Effects Assessment Policy

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ISSUED BY: _____

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This document provides guidance to help environmental assessment participants and the public better understand British Columbia's environmental assessment process. It is not advice and does not replace requirements of the *Environmental Assessment Act*, 2018 or its regulations, or bind any decision-maker.

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ACRONYMS AND ABBREVIATIONS

the Act – The 2018 *Environmental Assessment Act*

BMP – Best Management Practice

CAC – Community Advisory Committee

CEF – Cumulative Effects Framework

CO_2 – Carbon Dioxide

DPD – Detailed Project Description

EA – Environmental Assessment

EAO – Environmental Assessment Office

EAC – Environmental Assessment Certificate

EPIC – EAO Project Information Centre

GHG – Greenhouse Gas

LAA – Local Assessment Area

LNG – Liquified Natural Gas

QA – Quality Assurance

QC – Quality Control

RAA – Regional Assessment Area

TAC – Technical Advisory Committee

VC – Valued Component

DEFINITIONS

Alternative Means: The different economically and technically feasible ways in which the project could be carried out.

Application: An Application for an Environmental Assessment Certificate (EAC).

Application Information Requirements: The requirements for how all the matters listed in *Section 25* of the *Environmental Assessment Act* (2018) (Act) need to be addressed in the context of a proposed project. This includes information requirements for any assessments of effects on a participating Indigenous nation that the Nation will conduct.

Assessment Matters: Topics listed in the Act under *Section 25* that must be addressed in every assessment.

Assessment Plan: Sets out the procedures and methods for conducting the environmental assessment (EA). This will typically include who will be engaged, means of engagement, timeline and roles and responsibilities of each group of EA participants.

Carbon Leakage: Carbon leakage occurs when there is an increase in greenhouse gas (GHG) emissions in one jurisdiction as a result of a decrease in emissions in a second country due to lower economic activity resulting from stringent climate policy. Carbon leakage can result in equal or greater net global emissions.

Carbon Sinks: A natural system that absorbs more carbon than it releases as carbon dioxide (CO_2).

Community Advisory Committee: Established by the EAO to provide advice on the potential effects of the proposed project on the community.

Consensus: Consensus is achieved when an action is supported by a participating Indigenous nation and the EAO; or at least is not objected to by a participating Indigenous nation. Neither supporting an action during an EA process, nor choosing not to object to it, precludes the nation from deciding to provide notification to the Chief Executive Assessment Officer (CEAO) of its consent or lack of consent.

Cumulative Effect: Cumulative effects are changes to environmental, economic, social, cultural and health values caused by the combined effect of past, present and potential future human activities and natural processes.

Cumulative Effects Framework: A set of provincial policies, procedures and decision-support tools that helps identify and manage cumulative effects consistently and transparently across British Columbia's natural resource sector.

Direct Effect: Results of a cause and effect relationship between the project and a component of the biophysical or human environment.

Direct Emissions: GHG emissions generated by activities that are within the defined scope of the project (Note: If transportation of products beyond the project, such as marine or rail, is included in the scope of the project, then emissions generated by those transportation modes will be included as direct (GHG) emissions. Examples of direct emissions include, but are not limited to:

- Emissions from land clearing (for example land use change (including deforestation), biomass decay, etc.);
- Emissions from mobile combustion (for example vehicle, machinery, etc.);
- Emissions from stationary combustion (for example boilers, burners, reciprocating engines etc.);
- Emissions from industrial process (for example chemical, mineral and metal production, incineration, etc.); and
- Flaring, venting and fugitive emissions.

Ecosystem Function: the different physical, chemical and biological components of an ecosystem (for example, vegetation, water, soil, atmosphere and biota) and how they operate and interact with each other within ecosystems and across ecosystems. The proper functioning of an ecosystem depends upon the long-term integrity of its physical, chemical and biological elements.

Early Engagement: The commencement of the regulatory process with the EAO that provides an opportunity for Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders involved in the EA to be involved in the early planning and relationship building for a proposed project.

Effect Pathway: Cause-effect linkage between a project and component of the biophysical or human environment.

Existing Conditions: A combination of the characteristics of a valued component (VC), other components the integrity of the VC relies on, baseline upon which the integrity of the VC relies or that describes how linked VCs may interact and natural or human-caused trends potentially altering the VC.

Greenhouse Gas Emissions: Those emissions listed in the *Climate Change Accountability Act* and includes $CO_{2)}$ methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and nitrogen trifluoride (NF_3).

Indigenous Interests: Interests related to an Indigenous nation and their rights recognized and affirmed by Section 35 of the *Constitution Act, 1982*, including Treaty rights and Aboriginal rights and title, that may be impacted by a proposed project.

Indirect Effect: A result from a change that a project may cause that is often one step removed (secondary) from a project's activities due to complex relationships among components.

Negative Effect: A result that is identified as undesirable or adverse by participants in the EA including Indigenous nations, government agencies, the TAC, any CAC, the public, or the proponent involved in an EA process. Also referred to as an adverse effect.

Regulatory Coordination Plan: A plan that identifies the key required permits for the project and how information generated in the EA will support subsequent permitting processes, other regulatory processes or government initiatives.

Positive Effect: A result that is considered desirable or beneficial by participants in the EA including Indigenous nations, government agencies, the TAC, any CAC, the public, or the proponent.

Process Order: An Order under *Section 24* of the Act to define the scope of the EA, including the assessment plan and Application Information Requirements.

Process Planning: The phase of the environmental assessment in which the procedures and methods for the assessment are established, including development of the Process Order, Assessment Plan and Application Information Requirements.

Product/Activity Emissions Intensity: Ratio created by dividing total greenhouse gas emissions associated with the provision of a product or an activity by the units of product or activity. Usually expressed as a decimal.

Residual Effect: An effect remaining to a VC after the implementation of all mitigation measures, including offsetting measures.

Stakeholder: A person or group that has the potential to be directly affected by a proposed project.

Technical Advisory Committee: Established by the EAO to provide technical advice throughout the EA of a proposed project. The Technical Advisory Committee is chaired by the EAO and made up of representatives with the mandates and

technical expertise relevant to the assessment of a proposed project, including appropriately qualified provincial and federal experts and regulators, participating Indigenous nations and experts from local governments.

Valued Components: Components of the biophysical and human environment that are considered by Indigenous nations, TAC, any CAC, the public, local governments, provincial federal government agencies, and stakeholders, and the proponent involved in the EA process to have scientific, ecological, economic, social, health, cultural, archaeological, historical, or other importance. There may be aspects of environmental, economic, social, cultural, health or Indigenous values that are valued and may be assessed along an effect pathway but are not captured as an individual VC.

1.0 INTRODUCTION

Under Section 2 of the *Environmental Assessment Act* (2018) (Act), the purpose of the Environmental Assessment Office (EAO) is to carry out its responsibilities under the Act and to:

- Promote sustainability by protecting the environment and fostering a sound economy and the well-being of British Columbians and their communities; and
- Support reconciliation with Indigenous peoples in British Columbia (B.C.).

This document is intended to guide proponents and others involved in an environmental assessment (EA) in carrying out an effects assessment. Section 2 describes the process for identifying and selecting appropriate VCs upon which an EA will be focused. Section 3 outlines how to undertake the VC-based effects assessment. Section 4 provides guidance on assessing effects to Indigenous nations. and Section 5 provides guidance on how to consider other assessment matters not explicitly evaluated using the VC framework. This document should be read in conjunction with Section 25 of the Act and other related EAO policies and guidelines.

1.1 Purpose

The primary audience for this document is proponents of projects that require an EA in B.C. and their technical consultants. This document may also provide relevant guidance to proponents who undertake an amendment application for a project with an existing Environmental Assessment Certificate (EAC). The EAO staff, Indigenous nations, the Technical Advisory Committee (TAC), any Community Advisory Committee (CAC), the public, local governments, provincial and federal government agencies, and stakeholders may also be informed by this document.

The Act identifies assessment matters which must be considered in every EA. The purpose of this document is to provide guidance on how to consider these assessment matters, including how to identify, assess and manage potential environmental, economic, social, health and cultural effects (referred to collectively as the five pillars). This document will also be used to understand the potential effects of a project on interests related to an Indigenous nation and their rights recognized and affirmed by Section 35 of the *Constitution Act, 1982*.

1.2 Scope of Guidance

Section 25 of the Act identifies the required assessment matters for every EA. This includes an assessment of the effects of a project on Indigenous nations and rights, recognized and affirmed by Section 35 of the *Constitution Act, 1982* as well as a consideration of the following:

- Positive and negative direct and indirect effects of the reviewable project, including environmental, economic, social, cultural and health effects and adverse cumulative effects;
- Risks and uncertainties associated with those effects, including the results of any interaction between effects;
- Risks of malfunctions or accidents;
- Disproportionate effects on distinct human populations, including populations identified by gender;
- Effects on biophysical factors that support ecosystem function;
- Effects on current and future generations;
- Consistency with any land use plan of the government or an Indigenous nation if the plan is relevant to the assessment and to any assessment conducted under Section 35 or 73 of the Act;
- Greenhouse gas (GHG) emissions, including the potential effects on the province being able to meet its targets under the *Greenhouse Gas Reduction Targets Act* (now called the *Climate Change Accountability Act*);
- Alternative means of carrying out the project that are technically and economically feasible, including the use of the best available technologies and the potential effects, risks and uncertainties of those alternatives;
- Potential changes to the reviewable project that may be caused by the environment; and
- Other prescribed matters.

This document provides the typical steps for evaluating the effects of a project using the approach of VCs, starting with issues scoping through to the evaluation of project effects. When necessary, other assessment frameworks may also be used to ensure an effective and efficient consideration of all required topics in a project's EA. For example, there may be other methods more appropriate to understanding potential effects to Indigenous interests and proponents and the EAO should work with Indigenous nations to identify the appropriate assessment methods to assess potential effects to Indigenous interests.

For each project, the scope of the EA and the procedures and methods for conducting the assessment, are confirmed through the Process Order issued pursuant to *Section 19* of the Act. The scope of the EA is developed during Early Engagement and requires the application of this guidance and consideration of input received during Early Engagement. An Application for an EA Certificate must contain the information required by the EAO through the Process Order. This guidance does not supersede the requirements specified in the Act, related regulations, or project-specific orders issued under the Act.

The EAO will seek consensus with participating Indigenous nations throughout the EA process. This includes on materials developed using this document such as the Process Order and the Application. Proponents should work with Nations throughout the EA including in the development of their Application to ensure that Indigenous nations' issues and concerns are identified, appropriately understood and addressed where possible.

1.3 Regulatory Context

1.3.1 Other EA processes

Other provincial, federal, Indigenous and local government regulatory processes may apply to a reviewable project and may require coordination with B.C.'s EA process. Project proponents should engage with other regulatory bodies, including Nations, to confirm any information and procedural requirements that may be applicable at the EA stage of a reviewable project. The Process Order will also contain a Regulatory Coordination Plan that identifies the key permit requirements and associated timelines for these applications.

In 2019, B.C. and Canada signed a bilateral agreement (*Impact Assessment Cooperation Agreement between Canada and British Columbia*) to co-operate on project reviews under the Act and Canada's *Impact Assessment Act*. The agreement sets out the administrative processes required from both provincial and federal agencies to ensure an efficient and effective assessment is carried out when projects are subject to assessment by both jurisdictions, supporting the principle of 'one-project, one-assessment'. Should the provincial EA process be substituted to meet the requirements of a federal EA, provincial and federal ministers still make separate and independent decisions. When a project requires an assessment from both the Province and the federal government, a cooperative process will be conducted that meets the needs of both organizations, resulting in a more efficient and effective assessment.

In some cases, Indigenous nations may have established their own independent EA processes. In these cases, the EAO will work with the Nation to develop a process that meets the needs of both organizations, resulting in a more efficient and effective assessment. These independent EAs do not negate the need for the EAO to assess the effects of a project on a Nation and their rights recognized and affirmed by Section 35 of the *Constitution Act, 1982* as a component of every EA.

Proponents should review any agreements that are in place between a Nation and the EAO to ensure that any project specific considerations are identified and included where appropriate.

1.3.2 Land Use Plans

Section 25(2)(g) of the Act requires every assessment to consider the project's consistency with any land use plan of the government or an Indigenous nation if the plan is relevant to the assessment.

Provincial land use plans provide resource management direction for provincial Crown land. The scale of these land use plans ranges from regional plans to more detailed plans identifying specific values for smaller areas. Some Indigenous nations have also undertaken land use planning within their territories or treaty lands. For some Nations, land use plans may be important expressions of governance for their Nation in their territories and can provide valuable information to proponents when planning for a project and an EA. Proponents are required to identify and review available land use plans[1] in project areas for planning purposes and to consider consistency with the land use plans. Depending on the location of a project, available marine use plans may also need to be considered.

Local governments may also have land use plans that proponents should familiarize themselves with to understand how they may apply to their project.

Refer to the Early Engagement Policy, found *here*, for further details on how land use plans should be considered during Early Engagement.

1.3.3 Other Regulatory Processes

Projects that require an EAC often require multiple authorizations from one or more natural resource sector agencies throughout the life of the project. Provincial government agencies coordinate and collaborate their regulatory activities over the life of a project to ensure issues are addressed at the most appropriate and effective stage of project development and by the most appropriate agency.

During the EA, matters commonly arise that cannot be adequately managed within the EA process because they are outside of the EAO's purpose described in *Section 2* of the Act, the scope of the project or assessment as set out in the Process Order or because they are more appropriately managed within the role of other agencies' regulatory, permitting, or other authorization processes.

The EA is an opportunity for provincial agencies to provide information to proponents, the EAO, Indigenous nations, the TAC, any CAC, the public, local governments, provincial and federal government agencies, and stakeholders regarding future permitting or regulatory requirements. This information can help foster a greater understanding of the roles of each agency and the ability of permitting or other regulatory processes to address an issue.

