “adaptive environmental assessment and management” in the 1970s by ecologists C.S. Holling and Carl J. Walters at the University of British Columbia, the need for an adaptive approach to environmental assessment and management arose out of a recognition that although efforts to reduce uncertainty in EA are important, they need to be accompanied by equal efforts to design management experiments that account for uncertainty and to learn from unexpected outcomes. [FN18] This, according to Holling, goes to the heart of adaptive management, “an interactive process using techniques that not only reduce uncertainty but also benefit from it,” with a goal to develop “more resilient policies.” [FN19]

*6 Since that time, AM has undergone considerable evolution. As noted by Professor William Ross at the University of Calgary, it has shifted from policy development to applications in resource management (particularly in forestry and conservation). [FN20] While there does not appear to be a single, official definition -- AM having been the subject of at least 10 definitions over the years [FN21] -- the following relatively recent formulation appears to capture all the necessary ingredients:

In most environmental management domains ... there are varying degrees of certainty regarding the effectiveness of our actions in achieving desired objectives -- due to either gaps in our understanding, or changes in the ecosystems we are trying to manage. Adaptive management provides a way to systematically reduce this uncertainty. It is a rigorous approach for learning through deliberately designing and carrying out management actions as experiments, specifically to learn how the system responds to management and to increase the level of certainty regarding how best to achieve desired results (Walters 1986). It incorporates explicit articulation of hypotheses, designing management experiments to test these hypotheses, and then monitoring outcomes to refine hypotheses and build knowledge. [FN22]

While there may be some variability from one definition to another, there is general agreement that the AM process involves six steps, often explained using the following diagram (Figure 1) initially developed in 1985, with elaboration of the steps provided by Carol Murray and Dave Marmorek:

*7 Figure 1 [FN23]

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In the context of project-specific AM, Ross and others are clear that AM can only be effective in dealing with “the uncertainty associated with a *single or specific project impact* not the entire project itself.” [FN24] Moreover, Figure 1 makes clear that the level of detail required at the problem assessment step goes beyond

merely identifying a specific impact or problem, *e.g.* the restoration of wetlands destroyed as a result of strip mining. Rather, defining the problem includes defining measurable management objectives, identifying indicators of these objectives and making forecasts (hypotheses) about specific indicator response(s) to proposed management*8 options. [FN25] This step, as all the others, needs to be applied rigorously in order for AM to be successful:

Rigour is also an essential ingredient. If the management actions are implemented in a way that strays from the design, if the experimental design does not isolate the signal of interest from background noise (through spatial/temporal contrasts [*i.e.* baselines], replicates and controls), or if monitoring focuses on the wrong variables, scale or frequency, it will be difficult if not impossible to learn anything meaningful. [FN26]

Thus, where this article refers to a rigorous approach to AM, what is meant is one which meets the basic scientific and management conditions necessary for actually reducing uncertainty. Conversely, loose AM is intended to convey management “on the fly”, where little (if any) attention is given to experimental design and there are only vague commitments to adapt should “problems” arise. [FN27]

Even under a rigorous approach, however, AM has limitations and is not suitable for every kind of environmental problem. A major limitation raised by Ross is the availability of management options:

The major situation when [AM] should not be used is when there is no adaptation reasonably available. Thus, if there is the potential for a significant adverse effect and no known means of mitigating the effect in the event that [AM] monitoring determines such an effect, then it is inadvisable to use adaptive environmental management. [FN28]

Carol Murray and Marc Nelitz have suggested considering the following questions when deciding whether AM is the right approach for solving any given environmental management problem:

1) Is there significant uncertainty regarding what management actions will best achieve the desired outcomes? (Uncertainty is the driver for AM; if there is little or no uncertainty about the effects of management actions, there is no need to use AM, although some degree of monitoring is prudent to confirm assumptions and provide early warning of surprises.);

2) Is a management experiment the best way to reduce this uncertainty? (*E.g.* could you instead do retrospective analyses on data previously collected for some other purpose to find the answer?)

*9 3) Can you design a powerful enough management experiment to discern the effects of different management actions (*i.e.* to confidently detect cause-and-effect)?

4) Is sufficient monitoring (*i.e.* measuring enough indicators, and for long enough, to discern treatment effects from natural variability and confounding factors) feasible?

5) Can there be “safe failures” (*i.e.* if the management experiments “fail” or result in outcomes that are different from those desired, is this acceptable, or reversible)?

6) Is there support (institutional, stakeholder, partner) to implement adaptive management? [FN29]

While a negative answer to any of these questions suggests that AM may be “unnecessary, inappropriate, or unsuccessful,” [FN30] questions 3, 4 and 5 seem particularly relevant in the EA context. Questions 3 and 4 speak to spatial and temporal limitations to implementing AM, bearing in mind the difficulties associated with carrying out experiments not in a laboratory but rather in the natural world. Such experimentation is possible -- as farmers have demonstrated for thousands of years -- but becomes more difficult as problems increase in complexity and scope. Thus, while localized habitat restoration can be relatively easy, attributing changes in a species' population levels to certain management actions can be quite difficult, especially where a species has a

broad range that challenges managers' ability to maintain both treated and controlled environments. Question 5 is worth noting because it brings to the foreground an important caveat: there is a fundamental difference between reducing uncertainty (*i.e.* learning) and actually reducing impacts. Provided that AM is appropriate for a given problem and applied rigorously, the former is guaranteed but the latter is not; it may be that what is learned through AM is that none of the proposed mitigation measures work, in which case negative impacts, including potentially significant ones, could result.

An important distinction is also made between two types of AM, passive and active:

In active AM, managers explicitly recognize in step 1 [see Figure 1] that they are uncertain about which activities will best meet management objectives, and select several as alternatives to test according to the steps and elements in the cycle. In passive AM, the management action believed to be the best (e.g. best practice) is taken through the cycle, still following the elements in each step (e.g. in step 1 the rigour of identifying objectives, uncertainties, hypotheses, assumptions and indicators, and making predictions, would still occur). The only thing missing with good passive AM is the design and implementation of *alternative* treatments. [FN31]

It is very important that the distinction between passive and active AM not be confused with the difference between loose AM and rigorous AM. Both passive and active AM can be applied rigorously, whereas loose AM is not actually AM at *10 all. Active AM tends to be favoured by practitioners because passive AM can result in missed opportunities to improve the system being managed. [FN32]

In summary, AM can be a powerful tool for managing and ultimately reducing the uncertainty associated with specific environmental effects and making better management decisions (Figure 2, below) but only if it is applied rigorously; uncertainty will not be reduced without strong experimental design and a commitment to implementation. In addition, AM is not a *panacea*, or a “one size fits all” solution, to environmental problems. Certain kinds of potential environmental effects, like those that are large-scale and irreversible, may be unsuitable for AM. This is especially the case when one considers that reducing uncertainty is not the same as reducing impacts or adverse effects.

***11 Figure 2 [FN33]**

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3. ADAPTIVE MANAGEMENT IN CANADIAN ENVIRONMENTAL LAW

(a) The Statutory Context

Bearing in mind the focus of this article, it may come as something of a surprise that CEAA actually makes only one reference to AM, and an undefined one at that. That reference is found in s. 38, which deals with “follow-up programs”:

38. (1) Where a responsible authority [RA] takes a course of action under paragraph 20(1)(a), it shall consider whether a follow-up program for the project is appropriate in the circumstances and, if so, shall design a followup program and ensure its implementation.

(2) Where a responsible authority takes a course of action under paragraph 37(1)(a), it shall design a

follow-up program for the project and ensure its implementation ...

(5) The results of follow-up programs may be used for implementing *adaptive management measures* or for improving the quality of future environmental assessments. [FN34]

*12 Generally speaking, the primary objective of an EA under CEAA is to determine whether a project is likely to result in significant adverse environmental effects (“the environmental effects determination”). In making this determination, an RA [FN35] (in the case of a screening or comprehensive study) or a panel (in the case of a panel review) is authorized to consider any mitigation measures that are economically and technically feasible and that they deem appropriate. [FN36]

Follow-up programs, then, are a means of “(a) verifying the accuracy of the [EA] of a project, and (b) determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the project.” [FN37] Following amendments to CEAA in 2003, [FN38] s. 38 states that follow-up programs are optional for projects that underwent a screening type of assessment, but mandatory where a project underwent either a comprehensive study or panel review -- a reflection of the latter kind of project's greater potential for environmental harm. Section 38 goes on to indicate in a permissive way that the results of such programs *may* be used for implementing AM measures -- nothing more, nothing less.

