Defining Significance: Baseline vs. Integrity

Celesa L. Horvath
Ventus Development Services Inc.
Presentation given to IAIA2015
Florence, Italy, April 2015

VENTUS

CHECK SPEAKING NOTES AGAINST DELIVERY

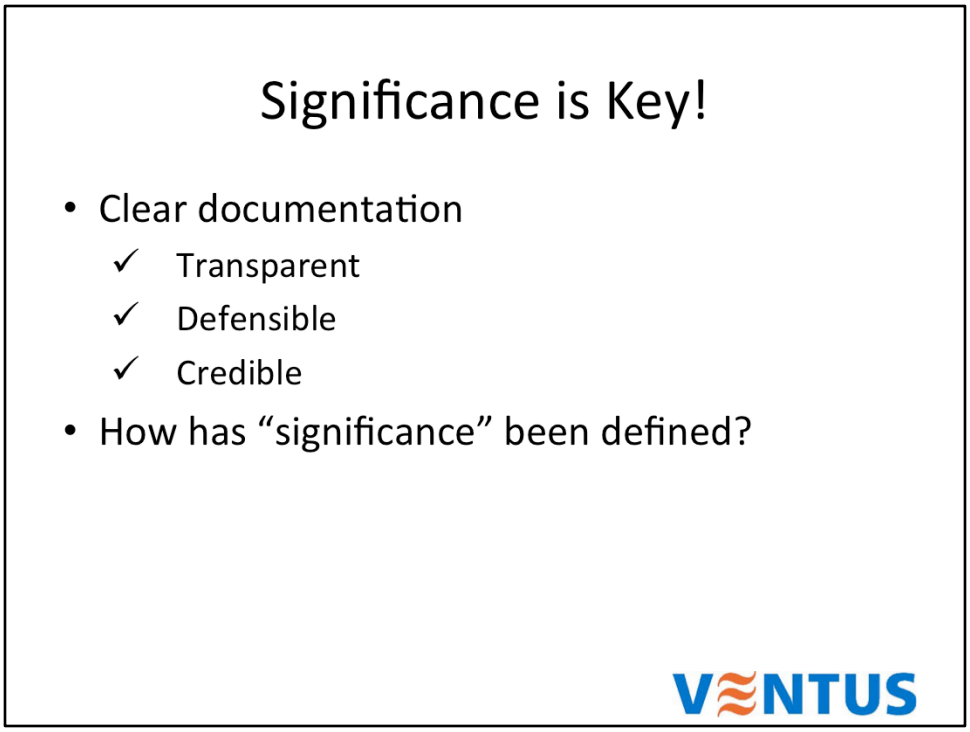
Significance: Legislative Basis

- The *Canadian Environmental Assessment Act, 2012* (CEAA 2012) requires EA to take into account the significance of environmental effects
- Provincial EA legislation has similar requirements