During Process Planning the EAO develops a Regulatory Coordination Plan that includes an issues tracking document that describes the key issues raised during Early Engagement and how those issues may be addressed during the EA, subsequent permitting, other regulatory processes or government initiatives. The EAO maintains and updates the Regulatory Coordination Plan, in collaboration with other agencies during the EA. When issues arise in the EA that are best managed by another agency, the Regulatory Coordination Plan will ensure that they are captured and tracked. As the EA progresses, the EAO will describe additional details relating to how issues are addressed in the EA or may be further addressed in subsequent permitting, other regulatory processes or government initiatives.

The Regulatory Coordination Plan will provide staff from other provincial agencies engaged in the EA an early opportunity to understand potential key issues that need to be addressed during permitting, other regulatory processes or government initiatives and carry forward any relevant information or commitments from the EA into those processes. For further details, please refer to the Regulatory Coordination Plan Guidelines found *here*.

[1] Available land use plans may include *draft* plans depending on the status and progression of the plan.

A Regulatory Coordination Example

When considering water treatment at a proposed mine provincial agencies coordinate by having information requirements that build off of or are linked to the requirements of other agencies:

EA Phase

1. Confidence that the water management system will be effective as proposed.

Permitting Phase

2. The Ministry of Energy, Mines and Petroleum Resources will require detailed engineering and technical information to ensure that the location, technology, modelling and mine plan will function as proposed.
3. The Ministry of Environment and Climate Change Strategy will require specific water quality metrics to be achieved and to have confidence that the detailed permitted design will accomplish this.

2.0 Identifying and Scoping Project Related Effects

In B.C. the provincial EA process provides a process for identifying, evaluating and managing the potential positive and negative direct and indirect effects of a project that may occur during the life of a project. The EAO carries out thorough timely, transparent assessments, using the best available science, Indigenous knowledge and local knowledge and considering the environmental, economic, social, cultural and health effects of projects. The EAO also ensures that the issues and concerns of Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders are considered by Provincial decision makers.

EAs in B.C. typically use a VC-based framework to promote a comprehensive, yet focused, understandable and accessible assessment of potential effects of a project. VCs are used to organize an effects assessment so that the most important potential effects are identified, assessed and mitigated. The EAO defines VCs as components of the biophysical and human environment that are considered by Indigenous nations, the TAC, any CAC, the public, local governments, provincial and federal government agencies, and stakeholders involved in the EA process to have scientific, ecological, economic, social, cultural, archaeological, historical, Indigenous or other importance.

Assessing effects to Indigenous interests typically follows the assessment approach that is outlined under the VC framework but may require additional considerations throughout the process. An Indigenous interest may be directly assessed through a representative VC or an assessment of Indigenous interests may be supported by the information provided from the assessment of one or more VCs (see *Section 4* for more information).

It is recommended that Indigenous interests should generally be incorporated into each stage of the effects assessment undertaken using the VC framework. To support this, each section of the guidance below provides additional information specific to considering Indigenous interests with additional information provided in *Section 4* on assessing effects to Indigenous interests.

In some cases, the EAO and an Indigenous nation may decide that an alternative approach to assessing effects on a Nation's interest is more appropriate than following the approach outlined in *Sections 2* through *4* of this Policy. The assessment methods selected to assess effects to an Indigenous interest must be clearly documented in the Application Information Requirements and the Assessment Plan, if relevant, during Process Planning. Whatever methods are decided

upon, it is important that the assessment of effects on that Indigenous interest is appropriately scoped to be relevant to the project EA, have identified spatial and temporarily boundaries, and use clearly defined methods.

Indigenous Interests

The Act requires every EA to assess the effects of a project on Indigenous nations and their Section 35 rights. Indigenous interests are those interests related to an Indigenous nation and their rights recognized and affirmed by Section 35 of the *Constitution Act, 1982,* including Treaty rights and Aboriginal rights and title, that may be impacted by a proposed project (Indigenous interests). This scope of assessment is meant to ensure that Indigenous and provincial decision makers are fully informed of how a project may affect an Indigenous nation. This will require that the EAO and proponents work collaboratively with Indigenous nations to identify and assess the matters that are of central importance to the Indigenous nation and could be affected by the project. Of key importance will be those interests that pertain to constitutionally protected rights as well as matters that inform the Indigenous nation's decision regarding whether or not to consent to the project proceeding. Each Indigenous nation may have different priorities and concerns. The collaborative process to identify Indigenous interests to assess should happen concurrently to the identification of VCs for the project. It is recommended that these discussions begin as early as possible to ensure that proponents can submit any relevant project specific tailoring of the Application Information Requirements Guidelines with their DPD. The required Indigenous interests to assess will be confirmed through a consensus seeking process between the EAO and the Indigenous nation and outlined in the Process Order.

2.1 What are Valued Components and how are they used in an Effects Assessment?

2.1.1 Valued Component

In an EA, Valued Components (VCs) are identified based on comprehensive issues scoping and engagement, which reveals the values that may be affected by the project and priorities of Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders. Initial identification of VCs including Indigenous interests begins in Early Engagement with the review of best available knowledge, including science, Indigenous knowledge and local knowledge and as key areas of interest and concern are identified. At the end of Early Engagement, with the submission of the Detailed Project Description (DPD), proponents are encouraged to provide their project specific tailoring of the AIR, including project specific VCs and identification of Indigenous interests, to assist with the timely completion of the Process Planning phase. Proponents should use the EAO's Application Information Requirements Guidelines, found *here*, as a starting place for this work. The AIR, including VCs and Indigenous interests, is confirmed by the EAO in Process Planning through a consensus-based process with Nations and through review by the TAC. Refer to Early Engagement Policy and the Process Planning Policy, found *here*, for further information.

To be well-defined and effective, VCs must have the following attributes:

- **Relevant** to at least one of the assessment matters and clearly linked to the values reflected in the issues raised in respect of the project;
- **Comprehensive**, so that taken together, the VCs selected for an assessment should enable an understanding of the potential effects of the project;
- **Representative** of the important features of the biophysical and human environment likely to be affected by the project;
- **Responsive** to the potential effects of the project; and

- **Concise**, so that the nature of the interactions between the project and the VCs can be clearly articulated and understood and redundant analysis is avoided.

VCs will vary by project, industry, Indigenous nation and geographic region, to reflect the nature of the potential project effects and the environmental, economic, social, cultural, health, and Indigenous context within which the project is located.

Not every value identified will become a VC. Candidate VCs may be considered through an assessment or may be identified as a pathway component for a VC assessment. Sub-components may also be identified for a VC to divide broadly defined VCs and help frame the analysis. Subcomponents are smaller distinct aspects of a VC that can be used to classify, assess, or characterize the effects assessment into meaningful parts. For example, 'wildlife' as a VC may have 'ungulates', 'fur-bearers' and 'birds' as subcomponents.

Proponents should seek input from appropriate Technical Advisors (government agencies and participating Indigenous nations identified during Early Engagement prior to the TAC being formed in Process Planning) and work with Nations to select appropriate project-specific VCs and identify Indigenous interests.

Indigenous Interests

Indigenous interests will vary depending on the Nation, the project, and the location that the project could potentially affect. Indigenous interests should be identified early on through an iterative process with the Nation to identify and refine those interests that may be affected by the project. Indigenous interests may be a VC or they may be informed by one or more VCs. The selection of project specific VCs should be informed by these identified Indigenous interests. The VCs selected for the project should allow for an efficient and robust assessment of project effects, including effects to Indigenous interests.

2.1.2 Indicators

Indicators represent an aspect of the VC that is important to its integrity and can be used to understand and evaluate the potential effect of the project on the VC. Indicators are qualitative or quantitative metrics used to assess and report on the condition and trend of a VC and should be clearly identified in order to better understand the interactions between the project and the selected VC. Parameters may be used to provide a means to determine the level or amount of change in an indicator and facilitate quantitative or qualitative measurement of potential effects.

To be effective and useful, indicators must have the following attributes:

- **Relevant**: Relate directly or indirectly to the selected VC;
- **Practical**: There must be a practical way to evaluate the indicator, using existing or achievable data, predictive models, or other means;
- **Measurable**: The measurement of the selected indicator must generate useful data that inform our understanding of the potential effect on the VC;
- **Responsive**: To the potential effects of the project;
- **Accurate:** In reflecting changes to the VC; and
- **Predictable:** In terms of their response to the project[2].

[2] In some circumstances there may be uncertainty in the response of indicators to the project, in which case the uncertainty must be clearly identified and described.

Indicators may directly measure the condition of the VC (state indicators[3]) or the pressures affecting the VC (pressure indicators[4]). Scientific, Indigenous and local knowledge should be used in selecting relevant indicators for a VC.

Indicators for Indigenous Interests

Where a VC directly represents an Indigenous interest or informs the assessment of effects to Indigenous interests, proponents should work with the Indigenous nation to identify relevant and appropriate indicators and parameters to assess and measure effects to the VC. The indicators and parameters selected may also reflect Indigenous knowledge, where appropriate, and in consultation with the Indigenous nation.

In some cases, indicators selected for the assessment of cumulative effects may be different than the indicators selected for project-level effects assessment, to reflect the scale of the cumulative effects assessment boundary. Where possible and appropriate, indicators should be chosen that align with indicators used in provincial initiatives including the B.C. Cumulative Effects Framework (CEF). Selection of these same indicators will allow for supporting data and benchmarks already developed for those indicators to be used in the assessment of project-level effects, including cumulative effects. Project assessment results for these indicators can improve the province's knowledge base informing regional cumulative effects initiatives. See the example below.

Example of how the provincial Cumulative Effects Framework can inform the selection of project specific indicators

The B.C. CEF assessment protocol for grizzly bear describes several indicators selected to reflect the key factors affecting the condition of grizzly bear populations and habitat. When the provincial assessment protocol was used to assess the condition of grizzly bear in the northeast, regional experts recommended that resource managers focus management attention on the most precise and relevant indicators for the northeast context: Core security areas, hunter day density, road density and quality habitat protected. Except for hunter day density, these indicators were developed by applying GIS data analyses to provincial mapping data reported at the landscape unit scale. Hunter day density relied on provincial data available at the wildlife management unit scale derived from hunter questionnaires and guide outfitter declarations.

An EA considering grizzly bear as a VC or as a sub-component of a Wildlife VC might assess project effects using relevant indicators described in the CEF assessment protocol for grizzly bears. For example, indicators for effects to grizzly bear may include indicators such as habitat capability, core security habitat and road density. In addition, project-specific indicators such as proximity of grizzly bear habitat to project infrastructure may be used to capture the potential impacts of sensory disturbance, increased mortality risk and habitat alteration resulting from the project. The methods used to obtain habitat information may go beyond GIS data analysis to include field studies in the project area.

2.2 Identifying, Evaluating and Selecting Valued Components

VCs and their assessment boundaries, including spatial and temporal boundaries, provide the foundation for the effects assessment. Selecting the appropriate VCs is a key step for high-quality EAs. The EAO's Application Information

[3] State indicators are metrics used to directly measure and report on the condition of a component.

[4] Pressure indicators measure and report on processes that act upon or influence the condition of a component.

Requirements Guidelines, found *here*, which includes a standard VC list, should be used by proponents as a starting place for any proposed tailoring of the project-specific list of VCs.

There are four basic steps in the selection of appropriate VCs, as shown in Figure 1. These steps should be undertaken with Indigenous nations to ensure that their Indigenous interests are fully considered and integrated throughout the process.

Figure 1. Four basic steps in VC selection

In order to assist in the timely completion of Process Planning, proponents are also encouraged to provide with their DPD any proposed revisions to the EAO's Application Information Guidelines, including to the proposed list of VCs. Proponents must clearly document the rationale, based on this guidance document, for the revisions proposed. It is important to note that the EAO will be seeking consensus with participating Indigenous nations prior to finalizing the AIR during Process Planning. To facilitate consensus-seeking processes during the EA, the proponents should work with Indigenous nations to incorporate their concerns and interests into any changes proposed to the AIR.

Identifying, Evaluating and Selecting Indigenous Interests

The EAO provides a standard list of VCs in the Application Information Requirements Guidelines to be considered for inclusion in every EA. The standard VC list does not identify specific VCs to represent Indigenous interests, but does provide a placeholder for these to be identified and developed with Indigenous nations, where appropriate. While many Indigenous interests may overlap with the standard VC and/or VC effects pathways, project specific Indigenous interest(s) may require the addition of VC(s).

2.2.1 Issues Scoping

VCs should be related to relevant assessment matters, including environmental, economic, social, cultural and health matters and Indigenous interests and clearly linked to issues raised during Early Engagement for the project. Such issues are normally identified through issues scoping. Issues scoping should start as early as possible and include consideration of scientific, local knowledge and Indigenous knowledge.

Issues scoping is a process of compiling and analyzing available information to identify environmental, economic, social, cultural and health issues and Indigenous interests that may be related to a project. These project-specific issues are generally based on the local and regional values held by Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders in the area within which a project is proposed. They may also reflect issues of concern to the Nation, scientific community or to governments. The issues identified through issues scoping are used to inform the selection of VCs for the assessment.