Viewed in this light, the confusion surrounding AM noted by the WPQ panel seems all the more understandable, and may explain why the Agency did recently publish its OPS on AM. This document appears to be generally consistent with the discussion in Part II, [FN39] though it is perhaps not as comprehensive as the guidance recently provided by the United States Department of Interior to its member agencies.*13 [FN40] The Agency's OPS does, however, provide some specific guidance with respect to CEAA. For example, it explains that AM is not a substitute for identifying mitigation measures under CEAA:

Section 16 of the Act requires every type of EA to consider measures that are technically and economically feasible, and that would mitigate any significant adverse environmental effects. The implementation of these measures is then taken into consideration by the responsible authority when making its course of action decision. Therefore, it is insufficient to assert that implementation of an unidentified future measure, developed as a result of adaptive management, constitutes mitigation of a predicted adverse environmental effect. [FN41]

That being said, the Agency's OPS goes on to say that since roles and responsibilities for AM are not explicitly provided for in the Act, many of its suggestions should be considered as “best practices only.” [FN42] Thus, while it will be referred to from time to time, it is not particularly helpful in fleshing out the legal limitations that CEAA's overall structure may impose on those invoking AM.

CEAA also contains other provisions for dealing with uncertainty that should be noted here. The first and most obvious ones are those dealing with the precautionary principle or approach. Ensuring that “projects are considered in a careful and precautionary manner” is one of the purposes of CEAA pursuant to s. 4. Subsection 4(2) also imposes a duty on RAs and other federal authorities to exercise their powers “in a manner that ... applies the precautionary principle.” [FN43] As noted by Professor Tollefson, however, “to date, within much of the jurisprudence, [the precautionary principle] has been adverted to as a discretionary consideration or background interpretive canon.” [FN44]

Two additional mechanisms exist. Where, following the completion of a screening, an RA is “uncertain whether the project, taking into account the implementation of any mitigation measures that [it] considers appropriate, is likely to cause significant adverse environmental effects,” the RA must refer the project to the Minister

for a referral to a mediator or a review panel. [FN45] On its face, this provision could be seen as placing some kind of limit on the amount of uncertainty that an RA could accept in the case of screenings. [FN46]

*14 A somewhat similar mechanism exists with respect to comprehensive studies. Pursuant to ss. 21(2), following public consultations on the proposed scope of the project to be assessed and several other enumerated items, an RA must, “as soon as it is of the opinion that it has sufficient information to do so,” report to the Minister of the Environment regarding “(iii) the potential of the project to cause adverse environmental effects, and (iv) the ability of the comprehensive study to address issues relating to the project.” [FN47] The RA must also recommend to the Minister whether to continue with the EA by means of a comprehensive study, or whether to refer the project to a mediator or review panel. [FN48] In both of these cases, uncertainty with respect to a project's potential environmental effects or proposed mitigation measures would seem to be reasonably caught by the wording in these provisions.

(b) The Jurisprudence

As noted above, there is a small but growing body of jurisprudence respecting the role of AM in Canadian environmental law. The first case to consider AM may have been *Environmental Resource Centre v. Canada (Minister of Environment)*. [FN49] In that case, a group of non-governmental organizations (NGOs) challenged the sufficiency of the comprehensive study report (CSR) submitted to the federal Minister of the Environment (MOE) in relation to the proposed expansion of an existing oil sands mine operated by Suncor.

With respect to AM specifically, it appears to owe its jurisprudential debut to the NGOs' argument that the Minister erred in law to the extent that she relied on Alberta's Regional Sustainable Development Strategy (RSDS) as a mitigation measure in relation to the project's cumulative environmental effects. The RSDS was described in court as a voluntary, consensus-based, multi-stakeholder process involving all of the companies operating in the Athabasca oil sands region, federal and provincial government agencies, affected municipalities and towns, First Nations and non-governmental groups. [FN50]

In response, the MOE argued that the RSDS was an example of AM:

[The Ministers] characterize the environmental assessment process under the CEAA as a flexible one, where environmental effects and mitigation measures could be considered together ...

The Respondent Ministers go further and submit that the implementation of the environmental process in an adaptive way is sound in law and science, and that adaptive management is an appropriate tool to address the inherent uncertainties in the environmental assessment process. In both their written and oral arguments, the Respondent Ministers promote the idea that adaptive*15 management, as illustrated by the RSDS, was properly relied on in this case. [FN51]

Ultimately, the Federal Court held that regardless of whether the RSDS was “an example of the science of adaptive management” [FN52] it was a process over which the Minister had no control and in which she participated only as a voluntary stakeholder. As such, it did not meet the requirements of the Act as it existed at that time.

The next -- and more substantive treatment -- can be found in *Canadian Parks & Wilderness Society v. Canada (Minister of Canadian Heritage)*, [FN53] where an association between AM and the precautionary principle appears to have been first perceived:

The concept of “adaptive management” responds to the difficulty, or impossibility, of predicting all the environmental consequences of a project on the basis of existing knowledge. It counters the potentially paralyzing effects of the precautionary principle on otherwise socially and economically useful projects. The precautionary principle states that a project should not be undertaken if it may have serious adverse environmental consequences, even if it is not possible to prove with any degree of certainty that these consequences will in fact materialize. Adaptive management techniques and the precautionary principle are important tools for maintaining ecological integrity. [FN54]

In that case, the applicants argued that the Minister had knowledge of a variety of environmental harms associated with the construction of a road through Wood Buffalo National Park such that her approval of said road was unreasonable in the circumstances. The Federal Court of Appeal disagreed, relying in large part on commitments made with respect to AM:

... In my opinion, however, there was a rational basis for the Minister's conclusion that, when combined with mitigative measures and adaptive management techniques designed to identify and deal with unforeseen effects, any adverse environmental effects were unlikely to be significant ...

I do not find it necessary to address [the variety of environmental harms] in detail here. Suffice it to say that, for the most part, the environmental screening assessment report ranked each of the risks as low, with the exception of the weed problem, although the report also noted that information was somewhat sparse. These concerns are nearly all addressed in the Minister's decision. In addition, the construction and maintenance agreement between the Parks Canada Agency and Thebacha provides for extensive mitigation measures and adaptive management techniques, together with enforcement provisions. Similar conditions will also be attached to the various permits and permissions that the agreement requires Thebacha to obtain ... [FN55]

*16 Most recently, AM was given its most prominent role to date in *Pembina Institute for Appropriate Development v. Canada (Attorney General)*. [FN56] The applicants in that case, again a group of NGOs, challenged the sufficiency of the report written by the joint review panel established by the Alberta Energy and Utilities Board (AEUB) and Canada with respect to the proposed Kearsy Oil Sands (KOS) mine.

After setting out CEEA's legislative scheme, including the first reference to ss. 38(5) (the term “adaptive management” not having been part of CEEA at the time of the preceding two cases) [FN57], the Federal Court dedicated an entire section to what it dubbed “Guiding Tenets”:

The powers associated with the administration of the CEEA are to be exercised “in a manner that protects the environment and human health and applies the precautionary principle” (s. 4(2)).

In recent amendments to the CEEA [Bill C-9], acting in a manner consistent with the precautionary principle was specifically introduced in s. 4 as a duty bearing upon “the Government of Canada, the Minister, the Agency and all bodies subject to the provisions of this Act, including federal authorities and responsible authorities” in the administration of the CEEA.

In the case of *114957 Canada Ltée (Spray-Tech, Société d'arrosage) v. Hudson (Ville)*, [2001] 2 S.C.R. 241, [2001] S.C.J. No. 42 at para. 31, the Supreme Court of Canada cited the definition of the precautionary principle from the Bergen Ministerial Declaration on Sustainable Development (1990):

In order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation

An approach that has developed in conjunction with the precautionary principle is that of “adaptive management”. In *Canadian Parks and Wilderness Society* [see above], Evans J.A. stated that “[t]he concept of ‘adaptive management’ responds to the difficulty, or impossibility, of predicting all the environmental consequences of a project on the basis of existing knowledge” and indicated that adaptive management counters the potentially paralyzing effects of the precautionary principle. Thus, in my opinion, adaptive management permits projects with uncertain, yet potentially adverse environmental*17 impacts to proceed based on flexible management strategies capable of adjusting to new information regarding adverse environmental impacts where sufficient information regarding those impacts and potential mitigation measures already exists.

Accordingly, the scope of the duties incumbent upon a panel must be viewed through the prism of these guiding tenets: the precautionary principle and adaptive management ...

In sum, the CEAA represents a sophisticated legislative system for addressing the uncertainty surrounding environmental effects. To this end, it mandates early assessment of adverse environmental consequences as well as mitigation measures, coupled with the flexibility of follow-up processes capable of adapting to new information and changed circumstances. The dynamic and fluid nature of the process means that perfect certainty regarding environmental effects is not required. [FN58]

In *Kearl*, AM was invoked in the context of the mine's end pit lakes and ultimate reclamation. With respect to end pit lakes, the NGOs argued that by recommending further testing of modelling predictions, this mitigation measure was not “technically and economically feasible” such that it was not one available to the panel for its determination as to whether end pit lakes were likely to result in significant adverse environmental effects. [FN59] The Federal Court rejected this argument:

... In my view, the Panel took a precautionary approach by demanding that an operator validate modelling predictions by testing end pit lake technology.