VENTUS

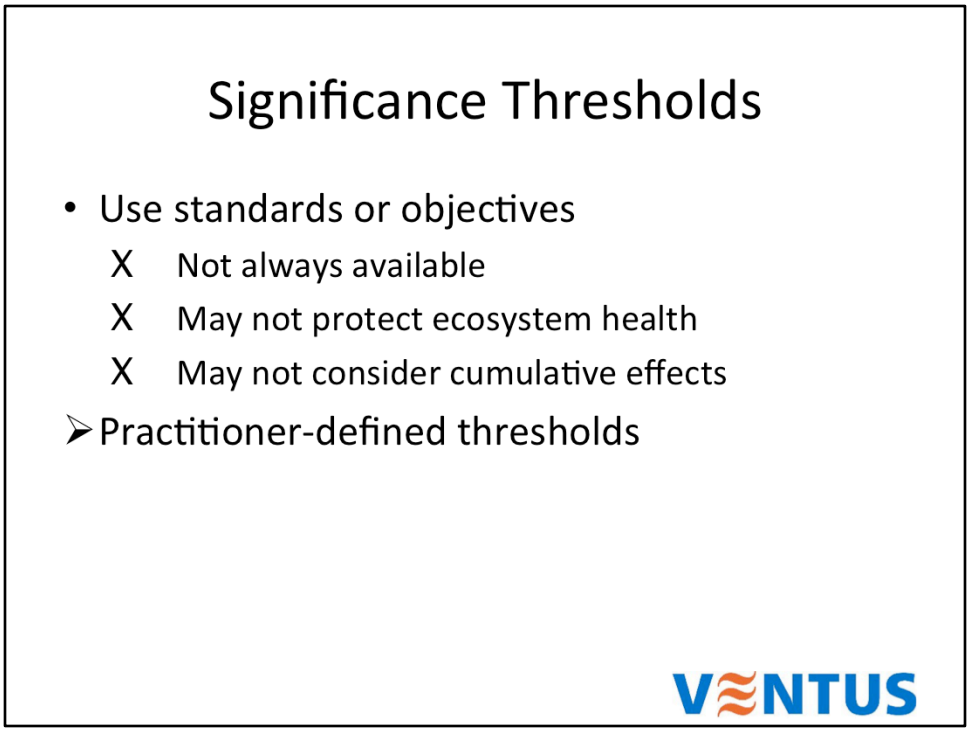
Since it first came into force in 1995, the federal *Canadian Environmental Assessment Act* (CEAA) has included a legislative requirement to take into account the significance of environmental effects of the project being assessed, including cumulative effects. The environmental assessment legislation for most Canadian provinces and territories also includes a requirement to consider the significance of project (and cumulative) effects.

While the legislative authority to determine significance remains with the statutory decision-maker of each jurisdiction, it has become common practice for the practitioner (usually the project proponent and/or a consultant engaged on their behalf) to make a significance determination in environmental assessment documentation. In fact, the requirement for the proponent to determine significance of residual effects is typically specified by the EA process administrator in guidelines, terms of reference, or similar documents that establish the scope of assessment.



The potential for a project to cause significant adverse effects is a key consideration in making a statutory decision following an environmental assessment. It is therefore important to ensure the determination of significance is clearly documented and explained in the assessment. This enhances process transparency, defensibility, and credibility. In particular, the assessment should clearly define how the term 'significance' has been used, including the threshold or point beyond which an adverse effect is considered significant. This principle was recently incorporated into the Government of British Columbia's environmental assessment methodological guidance (EAO 2013), and has been incorporated into Application Information Requirements for several projects in British Columbia since then. To me, this seems like an obvious point, but I continue to be surprised at how many EA practitioners fail to explain how they determined significance!

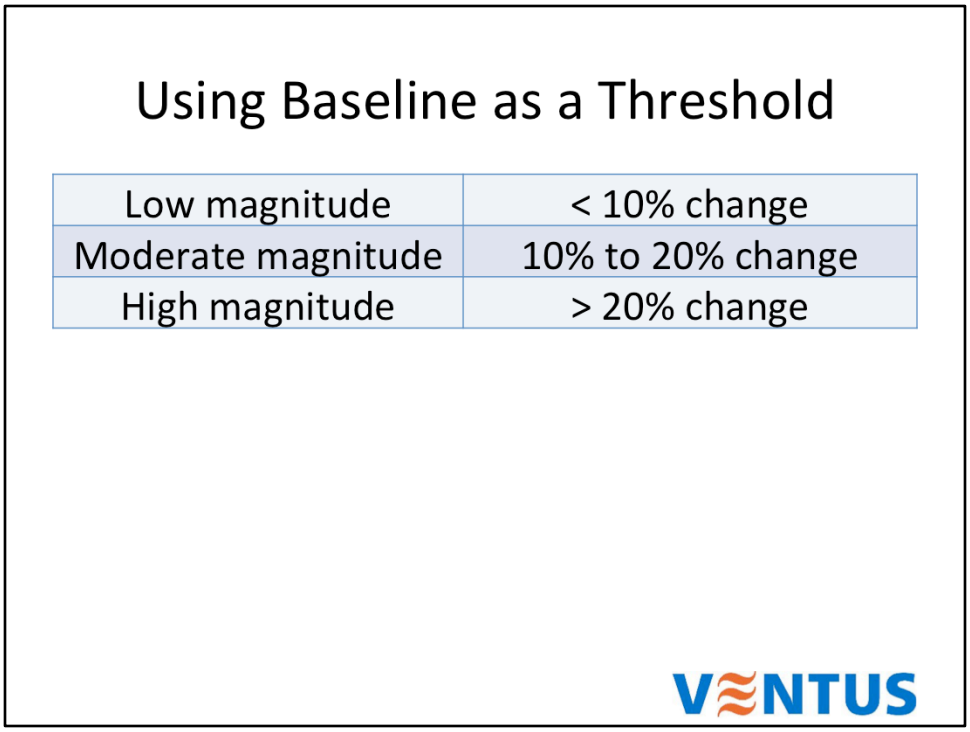
Thresholds are particularly important for assessing potential cumulative effects, when multiple smaller effects, which in isolation may be considered not significant, together exceed the limit of acceptable change of a specific component of the natural or human environment.