Best practices in issues scoping include:

- Engaging Indigenous nations as early as possible to identify Indigenous interests in the project area;
- Working with Indigenous nations to identify sources of Indigenous knowledge to apply to the issue scoping process;
- Describing the physical works and activities associated with the project including location of project components or options under consideration;
- Reviewing available information regarding the type of project being proposed, including, but not limited to, research publications and previous EAs;
- Reviewing available information regarding the local area and region in which the project is to be located, including, but not limited to, research publications, previous EAs and cumulative effects information;
- Reviewing the Application Information Requirements Guidelines, found *here*, and other guidance material provided by the EAO (and by the Impact Assessment Agency of Canada, if a federal EA is also required);
- Engaging the EAO and provincial agencies and committees as early as possible, including those undertaking provincial, regional, or trans-boundary cumulative effects assessments (for example, CEF, Environmental Stewardship Initiatives and Collaborative Stewardship Frameworks), to understand the key values and interests of government;
- Engaging federal agencies and departments as early as possible if there are matters of federal jurisdiction that may be affected by the project;
- Engaging local and Indigenous governments, regional health authorities, emergency service providers and other local and regional community service organizations as early as possible;
- Engaging landowners, tenure holders, community and interest groups, the public and other key stakeholders in the project area as early as possible; and
- Drawing on the professional judgment and expertise of discipline specialists.

Information sources that may be appropriate to review during issues scoping include, but are not limited to:

- Other EA reports for similar types of projects or projects in the same area on the *EAO's Project Information Centre* (EPIC) or Canadian Impact Assessment Registry, administered by the Impact Assessment Agency of Canada[5];
- Applicable provincial and federal legislation and regulations (such as the B.C. *Forest and Range Practices Act*, the federal *Fisheries Act* and others);
- Provincial land use plans (for example, Land and Resource Management Plans) and regional and local government plans (for example, Official Community Plans, Regional Growth Strategies, Regional Sustainability Strategies, Climate Action Plans and other environmental, social and/or economic development strategies);
- Indigenous nation's land use plans;
- Relevant Current Conditions Reports or Cumulative Effects Assessment and Management Reports prepared pursuant to the B.C. CEF;
- Reports developed by regional Collaborative Stewardship Frameworks and Environmental Stewardship Initiatives or any other applicable cumulative effects initiatives;
- Applicable provincial and federal policies and guidance documents (for example, Environmental Mitigation Policy);
- B.C. Conservation Data Centre, the federal Species at Risk Act and the Committee on the Status of Endangered Wildlife in Canada, recovery or management plans from the Species at Risk registry, or B.C. species recovery plans;
- Future climate projections for the applicable region;
- Indigenous nation treaties and information regarding asserted claims, from the B.C. Treaty Commission;

[5] Please note that indigenous knowledge provided for other projects should only be used with the permission of the Indigenous nation. For more information, please see the Indigenous Knowledge Guide.

- Reconciliation agreements between the Province and Indigenous nations, from the Ministry of Indigenous Relations and Reconciliation;
- Available agreements between the EAO and Indigenous nations regarding the delivery of EAs in their territory;
- Indigenous knowledge made available by an Indigenous nation and used in accordance with the laws and customs of the Indigenous nation;
- Information provided by Indigenous nations or developed with Indigenous nations;
- Provincial Archaeological Report Library and the Provincial Archaeological Site Inventory; and
- Other sources relevant to the type of project being proposed, the region in which the reviewable project is located, the Indigenous territory in which the reviewable project is located and the nature of likely project effects.

Data limitations should not prevent the assessment of a VC or Indigenous interest for which effects, including cumulative effects, are expected. Where data are not readily available, practitioners may rely on surrogate or modelled data outputs, undertake new data collection, or apply existing scientific, local and traditional knowledge.

Issues Scoping for Indigenous Interests

In addition to the information identified for VCs, Indigenous nations may have unique considerations and information sources. This may include the Nation's unique ethnography, language, governance, economy, population, communities, reserves, and health and social conditions. This may also include consideration of Indigenous knowledge or any other contextual information the Nation's views as important to understanding the potential effects of the project on their interests.

2.2.2 Identifying Candidate Valued Components

The issues identified through issues scoping should be grouped generally by environment, economic, social, cultural, health and/or Indigenous interests – and then more specifically within those broad thematic areas such as wildlife or water quality. A range of questions should then be considered when determining whether a component related to the issues identified through scoping can or should be considered as a candidate VC for the assessment and the reasons why. Table 1 below outlines key questions to consider when identifying candidate VCs.

Table 1. Candidate Valued Components Considerations

MORE LIKELY this component is relevant	Candidate Valued Components Considerations	LESS LIKELY this component is relevant
YES		NO
	Is the component present in the local or regional project area? If the component is known to be absent from the project area, it is unlikely to be affected by the project and will not warrant assessment.	
	Do the project and related activities have the potential to interact with and positively or negatively affect the component?	

	A component may occur in the project area, but if the project does not result in some emission, effluent, or other source of effect (direct or indirect) on that component, assessment may not be warranted.	
	Have community residents, land and resource users, Indigenous nations or government agencies raised issues or concerns related to how the project could interact with the component?	
	Has this component been identified as an interest of an Indigenous nation?	
	Do changes to the component due to the project and related activities have the potential to affect biophysical factors that support ecosystem function? Does the project and related activities effect: habitats supporting ecosystem function; pattern, quantity, size and connectivity of habitat patches; continuation of key natural disturbance regimes; structural complexity; hydrologic or oceanographic patterns; nutrient cycling; purification services; biotic interactions; population dynamics and genetic diversity. (Refer to *Section 5.3* on biophysical factors that support ecosystem function for more detailed descriptions of these biophysical factors)	

Proponents should also consider if there is a legally binding government requirement (for example, regulation, management framework) already in place to protect the component. Provincial and/or federal regulation, standards, or codes of practice may exist, governing certain types of project activities and/or protecting certain components. Government management plans or policy frameworks may also exist for certain components. Such regulatory frameworks typically have been developed based on a wealth of information and knowledge about the activity and/or component to which the frameworks apply and are intended to avoid potential adverse effects. Additional detailed analysis in the context of an EA may therefore not be needed.

The Act also requires the assessment of biophysical factors that support ecosystem function. These factors may be captured within a VC or a sub-component of a VC. See *Section 5.3 Biophysical Factors that Support Ecosystem Function* for more direction on components of VCs that relate to biophysical factors that support ecosystem function, including an ecosystem function scoping tool.

Once a component has been confirmed as being potentially relevant to the assessment, the following questions in Table 2 help to ensure the scoping of the assessment takes into consideration the priorities and values of the Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders and the likely key issues or potential significant effects that need to be assessed and considered in an EAC application decision. If the answer to one or more of these questions is affirmative, the component should be considered as a candidate VC.

Table 2. Additional Questions for Identifying Candidate Valued Components

YES	Key Questions	NO
	Does the component reflect a legislative, regulatory, or other requirement or provincial/federal/ Indigenous government management priority (for example, species at risk)?	
	Is the component important for the assessment of effects on interests of Indigenous nations?	
	Is there potential for adverse cumulative effects on the component? (for example, are there known stressors already occurring on the land base that will also affect the component?)	

	Is the component particularly sensitive or vulnerable to disturbance?	
	Has the component been identified as a value in the B.C. CEF or in regional cumulative effects assessments?	
	Would climate change projections or other future activities on the land base result in the inclusion of a component that may have reduced resilience and might not otherwise have been considered in the current state?	

Identifying Candidate Indigenous Interests

Proponents and Indigenous nations should discuss with Indigenous nations early on their initial views of what interests may be impacted by the project and would be important to consider during the EA. This early understanding can be refined through further discussions through Early Engagement and the following questions may be used as a starting place to identify those Indigenous interests of most importance for a project-specific assessment:

1) Is the Indigenous interest an Aboriginal right or Treaty right?

2) Does the Indigenous nation consider the interest to be a key information requirement when determining whether or not to consent to the project proceeding?

3) Is the interest listed as a standard Indigenous interest in an agreement with the EAO or in policies established by the Indigenous nation?

3) Is the interest in the local or regional project area? Does the project have the potential to interact with the interest?

4) Are there specific concerns or issues raised by the Indigenous nation regarding how the project could interact with the interest?

2.2.3 Evaluating Candidate Valued Components

Once a list of candidate VCs has been established, further evaluation is required to focus the assessment on selected VCs for analysis. The selection of appropriate VCs will minimize the degree of duplication and redundancy in the assessment and will help to focus the analysis on the project interactions of greatest importance.

Map Effect Pathways and Understand Linkages

To support the evaluation of candidate VCs, it is useful to examine how the project may interact with the biophysical and human environment.

The term **effect pathway** refers to the cause-effect linkage between a project and components of the biophysical or human environment. Understanding the effect pathways and the interaction between effects helps to clarify the relationship between candidate VCs and can be used to focus the assessment. In some cases, the pathway between a project and a component of the biophysical or human environment is direct, while in others the project may affect the component indirectly, by causing changes in the biophysical or human environment on which the component depends. Proponents are encouraged to document and describe effect pathways relevant to their project to facilitate the

identification of VCs for assessment. Pathway diagrams, such as the one shown in Figure 2, or conceptual site models [6] are useful for this purpose. The description of relevant effect pathways should identify VCs and the mechanisms by which effects may link to other VCs. Sometimes, this exercise may lead to identification of components that were not previously included in the list of candidate VCs based on issues scoping.

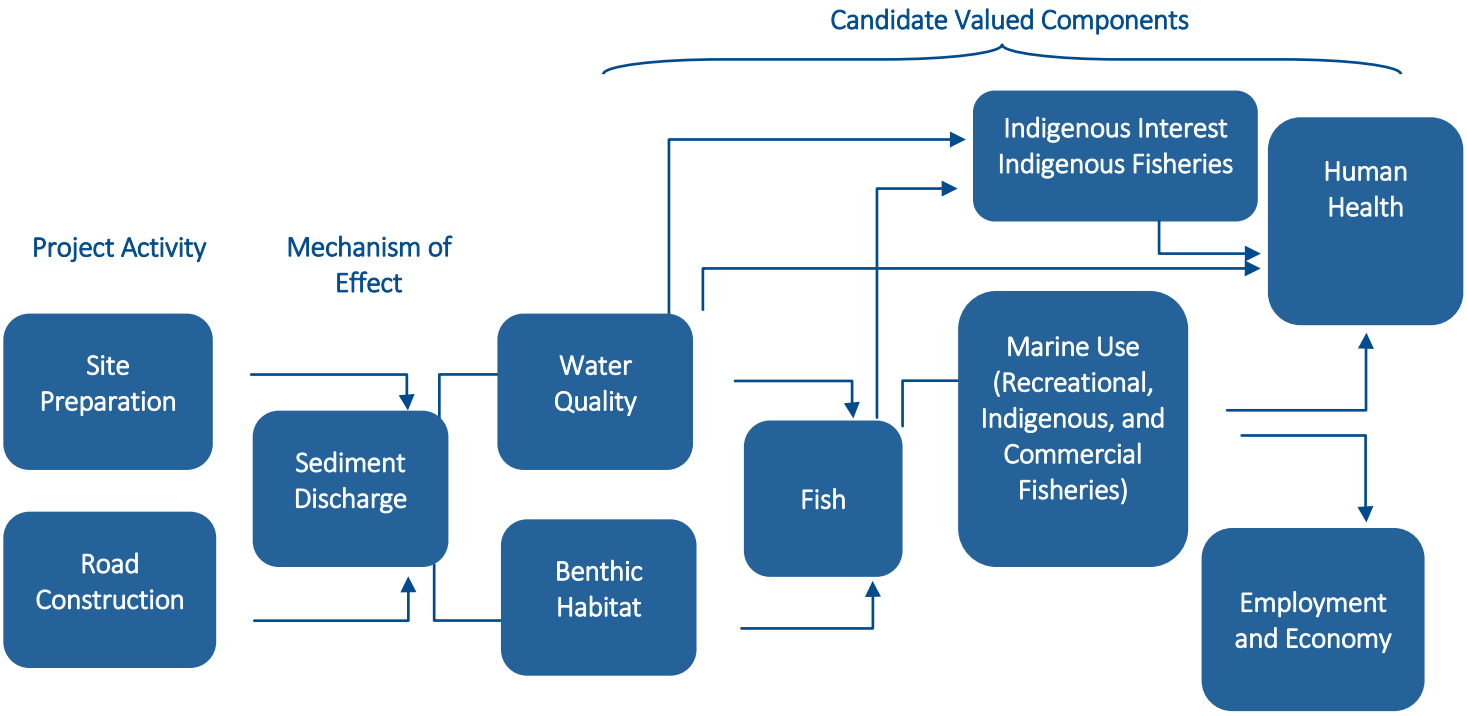

Figure 2. Example of Effect Pathway

Example of an effect pathway

Instream work may cause mortality of fish directly through stranding, entrainment, or other means. The instream work may also cause mortality of fish *indirectly* by reducing fish health and reproductive success through the degradation of water quality. While road work may change hydrologic patterns and *indirectly* result in degradation of habitat and water flow.

Effects pathways can be used to focus the assessment and identify appropriate VCs. There may be cases where a candidate VC may not be selected as a VC, but the pathway effects would still be assessed under other VCs. For example, benthic invertebrates may not be a VC if Fish and Fish Habitat is a VCs or fishing may not be a VC if Land and Resource Use is a VC. The assessment on benthic invertebrates and fishing would still occur as this data are required for assessment of the receptor VC.

[6] In the context of EA, a conceptual site model is a visual representation and narrative description of the physical, chemical and biological processes that demonstrates how the project may interact with the biophysical and human environment.

Evaluating Importance and Suitability for Assessment

- It is impractical and unnecessary to assess all effect pathways and all components to understand the potential effects of a project in an EA. It is necessary to identify effect pathways and components of greatest importance and subsequently to select those that are best suited for assessment (including those that have the key attributes specified in *Section 2.1*).
- The evaluation of candidate VCs should consider which effect pathways and which VC on each selected effect pathway, should be assessed.
- The information gathered during issues scoping, as well as available scientific evidence, Indigenous knowledge, local knowledge and technical expertise will assist in identifying effect pathways and components that are of greatest importance.
- The evaluation criteria described below will be helpful in determining which VCs are best suited for assessment and why.