Indeed, this approach is broadly consistent with the principles of adaptive management. As Evans J.A. asserted in *Canadian Parks and Wilderness Society, supra*, at para. 24, “[t]he concept of “adaptive management” responds to the difficulty, or impossibility, of predicting all the environmental consequences of a project on the basis of existing knowledge.” The same holds true for the assessment of mitigation measures. While there does exist some uncertainty with respect to end pit lake technology, the existing level of uncertainty is not such that it should paralyze the entire project.

Thus, based on the information that was before it, including the modelling predictions, the Panel accepted the measure as technically and economically feasible. The fact that uncertainty remained regarding end pit lakes in the oil sands region is understandable given that they will only become operational upon mine site closures. Thus, the Panel recommended the validation of modelling results, including a physical test case and continued research, well in advance of the slated closure date in 60 years.

In my opinion, the Panel is permitted and indeed mandated to make these kinds of recommendations regarding the proposed Project, which should include recommendations for continued study of potential impacts on valued environmental components and the development of further mitigation strategies. This is consistent with the ongoing and dynamic nature of environmental*18 assessment referred to above and ensures that new information is obtained which facilitates the adaptation of project implementation as required. [FN60]

AM also came up in the context of reclamation of peatlands, which the applicants argued “is not even known in general terms.” [FN61] With respect to AM specifically, the NGOs argued that “relying on [AM] to address uncertainty and future risk requires at least some general understanding initially of the mitigation system in play.” [FN62] Here too, however, the Federal Court agreed with the respondents:

The respondents submit that the dynamic nature of follow-up measures and adaptive management will resolve initial uncertainties. Further, sufficient information was available to the Panel which enabled it to reasonably conclude as it did. I agree. The recommendations are not necessarily flawed because the evidence was insufficient to eliminate all uncertainty. The Panel had before it information indicating that while the reclamation of peat-accumulating wetlands remained uncertain, there is considerable experience with respect to wetland and marsh reconstruction and that Imperial Oil's closure plan called for the reconstruction of approximately 900 hectares of marsh ...

Thus, while uncertainties with respect to reclamation of peat-accumulating wetlands remained, they could be addressed through adaptive management given the existence of generally known replacement measures contained in Imperial Oil's mine closure plan. Indeed, it is worth noting that the Panel cited with approval the reclamation milestones from Imperial Oil's Project Application in its Report. [FN63]

From the foregoing, it is clear that AM has come to play a considerable, if not entirely consistent, role in Canadian environmental law. It has been invoked as a mitigation measure unto itself, as a response to the "potentially paralyzing" effects of precautionary principle and, most recently, as a "guiding tenet" in the interpretation of the scope of the duties imposed by CEAA.

(c) Discussion

Bearing in mind the discussion in Part II, it is clear that, whatever else it may have been, the RSDS relied upon in *Suncor* was not "an example of the science of adaptive management." As is now known, this voluntary, multi-stakeholder initiative did eventually manage to identify and prioritize 72 environmental issues within the oil sands region to be *studied*, but it had no mandate to either mitigate or monitor those issues. Similarly, it could not set objectives, formulate hypotheses or institute corrective action. [FN64] Moreover, the body tasked with eventually undertaking approximately one-half of this research, the Cumulative Environmental Management *19 Association (CEMA), did not manage to settle on its own Terms of Reference until 2004 -- three years after the Federal Court's decision -- and has since been routinely criticized for failing to meet deadlines. [FN65] Ultimately, attempts to pass such schemes off as AM simply fuel concerns already raised by American legal scholars that the invocation of AM "will translate into a kind of open-ended discretion likely to yield to unprincipled compromise, self-dealing, and a lack of accountability in basic governance processes." [FN66]

In both the *CPAWS* and *Kearl* decisions, on the other hand, AM was more properly situated as a process for dealing with specific environmental effects: those associated with a road in the case of the former; end pit lakes and peatland reclamation in the latter. Both decisions, however, are also troubling in several respects, most of which can be traced back to the misconception, first articulated in the *CPAWS* decision, that AM is somehow a response to the precautionary principle and its "paralyzing effects." [FN67]

Aside from being historically inaccurate, [FN68] and bearing in mind that a detailed discussion of that principle is beyond the scope of this article, the precautionary principle would not seem paralyzing at all, at least not in its more common formulations. [FN69] That the Federal Court of Appeal thought so can be explained by considering the very strong -- to the extent of being erroneous -- formulation upon which it relied. [FN70] Unfortunately, and notwithstanding the fact that it had just cited one of the more common and accepted formulations of the principle in a preceding paragraph, [FN71] the Federal Court in *Kearl* not only endorsed this relationship but also *20 built upon it, weaving its logic with the provisions of CEAA into a generalized framework for dealing with uncertainty. While such judicial attempts to develop consistent, *quasi*-objective, approaches to decision-making in the environmental context can be a positive development [FN72] -- a similar approach with respect to

the precautionary principle by an Australian court has been met with considerable approval -- in *Kearl* the results are less than ideal. [FN73]

In the Australian case, *Telstra Corporation Ltd. v. Hornsby Shire Council*, [FN74] the Land and Environment Court of New South Wales applied a three-stage framework to applying the precautionary principle, which had been incorporated into the relevant EA legislation: (1) conditions precedent to its application, including “threats of serious or irreversible damage” and “scientific uncertainty”; (2) shifting the burden of proof to the applicant; and (3) governmental response. [FN75] This framework has been described as “the best illustration of a judicial attempt to train the precautionary principle to play a meaningful role in domestic litigation.” [FN76]

In *Kearl*, a similar “training” seems underway. Thus, the Federal Court stated at the outset its view that AM “permits projects with uncertain, yet potentially adverse environmental impacts to proceed.” [FN77] The problem with this statement, however, is that CEAA itself permits projects with merely adverse effects to proceed, without the need to resort to AM or any mitigation whatsoever; adverse effects have to be *significant* in order to prevent projects from proceeding. [FN78] In such instances, such effects have to be either unlikely to occur or be capable of mitigation. [FN79] The converse side of this is that where mitigation measures are proposed (*e.g.* as in the case of end pit lakes or peatland restoration), one can assume that the adverse environmental effects have been deemed both likely and significant, such *21 that without mitigation or where there is too much uncertainty with respect to its effectiveness, a finding that significant adverse environmental effects are unlikely could be viewed as unreasonable. [FN80]

With this important correction in mind, the *Kearl* approach to the environmental effects determination under CEAA appears almost identical to the *Telstra* framework, with CEAA's “significant adverse environmental effects” standing in for “serious and irreversible damage” in step (1) but still coupled with scientific uncertainty. Although no explicit shifting of any burden of proof is mentioned, the Federal Court did hint at some kind of shifting when it stated that “while there does exist some uncertainty with respect to end pit lake technology, [it] is not such that it should paralyze the entire project.” [FN81] This passage implies that there is a level of uncertainty which would prevent an RA or a panel from reasonably relying on proposed mitigation measures. Where that level of uncertainty has been established, the Federal Court in *Kearl* has signalled that proponents can invoke AM as a means of “resolving” it. [FN82]

This brings into focus the third, and perhaps most important, difficulty with the *CPAWS* and *Kearl* approach to AM: the automatic association of what is supposed to be an experimental approach to environmental problems with “threats of serious or irreversible damage” or “significant adverse environmental effects.” Simply put, there would seem little room for “safe failures” in this context. The likely result is that AM will lose much of its experimental nature, devolving into a reactionary response to foreseeable -- if not imminent -- harm, which is not actually AM at all. At the very least, its passive form would seem favoured, where the most certain management option (*e.g.* best practice) is applied first without implementing alternatives, some of which would obviously be expected to fail. Paradoxically, this could make significant adverse environmental effects all the more likely, bearing in mind that active AM is the more powerful learning tool.

