# **Focusing on Receptors**

## Abstract

Effect pathways are often complex, comprising multiple components of the natural and human environment. In some recent environmental assessments (EAs), the British Columbia (BC) Environmental Assessment Office (EAO) has differentiated between intermediate components (ICs) along effect pathways and receptor components. These EAs describe changes in ICs expected to result from the project, and the consequence of those changes to receptor components is then examined. Thus, the analysis, and particularly the discussion of significance, is focused on the receptor components, instead of physical media through which effects are transferred. The use of ICs has been one effort to potentially reduce duplication and overlap, and increase clarity, in assessments. This paper reviews the benefits of and challenges related to differentiating between intermediate and receptor components as a means of focusing EA in provincial EA practice in BC.

## Introduction

Environmental assessments in BC use a values-based framework to promote a comprehensive, yet focused, understandable, and accessible assessment of potential effects, while making the most effective and efficient use of resources. This framework relies on the use of Valued Components (VCs) as a foundation for the assessment (EAO 2013).

Selecting appropriate VCs allows the assessment to be focused on those aspects of the natural and human environment that are of greatest importance to society. Using VCs also improves the effectiveness and efficiency of assessment, in part by helping to focus the analysis on key project-environment interactions and ensure appropriate study methods are used (EAO 2013).

The VCs required to be assessed in a provincial EA[[1]](#footnote-1) in BC are specified in project-specific Application Information Requirements (AIR), which is issued by EAO following public and working group consultation on a draft AIR. In some cases, this is supported by the proponent providing an initial rationale for the VCs proposed to be assessed.

As in many jurisdictions, over time, EAs in BC have become larger and more complex, as both EA process and practice have evolved and awareness of and participation in EA has increased. It is very important that the EA process remains accessible to a wide range of participants and that it generates the information required to support robust decision-making. Therefore it is a priority in EAs to maintain the focus of assessment on key project issues and impacts, while continuing to improve the consistency, efficiency, and quality of the EA.

## EAO’s Approach

In 2013, EAO established the [*Guideline for the Selection of Valued Components and Assessment of Potential Effects*](http://www.eao.gov.bc.ca/VC_Guidelines.html) (EAO 2013) (the VC Guideline), which aimed to address these and other challenges. The intent of the VC Guideline was, in part, to promote the selection of VCs that are appropriate and have desired attributes, to minimize the degree of duplication and redundancy in the assessment, and therefore to focus the analysis on the project-environment interactions of greatest importance and consequence and on the components most valued by society (EAO 2013).

EAO advises proponents to develop a list of candidate VCs on the basis of comprehensive issues scoping and then to evaluate the relevance and suitability of those candidate VCs for assessment against a range of criteria. These criteria encourage the practitioner to explicitly examine whether each candidate VC is measurable, whether it could be better represented by another VC or was itself representative of one or more other VCs (*e.g.,* other species from the same guild or occupying a similar ecological niche or affected by the project in a similar way), and whether the candidate VC was a component of an effect pathway upon which other candidate VCs depend (*e.g.*, aspects of the natural environment upon which fish, wildlife, or people depend).

With respect to effects pathways, EAO recognized the significance of adverse effects to physical media – which are intermediate on an effect pathway – was usually being assessed in relation to the significance of effects on (usually biological) receptor components. EAO therefore advised proponents in most cases, rather than include ICs as VCs, the assessment should focus on the ultimate receptor or component that is of concern, and select that as the VC. EAO’s VC Guideline noted that, in some cases, for some kinds of projects, it may be appropriate to select an IC as a stand-alone VC, particularly if there is potential for significant adverse effects on the IC and/or the IC is of particular concern. An IC may also be selected as a VC when the IC is more amenable to measurement and monitoring than the receptor component. Since the VC Guideline requires significance to be determined for VCs, this has often led to focusing the determination of significance on receptor components.

Since 2013, some provincial EAs have differentiated between ICs and receptor VCs. For example, some provincial EAs in BC have classified some components as ICs, most commonly air quality, water quality, acoustic conditions, and other mainly physical environmental components, but also others such as soil and terrain, and some human components, such as population. The assessment of these ICs has focused on describing the changes that would result from the project and discussing the interaction with receptor components, but generally not determining the significance of changes to the ICs. Significance has been determined in relation to consequential effects on receptor VCs, drawing on the information pertaining to all the relevant ICs on which the receptor VC depends. .

## Our Experience

### *What’s Worked Well*

Implementation of the VC Guideline has contributed to improvement in the transparency of IC and VC selection. This process has often been supported by proponents’ providing a stand-alone report documenting the VC selection process and rationale for ICs and VCs.

The new guidance has also led to greater consideration of effect pathways and use of ICs in provincial EAs, particularly for physical media. The increased discussion about and use of ICs has improved understanding of the linkages between components on effect pathways. Use of ICs can reduce related or redundant significance determinations by focusing significance on receptor VCs. For example, the threshold of significance for an IC is often defined in relation to whether a consequential effect on a receptor VC is considered to be significant. Thus, a significant adverse effect for air quality is typically defined as one that resulted in a significant adverse effect on human health or exceeded a criterion or guideline that was established to protect human health. By shifting the focus of significance determination to the receptor VCs, more relevant and meaningful significance determinations can be made in the context of the effect pathway.