Existing guidance material in Canada recommends using government-established environmental protection standards or objectives to determine significance. This is most often done in the case of physical components, such as air quality and water quality.

However, it is acknowledged that standards and objectives do not exist for most environmental components that may be affected by a project. Furthermore, such standards and objectives may not protect ecosystem health and may not adequately consider cumulative effects.

Available guidance therefore recommends the use of other methods and approaches for determining significance, including qualitative approaches based on professional judgment.



In environmental assessment practice in Canada, the changes to an environmental component caused by a project are usually compared against existing conditions, and the residual effects are typically characterized using criteria such as magnitude, extent, duration, frequency, and reversibility. While any or all of these criteria may be important factors in determining the significance of the residual effect, magnitude is often a key driver of significance.

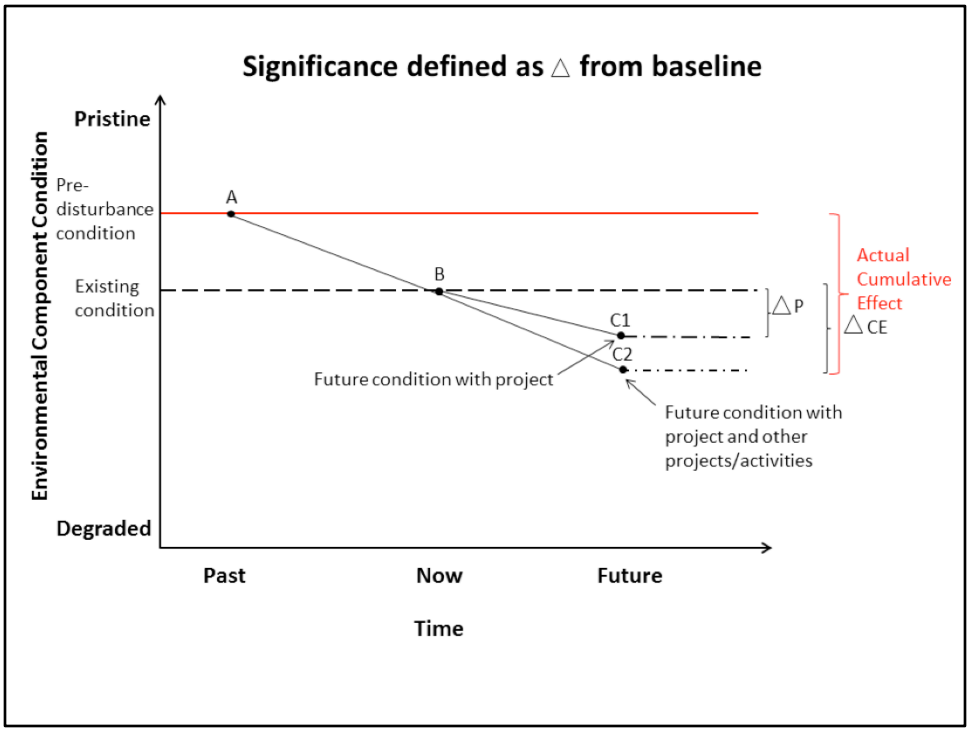
Magnitude is often defined in terms of a degree of change from a baseline; the existing conditions of the component being assessed are usually used as the baseline for this purpose.