Key questions to consider when evaluating candidate VCs to determine if they are suitable include:

- Taken together, do the candidate VCs adequately represent the important effect pathways, either directly or by proxy?
    - When selecting a suite of VCs for assessment, the proponent should strive to ensure that important effect pathways and components are represented, either directly or by proxy (for example, represented by another component) and key ecological, economic, or socio-cultural system linkages are not overlooked.
- Do the candidate VCs adequately capture the effects identified along the effect pathway?
    - The selection of VCs should consider the appropriate scale and level at which effects of the project may occur.
- Can the potential effects of the project on the candidate VC be measured and monitored? Is the candidate VC better represented by another VC?
    - In some cases, it may be difficult to measure the key characteristics of a component that may be affected by the project, or to monitor the effectiveness of mitigation designed to protect that component. In such cases, it may be appropriate to select an alternative component that is likely to experience similar effects which can be mitigated in a similar way but is more easily measured and monitored.
    - When evaluating candidate VCs with respect to their measurability, it is useful to consider what specific indicators and measurable parameters will be used to measure the change attributable to the project and whether meaningful and credible data are available or can feasibly be obtained for those indicators. If data are not available or cannot feasibly be obtained, or if changes in a candidate are not measurable for other reasons, alternative VCs should be considered that enable a proxy assessment of potential effects.
- Can the potential effects on the candidate VC be effectively considered within the assessment of another VC?
    - Sometimes, multiple candidate VCs may be affected by the project in the same or similar ways. In such cases, it may be appropriate to select only one of the candidate VCs for detailed analysis, to avoid redundancy in analysis. For example, members of the same guild or group of species may occupy a common ecological niche and display similar ecological functions and requirements. A socio-economic example may include the consideration of one or more land uses within a VC such as Land and Resource Use, instead of separate land use VCs.

Evaluating Indigenous Interests

It may be helpful for Indigenous nations and proponents to also develop an effects pathways to determine how a relevant Indigenous interest should be included in the assessment. Given the scope of the assessment of effects on Indigenous nations *and* their Section 35 rights, evaluating the effects pathways of a project may help Indigenous nations to clarify whether there is the potential for a project to affect an interest of the Nation. This can help focus the assessment on those Indigenous interests and VCs of greatest importance.

It is important that the assessment provides enough information to meet the requirements of the Act as well as the Crown's duty to consult, and where appropriate, to accommodate. In many cases, Indigenous interests may represent or be integrally linked to a Section 35 right. For these interests, it may be important for the right to be included as a distinct Indigenous interest, even if there is overlap with other interests. This is to ensure that the Indigenous nation is able to make an informed decision regarding consent and to ensure the provincial decision maker is able to determine whether or not its legal obligations have been discharged.

2.2.4 Selection of Valued Components

When selecting VCs, the attributes listed in *Section 2.1* (***Relevant/ Practical/ Measurable/ Responsive/ Accurate/ Predictable***) should once again be considered, as well as the relationship between the VCs, to ensure environmental, economic, social, cultural and/or health pillars and Indigenous interests are adequately represented. The selected VCs should allow for the collection of information to inform a consideration of all the required assessment matters, including:

- Effects to Indigenous nations and rights recognized and affirmed by Section 35 of the Constitution Act, 1982;
- Environmental, economic, social, cultural and health effects;
- Key areas of concern regarding the potential cumulative effects of the project;
- Understanding potential effects to biophysical factors which support ecosystem function in the project area;
- Potential disproportionate effects to distinct human populations;
- Results of any interactions between effects; and
- Potential effects to current and future generations.

VCs that have been identified in the B.C. CEF or in regional cumulative effects assessments should be chosen over similar VCs that have not, provided they capture the issues of concern identified in the scoping stage and the key functions of the value and are at an appropriate scale. The list of selected VCs will vary for each project to reflect the characteristics of the project and of the region, and context within which it is located. The scoping and evaluation process outlined above is intended to be flexible to meet project-specific requirements.

When selecting VCs for assessment, appropriateness is a more important criterion than quantity. The selection of fewer well-defined, meaningful VCs that display the attributes listed in *Section 2.1.1* is generally preferable to the selection of more but less appropriate VCs. The rationale for including VCs should be as robust as the rationale for excluding candidate VCs.

In some cases, when selecting VCs for assessment it may be useful and appropriate to group components into a broadly defined VC and use sub-components and indicators as necessary to frame the analysis. In this situation, indicators should be identified for each sub-component. For example, Wildlife may be selected as a VC, with individual species or species groups (for example, grizzly bear or large carnivores, northern goshawk or raptors, western toad or amphibians) as sub-components. While in other cases, it may be appropriate to "split" the components and define the VCs more narrowly to highlight them in the EA, for example, grizzly bear and caribou may be selected as VCs because of the vulnerability of the

population in the project area and the level of potential effects from the project to those populations. Sub-components are assessed in the same ways that VCs are assessed. Both approaches are acceptable and the rationale for VC selection including use of sub-components should be clearly articulated. VCs selected at an appropriate level will promote a well-organized assessment with minimal redundancy, account for all the types of effects that are expected, permit a meaningful analysis of significance of potential residual effects and an effective cumulative effects assessment.

Valued Component Selection and Indicators

Once VCs have been selected, proponents should link the selected values and value sub-components to indicators and to project activities affecting those indicators. These linkages should be described in text and represented in a table or diagram to support the assessment of effects. Proponents may build off the effects pathway table or diagram developed in *Section 2.2.3* to demonstrate linkages.

Indigenous Interests and Valued Component Selection

When selecting Indigenous interests for assessment, it may be useful to group interests into broadly defined categories or into the categories that make sense according to the cultural or governance requirements of the Indigenous nation. Indigenous interests selected at an appropriate level will promote a well-organized assessment with minimal redundancy, account for all the types of effects that are expected on the Nation and permit a meaningful analysis of significance of potential residual effects and an effective cumulative effects assessment.

In many cases, Indigenous nations may have similar interests to assess. It is helpful to look at commonalities between interests to reduce redundancies in analysis and to ensure selected VCs meet the needs of multiple Indigenous nations wherever possible.

2.3 Timing of VC Selection in the EA Process

As discussed in *Section 2.2.1*, issues scoping should begin early in project planning. The Early Engagement phase supports the early identification of key issues; however, proponents may be able to start this discussion even earlier to understand the key values and interests of Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders. The information gained during issues scoping will inform not only the selection of VCs but also the determination of the scope of the assessment. VC and indicator selection will in part determine the type of data that will be required to support the assessment and the methods that may be required to collect it. Proponents are strongly encouraged to submit their proposed revisions of the Application Information Requirements Guidelines, found *here*, with their DPD during Early Engagement to facilitate a more efficient Process Planning phase.

During the Process Planning phase, discussions between the EAO and Indigenous nations, the TAC, any CAC, the public, local governments, provincial and federal government agencies, and stakeholders will help to refine the selection of VCs to ensure that they are appropriate to focus the EA on the key issues and interactions.

Proponents should refer to the Process Planning Policy and Application Information Requirements Guidelines found *here* for additional guidance on the required level of assessment and detail to be provided in the Application.

Timing of Indigenous Interest Selection in the EA Process

Proponents are encouraged to start dialogues and relationship building with Indigenous nations prior to the start of Early Engagement. The understanding of Indigenous interests should be sufficiently developed to inform any changes proposed by the proponent to the Application Information Requirements Guidelines at the time of submission of their DPD.

The EAO will start to work collaboratively with Indigenous nations during Early Engagement to understand their interests and how the assessment of those interests may be undertaken. The methods and timing for undertaking the assessment of effects to indigenous interests will be confirmed by the EAO through consensus seeking processes with participating Indigenous nations during Process Planning.

2.4 Documentation

Proponents should clearly document the issues identified through issues scoping, particularly issues raised during Early Engagement with Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders. An issue may be identified from multiple sources, including Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders, as well as in published reports, databases, or other materials. Proponents should document the source of issues and clearly show how the issues informed the selection of VCs. Tables or figures should be used as required to demonstrate how issues identified during issues scoping are considered in the selected VCs and supporting technical information. The rationale should also identify the applicable legislative or regulatory, or Indigenous source from which the VC may be derived. If an issue or concern is not addressed in the assessment because it is not affected by the project or is not relevant to the assessment for another reason, those reason(s) should be explicitly noted. Where an important component of the biophysical or human environment is expected to be affected by the project but is not selected as a VC, the rationale for its exclusion as a VC or other method for assessment must be provided (for example, well-protected through other government legal requirements).

For the EA to be meaningful and effective, participants (including Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders) must be able to understand the rationale for the VCs that are proposed to be assessed. This rationale includes how the selected VCs will enable a robust assessment of the range of potential effects that may result from the project. The VC selection process and outcomes should be clearly documented by the proponent and provided to the EAO with any suggested revisions to the AIR Guideline. To facilitate a more efficient Process Planning phase, the EAO recommends that this information is provided by the proponent during Early Engagement with their DPD.

Documentation for Indigenous Interests

Proponents should clearly document how they engaged Indigenous nations to identify the Indigenous interest to address during the EA and how project effects will be assessed on each. The EAO will be seeking consensus with participating Indigenous nations when determining the interests to include in the Process Order. It is important for the EAO to be able to clearly understand the work that the proponent has done with Indigenous nations, including in the selection of VCs. Proponents should be able to demonstrate clearly how the selection of VCs considers and supports the assessment of effects on the Indigenous interests of the Nation.

3.0 Effects Assessment

The Application must assess and describe the project's potential positive and negative direct and indirect effects and adverse cumulative effects on the assessment matters in relation to each phase of the project and as required in the Process Order. As previously discussed, the effects assessment should focus on those components and Indigenous interests of most importance to ensure relevant information is collected for a robust assessment. The following sections and Figure 3 below describe the general methods to conduct an EA. More information specific to assessing effects to Indigenous interests is provided in *Section 4*.

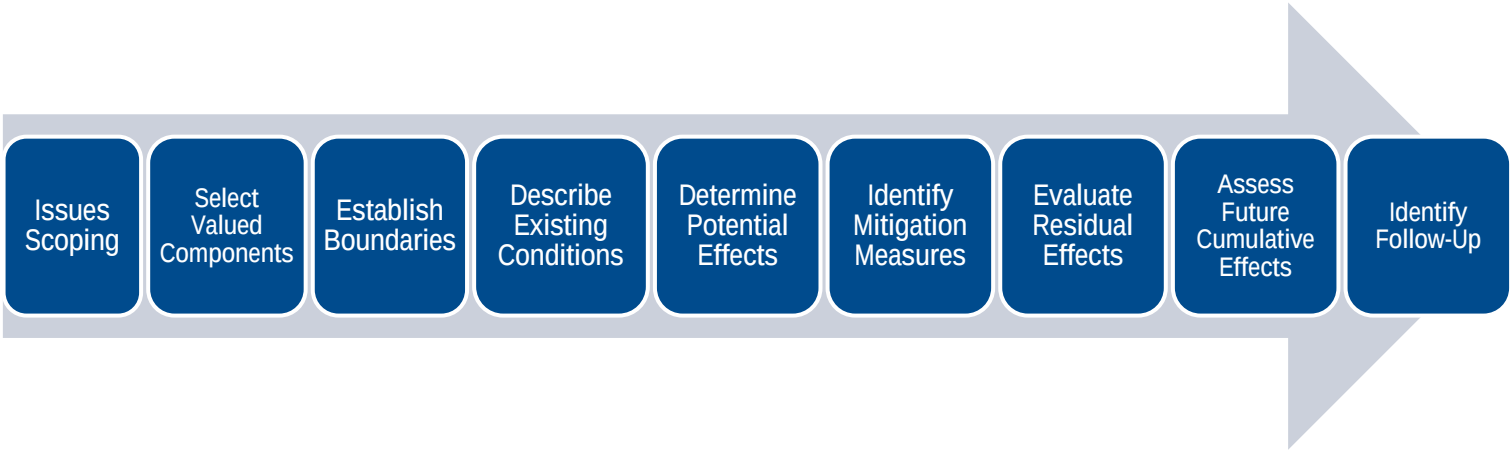

Figure 3. The effects assessment steps

3.1 Establishing Assessment Boundaries

Assessment boundaries serve to define the scope or limits of the assessment both temporally and spatially. Boundaries should be established and articulated separately for each VC, to reflect the characteristics specific to each VC, as explained more fully below.

Proponents should work with participating Indigenous nations and technical advisors to identify appropriate assessment boundaries. If a proponent chooses to propose VC specific assessment boundaries these should be provided with their revisions to the Application submitted with their DPD. The final assessment boundaries or processes to establish these boundaries will be confirmed by the EAO in the Process Order.

For the most part, the boundaries will determine the scope of information required to support the assessment. In some cases, the assessment boundaries may change as new information becomes available during the assessment, such as a better understanding of the extent of potential project or cumulative effects or the selection of a final project design component. Engagement with participating Indigenous nations and the TAC may be required should any changes to assessment boundaries be considered. If the assessment boundaries in the Application differ from those specified in the Process Order, the rationale for any such change must be clearly documented in the Application.

3.1.1 Spatial Boundaries

Spatial boundaries encompass the areas within which the project is expected to have potential effects on the VCs. Spatial boundaries should consider the spatial characteristics of the VC, such as appropriate population units or other VC specific

parameters, to provide the necessary context for the meaningful evaluation of residual effects and determination of significance.

Spatial boundaries are typically defined through consideration of:

- Potential interactions (direct and indirect) of the project with environmental, economic, social, cultural and health considerations;
- Potential interactions (direct and indirect) of the project with Indigenous interests;
- Information collected during Early Engagement including any key issues or concerns raised Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders;
- Best available science, Indigenous knowledge and local knowledge; and
- Current or traditional land and resource use by Indigenous nations.

