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Cumulative Effects Assessment Practitioners Guide

Prepared for:
Canadian Environmental Assessment Agency

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DISCLAIMER

This Guide was developed by an independent Working Group supported by the Canadian Environmental Assessment Agency (the Agency). The Guide provides insightful information and advocates good cumulative effects assessment practices. It is to be used as guidance material only. Users of the Guide should consult with the appropriate decision-making authority for which the environmental assessment is undertaken for further information on assessment requirements specific to applicable statutory requirements and expected best practice.

RELATIONSHIP TO FIRST CEEA GUIDE ON CUMULATIVE EFFECTS

In 1994, the Agency published *A Reference Guide for the Canadian Environmental Assessment Act: Addressing Cumulative Environmental Effects*. This publication was available as part of the Agency's *The Canadian Environmental Assessment Act Training Compendium* or under separate cover. That Reference Guide formed the basis of the Agency's response to questions about conducting Cumulative Effects Assessments, and has been widely used and referenced. The Agency has updated the 1994 Reference Guide on Cumulative Environmental Effects to reflect evolving processes and methods to meet requirements under the Canadian Environmental Assessment Act.

The *Practitioners Guide* you are now reading represents a CEEA initiative to provide further information on cumulative effects. This Guide is focussed on practical solutions for practitioners conducting Cumulative Effects Assessments and should be considered a supplement, not a replacement, to the Reference Guide.

RELATIONSHIP TO THE CANADIAN ENVIRONMENTAL ASSESSMENT ACT

The Canadian Environmental Assessment Agency has developed a four page policy paper on the Agency's position regarding CEAs under the *Canadian Environmental Assessment Act*. This Operational Policy Statement is entitled *Addressing Cumulative Effects under the Canadian Environmental Assessment Act*. The policy document does not recount what is contained in the *Practitioners Guide* but provides the Agency's view on CEA under the Act and the use of this Guide by federal authorities.

COMMENTS ABOUT THIS GUIDE

This document is an evolving product and is not the "final word" on CEA. It will be updated and revised as the practice of CEA evolves. The CEA Working Group and the Canadian Environmental Assessment Agency welcome comments and suggestions regarding this Guide. These should be addressed to: Senior Guidance and Training Officer, Canadian Environmental Assessment Agency, 13th Floor, Fontaine Building, 200 Sacré-Coeur Boulevard, Hull, Quebec, K1A 0H3; or Fax to (819)-997-4931; or E-mail to training/formation@ceaa.gc.ca.

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TO OBTAIN COPIES OF THIS GUIDE

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Ce rapport est aussi disponible en français.

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3.5 STEP 4: EVALUATION OF SIGNIFICANCE

3.5.1 Approaches to Determining Significance

Determining the significance of residual effects (i.e., effects after mitigation) is probably the most important and challenging step in EIA. The determination of significance for CEAs is fundamentally the same; however, it may be more complex due to the broader nature of what is being examined. A cumulative effects approach requires determining how much further effects can be sustained by a VEC before suffering changes in condition or state that cannot be reversed.



Significance

Deciding Whether Effects are Likely

The *Canadian Environmental Assessment Act* states that "any cumulative environmental effects that are likely to result..." must be considered. According to guidance provided by CEAA (1992), the following questions should be asked:

1. Are the environmental effects adverse?
2. Are the adverse environmental effects significant?
3. Are the significant adverse effects likely?

The determination of likelihood is based on two criteria: 1) probability of occurrence and 2) scientific certainty. In practice, likelihood as an attribute of significance (→ *Cold Lake Oil Sands Project: Significance Attributes* for examples of other attributes) is often rated on a scale: e.g., None (no effect will occur), Low (<25% or minimal chance of occurring), Moderate (a 25% to 75% or some chance of occurring), and High (>75% or most likely a chance of occurring).

Query for Evaluating Significance

Significance conclusions in assessments should be defensible through some form of explanation of how the conclusions were reached. The following is an example of one approach (Duval and Vonk 1994). A series of questions are structured so as to guide the practitioner through a series of steps, eventually leading to a significance conclusion. The questions follow a basic line of inquiry as follows:

- Is there an increase in the action's direct effect in combination with effects of other actions?
- Is the resulting effect unacceptable?
- Is the effect permanent?
- If not permanent, how long before recovery from the effect?