It must also be recalled that reducing uncertainty and learning are not the same as reducing or mitigating adverse environmental effects. As previously noted, it may be that what is learned through rigorous AM is that none of the proposed mitigation measures work, in which case adverse effects could well result, including*22 significant ones. It is perhaps not surprising, therefore, that the Agency OPS on AM seems to advise against the use of AM in such circumstances:

If, taking into account the implementation of mitigation measures, there is uncertainty about whether the project is likely to cause significant adverse environmental effects, a commitment to monitor project effects and to manage adaptively is not sufficient. A commitment to implementing adaptive management measures does not eliminate the need for sufficient information regarding the environmental effects of the project, the significance of those effects and the appropriate mitigation measures required to eliminate, reduce or control those effects. [FN83]

That being said, the Federal Court in *Kearl* was correct when it stated that “perfect certainty regarding environmental effects is not required” [FN84] -- RAs and panels need only determine that a project is not *likely* to result in significant adverse environmental effects, and it is fair to suggest that AM -- if rigorously applied to appropriate environmental problems -- makes such a result less likely. Thus, while the destruction of vast areas of peatland may well constitute a significant adverse environmental effect, the relatively large sampling size created as a result of this destruction presents an opportunity for implementing multiple alternative management actions (e.g. small-scale pilot projects), maximizing learning and ostensibly leading to better decision-making (see Figure 2, *supra*). It may also be that AM is being invoked not only where a discrete environmental effect may be significant, but where the sum of several otherwise merely adverse effects could be considered significant pursuant to a cumulative effects analysis. [FN85]

Whether or not such an approach is precautionary is another matter. It is arguable that a precautionary approach to the issue of end pit lakes or peatland restoration would be to require AM experiments to be conducted -- and learning derived -- prior to the full-scale implementation of the project and before potentially irreversible damage occurs. [FN86]

This much is clear: AM in the context of CEAA is being used to help satisfy the statutory requirement that a project is not likely to result in significant adverse environmental effects. Specifically, it is being invoked to reduce the uncertainty associated with mitigation measures whose effectiveness is in doubt so that these can be taken into account in making the environmental effects determination, the *23 AM process standing in as a kind of proxy for effective mitigation. The limitations that CEAA may impose on such a role are the focus of the next part.

4. LIMITATIONS ON THE USE OF AM UNDER CEAA

As noted in Part III, CEAA itself says very little about AM, and certainly does not include any explicit limitations to its use. This does not mean, of course, that such limits do not exist. Rather, as stated by the Supreme Court, by virtue of the rule of law principle, “[a]ll decision-making powers have legal limits, derived from the enabling statute itself, the common or civil law or the Constitution.” [FN87]

In my view, the limits that CEAA imposes on the use of AM derive from the provisions dealing with the environmental effects determination. [FN88] In making this determination, an RA or a panel may take into account any mitigation measures that it considers appropriate, provided that these are technically and economically feasible. In addition, through the combined operation of paragraphs 20(1.1) (for screenings) and 20(2) and paragraphs 37(2)-37(2.2) (for comprehensive panels and reviews), mitigation measures that are taken into account must fall into one of two categories: (a) those whose implementation the RA can ensure, in which case it is not limited to its duties or powers under any other Act of Parliament; and (b) those that it is satisfied will be implemented by another person or body.

(a) Technically And Economically Feasible Mitigation Measures Must Still Be Identified

As a starting point, it is clear that AM is not mitigation in and of itself. [FN89] AM is not a form of restitution for damage to the environment like replacement, restoration, or compensation; [FN90] nor does it eliminate, reduce or control adverse environmental effects [FN91] as would a sedimentation curtain, a wildlife corridor or the establishment of a set-back in a riparian zone. Rather, and at the risk of sounding repetitive, AM is a process through which such measures may be modified or new ones identified and implemented on the basis of new information.

Nor is there any basis for suggesting that AM somehow removes the requirement, pursuant to paragraph 16(1)(d), that mitigation measures be technically and economically feasible. There is relatively little treatment of these terms in the case law, but they appear to have taken on their plain meaning. With respect to technical feasibility or “known technologies” as they were known in paragraph 12(c) of the *24 *Environmental Assessment Review Process Guidelines Order* (EARPGO), the Federal Court in *Canadian Wildlife Federation Inc. v. Canada (Minister of the Environment)*, [FN92] held that “since the Minister did not identify any known technologies but only *vague hopes for future technology*, it is not possible to consider that the recited adverse water quality effects are mitigable.” [FN93]

What remains is an RA's or panel's opinion as to whether or not mitigation measures are “appropriate.” It is under this seemingly broad umbrella that AM appears to be playing its role, promising to “resolve initial uncertainties” [FN94] associated with proposed mitigation measures, clearing the way for these to be taken into account in the environmental effects determination. This explains why the jurisprudence with respect to AM predates its introduction in the CEEA in 2003 and appears relatively out of proportion with the singular reference to it in s. 38.

(b) Reliance On AM Must Be Reasonable

Because the invocation of AM ultimately informs the environmental effects determination, it follows that its invocation in this context must be reasonable. While various Canadian courts have reiterated that they do not sit as an “academy of science” [FN95] and that a determination with respect to environmental effects is not a wholly objective exercise but rather contains “a large measure of opinion and judgement,” [FN96] they have also cautioned that their approach will not be “so deferential as to exclude all enquiry into the substantive adequacy of the environmental assessment. To adopt this approach would risk turning the right to judicial review ... into a hollow one.” [FN97]

Consequently, just as neither an RA nor a panel could reasonably take into account mitigation measures that had no likelihood of success, so too would they seem precluded, as an example, from blindly accepting a proponent's plan to apply AM no less than 140 times for a single project. [FN98] On the contrary, before an RA or panel relies on AM in making an environmental effects determination, they should be reasonably satisfied that AM is an appropriate response to the environmental problem for which it is being proposed and that it will be implemented in such a manner as to actually reduce uncertainty and increase learning, which is to say that a rigorous conception of AM is being proposed. Factors that could be considered and which would inform these determinations are generally those discussed in Part II, and include the following:

- *25 • Has the proponent demonstrated an understanding of AM, including the six steps?
- Is active AM being proposed, or will it be passive AM?

- Have clear objectives been articulated?
- Are these objectives measurable (*i.e.* are indicators available)?
- Are the different management options (mitigation measures) economically and technologically feasible?
 - Is sufficient monitoring provided for (*i.e.* measuring enough indicators, and for long enough, to discern treatment effects from natural variability and confounding factors)?
 - Have thresholds for corrective action been established and committed to?
 - Is it feasible to assess compliance with these thresholds and, if necessary, make adjustments in mitigation measures prior to the occurrence of significant adverse environmental effects?
 - What are the risks of failure?

Obviously, a proponent's failure to articulate an understanding of the principles of AM would undermine the reasonableness of any reliance on it. With respect to the second factor, the kind of AM that is being proposed should generally correspond to the degree of uncertainty associated with the environmental problem. The higher the uncertainty, the less reasonable reliance on passive AM would seem to be, bearing in mind that active AM is the more powerful learning tool. At the very least, the use of passive AM should diminish the extent to which AM can be invoked to resolve uncertainties with respect to environmental effects (assuming that courts build on the framework proposed in *Kearl*). A consideration of the other factors would further ensure that AM is appropriate in the circumstances and can reasonably be expected to build knowledge that, in turn, will ensure effective mitigation.

Alternatively, RAs and panels could rely on third party or expert evaluations of proponent's AM plans, which is precisely what the Department of Fisheries and Oceans (DFO) recently did in the context of the Ekati and Diavik diamond mines. [FN99]

Whatever the case, if there is no consideration of these issues in an RA's or panel's report, or no basis for a conclusion either way in the record (*e.g.* proponent's EIS, conditions in anticipated regulatory approvals, etc.), then reliance on AM may be inappropriate in the circumstances. [FN100]

***26 (c) RAS' Implementation Duties Favour Rigorous AM**

Not only does a clear commitment to AM appear necessary to support an RA's or panel's environmental effects determination, but it also seems necessary in order for an RA to discharge its statutory duty to (a) ensure the implementation of mitigation measures or (b) be satisfied thereof ("the implementation duty").

With respect to the first category (a), the Federal Court in *Suncor* held that an RA has "a non-delegable statutory duty to ensure the implementation of mitigation measures" [FN101] such that it could not, in that case, rely on the mitigation measures proposed and in place for the province of Alberta. [FN102] Following amendments to CEEA in 2003, however, such reliance would now seem permitted (category (b)), as would contractual agreements with third parties (*e.g.* independent monitoring agencies). [FN103]

In any event, both categories would still seem to require some *basis* for concluding that mitigation measures will be implemented, and, if the Pembina Institute's recent difficulties with Royal Dutch Shell with respect to voluntary greenhouse gas commitments are any indication, [FN104] voluntary agreements or promises would not seem sufficient. The two most obvious candidates, therefore, are regulatory and contractual obligations, with the important *proviso* that where AM has been relied upon it is not just the implementation of the mitigation measures themselves that is of concern but rather the entire AM process; gathering baseline data, developing hy-

potheses, defining objectives, designing mitigation measures, monitoring, evaluating and adapting accordingly. [FN105]

That the implementation duty should not be considered discharged by merely ensuring or being satisfied of the implementation of mitigation measures whose *27 effectiveness is plainly in question becomes clear when one considers the logic behind it. CEAA would be a poor tool for environmental protection if RAs and panels could justify their environmental effects determination on the basis of all sorts of mitigation measures whose implementation was never actually contemplated. [FN106] While reliance on AM may complicate matters because the precise measures that will ultimately be implemented may not yet be known, failure to apply this duty to the AM process would lead directly to the kind of open-ended discretion, self-dealing, and lack of accountability foreshadowed by American legal scholars and, most importantly, a circumvention of the CEAA scheme.