Spatial boundaries and the rationale for selection should be documented for each VC. Defining suitable spatial boundaries ensures the collection of appropriate baseline data and consideration of all-important potential effects, including cumulative effects.

There are usually several scales of spatial boundaries that are relevant to an assessment:

- Project footprint – The smallest scale includes the footprint of temporary and permanent physical works associated with the project and the area within which physical activities associated with the project will occur.
- Local Assessment Area (LAA) – Typically comprised of a larger area that the project footprint within which all (or most) potential project effects are expected to occur. The LAA encompasses the project footprint and the zone of influence[7] of the project, including areas that may be affected by direct and indirect project effects, such as air contaminants, noise, light, effluents and wastes, employment and use of services and infrastructure.
- Regional Assessment Area (RAA) – The RAA is used to provide context for the assessment of potential project effects and includes the LAA. The RAA is typically based on a natural transition (for example, watershed boundary, ecological zone) or an artificial delineation (for example, political or economic district or zone) that is relevant to the VC in order to understand the context for the effect. The RAA boundary should be at an appropriate scale that provides relevant context for consideration of project direct and indirect effects, offers useful and meaningful data and neither over-emphasizes nor under-emphasizes the scale of the project effects.
- Cumulative Effects Assessment Area – The RAA may be used as the spatial boundary for the assessment of potential cumulative effects, or a different boundary may be chosen that better reflects the nature of cumulative effects relevant to the project's potential effects. The spatial boundary for cumulative effects assessment for a VC should encompass the area within which the residual effects of the project are likely to interact cumulatively with the effects of other past, present and reasonably foreseeable future projects and activities on that same VC. Boundaries may be informed by the B.C. CEF[8] or other available CEFs and through engagement with Indigenous nations, the TAC, any CAC, the public, local governments, provincial and federal government agencies, and stakeholders.

In some cases, spatial boundaries may extend to areas outside of B.C. Transboundary spatial boundaries should be identified where transboundary effects are expected.

[7] The zone of influence is a spatial limit beyond which the residual environmental effects of the project on a given assessment matter are not detectable.

[8] Assessment protocols, assessment reports and supporting data are available at: https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/cumulative-effects-framework.

3.1.2 Temporal Boundaries

Temporal boundaries encompass the periods of time during which the project is expected to have potential effects on the VCs. Where appropriate, VC-specific temporal boundaries relevant to the assessment should be documented. There are two types of temporal boundaries that must be considered in an assessment:

- The temporal limits of the project are expressed at a large scale as the different phases of the project for which an assessment is required (for example, construction, operation, and decommissioning) and at a finer scale as the timing of specific project activities. These are normally relevant to all VCs.
- The temporal characteristics of the VCs are important to understand when and for how long certain VCs may be affected by the project. The temporal characteristics will vary by VC. For example, the timing and duration of sensitive or critical life stages of biological VCs (for example, spawning, nesting, over-wintering) and of important human activities (for example, seasonal rounds, economic cycles, or busy tourism and recreation seasons).

If potential effects are predicted after project decommissioning or abandonment, this should be taken into consideration in defining temporal boundaries.

3.1.3 Administrative Boundaries

Administrative boundaries refer to the limitations imposed on an EA by political, economic, or social constraints. Administrative boundaries may not apply to every VC, or every assessment. Where administrative boundaries have constrained the identification and/or assessment of potential effects of a reviewable project, the nature of the administrative boundaries and their effect on the assessment should be documented.

Administrative boundaries may include existing datasets that are collected based on regional or provincial boundaries that are not the same as the spatial boundaries of the selected VCs and which may therefore constrain the assessment of potential effects in some way. For example, some social and economic data are compiled based on Statistics Canada or B.C. Stats boundaries, such as Census subdivisions. These areas may not align with the LAA or RAA and may constrain the assessment (for example, make it difficult to determine existing conditions in the study area or attribute changes to the project). Administrative boundaries may also include limits imposed on the assessment due to fiscal or other resourcing constraints.

3.1.4 Technical Boundaries

Technical boundaries refer to the constraints imposed on an EA by limitations in the ability to predict the potential effects of a project. Technical boundaries may not apply to every VC or every assessment. Where technical boundaries have constrained the identification and/or assessment of potential effects of a project, the nature of the technical boundaries and their limiting effect on the assessment should be documented.

Technical boundaries may include difficulties in accessing parts of a study area (for example, in rugged or hazardous areas) or challenges associated with sampling reclusive species or gathering data on the human use for an area, leading to a gap in information about a selected VC. The use of models to predict project effects on a VC may also impose technical limitations on the analysis (for example, assumptions that may affect the margin of error).

3.2 Describe Existing Conditions

For each selected VC, the existing conditions in the study areas should be described in sufficient detail to enable potential project-VC interactions to be identified, understood and assessed. This description may include the characteristics of the VC itself and other components upon which the integrity of the VC relies. For example, if the VC has been defined as

"fish", the assessment should describe not only the characteristics of the fish population, but also the important habitat features upon which that population depends for survival. This assessment may also require reference to baseline information that describe the existing conditions of linked VCs that may interact, such as water quality using the fish example. Baseline information often requires the collection of field data. Proponents should work with Indigenous nations and the TAC to ensure appropriate data is collected.

The description of existing conditions should include natural and/or human-caused trends that may alter the VC (or sub-component) irrespective of the changes that may be caused by the project or other projects and activities in the local area. It is important that the assessment of the existing conditions discuss the factors that have led to the current state. The knowledge of Indigenous nations, the TAC, any CAC, the public, local governments, provincial and federal government agencies, and stakeholders will likely be key resources in completing this work.

Understanding trends in a VC is also important context for identifying potential cumulative effects. Trends may include population fluctuations, employment or existing health status, forecasted climatic changes such as temperature or precipitation, or other trends that are important for understanding how the sensitivity of the VC to project effects and cumulative effects may change over time.

The description of existing conditions should also explain if and how other past and present projects and activities in the study area have affected or are affecting each VC, to support the consideration of project effects and cumulative effects. This consideration may include earlier phases or activities of the project (for example exploration) or other unrelated projects in the region.

Indigenous nations and local communities should be engaged in the identification of relevant information to describe existing conditions. Where appropriate, Indigenous and local knowledge should be incorporated into the description or existing conditions and any related field study plans.

The development of the existing conditions description may include, but may not be limited to, the following information sources:

- Available databases and literature, such as the B.C. Conservation Data Centre, the B.C. Ministry of Environment's Cross-Linked Information Resources application, GeoBC, the B.C. Data Catalogue, the Provincial Archaeological Report Library and Provincial Archaeological Site Inventory, B.C. Stats community profiles;
- Previous EAs for similar projects and for other types of projects in the same region[9];
- Reports developed by the B.C. CEF, regional cumulative effects assessments, or other applicable cumulative effects initiatives;
- Results of monitoring programs, if any;
- Provincial land use plans (for example Land and Resource Management Plans) and other regional and local studies and plans (for example, Official Community Plans, Regional Growth Strategies, Regional Sustainability Strategies, Climate Action Plans, regional strategic assessments and other environmental, social and/or economic development strategies), if any;
- Available remote sensing imagery and data;
- Community information and socio-economic data;
- Local and regional meteorological information, including any climate trends identified;
- Available ethnographic information, Indigenous knowledge and Traditional Use Studies, if any (subject to any

[9] Note: While it is good practice to review other EAs in the region, it may not be appropriate to use social data or traditional use information from a previous project. Please refer to the *Guide to Indigenous Knowledge in Environmental Assessments* and the *Human and Community Well-being: Guidelines for Assessing Social, Economic, Cultural and Health Effects in Environmental Assessments* for further information, found here.

confidentiality constraints that may apply)[10]; and
- Project- and VC-specific field studies as required to address key data gaps.

Where additional project- and VC specific field studies are determined to be required to address key data gaps, the scope and methods to be used for such studies should follow existing published guidance documents pertaining to data collection and analysis methods, where these are available. Consideration should be given whether a variation in common assessment practice should be considered for a particular VC or the project. Where proposed methods used for the assessment deviate from applicable published guidance, the rationale for the variance should be clearly documented.

Study and modelling plans to address key issues or data gaps may need to be described during Early Engagement with the submission of the DPD. Other study and modelling plans may be required during Application Development and Review, as outlined in the project-specific Process Order.

3.3 Determine Potential Effects

A critical step in the assessment process is to determine how the VCs may be affected by the project, including direct and indirect effects and positive and negative effects. Effects on the biophysical and human environment can be directly attributable to a project or can arise indirectly from a project's activities. **Direct effects** are a consequence of a cause-effect relationship between a project and a specific VC. **Indirect effects** are those that occur because of a change that a project may cause, often produced away from or as a result of a complex effects pathway and are at least one step removed from a project activity in terms of cause-effect linkages. Project effects can be **positive** (desirable or beneficial) or **negative** (undesirable or adverse).

Examples of direct, indirect, positive and negative effects

Direct effect: Vegetation clearing may result in direct wildlife habitat loss. Instream work may cause mortality of fish directly through stranding, entrapment, or other means. Reduced air quality may directly affect human health and particularly those that are vulnerable to adverse health effects (e.g., elderly and young people).

Indirect effect: Instream work may cause mortality of fish indirectly by reducing fish health and reproductive success through the degradation of water quality. Road work may change hydrologic patterns and indirectly result in degradation of habitat and water flow. Fugitive dust may affect vegetation, which could have an indirect effect on traditional or subsistence foods and Indigenous nations' health and well-being. A project might contribute to the spread of communicable diseases within the workforce, or between the workforce and a community.

Positive effect: Infrastructure (e.g., roads, water, or power transmission) improvements that may also benefit the community. Creation of local employment, including training, strategic hiring or other strategies to direct some of the employment opportunities to people in the community who are under- or unemployed. Positive health effects resulting from improved economic opportunities.

Negative effect: Loss or alteration of wildlife habitat and increased risk of mortality of wildlife due to increased in project traffic emissions, discharges or waste in areas that affect natural resources that are consumed as food. Impacts on Indigenous traditional and current use areas or sacred sites.

[10] Note: Depending on the preference of the Indigenous nation, it may not be appropriate to use traditional use information from a previous project. Proponents should discuss the use of the information directly with Nations and refer to the Indigenous Knowledge Guide for further information.

Identifying and assessing the positive effects may provide an opportunity to implement measures to maximize overall positive benefits of the project. Proponents may make deliberate attempts to ensure the success of a wider range of direct and indirect benefits that could possibly flow from the project. Offsetting and mitigation to address negative effects attributable to a project are not considered positive effects. Positive effects may, however, result from mitigation that addresses effects to the human or the biophysical environment beyond what is predicted to be attributable to the project. In these examples, monitoring may be required to demonstrate the effectiveness of this type of mitigation to provide positive effects.

3.3.1 Determine Potential Interactions

To support the identification of potential effects on VCs that may result from the construction, operation, decommissioning and/or post-closure activities of the project, it is useful to begin by identifying the potential interactions between the various physical works and activities and the selected VCs. This is often achieved using a simple interaction matrix, an example of which is given in Table 3 below. For some VCs, often those related to cultural or social values, this type of interaction matrix may need to be adapted or replaced to ensure a fulsome consideration of the different types of interactions that may occur as a result of the project.

Table 3. Potential Interaction Matrix

Project Aspect / Activities	Selected Valued Components						
	VC 1	VC 2	VC 3	VC 4	VC 5	VC 6	Etc.
Construction							
Project Activity 1	●	●		●	●		
Project Activity 2	●		●	●		●	
Etc.							
Operation							
Project Activity 3		●	●	●	●	●	
Project Activity 4		●	●	●			
Etc.							
Decommissioning							
Project Activity 5	●	●		●			
Project Activity 6	●		●	●		●	
Etc.							
Post-Closure							
Project Activity 7		●		●		●	
Project Activity 8		●		●			
Etc.							

Preliminary evaluation of the identified interactions will allow the assessment to be focused on those project-VC interactions of greatest importance. Further analysis may not be warranted for project-VC interactions that are known to have no or negligible effects, or possibly those that are already well regulated or managed under another government

process. If a proponent suggests omission of a project-VC interaction from further analysis, the methods and criteria used and rationale for this determination should be documented and submitted with any other recommended tailoring of the standard AIR, including the VC list. Proponents are encouraged to provide their project specific tailoring of the Application Information Requirements Guidelines with the DPD in order to assist with the timely completion of the Process Planning phase.

3.3.2 Focus on Key Interactions

Preliminary evaluation of identified project-VC interactions may also reveal key interactions that have greater potential to result in residual effects or to be of concern to Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders. This allows the assessment to be focused on these key interactions. Ranking methods or tools may be used to focus on these key project-VC interactions.

This ranking may be achieved by combining the interaction matrix approach described above with a simple ranking system to differentiate those interactions that do and do not warrant further analysis and, of those that do, which have the greatest potential to be significant, as shown in the example in Table 4. The rationale for identifying key potential interactions should be provided in the assessment.

Project Aspects / Activities	Selected Valued Components						
	VC 1	VC 2	VC 3	VC 4	VC 5	VC 6	Etc.
Construction							
Project Activity 1	●	●		●	●		
Project Activity 2	●		●	●		●	
Etc.							
Operation							
Project Activity 3		●	●	●	●	●	
Project Activity 4		●	●	●			
Etc.							
Decommissioning							
Project Activity 5	●	●		●			
Project Activity 6	●		●	●		●	
Etc.							
Post-Closure							
Project Activity 7		●		●		●	
Project Activity 8		●		●			
Etc.							
Note:							

● = Little to no interaction expected; no further consideration warranted.
● = Potential interaction with potential for adverse effects; warrants further consideration.
● = Key interaction with potential significant adverse effect or significant concern; warrants further detailed consideration.