This approach has its advantages. In particular, it enables the reader of the assessment to understand the scale of the change caused by the project relative to a directly observable, quantified condition that is documented in the environmental assessment. While that understanding is inherently valuable, and may be adequate to inform the determination of significance of the effect of the project alone, it is generally not adequate to consider the significance of the cumulative effect of the project.

The assessment of potential cumulative effects requires the consideration of how the effects of the project being reviewed will combine with the effects of other projects and activities, including not only those that *will be* carried out, but those that *have been* carried out already.

It is common practice in Canadian environmental assessment to rely on the documentation of existing conditions the assessment of cumulative effects to date, recognizing that the existing conditions reflect the effects of past projects and activities. A key benefit of this approach is that existing conditions can be directly observed and measured, whereas documentation of conditions in the past is often absent or incomplete, and reliable information about the specific effects of past projects and activities is often not available. These data gaps generally worsen the farther back in time one looks.

To overcome those data gaps, we assume the existing conditions reflect the cumulative effects to date of other projects and activities and consider how the effects of the project will further change those conditions.



This figure shows a simplified trend of degradation in the condition of an environmental component from pre-disturbance conditions in the past (point A) to an existing condition in the present (point B) to a forecast condition in the future with the project (point C1) and in the future with the project and other projects and activities that will be carried out (point C2). Based on current practice, the environmental assessment normally describes the project effect as the change caused by the project relative to existing conditions (ΔP) and the cumulative effect as the combined change caused by the project and other future projects and activities, also relative to existing conditions (ΔCE). As I mentioned before, describing the project and cumulative effects relative to the existing conditions helps the reader to understand the scale of the impacts.

However, when it comes to determining the significance of those changes, if the significance of cumulative effects is determined based on the degree of change in a component relative to a baseline of existing conditions (ΔCE), which most often occurs when magnitude is used as the key factor in determining significance, the actual total cumulative effect, including the effects of past projects and activities, will be underestimated.

Using Integrity as a Threshold

- "A major impact is defined as one affecting a whole population or species in sufficient magnitude to cause a decline in abundance and/or change in distribution beyond which natural recruitment … would not return that population or species, or any population or species dependent on it, to its former level within several generations."

VENTUS

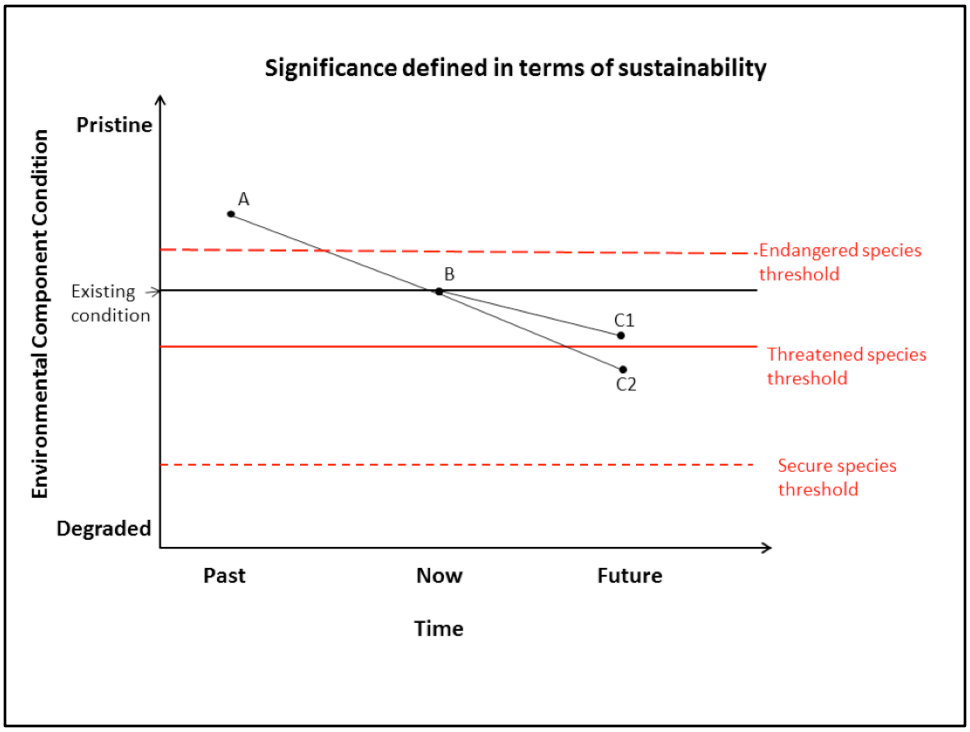
To overcome the problem of underestimating total cumulative effects when determining significance, the use of significance threshold definitions based, where possible, on the continued integrity or viability of the environmental component being assessed is recommended. This concept of defining significance in terms of component integrity has been used at least since 1985, when Conover *et al.,* in their framework for environmental impact analysis emphasized that population integrity comprises the threshold of concern for biological components. They established a definition for "major impact" (which today would be referred to as a significant effect) on biophysical components which incorporates this concept of component integrity.