Of course, if AM met the definition of a mitigation measure, there would be no problem. Because it does not, however, there are really only two options. The first is to find that the implementation duty cannot be interpreted as applying to the AM process, in which case RAs and panels would seem precluded from relying on AM in the first place. [FN107] The second is to conceptualize the mitigation measures subject to the duty as those developed through the AM process (e.g. “adaptive mitigation measures”). Thus, where AM has been relied upon in the environmental effects determination, RAs would have a duty to ensure or be satisfied of the implementation of adaptive mitigation measures, which would mean the full implementation of AM. [FN108]

Turning towards implementation, any regulatory or contractual instrument would need to include, as a minimum, an explicit commitment to the full cycle of steps that constitutes AM. In the regulatory context, the absence of such conditions, or lack of clarity with respect to terms, could leave regulators without recourse if and when uncertain mitigation measures fail.

Such a state of affairs was foreshadowed by the events following the *Kearl* decision. By the time the Federal Court released its decision in that case, remitting the report to the original panel for additional rationale with respect to its recommendations concerning greenhouse gas emissions, DFO had already issued its ss. 35(2) *Fisheries Act* authorization to Imperial Oil for the harmful alteration, disruption or destruction of fish habitat. With the status of that authorization in doubt, Imperial hauled DFO back into court and sought an injunction, arguing that “there is nothing in the *Fisheries Act* allowing the Minister to revoke the subsection 35(2) authorization or revisit his decision to grant the authorization.” [FN109]

*28 The authorization was ultimately held to be a nullity such that Imperial's argument was never really considered, [FN110] but it seems clear that Imperial was invoking the doctrine of *functus officio*, according to which an agency or tribunal lacks the capacity to reopen or reconsider a matter it has finally decided, even in the event of new evidence. [FN111] Simply put, RAs must ensure that any regulatory instruments state clearly what kinds of measures are required and when, failing which traditional principles of administrative law may thwart attempts to implement AM. As noted by Professors Benidickson, McLeod-Kilmurray, Chalifour and others in their pioneering report on the precautionary principle and AM to the SSHRC and the Law Commission of Canada in 2005,

[AM] raises most distinctly the divergence between administrative decisionmaking and science with regard to their visions of finality. As we have seen, AM calls for decisions taken in the face of uncertainty to be taken as hypotheses, to be tested and re-evaluated as additional information becomes available. By contrast, administrative decision-makers and reviewing courts have as one of their primary goals the *final*

resolution of disputes or determination of matters before them. Fundamental legal principles such as the rule of precedent, *res judicata*, and *functus officio* all indicate the quest, at least in the traditional view to date, of administrative tribunals and courts for certainty and finality. This satisfies the parties and others relying on the law to know their position and arrange their affairs. If administrative and judicial decisions become temporary or tentative, the argument is that this will reduce the certainty, predictability and hence legitimacy of the legal system. [FN112]

The same principles apply in the world of contracts. Where a written agreement exists, parties are generally bound by its terms -- no more. [FN113] Moreover, in order to be enforceable by the courts, a contract must be sufficiently clear to satisfy a court that the parties reached *consensus ad idem* (meeting of the minds) on its essential terms. [FN114] As noted by the Alberta Court of Appeal in *Ron Gitter *29 Property Consultants Ltd. v. Beaver Lumber Co.*, one of the reasons why such a meeting of the minds may not occur is mistake:

There are three types of mistake: common, mutual and unilateral ... Common mistake occurs when the parties make the same mistake. For example, one party contracts to sell a vase to another when unbeknown to both, the vase was destroyed and no longer exists. Mutual mistake occurs when both parties are mistaken, but their mistakes are different. In this event, the parties misunderstand each other and are, to use the vernacular, “not on the same page”. Unilateral mistake involves only one of the parties operating under a mistake. If the other party is not aware of the one party's erroneous belief, then the case is one of mutual mistake but if the other party knows of it, of unilateral mistake ... [FN115]

It is not hard to see how, in the absence of clear terms, including management objectives, indicators, thresholds for action and so on, proponents or other third parties may not be “on the same page” as RAs with respect to their obligations, with the result that if and when disagreements arise as to what is required in a given situation, an agreement to apply AM may be deemed unenforceable.

Ultimately, whether or not a regulator would be barred from reconsidering a permit or an agreement deemed unenforceable will depend on the facts and relevant legislation in each case. [FN116] An alternative approach may be for administrative decision-makers to explicitly acknowledge the relevance of uncertainty, issue time-limited or conditional permits and authorizations, and then explain in their reasons why such an approach is still efficient, fair and legitimate. [FN117] It is clear, however, that failure to do so, or to ensure that the full suite of AM-related steps are included in permits or agreements, leads to considerable uncertainty as to their implementation; uncertainty that arguably prevents RAs from discharging their statutory duty to ensure such implementation or be satisfied thereof.

Of course, a clear commitment to the six steps is not synonymous with rigorous AM. Under such circumstances, however, where regulatory compliance is based not on technical conformity but rather effectiveness (*e.g.* performancebased), it is proponents who would seem to benefit the most from ensuring as much rigour -- and, therefore, as much learning -- as possible. Otherwise, proponents could easily be on the hook over the long term for more monitoring, more mitigation, and the associated higher costs associated therewith.

***30 5. CONCLUSION**

The invocation of AM in the context of EA is undoubtedly on the rise. To some extent, this can be attributed to advances in AM techniques and knowledge gleaned from experience. Unfortunately, it can also be attributed to misconceptions about what AM is and what it requires. In the context of CEAA specifically, it is being driven by Canadian courts' increased familiarity with the precautionary principle, their willingness to give it “some spe-

cific work to do,” [FN118] and their general perception that AM is an appropriate response to scientific uncertainty in this context.

As such, it is essential that courts understand AM, its appropriate uses, and limitations. The jurisprudence to date suggests that while its basic premises are understood, AM is at risk of being both oversold and underdelivered. With respect to the former, AM is not a *panacea* to environmental problems; there are limits to experimentation in the natural world. With respect to the latter, it is clear that in order for AM to live up to its promise of reducing uncertainty, basic conditions of scientific knowledge and environmental management must be met. Failure to implement any one of AM's six steps, or implementing these without sufficient rigour, can unravel AM's potential and lead to serious and irreversible environmental damage.

This means that before RAs or panels can rely on AM to reduce the uncertainty associated with mitigation measures and ultimately the significance and likelihood of any adverse environmental effects in the EA process, they should have a reasonable basis for concluding that such uncertainty will actually be reduced, which is to say, that a rigorous and committed approach to AM is being contemplated. Moreover, CEAA's requirements that RAs ensure or be satisfied that mitigation measures will be implemented, coupled with principles of administrative and contract law, provide an additional driver for ensuring a clear commitment to the AM process. Under such circumstances, where regulatory compliance is based not on technical conformity but rather effectiveness, it is proponents who have a clear financial stake in ensuring as much rigour -- and, therefore, learning -- as possible.

[FN1]. LL.M. Candidate (UC Berkeley 2011), LL.B., B.Sc. (University of Saskatchewan). The views and opinions expressed in this article are those of the author alone. I would like to thank Leigh-Anna Gates for her comments on earlier drafts, as well as Carol Murray and David Marmorek for permission to use several of their figures and, most importantly, for their invaluable assistance in the writing of this article. Comments can be sent to m.olszynski@berkeley.edu.

[FN1]. (2007), 318 F.T.R. 160 (Eng.) (F.C.); reversed (2008), 2008 CarswellNat 1699, 2008 CarswellNat 3030 (F.C.A.); reversed (2010), 2010 CarswellNat 55, 2010 CarswellNat 56 (S.C.C.).

[FN2]. S.C. 1992 c. 37 [CEAA].

[FN3]. Prior to *MiningWatch*, the law seemed settled that “responsible authorities” (RAs) under the Act (*e.g.* the Department of Fisheries and Oceans in the context of the Red Chris mine) had discretion to define or “scope” projects pursuant to s. 15, and that this scoping exercise determined the kind of EA required (whether a “screening” or the more rigorous “comprehensive study”; see ss. 18 and 21). Justice Martineau held that, following amendments to the CEAA in 2003, it was the “project as proposed by the proponent” that determined the kind of EA that was required. This decision was overturned by the Federal Court of Appeal, but restored by the Supreme Court of Canada. See *supra* note 1.