Table 4. Key Potential Interaction Matrix

3.3.3 Describe Potential Effects

For those project-VC interactions carried forward in the assessment, the potential positive and negative direct and indirect effects arising from those interactions and the interaction between effects, should be described in clear language and enough detail to enable a non-technical reviewer to understand the cause, type and nature of potential effects. Diagrams and tables are useful tools to illustrate complex direct and indirect effect pathways and interactions between effects that may involve one or more VCs or sub-components. Proponents should use scientific, local and Indigenous knowledge when describing potential effects and effects interactions.

Adaptive management is a best management practice in environmental management and is not considered a mitigation measure. Adaptive management is an iterative process for the application of specified mitigation in a pre-determined and agreed on way for environmental management of complex issues, it is not on its own considered a mitigation

To support the understanding of effects to the assessment matters, where appropriate, information regarding potential effects on the human environment should be presented by sex, age and other community relevant identity factors to identify disproportionate potential effects for diverse subgroups and potential effects on biophysical factors that support ecosystem function should be clearly demonstrated.

Consultation between the proponent, the EAO, Indigenous nations and technical experts within government agencies, and the TAC will help explore the nature of potential project-VC and VC-VC interactions, as well as VCs and Indigenous interest interactions. For VCs that represent or inform Indigenous interests, proponents should work closely with Indigenous nations to ensure that potential interactions and effects pathways are identified and considered during the effects assessment (refer to *Section 4* for further details). This collaborative work to identify interactions will also help to identify when reliance on other regulatory or management processes or proven effective mitigation and Best Management Practices (BMPs) may be appropriate and when additional assessment may be required for these residual effects or VCs. For example, for some potential effects, there are proven effective mitigation measures or BMPs that if applied, would eliminate or reduce a residual effect to a negligible or unmeasurable level. If a potential effect is omitted from further analysis, the methods and criteria used and rationale for this determination should be documented in the assessment.

3.4 Mitigation and Enhancement Measures

Defining appropriate mitigation measures is a central part of the EA process. The Act defines mitigation as actions to offset the potential adverse effects of a project. In the context of EA, enhancement refers to deliberate attempts by the proponent to realize the success of a wider range of direct and indirect positive outcomes to the human and biophysical environment. The proponent will develop mitigation and identify opportunities to enhance positive effects through net gain / benefits initiatives in consultation with the EAO, Indigenous nations and technical experts within the TAC, any CAC, the public, local governments, provincial and federal government agencies, and stakeholders. Examples of enhancement

measures for positive effects include skills training, local procurement strategies and investments in community infrastructure (for example, roads and services). Proponents are encouraged to work with communities, local governments, and Nations to align project goals with an aim to enhance positive project effects. Such an approach may include the modification of the design of the project or relocation of project components.

The mitigation hierarchy is an approach that prioritizes preventing or avoiding harm over managing its consequences. The mitigation hierarchy[11] states that all feasible measures should be considered and applied at one level before moving to the next. The preferred order of addressing potential adverse effects is:

- Avoid impacting values and associated components;
- Minimize adverse impacts to values and associated components;
- Restore values and associated components where effects have occurred; and
- Offset residual adverse impacts to values and associated components.

Mitigation applied earlier in an effect pathway can often avoid or reduce multiple effects occurring later in an effect pathway and may be more effective than mitigation applied later in an effect pathway. Similarly, mitigation applied to an initial change or effect in a VC can prevent subsequent additive or synergistic effects on that VC from occurring and should be considered. When evaluating mitigation options, consideration should be given to the most effective mitigation, wherever it may occur in an effect pathway. In identifying options for avoiding adverse effects, proponents should consider and document alternatives means for undertaking the project to ensure all viable mitigation options are identified and considered. Proponents should also ensure that they use the best available scientific, local, and Indigenous knowledge in identifying and selecting appropriate mitigation measures.

Mitigation measures should be specific, achievable, measurable and verifiable and described in a manner that avoids ambiguity in intent, interpretation and implementation. Mitigation must be described in enough detail to support the assessment, including conclusions regarding the likely effectiveness of mitigation to reduce or manage effects. Sources of uncertainty should be identified, measures should be undertaken to reduce the uncertainty and residual uncertainty should be acknowledged and managed. Monitoring and reporting may also be required for some mitigation measures in order to understand the long-term outcomes. Managing residual uncertainty can be undertaken using general risk-management or adaptive management approaches.

It is important to note that mitigation measures may not be required for all potential effects and, further, that compensation or offset may not be warranted for all effects remaining after other avoidance, minimization and restoration measures have been implemented, particularly if the residual effect remaining after these measures are applied is considered negligible or not significant.

Key aspects in considering mitigation measures:

- Best available technologies;
- Technical and economic feasibility (for example, practical);
- Effectiveness of the mitigation measures, including suitability of the measures for the project and site-specific application;
- Uncertainty associated with the effectiveness of proposed mitigation measures; and
- The amount of time required for mitigation to become effective in order to enable understanding of the duration of a residual effect and the temporal characteristics of reversibility.

If there is an ongoing or completed regional assessment in the project area, the proponent should use the information generated through that process to inform possible mitigation and enhancement measures.

[11] For further information on the mitigation hierarchy, refer to the B.C.'s Environmental Mitigation Policy. The Environmental Mitigation Policy and associated Procedures are working documents and subject to change. Please visit http://www.env.gov.bc.ca/emop for the latest information.

Offsetting is a mitigation measure used to directly or indirectly address an effect that remains after other mitigation measures to avoid, minimize and restore on-site have been applied. Offsetting may include direct physical measures, such as habitat enhancement, restoration, or creation on, near, or away from the project site, or financial mechanisms, such as contributions to research, recovery plans, population enhancement programs for endangered species that have the outcome of reducing the residual effect. Offset is defined in the *Procedures for Mitigating Impacts on Environmental Values (Environmental Mitigation Procedures)* (Ministry of Environment 2014b or as updated) as means to counteract, or make up for, an impact on a component that cannot be adequately addressed through other mitigation measures in the hierarchy. Offsetting is the last step in the mitigation hierarchy to be considered only after previous steps have been evaluated.

In some cases, residual effects may be eliminated through offsetting, particularly when offsetting comprises on-site or proximal habitat compensation. In other cases, offsetting may not fully eliminate the residual effect, particularly if offsetting is incomplete, takes time to achieve, is temporary and/or is situated away from the project effect. Also, the use of financial offset mechanisms typically does not fully eliminate residual effects.

Mitigation measures that are proposed in the Application are discussed during the Application Review phase and may be modified as a result of the review. Mitigation measures may be considered for inclusion as EA certificate conditions in the EAO's decision material and/or in other compliance and enforcement mechanisms provided by the approval, permitting or licensing processes of other authorities or jurisdictions.

3.5 Assessing Positive Effects

Section 25(2)(a) of the Act requires every assessment to consider the positive direct and indirect effects of the reviewable project, including environmental, economic, social, cultural and health effects. Positive effects can be related to a VC or to an Indigenous interest being assessed. Potential positive effects may be directly related to the project or may be identified after considering the consequences of technically and economically feasible mitigation measures that maximize a wider range of benefits. Proponents are encouraged to look for opportunities to create positive effects and practically extend the scope or extent of project-specific mitigation, restoration and enhancement measures to produce net project benefits.

Example of positive effects that could be assessed:

- Increased revenue and employment rate;
- Improvement to road/access for the project results in increased safety of road for emergency vehicles;
- Increased access to health services; or
- Additional environmental reclamation activities beyond project effects.

When identifying and assessing potential positive effects, proponents must provide sufficient information to identify, predict, and describe the effect. During Early Engagement, proponents may propose potential positive effects of the project and engage with the EAO, Indigenous nations and Technical Advisors to identify what positive effects may be considered in the EA. If a proponent proposed to undertake a positive effects assessment, an appropriately robust assessment method for assessing positive effects must be identified during Early Engagement. These methods will be confirmed through the Process Order and with input from Indigenous nations and the TAC.

The residual effects characterization criteria identified in *Section 3.6.1* should be used as a starting point for describing potential positive effects. The spatial and temporal scale of any assessment of positive effects should be consistent with the identified scope of the project. For example, the positive effects assessment should not identify international benefits unless this geographic scope is within the scope of assessment for all other components of the project.

Other considerations in assessing positive effects include long-term trends (for example, changing environment, employment and technology) and market fluctuations. Where appropriate, information regarding potential positive effects on human and community well-being should be presented by sex, age and other community relevant identity factors to identify disproportionate potential effects for diverse subgroups.

3.6 Identifying and Evaluating Residual Effects

Residual effects are those effects remaining after the implementation of all mitigation measures, including offsetting measures and, therefore are the expected consequences of the reviewable project for the selected VC or Indigenous interest. The residual effects analysis should be clearly documented and supporting rationale for the evaluation should be described in sufficient detail to support the analysis.

3.6.1 Identifying Residual Effects

When identifying residual effects proponents must consider the existing conditions of the VC, the project-related effects to the VC, and the proposed mitigation. Effectiveness of mitigation and timing for effectiveness should both be considered when identifying residual effects. The best available science and local and Indigenous knowledge should be used when identifying residual effects.

The residual effects analysis may be undertaken for one or more subcomponents of a VC and for one or more pathways of effects. When sub-components or effects pathways are similar it may be appropriate to groups this analysis together. However, when subcomponents and effects pathways are different it may be necessary to identify the different types of residual effects, and characterization of those effects, to fully understand how the VC may be impacted by the project.

3.6.2 Characterization of Residual Effects

Negative project effects may affect communities and stakeholders in different ways. Effects should be described in a qualifying manner appropriate for the effect. For example, impacts on Indigenous interests and the human environment may be described differently than biophysical effects. Where appropriate, information regarding residual effects on the human environment should be presented by sex, age and other community relevant identity factors to identify disproportionate residual effects for diverse subgroups.

It is common EA practice to describe residual effects using residual effects characterization criteria, taking into account any important contextual factors. Other factors may also be considered. When determining the appropriate residual effects characterization criteria and definitions for criteria rating, it is important to include a consideration of scientific, local and Indigenous knowledge and to work with other parties to the EA, including participating Indigenous nations.

Context

The environmental, economic, social, health, cultural and Indigenous context within which potential effects may occur should be taken into account when considering the residual effects criteria, as the context will help to inform the assessment of the extent of residual effects.

The particular context within which the project occurs may include:

- Applicable legislation, standards, plans and policies;
- Existing condition of the VC and the impact of natural

The extent of past disturbance is not a reliable indicator of sensitivity or resilience: a “pristine” environment may exhibit low sensitivity and high resilience or high sensitivity and low resilience. Likewise, a “disturbed” environment may be susceptible to additional disturbance or may be highly adaptive. “Pristine” and “disturbed” are not suitable terms to use to characterize context in relation to residual effects.

and human-caused trends on the condition of the VC, including cumulative effects;
- Ecological or social limits and thresholds;
- Vulnerability and resiliency of social and/or ecological systems and components;
- Climate change projections relevant to the geographic scope and the VC;
- Community and cultural context; and
- Indigenous interests.

The context of the effect should include a discussion of the environmental, economic, social, health, cultural and Indigenous interest consequences of the predicted effect. For example:
- Is a critical life stage of a species affected by the project?
- Is an important link in the food chain affected by the project?
- Is there an effect on Indigenous land use activities?

The current and future sensitivity and resilience of the VC to change caused by the project should also be considered. The assessment should indicate the level of sensitivity and/or resilience and explain the key factors contributing to the ranking of sensitivity and/or resilience. Qualitative terms (for example, low, medium or high) and/or quantitative terms (for example, range) must be clearly defined for each VC.

Note on sensitivity and resiliency:

A species that is already endangered or threatened is probably more susceptible to adverse effects from additional disturbance than is a species that is secure. Similarly, a community that is already struggling to adapt to population increases may be less resilient to additional demands on infrastructure and community services.

Context is considered one of the most critical factors when evaluating residual effects. The proponent must consider environmental, economic, social, cultural and/or health matters affecting the sensitivity and/or resilience of the VC. Additional supporting narrative may be required to explain contextual factors that cannot adequately be communicated in a simple ranking.

Magnitude

Magnitude refers to the expected scale and/or severity of the residual effect. When evaluating the magnitude of residual effects, consider both the proportion of the VC affected within the spatial boundaries and the relative effect. For example, relative to natural annual variation of the VC or other relevant characteristic.

The definitions of each level of magnitude may vary by VC and should be documented in the assessment, so that a non-technical reader can understand the nature of the residual effect. Magnitude may be described quantitatively, where empirical data are available, or qualitatively, using terms such as negligible, low, moderate and high. The use of qualitative terms should be accompanied by distinct definitions for each of these rankings that clearly delineate the different levels

of magnitude. The definitions should be sufficiently clear to allow different readers to reach the same magnitude characterization for a given residual effect on a VC.

Extent

Extent refers to the spatial area over which the residual effect is expected to occur. The spatial area of a "local" or "regional" effect should be defined for each VC. It may also be useful to state the extent of the residual effect in relation to the distribution of the VC, to clarify the scale of the residual effect.

Note: A "negligible" effect does not mean "no effect" but that an effect is sufficiently small that it likely will not result in a noticeable change to the VC. However, in the context of cumulative effects assessment a negligible effect may still be considered important in understanding regional effects as a whole.

Duration

Duration refers to the length of time the residual effect persists which may be longer than the duration of the physical work or activity that gave rise to the residual effect. It may be relevant to describe the duration of the residual effect in relation to the characteristics of the VC for example, in relation to sensitive or critical life stages for a particular biophysical VC.