Integrity-based Thresholds

Component	A significant effect is one where…
Bull trout	…the project causes mortality or reduced productivity at any life stage, either directly or through habitat loss or degradation, that is likely to reduce the integrity of the population.
Grizzly bear	…the project results in the mortality of any female grizzly bear or affects individual grizzly bears and/ or grizzly bear habitat in such a way as to reduce the integrity of the grizzly bear population overall.

VENTUS

The concept of population integrity continues to be integrated into significance threshold definitions in some EAs in Canada, as shown in these examples.



By assessing the significance of project effects and cumulative effects in terms of the integrity or viability of the environmental component being assessed, the assessment more fully considers the cumulative effects to date of past projects and activities. This point is most easily understood in relation to species at risk. The status of a species reflects the effects it has experienced from past projects and activities (as well as, perhaps, natural factors); the viability of a threatened species is understood to have been compromised to some degree. EXPLAIN THRESHOLDS.

The incremental effect of a new project, if measured only as a degree of change from existing conditions, may not appear to be significant, but, when measured in terms of its effect on the viability of the threatened species, may be determined to be significant, particularly if it results in an elevation of risk to the survival or recovery of the species.

This approach has the advantage of relying on the existing conditions of the environmental components being assessed, which can be directly observed in field studies before and after the assessment, instead of more speculative re-construction of conditions at some historic point in time that would be required if significance is defined in terms of a degree of change from pre-disturbance or pre-industrial conditions.