[FN4]. See Kemess North Copper-Gold Mine JRP Report (2007) and Whites Point Quarry and Marine Terminal Project JRP Report (2007) [WPQ Panel Report], online: CEAA Registry <<http://www.ceaa.gc.ca/052/details-eng.cfm?pid=3394>> and <<http://www.ceaa.gc.ca/default.asp?lang=En&n=D67F0296-1>>, respectively.

[FN5]. “Bilcon appealing quarry decision under NAFTA,” online: CBC <<http://www.cbc.ca/canada/nova-scotia/story/2008/02/05/bilcon-appeal.html>> (last updated: 5 February 2008).

[FN6]. WPQ Panel Report, *supra* note 4 at 105.

[FN7]. One of the earliest references to AM in the federal EA context can be found in the 1997 Panel Report of the Ekati Diamond Mine in the Northwest Territories, not pursuant to CEEA but rather the previous *Federal Environmental Assessment and Review Process*. The Panel agreed with the concept of an adaptive management strategy: “This strategy is well-suited to the Project as it is a new endeavour in an area with relatively little information ... The Panel concludes that, in general, the level of detail provided in environmental management plans is sufficient for this stage of the regulatory process and expects that many of the plans would become more detailed as final design and Project implementation proceeds”: at 24. The Ekati Report, online: <<http://www.ceaa.gc.ca/default.asp?lang=En&n=8F4BE333-1>>.

[FN8]. *Kearl*, *infra* note 56.

[FN9]. For a thorough and recent overview of the issues surrounding the application of the precautionary principle, see C. Tollefson & Jamie Thornback, “Litigating the Precautionary Principle in Domestic Courts” (2009) 19 J.E.L.P. 33 [Tollefson]. Professor Tollefson observes that “[w]hile controversy surrounding its meaning and implications continues to rage, increasingly the principle is being incorporated into domestic legislation and invoked in litigation before domestic courts and tribunals.” See also *infra* note 118 for recent applications in the context of the *Species At Risk Act*, 2002, c. 29.

[FN10]. Tollefson, *ibid.* at 35.

[FN11]. C. Murray & D.R. Marmorek, “*Adaptive Management: A spoonful of rigour helps the uncertainty go down*” (2004) in Proceedings of the 16th Annual Society for Ecological Restoration Conference, Victoria, B.C. (24-26 August, 2004) at 1 [A *spoonful of rigour*], online: <http://www.essa.com/documents/Murray_Marmorek_adaptive_management_SER_conference.pdf>.

[FN12]. *Ibid.* According to Murray and Marmorek, “[o]ften resource managers think that they are doing adaptive management if their program or project involves any semblance of “adapting”, either to knowledge or events. Sometimes the term is misused to describe programs involving public participation. These misconceptions have led to dilution and confusion over what adaptive management really means. It is not a trial-and-error, adapt-as-you-go process ...”

[FN13]. See *infra* note 23.

[FN14]. A search of Canadian legal journals generated only 12 articles, the majority of which make only passing reference to AM. AM was referred to by Tollefson, *supra* note 9, as a potential response to the precautionary principle: see discussion surrounding note 82, *infra*. See also D. VanderZwaag, Gloria Chao & Mark Covan, “[Canadian Aquaculture and the Principles of Sustainable Development: Gauging the Law and Policy Tides and Charting a Course-Part II](#)” (2003) 28 *Queen's L.J.* 529 at 573. But see J. Benidickson *et al.*, *Practicing Precaution and Adaptive Management: Legal, Institutional, and Procedural Dimensions of Scientific Uncertainty*, Report to the SHHRC and Law Commission of Canada (Ottawa: UOIE, 2005) for a thorough examination of the administrative law principles applicable to AM, some of which are discussed in Part IV [Benidickson *et al.*]. Professor Arlene Kwasniak, from the University of Calgary, Faculty of Law, has also recently written an article

on AM in the context of CEAA that will be published in the Journal of Environmental Assessment Policy and Management (JEAPM): “Adaptive Management in Environmental Assessment and Environmental Management: A Legal and Policy Analysis” (2010/11) JEAPM [forthcoming] [Kwasniak].

[FN15]. Online: <<http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=50139251-1>> [Agency OPS on AM].

[FN16]. As further set out in Parts III.B and C.

[FN17]. CEAA, *supra* note 2 at s. 20, 37.

[FN18]. C.S. Holling, ed., *Adaptive Environmental Assessment and Management* (Chichester: John Wiley and Sons, 1978) at 9.

[FN19]. *Ibid.* Resilience, noted Holling, is the hallmark of persistent ecological systems: “In order to live successfully with uncertainty, our environmental management institutions must maintain their responsiveness to change. The ecological systems that have persisted have been those that were resilient enough to absorb the unexpected and learn from it. Our institutions, too, need a similar ability to cope. Institutions, like biological systems, learn to handle change by experiencing change. And as with other things learned, this ability will be forgotten if the experience is not occasionally reinforced. Insulation from small disasters leaves one ill-prepared and vulnerable to larger ones.”

[FN20]. J. Jackson, L. Walayat & W. Ross, “*Adaptive Environmental Management Approaches in Relation to Environmental Assessment and Follow-up Programs for Environment Canada*” Final Report 2006 (unpublished, with permission from Professor Ross, University of Calgary) at 3 [Ross].

[FN21]. *Ibid.* at 13 (Appendix A).

[FN22]. *A spoonful of rigour*, *supra* note 11 at 1.

[FN23]. *Ibid.* at 2 (with permission). For a more detailed explanation of each step, along with examples, see C. Murray & D.R. Marmorek, “Adaptive Management: A science-based approach to managing ecosystems in the face of uncertainty” (2004) in N.W.P. Munro *et al.*, (eds.), *Making ecosystem-based management work. Proceedings of the Fifth International Conference on Science and Management of Protected Areas* (Victoria, B.C.: May, 2003) (Wolfville, Nova Scotia: Science and Management of Protected Areas Association). Chapter 8, Ecosystem Based Management (Terrestrial), Paper #9 [*Managing ecosystems in the face of uncertainty*], online: <http://www.essa.com/documents/AM_paper_Fifth_International_SAMPAA_Conference.pdf>.

[FN24]. Ross, *supra* note 20 at 9. Recent work with leading AM practitioners in Canada and the U.S. led to a comprehensive list of what each step should entail. See Appendix 2 in C. Murray & M. Nelitz, *Review of Diavik and EKATI Adaptive Management Plans* (2008) Prepared by ESSA Technologies Ltd., Vancouver B.C., for Fisheries and Oceans Canada, Western Arctic Area, Central and Arctic Region, Yellowknife, N.T. 23 pp [*Diavik and EKATI AM Review*], online: <<http://www.monitoringagency.net/LinkClick.aspx?fileticket=5ucjCF4oG0U%3d&tabid=89&mid=425>>.

[FN25]. Ross, *ibid.* at 4.

[FN26]. *A spoonful of rigour*, *supra* note 11 at 1.

[FN27]. For the WPQ project, the “[p]roponent suggested that once a plan of action for an environmental issue had been defined, that course would be adhered to until problems arose, then a process of trial and error (adaptive management) would be employed until the process or issue once again conformed to original expectations”: WPQ Panel Report, *supra* note 4 at 92. Although the proponent's Environmental Impact Statement (EIS) is no longer available online, one can infer from the Panel's comments that it was light on details: “While the surveys carried out for the preparation of the EIS met the needs of the EIS process, the Panel found they often appeared inadequate for evaluating the long-term processes described throughout the EIS,” *ibid.* at 51.

[FN28]. Ross, *supra* note 20 at 10.

[FN29]. *Diavik and EKATI AM Review*, *supra* note 24 at 3.

[FN30]. *Ibid.*

[FN31]. *Ibid.* at 2.

[FN32]. *A spoonful of rigour*, *supra* note 11 at 1. See also Ross, *supra* note 20 at 7. As will be seen however, it is passive AM which appears to be exclusively applied in the context of CEAA.

[FN33]. *Managing ecosystems in the face of uncertainty*, *supra* note 23 at 4 (with permission). Upper Panel: immediately implementing the apparently “best” long term management decision and then monitoring its effects results in only a slow decrease in uncertainty and only slight improvements over time in decisions. Lower Panel: A deliberate, well-designed adaptive management experiment can reduce uncertainty much more quickly and result in a far superior long term management decision.

[FN34]. The “course of action” referred to in ss. 38(1) and (2) includes a determination that a project “is not likely to result in significant adverse environmental effects” (in this article, I refer to this as the environmental effects determination) *and* the exercise of any power or the performance of any duty or function that would permit the project to be carried out in whole or in part, the application for which probably triggered the Act in the first place. Paragraph 20(1)(a) is the relevant provision where a project undergoes a screening type of assessment, whereas para. 37(1)(a) is the relevant provision where comprehensive studies or panel reviews are concerned.