In more detail, these questions appear below, specifically to address the nature of two different types of VECs.

Biological Species VECs

- How much of the population may have their reproductive capacity and/or survival of individuals affected? Or, for habitat, how much of the productive capacity of their habitat may be affected (e.g., <1%, 1-10%, >10%)?
- How much recovery of the population or habitat could occur, even with mitigation (e.g., Complete, Partial, None)?
- How soon could restoration occur to acceptable conditions (e.g., <1 year or 1 generation, 1-10 years or 1 generation, >10 years or >1 generation)?

Physical-chemical VECs

- How much could changes in the VEC exceed that associated with natural variability in the region?
- How much recovery of the VEC could occur, even with mitigation?
- How soon could restoration occur to acceptable conditions?

- **Significance may decrease as the relative contribution of an action decreases:** It can be argued that if the effects of an action within a regional study area are quite small relative to the effects of other actions in that same area, then the cumulative effects of that action are likely to be negligible. For example, if a forest cutblock of 4 ha is proposed within a region in which there are already 300 ha of clearcut areas, then the proposed action contributes an incremental loss of potential wildlife habitat of only 1.3%. The validity of this argument depends somewhat on the size of the study area (the larger the regional study area, the smaller the percentage becomes). The argument may not hold true in all cases, especially if that 4 ha supports plant species that are regionally rare, provides particularly important habitat for wildlife (e.g. salt licks for ungulates) or has a unique topographical feature. Furthermore, the argument may not hold if that further loss of 4 ha causes a threshold to be exceeded for a certain VEC, beyond which the VEC can not recover. However, applying this “straw-that-breaks-the-camels-back” view of the implications of adding one more action are often handicapped by the lack of clearly defined thresholds.
- **Significance may decrease as the significance of nearby larger actions increase:** For an action proposed in close proximity to larger existing actions, its relative contribution to cumulative effects may be minimal. Although this does not mean that a CEA is not required, it *does* suggest that the effects of the other action(s) should be adequately understood.
- **Significance may increase as a species becomes increasingly rare or threatened:** The significance of effects on a species’ population may have to consider the rarity of the species at larger scales (e.g., regional, provincial or global). To illustrate for biological organisms, consider a population of 200 animals or plants living within the “footprint” of a proposed action. Such a population might be severely affected. The importance, however, that is attributed to such an effect will almost certainly depend on whether the population is part of a local, regional or global population of 200, 2000 or 200 million. In addition, it must also be considered if *that* remaining population itself is rare or threatened.
- **Significance may decrease as the significance of local effects decrease:** It has been argued that if the conclusions of an EIA indicate that none of the residual direct effects are significant, then there will be no cumulative effects (as therefore there are no effects remaining to act cumulatively with other actions). While this may be true for some types of effects, this may not always be the case: *an insignificant local effect may still contribute to a significant cumulative effect!*
- The argument of insignificance may be true, for example, if mitigation eliminates or substantially reduces the transport of a constituent elsewhere (e.g., a contaminant discharged into a waterway) or the emanation of a sensory disturbance (e.g., noise). In these cases, the potential for cumulative effects with other actions will be reduced.
- However, the argument may be false if, on a regional scale, there nonetheless remains an important *indirect* effect that results in a regionally important loss of a VEC (e.g., loss of 10% of the population of a rare plant species with the study area) or of a resource on which the VEC depends (e.g., fragmentation of wildlife habitat). This indirect effect most commonly occurs as a result of the clearing of land which, although perhaps not significant at a local scale, may have important regional implications (i.e., the nibbling effect). In these cases, the practitioner must recognize this possibility and, while determining significance, consider the relative scarcity of what is being affected.
- **Significance may decrease if effects are within natural background variability:** If a *direct* effect causes no detectable change in a VEC, then the effect would usually be considered insignificant. If the change caused by the effect is detectable but within the magnitude of naturally fluctuating conditions (e.g., annual water temperatures and flows, percentage