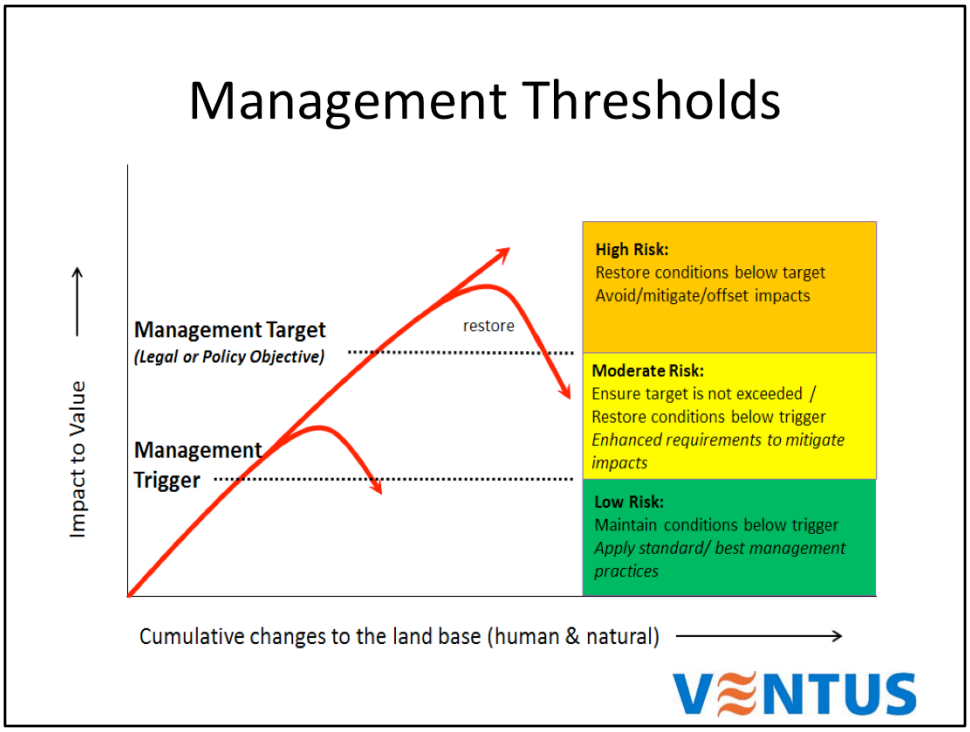
Applicability of Integrity Thresholds

- Best where:
  - ✓ Component status well understood
  - ✓ Targets and thresholds have been defined through land use planning or regional EA

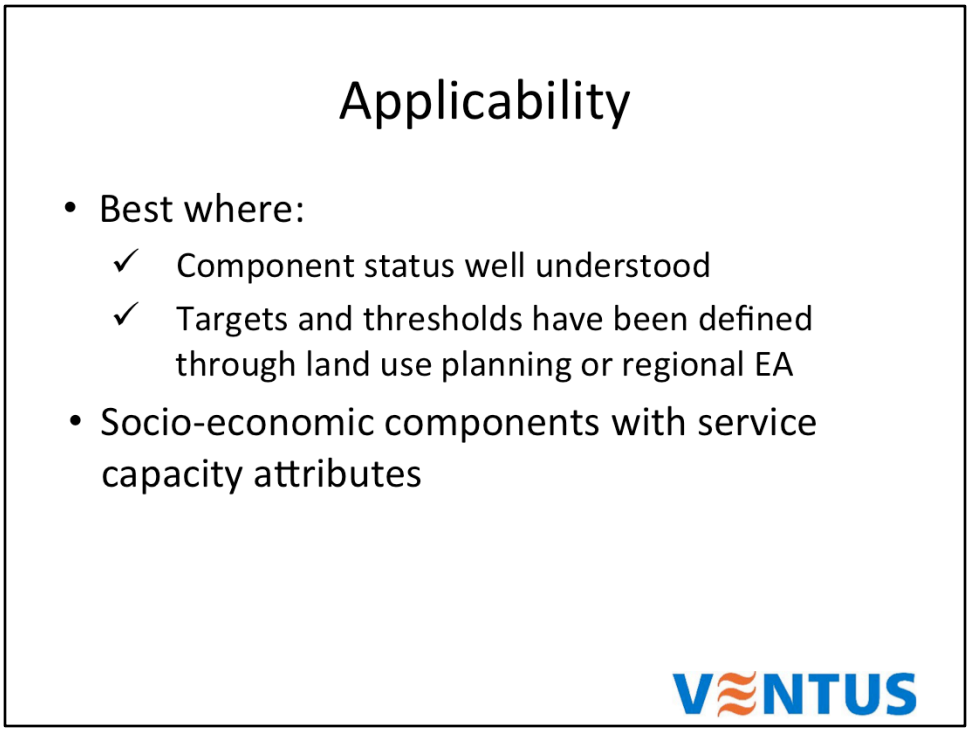
VENTUS

This approach will be most efficient where limits of acceptable change have already been defined through a regional land use planning process, regional or strategic environmental assessment, species recovery plan, or similar integrated system evaluation.

Also where the existing status of the component is well understood.



For example, in British Columbia, Canada's westernmost province, the government is developing a province-wide Cumulative Effects Framework, and within that, they are establishing management thresholds for priority valued components. These thresholds guide decision-makers, including EA practitioners, when assessing the significance of potential effects on valued components and determining the need for mitigation. They have identified not only a threshold for high risk to a component, but also intermediate thresholds that would trigger a higher level of management action to change the degradation trajectory of the valued component.