[FN35]. Through the combined operation of ss. 2, 5 and 11, an RA (responsible authority) is the federal authority that proposes a project or proposes to exercise a power or perform a duty in relation to it (give money, give land or issue a permit on the *Law List Regulations* SOR/94-636) and which, therefore, must ensure that an EA is conducted. Screenings and comprehensive studies are self-assessments wherein the RA makes the determination as to environmental effects. In the case of panels, these conduct hearings and prepare reports outlining their recommendations as to environmental effects, which are then usually accepted by RAs following Governor in Council approval.

[FN36]. Mitigation under CEAA is defined as “the elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means”: CEAA, *supra* note 2 at s. 2.

[FN37]. *Ibid.* at ss. 2(1).

[FN38]. Bill C-9, *An Act to Amend the Canadian Environmental Assessment Act*, was given Royal Assent on

June 11, 2003 and was proclaimed into force October 30, 2003 [Bill C-9].

[FN39]. For instance, it defines AM as “a *planned and systematic process* for continuously improving environmental management practices by learning about their outcomes. Adaptive management provides flexibility to identify and implement new mitigation measures or to modify existing ones during the life of a project”: Agency OPS on AM, *supra* note 15 at 1.

[FN40]. See B.K. Williams, R.C. Szaro & C.D. Shapiro *Adaptive Management: The U.S. Department of the Interior Technical Guide*” (2007) Adaptive Management Working Group, U.S. Department of the Interior, Washington, DC., online: < <http://www.doi.gov/initiatives/AdaptiveManagement/index.html>>.

[FN41]. Agency OPS on AM, *supra* note 15 at 3.

[FN42]. *Ibid.*

[FN43]. CEAA, *supra* note 2 at s. 4.

[FN44]. Tollefson, *supra* note 9 at 33.

[FN45]. CEAA, para. 20(1)(c).

[FN46]. See Kwasniak, *supra* note 14: “Since the CEAA requires, at least when a project proceeds by way of screening, that if it is uncertain whether a project, as mitigated, will have significant adverse environmental impacts, then the project must go to mediation or a panel, it would be contrary to the CEAA for an RA, in the face of uncertainty, to use adaptive management in an attempt to deal with uncertain impacts.” That being said, the same wording used to apply in the case of comprehensive studies before amendments to the CEAA in 2003, and was invoked -- unsuccessfully -- in the *Suncor* case (*infra* note 49) as a limiting factor with respect to the Minister’s discretion as to whether or not he had to refer the project to a panel review: see paras. 50, 53 67 and 144 of that decision.

[FN47]. CEAA, *supra* note 2 at para. 21(2)(a).

[FN48]. *Ibid.* at para. 21(2)(b).

[FN49]. (2001), 40 Admin. L.R. (3d) 217, 214 F.T.R. 94 (T.D.) [*Suncor*].

[FN50]. *Ibid.* at para. 71.

[FN51]. *Ibid.* at para. 71.

[FN52]. *Ibid.* at para. 157.

[FN53]. 2003 FCA 197, [2003] F.C.J. No. 703, 2003 CarswellNat 1232 [CPAWS].

[FN54]. *Ibid.* at para. 24.

[FN55]. *Ibid.* at paras. 101 and 105.

[FN56]. (2008), 323 F.T.R. 297 (Eng.) (F.C.) [*Kearl*]. This case is probably most well known for its treatment of

greenhouse gases and their mitigation. The applicants argued and the Federal Court agreed that the joint review panel failed to provide a rationale for its recommendations with respect to intensity-based reductions as a means of mitigating the project's greenhouse gas emissions; see para. 78. For a case comment on the *Kearl* decision, see Nathalie J. Chalifour “Case Comment: A (Pre)Cautionary Tale about the Kearl Oil Sands Decision: The Significance of *Pembina Institute for Appropriate Development v. Canada (Attorney General)* (2008) for the Future of Environmental Assessment” (2010) 5 McGill J.S.D.L.P. 251 [Chalifour].

[FN57]. *Kearl*, *ibid.* at para. 28.

[FN58]. *Ibid.* at paras. 29-43.

[FN59]. *Ibid.* at para. 55. Pursuant to para. 16(1)(d) and as further discussed in Part IV, mitigation measures must be “technically and economically feasible” in order to be considered.

[FN60]. *Ibid.* at paras. 55-58.

[FN61]. *Ibid.* at para. 59.

[FN62]. *Ibid.*

[FN63]. *Ibid.* at paras. 60, 62.

[FN64]. Cumulative Environmental Management Association (CEMA), online: < <http://www.cemaonline.ca/index.php/about-cema/cema-history> > (last accessed on 12 October 2009).

[FN65]. See, for example, the Kearl Oil Sands Joint Review Panel Report, at viii: “The Joint Panel believes that the efficiency of CEMA needs to be improved in order to keep pace with current development in the region and that there is a need for more definitive priority setting and adherence to deadlines.” Online: <<http://www.ceaaacee.gc.ca/050/document-eng.cfm?document=21349>> (last accessed on 12 October 2009).

[FN66]. Bradley C. Karkkainen, “Adaptive Ecosystem Management and Regulatory Penalty Defaults: Toward a Bounded Pragmatism” (2003) 87 *Minn. L. Rev.* 943 at 944, as cited by Benedickson *et al.*, *supra* note 14 at B-9.

[FN67]. CPAWS, *supra* note 53 at para. 24.

[FN68]. As noted in Part II, AM arose in an entirely different context well before the precautionary principle made its way into the international environmental context.

[FN69]. While the precautionary principle has been labelled “paralyzing” by some legal scholars, such as Cass Sunstein (see *Laws of Fear* (Cambridge University, 2005)), these have always focused on the strongest interpretations of the principle, which few seem to endorse from a practical perspective in any event: see Tollefson, *supra* note 9 at 37-38.

[FN70]. CPAWS, *supra* note 56 at para. 24: “... that a project should not be undertaken if it may have serious adverse environmental consequences, even if it is not possible to prove with any degree of certainty that these consequences will in fact materialize.” In contrast, the Bergen Ministerial Declaration on Sustainable Development (1990) states that “[w]here there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.”

[FN71]. *Kearl*, *supra* note 56 at para. 31.

[FN72]. See Elizabeth Fisher & Ronnie Harding, “The precautionary principle and administrative constitutionalism: the development of frameworks for applying the precautionary principle” in Fisher, Jones & von Schomberg, *Implementing the Precautionary Principle: Perspectives and Prospects* (Edward Elgar: 2006) 113-36, cited by Tollefson, *supra* note 9 at 38.

[FN73]. According to Professor Chalifour, Justice Tremblay-Lamer's use of AM “to justify mitigation measures with uncertain outcomes” is unprecedented, leading to the Court's failure “to apply the precautionary principle and inappropriately use [AM] to justify the divergence from precaution”: Chalifour, *supra* note 56.

[FN74]. [2006] NSWLEC 133 [*Telstra*].

[FN75]. *Ibid.*

[FN76]. Tollefson, *supra* note 9 at 49.

[FN77]. *Ibid.* at para. 32.

[FN78]. The relevant wording from CEAA is as follows: “where, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, the project is not likely to cause significant adverse environmental effects”; see ss. 20 and 37.

[FN79]. In *Canadian Wildlife Federation Inc. v. Canada (Minister of the Environment)* (1990), [1991] 1 F.C. 641 (C.A.) at 657, Iacobucci C.J.A. described the assessment of mitigation measures in s. 12(c) of the EARPGO (CEAA's predecessor) as follows: “If the initial assessment procedure reveals that the potentially adverse environmental effects that may be caused by the proposal ‘are insignificant *or* mitigable with known technologies’ the proposal [...] may proceed or proceed with mitigation, as the case may be.”

[FN80]. Certainly, this is the impression one gets when one considers the Federal Court of Appeal's conclusion in *CPAWS* that the Minister acted rationally because “when combined with mitigative measures and [AM] techniques ... any adverse environmental effects were unlikely to be significant”: *CPAWS*, *supra* note 53 at para. 101.

[FN81]. *Kearl*, *supra* note 56 at para. 56.

[FN82]. *Ibid.* at para. 60: “The respondents submit that the dynamic nature of follow-up measures and adaptive management *will resolve initial uncertainties*.” It is worth noting that the use of AM as a response to the precautionary principle was also discussed in *Telstra*; see Tollefson, *supra* note 9 at 52: “The response that is required by the precautionary principle will depend on the outcome of a risk assessment ... Where uncertainty exists, a margin of error should be left so that serious or irreversible harm is less likely to occur. This margin of error may be maintained through step-wise or *adaptive management plans*” (emphasis added).