Reversibility

Reversibility pertains to whether the residual effect on the VC can be reversed once the physical work or activity causing the disturbance ceases or a mitigation measure takes effect.

A residual effect may be fully reversible, partially reversible, or irreversible. Reversibility is closely linked with duration. An irreversible residual effect is of permanent duration, while the length of time required for the VC to fully or partially revert to its pre-effect condition or functionality may vary.

Frequency

Frequency refers to how often the residual effect occurs and is usually closely related to the frequency of the physical work or activity causing the residual effect. The frequency of the residual effect in relation to the characteristics of the VC may be important, for example, in relation to sensitive or critical life stages for a biophysical VC. The frequency of a residual effect may be described as once, regular, irregular or continuous.

Affected populations

Affected populations refers to the distribution of the effect amongst the population of affected people. Effects may be evenly distributed and could be experienced by any or all subpopulations[12]. Alternatively, the effects could be disproportionate and experienced only by certain subpopulations or experienced more acutely by certain subpopulations. *Section 25(2)(d)* of the Act requires that disproportionate effects on distinct human populations (see *Section 5.2*) be considered in every assessment.

[12] A subpopulation is a subset of affected people that share unique demographic or economic characteristics or circumstances.

3.6.3 Other Residual Effects Considerations

3.6.3.1 Importance

Importance of the effect refers to whether the effect or underlying issue has been previously identified as an interest and/or priority of potentially affected Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders. For example, importance of a residual effect may be characterized as low, moderate or high. Residual effects of low importance may have been previously identified by some individuals, but not by Nations, community member, or government agencies. Residual effects of moderate importance may be previously identified as an interest by Indigenous nations, community members, the public, local governments and/or provincial and federal government agencies, but not stated as a top interest. High importance residual effects have been identified repeatedly as a top interest by Nations, community members, the public, local governments, and/or provincial and federal government agencies. Consideration should also be given to whether the effect is related to an Indigenous interest that is of primary importance to a Nation including in terms of informing their decision regarding whether or not to consent to a project proceeding.

3.6.3.2 Risk and Uncertainty

The risks and uncertainties, including where there is concern from public, local government, or Indigenous nations, TAC and any CAC, associated with residual effects and the results of any interaction between effects must be considered in every assessment. The Proponent should describe the probability or likelihood of a residual positive or negative effect occurring and describe the degree of scientific uncertainty related to the data and methods used within the framework of this analysis.

Uncertainty

There are many types of uncertainty that are relevant to assessing whether an effect will occur, and the implications of the effect. Uncertainty in EA is to be expected, particularly when predicting outcomes in complex physical, biological and human systems. The sources of uncertainty need to be reduced where possible through additional study or mitigation measure, but when uncertainty cannot be reduced it needs to be described such that it can be considered in decision-making.

Throughout the EA, effort to address uncertainties should be focused on those uncertainties that are most meaningful to the EA decision, which are often the uncertainties regarding how the biophysical and human environment will respond to changes and the efficacy of mitigation measures. Where computer models were used it is important to identify which uncertainties have the greatest impact on effects predictions to focus further study and analysis during the EA. Drawing on expert judgement is a key approach for characterizing and reducing the uncertainty of predicted effects.

Uncertainty may be related to:

- Knowledge (for example, limitations in the understanding of processes, interactions or behaviour);
- Unpredictability (for example, complex systems or human behaviour, mitigation efficacy);
- Modeling (for example, inadequate, over-simplification, or omission of processes);
- Data (for example, limitations in data availability or quality, spatial or temporal resolution challenges, or poorly known model parameters); or
- Interpretations (for example, values or terms are interpreted differently by different people).

All predictions of residual effects to VCs or Indigenous interests should include a characterization of uncertainty and the level of confidence in predicted residual effects. Proponents should be state whether the uncertainty associated with the residual effects is considered to cause the residual effects to be underestimated or overestimated. The assessment should also describe in qualitative terms the nature and degree of uncertainty and confidence related to the data, modeling and methods used or

the analysis, assumptions, effectiveness of mitigation measures (including timing for effectiveness) and proposed adaptive management measures and prediction of potential residual effects including cumulative effects.

Risk

In the context of EA's in B.C., risk is identified as the likelihood (probability) of an event (incident) and its consequences. In reporting predicted effects in terms of the potential consequences and associated probabilities, generally the EA provides an assessment of risk to VCs and Indigenous interests to inform a decision on an EA certificate.

The assessment should describe the likelihood and consequences of a positive or negative residual effect occurring when describing a risk. This may be influenced by a variety of factors, such as the likelihood of a causal disturbance occurring, likelihood of mitigation being successful, or time lag for mitigation to become effective and the consequence(s) of these. Likelihood should be described for all residual effects using appropriate quantitative or qualitative terms and sufficient description to understand how the conclusions were reached. The magnitude and extent of the residual effect provides information on the consequence, which in conjunction with likelihood, informs the understanding of risk.

In some cases, additional risk analysis may be required to fully characterize the potential risk where there is high uncertainty about the mitigation effectiveness (for example, where mitigation measures are proposed to be implemented for which there is little experience or questions about their effectiveness). If additional risk analysis is required, a range of likely, plausible and possible outcomes with respect to likelihood and consequence will be assessed and additional studies, mitigation or contingency plans may be required. The Process Order or EAO information requests may include additional requirements for risk analysis to address uncertainty or outstanding issues raised by Indigenous nations or the TAC. Refer to the *BC government's Risk Management webpage* for further information on how the Province addresses risk analysis.

3.6.4 Significance

The purpose of the EAO is to promote sustainability by protecting the environment and fostering a sound economy and the well-being of British Columbians and their communities and to support reconciliation with Indigenous peoples in B.C. As part of the assessment process, the EAO will assess whether a project is likely to cause significant adverse effects,

including how the assessment matters may be impacted and provide this information in the Assessment Report. Proponents are not required to make significance determinations on potential project effects.

3.7 Cumulative Effects

Cumulative effects are changes to environmental, economic, social, cultural and health values caused by the combined effect of past, present and potential future human activities. The EA must consider adverse cumulative effects, including potential adverse cumulative effects to Indigenous interests. The cumulative effects assessment considers changes caused by the project effects combined with the effects of other past, present and reasonably foreseeable future projects and activities.

Cumulative effects are considered throughout the EA process, beginning in Early Engagement when proponents are required to gather and share initial information regarding the potential for cumulative effects as a result of their project and identify any known existing cumulative effects in the project area. If there is an ongoing or completed regional assessment or study in the project area, proponents should use the information generated through that process to inform the cumulative effects assessment. Indigenous, local and scientific knowledge may also be gathered to help inform an early understanding of the potential for cumulative effects in the project area.

The information gathered during Early Engagement informs the selection of VCs and the assessment requirements confirmed during Process Planning. The effects assessment conducted on these VCs considers the interactions of the project with past and present projects and activities. Section 3.2 Describing Existing Conditions provides guidance for determining existing conditions and understanding factors that have led to the current state, including past and present projects and activities, trends and temporal patterns.

Section 3.7 Cumulative Effects is focused on the methods for assessing the potential future cumulative effects of the project by examining the project effects in combination with reasonably foreseeable future projects and activities. The cumulative effects assessment builds off the VC assessments that considered past and present cumulative effects. The cumulative effects information that is gathered and considered during compilation of the VC assessments are used to inform the future cumulative effects assessment chapter.

3.7.1 Assessing Cumulative Effects

A cumulative effects assessment must be considered when adverse residual effects to VCs are identified following the residual effects evaluation. The residual effects evaluation must consider the current context for a VC taking into account past and current projects and activities that are affecting the existing condition of the VC and the project's proposed mitigation.

There may be circumstances where a cumulative effects assessment is not required even though a residual effect has been identified for a VC. For example, if there are no other projects or activities that may interact cumulatively within the cumulative effects study area. The potential for cumulative effects must still be considered and the rationale for this determination clearly outlined.

Interaction with past, present and reasonably foreseeable projects and activities

A cumulative effects assessment must be undertaken when a residual effect to a VC is predicted to interact with the effects of other past, present and reasonably foreseeable projects or activities within the determined cumulative effects assessment spatial and temporal boundaries. Section 3.1 describes the process for identifying spatial and temporal boundaries. The cumulative effects assessment should consider:

- Any other project or activity that is likely to affect the VC, even if that other project or activity is located outside the cumulative effects assessment spatial and temporal boundaries;
- Effects of past and present projects and activities that are expected to continue into the future (for

example, beyond the effects reflected in the existing conditions of the VC); and
- Activities not limited to other reviewable projects, if those activities are likely to affect the VC cumulatively (for example, forestry, agriculture, recreational activity).

Reasonably foreseeable future projects and activities include projects that may be considered certain or that have a high probability of proceeding including those that:

- Have been publicly announced and have a sufficient level of information available to inform the cumulative effects assessment;
- Are identified in a publicly available development plan that is approved or for which approval is anticipated (e.g., a wastewater treatment plant in a city's long-term development plan);
- Are under regulatory review (for example, the application is in process) or the submission for regulatory review is imminent (could be known if data collection has commenced, regulatory authorities have been contacted about information requirements, or through an announcement from the proponent);
- Have received approval in whole or in part (e.g., environmental assessment approval, pre-development approval for early works, permits for exploration or collection of baselines data);
- Are under construction or site preparation is being undertaken; or
- Are existing and expected to continue during the life of the project and project residual effects.

The following characteristics of the past, present and reasonably foreseeable future projects and activities should be considered when undertaking a cumulative effects assessment:

- Location, physical size of project components and activities;
- Expected duration and timing of activities, including seasonal variations;
- Transportation routes and modes of transport;
- Emissions, wastes and discharges; and
- Effective mitigation measures.

The criteria used to evaluate whether a VC is likely to be affected by project residual effects in combination with past, present and reasonably foreseeable projects and activities should be transparent and documented. A table matrix or diagram may be appropriate for identifying potential interactions with other projects and activities. The residual effects to VCs identified will be the focus of the cumulative effects assessment. In particular, the rationale for exclusion of any residual effect from consideration in the cumulative effects assessment should be provided. The availability (or lack) of information about the residual effects of other projects and activities should also be considered in the cumulative effects assessment. Any assumptions or uncertainty about other projects and activities and their effects should be documented.

Existing Condition

To undertake a cumulative effects assessment, it is essential to understand the state of the receiving environment or the setting in which a project occurs. In practice, the existing conditions (baseline conditions) captures the effects of past and current activities. It is important, however, to ensure that the effects of these past projects and activities are identified and discussed.

Section 3.2 (Describe Existing Conditions) of this document provides guidance for determining existing conditions. In cases where a Cumulative Effects Study Area (for example, spatial boundary that is different from the residual effects assessment) is used, the existing condition information provided should be updated to be relevant to the cumulative effects assessment.

The existing condition of a VC may be compared to past conditions to reveal spatial or temporal patterns or trends. Describing past conditions and evaluating trends of a VC is important context to understand how the VC condition has been affected and for identifying potential cumulative effects. However, it is important to acknowledge that past conditions or historical trends may no longer be an accurate measure of what to expect in the future given climate change. When available, any known changes to future baseline conditions given climate projects should be discussed using qualitative or quantitative terms.

Ecological, Indigenous, or social context also supports the understanding of the existing conditions of a VC. This may include the use of benchmarks, indicators (identified in published standards, guidelines, targets, or objectives) or ecological thresholds, where available. For examples of detailed current condition assessments comparing indicator state to benchmarks, see the B.C. Cumulative Effects Framework reports[13].

Potential Cumulative Effects

Determining potential cumulative effects to a VC requires a comparison of the existing condition of a VC to predicted future condition of a VC with the project in combination with reasonably foreseeable future projects and activities. Effects of past and present projects and activities are used to contextualize the current state of the VC. Ecological, Indigenous, or social context also supports the understanding of the potential future condition of a VC.

The future condition of a VC should be assessed based on the predicted effects of reasonably foreseeable future projects and activities on the VC in combination with the residual effects of the project. Where available, EA and permitting applications and reports may provide information on the predicted effects of other such developments. Where reports describing predicted effects are not available, proponents should describe likely effects based on existing knowledge of the effects of similar activities or reference cases as described in scientific literature or other reports. Reasonably foreseeable future projects and activities with similar predicted effects may be grouped in broad categories, such as forest harvesting or mineral exploration. In addition to future project and activities, future projections related to climate change should also be considered when assessing cumulative effects.

The approach and level of effort applied to the assessment of future condition for a VC will differ depending on, for example:

- The potential of the project to contribute to future cumulative effects;
- The sensitivity of the VC to potential effects of the project;
- The health or status of the VC that may be affected by the project; and
- The level of past or existing disturbance in the project's zone of influence.

Information on the potential effects of reasonably foreseeable future projects and activities should be compiled for each VC residual effect and described in reference to the project effects pathways described for that VC. A pathway diagram or model may be used to depict the relationship between the project and other past, present and reasonably foreseeable future projects and activities. Many cumulative effects will be additive, but other ways that cumulative effects can interact include synergistic, compensatory or masking and should be considered where relevant. Pathway diagrams may assist in identifying and assessing project effects in combination with effects from reasonably foreseeable future projects and activities on the VCs identified. There are also numerous ways that cumulative effects occur including for example: nibbling loss, spatial and temporal crowding and physical or chemical transport. Proponents should ensure that their

[13] *https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/cumulative-effects-framework/regional-assessments*

assessment of cumulative effects considers the different types of cumulative effects and the different ways in which they occur.

Examples of types of cumulative effects interactions to consider in the assessment

Additive cumulative effects result from the sum of individual effects. For example, habitat loss may increase with each new type of development in an area resulting in an additive cumulative effect to habitat.