This approach can also be applied to socio-economic components of the environment, especially those with service capacity attributes, such as emergency services, medical and health services, and infrastructure and utilities. The capacity of such systems can be used as a measure of system integrity, and therefore serves as a useful threshold for determining significance.

Integrity-based Thresholds

Component	A significant effect is one where…
Community Services and Infrastructure	…the incremental demand on services and infrastructure due to the Project will exceed the existing and future capacity of those services and infrastructure such that the needs of the community cannot be met
Health	…the Project adversely affects one or more population health indicators in a manner that erodes the collective ability of the community to maintain its state of well-being.

VENTUS

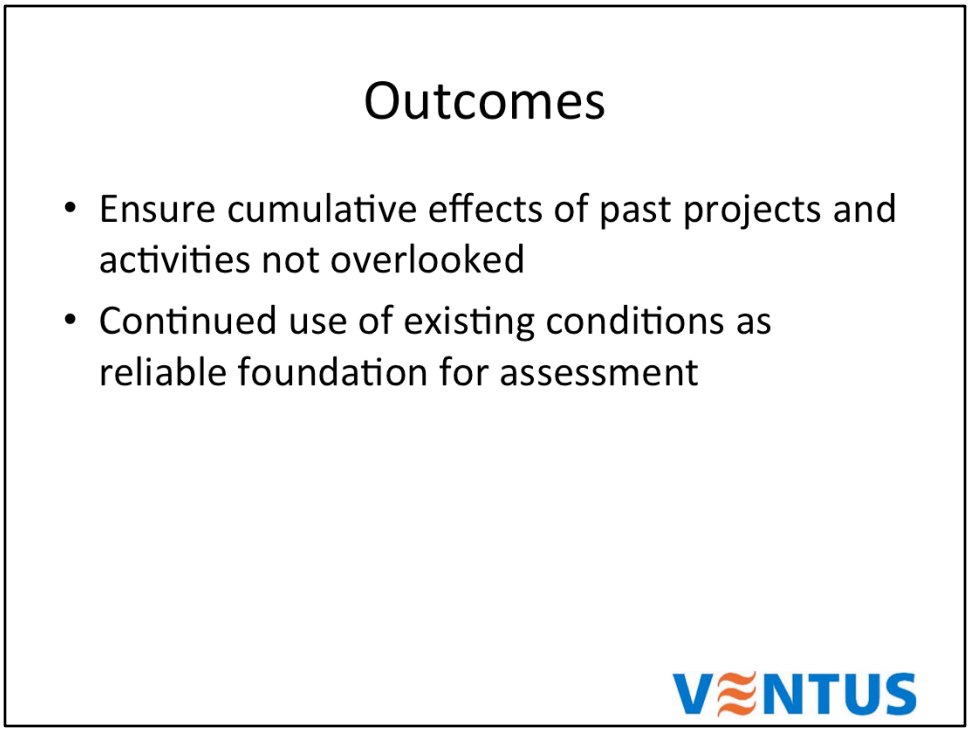
Here are two examples of integrity-based thresholds that have been used for socio-economic components.

As a practitioner…

- Use existing integrity thresholds where available
- Apply professional judgement when required
- Consult with EA process administrator and experts
- Articulate the rationale!

VENTUS

In the absence of pre-defined limits, the practitioner must apply professional judgment to define an appropriate threshold based on available science and other relevant information, ideally in consultation with the EA process administrator and other technical experts. In any case, the rationale for the threshold should be clearly articulated in the assessment to enable informed discourse during the assessment process.



Basing the determination of significance on the continued viability of environmental components will help to ensure the cumulative effects to date of past projects and activities are not inadvertently overlooked, while maintaining the use of existing conditions as a reliable foundation for assessing the effects of the project and its contribution to cumulative effects.

END

Image downloaded from http://commsbusiness.co.uk/news/72823/.

Celesa L. Horvath
Principal, Ventus Development Services Inc.

Box 1051, Pincher Creek, AB, T0K 1W0, Canada
clh@ventus.ca
1-403-627-9427
Twitter: @celesahorvath

VENTUS

Image downloaded from galleryhip.com