[FN83]. Agency OPS on AM, *supra* note 15. It is not clear, however, whether by referring to “manage adaptively” and not “adaptive management” the authors are referring to something which may fall short of rigorous AM.

[FN84]. *Kearl*, *supra* note 56 at para 43.

[FN85]. According to Ross, “AEM is a useful tool in the management of cumulative environmental effects. Specifically, the everglades restoration plan case study depicts how AEM can be used to reduce and mitigate cumulative effects ... As is observed elsewhere, the management of cumulative effects is challenging and there are many uncertainties. The use of AEM, we believe, shows considerable promise for application to cumulative effects management ...”: Ross, *supra* note 20 at 5. See also Agency OPS on AM, *supra* note 15.

[FN86]. Benedickson *et al.*, also explore the link between the precautionary approach and AM: “Some believe that [AM] conflicts with precaution, while others view the two principles as complementary.” *Supra* note 14 at B-9.

[FN87]. *New Brunswick (Board of Management) v. Dunsmuir*, (sub nom. *Dunsmuir v. New Brunswick*) [2008] 1 S.C.R. 190 at para. 28.

[FN88]. Professor Kwasniak takes a slightly different view and argues that since AM is explicitly referred to in ss. 38(5), the principle of *expressio unius est exclusio alterus* applies and AM “may not be used in other processes or determinations in the CEAA. If Parliament meant that adaptive management could be used in determining significance of environmental effects, or effectiveness of mitigation, Parliament would have stated so”: see Kwasniak, *supra* note 14.

[FN89]. As noted in Part II, the Agency's OPS on AM speaks to this issue as well.

[FN90]. CEAA, *supra* note 2, s. 2.

[FN91]. *Ibid.*

[FN92]. (1989), 31 F.T.R. 1 (T.D.); affirmed (1990), 1990 CarswellNat 725, 1990 CarswellNat 18 (Fed. C.A.) [*Canadian Wildlife Federation*].

[FN93]. *Ibid.* at 12 [emphasis added].

[FN94]. *Kearl*, *supra* note 56 at para. 60.

[FN95]. *Vancouver Island Peace Society v. Canada*, [1992] 3 F.C. 42 at 51 (T.D.).

[FN96]. *Alberta Wilderness Assn. v. Express Pipelines Ltd.* (1996), 1996 CarswellNat 961, [1996] F.C.J. No. 1016 at para. 10.

[FN97]. *Inverhuron & District Ratepayers' Assn. v. Canada (Minister of the Environment)* (2001), 206 F.T.R. 318 (note) at para. 37 (C.A.); leave to appeal refused (2002), 2002 CarswellNat 414, 2002 CarswellNat 415 (S.C.C.).

[FN98]. As the proponent proposed to do with respect to the Whites Point Quarry and Marine Terminal Project; see WPQ Panel Report, *supra* note 4 at 92.

[FN99]. *Diavik and EKATI AM Review*, *supra* note 24.

[FN100]. It is also worth noting that which standard of review will be applied seems to depend on context. In *Suncor*, for example, the Minister's reliance on the RSDS as a mitigation measure was held to be an error in law first, and an unreasonable exercise of her discretion in the alternative. Similarly, in *Kearl*, the panel's failure to

provide a sufficient rationale for its recommendation in relation to the KOS project's projected greenhouse gas emissions was held to be an error in law.

[FN101]. *Suncor*, *supra* note 49, at para. 158.

[FN102]. *Ibid.* at para. 159.

[FN103]. See Hobby, Ricard *et al.*, *Canadian Environmental Assessment Act -- An Annotated Guide* (Aurora: Canada Law Book, 2008 (updated)) at II-134: "Section 37(2.1) is similar to s. 20(1.1) as it allows [RAs] ... to take into consideration mitigation measures the [RA] can ensure are implemented because they relate to aspects of the environment that fall within federal jurisdiction, as well as mitigation measures to be implemented by third parties, including provincial and municipal governments." In his report to Parliament following CEEA's five-year review, the then Minister for the Environment, David Anderson, explained that the purpose was to "clarify that responsible authorities have the authority to ensure the implementation of any mitigation measure as long as, in so doing, they are acting within areas of federal jurisdiction." See *Strengthening Environmental Assessment for Canadians: Report of the Minister of the Environment to the Parliament of Canada on the Review of the Canadian Environmental Assessment Act*, online: < http://www.ceaa.gc.ca/013/001/0001/report_e.htm>.

[FN104]. See "Court ruling demonstrates oil sands review process broken; Judge rules ERCB not required to re-view Shell's failure to follow through on pollution limits" (28 August 2009), online: Ecojustice: <<http://www.ecojjustice.ca/media-centre/press-releases/courtruling-demonstrates-oil-sands-review-process-broken>>.

[FN105]. As discussed in Part III, some of these fall within the scope of "follow-up programs" which are mandatory in the case of comprehensive studies and panel reviews in any event, but there is no other provision in CEEA that would require the results of such programs to actually be implemented by adjusting mitigation measures.

[FN106]. *Suncor*, *supra* note 49 at paras. 153-54.

[FN107]. See *supra* note 88.

[FN108]. The Agency's OPS on AM, while based not on legal principles but rather best practices, arrives at a similar conclusion: "Responsible or regulated authorities should ensure that adaptive management is considered and, where appropriate, planned during the EA. The responsible or regulated authority should ensure *that the status of the project is monitored and that adaptive management measures are implemented*, where follow-up or monitoring indicate that such measures are necessary": Agency OPS on AM, *supra* note 15 at 6 [my emphasis].

[FN109]. *Imperial Oil Resources Ventures Ltd. v. Canada (Minister of Fisheries & Oceans)*, 2008 FC 382 at para. 18.

[FN110]. See *Imperial Oil Resources Ventures Ltd. v. Canada (Minister of Fisheries & Oceans)*, 2008 FC 598.

[FN111]. *Black's Law Dictionary*, 8th ed. 2004, defines *functus officio* as "having performed his or her office." See *Telus Communications Inc. v. T.W.U.* (2005), 2005 CarswellBC 411 (S.C.) at para. 33: "The doctrine of *functus officio* is that once a decision has been made, a decision-maker loses jurisdiction, unless, following a successful application for judicial review, that jurisdiction is revived by the court remitting the matter back for further consideration. It is founded on the same principle of finality that underlies the other [administrative] ar-

guments.” See also *Chandler v. Assn. of Architects (Alberta)* (1989), 101 A.R. 321 (S.C.C.) [*Chandler*].

[FN112]. Benidickson *et al.*, *supra* note 14 at F-7 [emphasis in original].

[FN113]. *Associated Japanese Bank (International) Ltd. v. Crédit du Nord SA* (1988), [1989] 1 W.L.R. 255 at 268 (Eng. Q.B.).

[FN114]. See *Ron Ghitter Property Consultants Ltd. v. Beaver Lumber Co.* (2003), 17 Alta. L.R. (4th) 243, [2004] 1 W.W.R. 628 at para. 8 (C.A.).

[FN115]. *Ibid.* at para. 12.

[FN116]. See *Chandler*, *supra* note 111, where Sopinka J. stated that in the administrative context, *funtus officio* “is based ... on the policy ground which favours finality of proceedings rather than the rule which was developed with respect to formal judgments of a court whose decision was subject to a full appeal,” such that “its application must be more flexible and less formalistic in respect to the decisions of administrative tribunals which are subject to appeal only on a point of law.” See also *Chan v. Canada (Minister of Citizenship & Immigration)* (1996), 34 Imm. L.R. (2d) 259 (Fed. T.D.), where the Federal Court interpreted *Chandler* as holding that “administrative decision-making, because it is more flexible and less formalistic than judicial decision-making, can be ‘re-opened’ in the interests of justice where the enabling statute contemplates reconsideration of a decision.”

[FN117]. Benidickson *et al.*, *supra* note 14 at F-7.

[FN118]. Tollefson, *supra* note 9 at 34, citing Stein J. of the New South Wales Court of Appeal in “A Cautious Application of the Precautionary Principle” (2000) 2 Env'tl. L.R. 1 at 2. For two recent Federal Court treatments of the precautionary principle in the context of the *Species At Risk Act*, see *Alberta Wilderness Assn. v. Canada (Minister of Environment)*, 2009 FC 710, [2009] F.C.J. No. 876, 2009 CarswellNat 2178 at para. 25; additional reasons at (2009), 2009 CarswellNat 2756 (F.C.), and *Environmental Defence Canada v. Canada (Minister of Fisheries & Oceans)*, 2009 FC 878 at paras. 33-40. Paragraph 40, in particular, is worth noting: “... Therefore, as argued by the Applicants, I find that Ms. Webb's direction and Mr. Murray's approval of her direction are actions contrary to law ... The totality of this conduct is fundamentally inconsistent with the precautionary principle as codified in SARA.”

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