Use of ICs can also decrease the duplicative content in EAs, as chapters describing the changes in ICs do not need to draw in as much material from dependent receptor chapters to support a determination of significance for the IC. At the same time, cross-referencing robust IC chapters can avoid duplicating descriptions of the changes in various effect pathways in each dependent receptor chapter. These outcomes in documentation efficiency have the potential to improve the efficiency and effectiveness of the application review by EAO and other EA participants, and to help improve clarity of issues for decision-makers.

### *What Challenges Have Arisen*

Notwithstanding these beneficial outcomes, some EA participants and EAO have identified challenges with using ICs, based on the experience of some EAs.

Because the VC Guideline referred to only receptor components as VCs, this led to a perception among some EA participants that ICs are not inherently valued. It is common for some participants to view some physical components of the environment, such as air or water, as having an intrinsic value of their own. Further, for professional or personal reasons, some EA participants are particularly interested in ICs and want or expect to see changes in ICs dealt with at the same level of detail as receptor VCs. These factors have led to strong views in some EAs that ICs should be treated the same as receptor VCs (and particularly include a determination of significance). Seeking to resolve whether an IC should have its own significance determination takes time during the EA review process. In response to concerns, in some cases, intermediate physical media have been assessed as VCs. Consequently, physical media are not consistently assessed as ICs in EAs across BC.

Concern about the use of ICs has sometimes been seen to arise due to inadequate documentation or assessment of ICs by proponents. Neither EAO’s VC Guideline nor its other complementary guidance are prescriptive with respect to the assessment of ICs; this has resulted in varying approaches by different practitioners. While some EAs provide comprehensive, well-documented descriptions of project-induced change in ICs, others provide a lighter treatment. As a result, EA participants sometimes find it difficult to understand or track how effects may propagate along effect pathways to receptor VCs, or even which receptor VCs may be affected by changes in an IC.

Concern has been raised about whether the assessed receptor VCs adequately capture the range of potential project effects along an effect pathway. If some relevant receptor VCs are omitted from assessment, this can impact the credibility of an EA and require additional discussion and analysis during the EA review process to resolve. Further, if the linkage between ICs and receptor VCs is not clear, it can be difficult for the reader to understand the importance (or significance) of changes along the effect pathway and how these are influencing receptor VCs. This clarity is important to support EA and post-EA decision-making (*i.e.*, permitting).

Lastly, in some cases, measuring the impacts of a project can be more difficult along an effects pathway. For example, measuring potential project impacts on water quality can be relatively straightforward, while estimating the impacts of changes in water quality to fish or fisheries as a result of the project can be more challenging. This increases the importance of ensuring changes in ICs and the linkages between ICs and receptors are adequately described. In a few cases, the consequential effects on an ultimate receptor cannot be measured (*e.g.*, the effect on climate due to greenhouse gas emissions from a project) and alternative approaches to assessing the project’s effect must be adopted.

## Moving Forward

To address the challenges identified in the first few years of practical use of ICs in EA in BC, and in particular to continue to promote EA that is concise, effective, and focused on key issues and impacts, EAO is currently updating its VC Guideline to, among other things, clarify the role and purpose of ICs, refine criteria for identifying intermediate and receptor components, and strengthen guidance regarding the appropriate level of detail required for the assessment and documentation of both types of components and the pathways that link them.

EAO is also developing new tools for use in documenting the process and outcomes of VC selection (including both intermediate and receptor components). This will clarify the information that must be provided to support the selection of components, articulate the linkages between them, describe their scope, and clarify where and how the significance of changes along each effect pathway will be determined. This will help ensure consistent and appropriate documentation of the proponent’s rationale for component selection to support early, and will support effective engagement of government, Aboriginal groups, and the public regarding the appropriate focus of the EA.

Finally, EAO is developing new materials to better communicate the concepts of effect pathways and intermediate and receptor components, the value of and approach to focusing EA, and approaches to determining significance, in lay terms, to enable more effective participation in the EA review process by government, Aboriginal groups, and the public.

These approaches seek to ensure that assessments remain focused on the key issues for each project, by guiding the technical assessment to focus on the important pathways and components, facilitating reader comprehension of and access to information of interest in the EA, and realizing efficiencies in EA documentation and the overall EA process.

## Conclusion

When properly selected, assessed, and documented, the identification of intermediate and receptor components shows promise as a tool to focus EA and improve the clarity and efficiency of EA review processes. To realize this outcome, guidance for practitioners must be clear and establish minimum information requirements to ensure quality EAs that enable effective participation by government, Aboriginal groups, and the public. In particular, transparency regarding effect pathways, linkages between intermediate and receptor components, and determination of significance appears to be an essential factor in effective use of ICs in EA.

## References

EAO (British Columbia Environmental Assessment Office). 2013. Guideline for the Selection of Valued Components and Assessment of Potential Effects. Available on-line: <http://www.eao.gov.bc.ca/VC_Guidelines.html>. 45p.

1. The proponent’s EA is contained in its Application for an EA Certificate submitted to EAO. Following its review of the Application, EAO prepares its own EA Report to support statutory decision-making. [↑](#footnote-ref-1)