Synergistic cumulative effects occur when the interaction between two or more effects result in greater cumulative effects than the simple addition of effects. For example, water quality contaminants may act synergistically, causing greater or different effects to aquatic biota than would be expected based on the respective concentrations of the individual contaminants.

Compensatory cumulative effects occur when two or more physical activities offset each other. For example, mine effluent may add contaminants of concern that affect the overall health of fish populations, while an upstream run-of-river hydro project may increase water temperature and flows to levels more favorable to fish reproduction. In the short term, the cumulative effects to the population may result in a net neutral change to the population structure. However, cumulative effects assessment must consider that once the source of the compensatory cumulative effect is removed, an adverse cumulative effect may remain.

Masking cumulative effects occur when the effects of one project mask those of another in the field. For example, if effluent discharges from a pre-existing mine cause serious contamination to surface waters, the additional effluent discharges of a much smaller newer mine may not cause measurable additional effects. As for compensatory effects, the cumulative effects assessment must consider that once the source of the masking cumulative effect is removed, an adverse cumulative effect may remain.

Develop mitigations

As described in *Section 3.4*, defining appropriate mitigation and management measures is a central part of the EA process. If an adverse cumulative effect is identified, additional mitigation measures must be considered that follows the mitigation hierarchy (avoid, minimize, restore and offset). Depending on the condition of the specific VC, there may be a need to develop mitigation measures that reduce the overall cumulative effect. Mitigation may also include additional monitoring and reporting out requirements combined with mitigation included in adaptive management strategies. Where available, some B.C. *CEF assessment reports* may identify management responses to be considered by the proponent when selecting mitigation for a project. The effectiveness of mitigation measures applied to mitigate cumulative effects must also be described and assessed.

There may be cases in which proposed measures to mitigate cumulative effects are beyond the control of the proponent and will be addressed within a broader regional framework or through other processes or initiatives. In these cases, the proponent must identify what parties have authority to act on the measures, how the proponent may be able to support or contribute to these processes or initiatives and describe the potential consequences should the measures not be undertaken by the parties.

If a project receives an EA Certificate, the Certificate may include conditions that mitigate cumulative effects and/ or support ongoing monitoring and adaptive management of the cumulative effects identified for the project.

Technical and Economic Feasibility

Proponents must be transparent about the criteria used to determine whether a mitigation measure or alternative option is technically and economically feasible. This may include providing a detailed analysis of the criteria used with supporting evidence and rationale. The metrics and inputs used to determine technical or economic feasibility should be clearly documented and shared through the EA.

Generally, technical feasibility is based on whether the proposed mitigation can be successfully implemented with commercially available skills, equipment and/or materials considering local criteria, such as climate, geography, infrastructure and operational reliability.

Financial feasibility is based economic and commercial considerations, which may include incremental cost of implementing and supporting the mitigation in relation to the overall project's investment.

Characterization of adverse cumulative effects

Residual adverse cumulative effects are those remaining after the implementation of all mitigation measures. Adverse cumulative effects should be characterized using language most appropriate for understanding the magnitude and severity of the effects. Where possible, quantitative terms (for example, area, length, concentration) should be applied and effects characterization criteria, as described in *Section 3.6.1* should be used to characterize cumulative effects. A qualitative characterization of cumulative effects may also be appropriate in some circumstances. The risks and uncertainties associated with adverse cumulative effects and the results of any interaction between effects must also be considered in every assessment (see *Section 3.6.2*).

Where possible and appropriate, benchmarks identified in provincial and regional CEF assessment protocols or other regional assessments should be applied. Where known, ecological thresholds (for example the points at which small changes to the indicator could cause a major shift in an ecosystem) for biophysical factors that support ecosystems should be considered in the future cumulative effects assessment. Proponents are no longer required to make significance determinations on cumulative effects. As part of the assessment process, the EAO will assess whether a project is likely to cause a significant adverse cumulative effect.

Example of Cumulative Effects Framework benchmarks

Cumulative Effects Framework benchmarks are reference points that support interpretation of the condition of an indicator or component. Benchmarks are based on our scientific understanding of a system. Examples include:

- Grizzly bear value – road density indicator: high benchmark is 0.6km of road/km^2
- Grizzly bear value – Core security area indicator: benchmark is 60% secure core area in a landscape unit
- Aquatic Ecosystems Value – Stream Crossing density Indicator: high benchmark is 1.4 crossings/km^2 for coastal watersheds and 0.6km/km^2 for interior watersheds
- Bighorn sheep winter range habitat indicator – benchmark to delineate between moderate and high risk is 12.5% of winter range habitat disturbed or impacted.

Sources:

Provincial Value Assessment Protocols. Available at: https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/cumulative-effects-framework/values

Elk Valley Cumulative Effects Management Framework. Available at: https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/cumulative-effects-framework/regional-assessments/kootenay-boundary/elk-valley-cemf

3.8 Follow-up Strategy

The purpose of a follow-up strategy is to verify the accuracy of the effects assessment and evaluate the effectiveness of mitigation measures for VCs where positive or negative residual effects or adverse cumulative effects are predicted or uncertain. To verify the accuracy of the effects assessment, the follow-up strategy will identify the measures the proponent will undertake to ensure that mitigation measures are implemented as planned and evaluate the accuracy of the predicted effects. To evaluate the effectiveness of mitigation measures, the follow-up strategy will identify the measures the proponent will use to evaluate the effectiveness of proposed mitigation measures to meet the intended mitigation commitments and goals.

Considerations for developing a follow-up strategy for environmental, economic, social, health and cultural effects and effects on Indigenous interests, as applicable, include:

- The nature of concerns raised by Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders about the project;
- Proposals from Indigenous nations and local communities regarding the design of and involvement in, follow-up strategies and monitoring programs;
- Community and Indigenous knowledge, where available;
- The accuracy of predictions;
- An evaluation of the effectiveness of mitigation measures;
- The efficacy of new or unproven techniques and technology;
- Disproportionate effects on distinct human populations;
- The nature of cumulative effects;
- The degree of uncertainty about the effectiveness of proposed mitigation measures;
- Any technically and economically feasible measures to manage effects if the applied mitigation measures

do not work as intended;
- Whether there was limited scientific knowledge about the predicted effects in the effects assessment;
- Which parties will participate in the conduct of the follow-up program and reviewing its results;
- The duration of the follow-up strategy activities, which may vary depending on the VCs assessed;
- Any existing follow-up strategies or monitoring programs relevant to the project;
- How the results of the follow-up strategy will be shared with interested parties; and
- Triggers for adaptive management of any unacceptable or unexpected results.

Monitoring is a key component of an effective follow-up strategy. The information gathered as part of a follow-up strategy may be used to determine whether additional or corrective actions are necessary to address unanticipated outcomes. The proponent must provide an appropriate strategy (for example, adaptive management) to apply if predicted effects and mitigation effectiveness are not as expected and that corrective action is required. This includes reference to further mitigation, involvement of key stakeholders, Indigenous nations, government agencies and any other measures deemed necessary to manage the issue. The follow-up strategy will explain the uncertainty of the effects outcomes and whether it is related to the effects assessment predictions or the effectiveness of mitigation measures. Follow-up strategies should be developed through engagement with the EAO, Nations and the TAC.

The duration of follow-up strategies may vary depending on the VC and is based on the length of time required to verify the accuracy of the effects assessment and to evaluate the effectiveness of the mitigation measures.

Where management responses are available through provincial cumulative effects initiatives, they can inform and focus the design of follow-up programs. Proponents may be required to provide ongoing monitoring or other information to support adaptive management protocols or provincial or regional cumulative effects assessment modelling initiatives. Any information generated through ongoing or completed regional strategic assessments may also inform considerations for a follow up strategy.

4.0 Assessing Effects to Indigenous Nations

The effects of a project on Indigenous nations and their rights must be assessed in every assessment, as per the requirement of *Section 25(1)* of the Act. The assessment of effects to Indigenous interests (interests relate to an Indigenous nation and their rights recognized and affirmed by Section 35 of the *Constitution Act, 1982*, including Treaty rights and Aboriginal rights and title that may be impacted by a proposed project) is a key focus of the consensus seeking activities with participating Indigenous nations under the Act and an important foundation for informing decisions by provincial Ministers and participating Indigenous nations on the issuance of an EA Certificate for a project.

Treaties are constitutionally protected agreements and have the force of law. Indigenous nations that have a modern treaty have specific section 35 rights set out in the treaty. Where a proposed project may affect those treaty rights, EAO must ensure that all treaty commitments related to environmental assessments are fulfilled.

In the past the provincial EA process has focussed primarily on impacts to the rights that the courts or treaties have generally addressed to date; typically hunting, fishing, trapping, gathering, and title. The EAO has heard from Indigenous nations that this approach is constraining and does not align well with the usual approach of an EA. The VC framework provides a strong foundation for undertaking an assessment of effects that are fully inclusive of Indigenous interests, including rights that have been addressed by the courts and other interests that may inform Indigenous nations' views on a project.

Generally, there are three different ways that the VC framework can be used to assess effects to Indigenous interests:

1. The effects assessed to the VC are all relevant to the Indigenous nation's interest(s). This would typically be the case where the effects of the VC are wholly within the nation's territory and the effects to the VC are all of importance to the Nation's decision making. In these instances, the Indigenous nation's input and perspectives are adequately captured through the VC effects assessment and what remains is to ensure any Nation specific considerations are reflected in the evaluation of residual effects (*Section 4.5*) and consideration of cumulative effects (*Section 4.6*), ensuring that the effects to the VC are properly considered through the lens of the particular context of that Nation.
2. There is only a portion of the effects to the VC that are relevant to the Indigenous nation's interest(s). This may be the case when the project's effects to the VC are not wholly within the Nation's territory or where some aspects of the effects are not relevant to the Nation's decision making. In these instances, while Indigenous nation's input and perspectives have been incorporated to some extent in the VC effects assessment, additional assessment or analysis is required in order to properly inform an assessment of potential project effects to the Indigenous interest and to ensure the Nation-specific context is appropriately reflected in the assessment.
3. The effects to the VC provide some, but not all, of the necessary information to understand effects to the Indigenous interest(s). In this case the VC may represent a portion of the interest but additional data collection and analysis regarding effects of the project to the interest is required to ensure a fulsome assessment. In these instances, the while Indigenous nation's input and perspectives have been incorporated to some extent in the VC effects assessment additional data collection and analysis is required. This may be the case for an interest that is not conducive to an assessment using only the VC framework (such as spiritual activity). In this case, some biophysical and social VCs may be identified that can inform part of the assessment of project effects to the interest, but additional information or context provided by the Nation or collected with the Nation would be required to ensure a fulsome understanding of potential project effects.

In some cases, the EAO and an Indigenous nation may decide that an alternative approach to assessing effects on a Nation's interest is more appropriate than applying the methods used for the VC framework, including instances where a

Nation decides to undertake its own assessment of effects as per *Section 19(4)* of the Act. The methods for assessing effects to Indigenous interests will be confirmed through consensus seeking between the participating Indigenous nation and the EAO in the Process Order.

The proponent's Application must contain a separate section for each Indigenous nation potentially affected by the project (see Section 11 of the Application Information Requirements Guidelines). This section need not repeat everything from the analysis of each VC, particularly where the VC directly overlaps an Indigenous interest and Indigenous input and perspectives have been incorporated throughout (scenario 1 identified above) but should summarize and present the appropriate information in the context relevant for each Indigenous nation. The Application and any other information specified in the Assessment Plan will form the basis for the EAO's work in seeking to achieve consensus with participating Indigenous nations regarding the seriousness of impact to their Indigenous interests.

As with VCs, proponents do not conclude on the seriousness of impact to Indigenous interests. The EAO will work with participating Indigenous nation to identify the seriousness of effect to the Nation's interests and seek consensus on these conclusions in the EAOs Assessment report.

4.1 Establishing Assessment Boundaries for Indigenous Interests

Where relevant, each Indigenous interest should have a defined spatial and temporal boundary. If relevant to the assessment, any administrative and technical boundaries should also be identified for the interest. Where the Indigenous interest is fully represented by a VC(s), the same boundaries identified for the VC(s) may be used. Where an Indigenous interest is represented by a VC but has a different spatial or temporal boundary, this should be clearly identified.

When assessing effect to Indigenous interests, boundaries for each Indigenous nation relevant to understanding the effect on the interest may be different than those selected for the relevant VC(s) as a whole. For example, for a project that crosses the territories of multiple nations, the assessment for each Indigenous nation should only focus on the portion of the VC that is within their territory.

4.2 Describe Existing Conditions for Indigenous Interests

When identifying existing conditions for an Indigenous interest the guidance for identifying the VC existing conditions should be used and contextualized within any unique Indigenous nation specific information, as appropriate. This may include a consideration of environmental, specific sites or areas of importance[14], and Indigenous peoples and community well-being factors and the application of Indigenous knowledge, or other criteria identified by the Nation.

Existing conditions should also appropriately reflect how past and present activities and projects may have affected the Indigenous interest or caused changes in the resilience of the interest to adapt to further changes. For some components this may be similar to the existing conditions of the VC, but for other components that have socio-cultural, spiritual, or governance information specific to the Indigenous nation, these may be identified through discussion with the Nation to reflect their unique history and current condition.

4.3 Determine Potential Effects to Indigenous Interests

The VCs that represent and/or inform the assessment of effects to Indigenous interests will be identified in the AIR, as well as any other unique assessment methods or information necessary to assess potential project effects to Indigenous

[14] Consideration of specific sites or areas of importance may include sites, trails, or other places of importance identified by an Indigenous nation.

interests. Proponents should use the analysis of relevant VCs to inform the assessment of effects to Indigenous interests. In many cases, the identification of potential effects to VCs that are Indigenous interests or are used to assess effects to Indigenous interests will fully consider all relevant effects pathways, including those specific to Indigenous nations. In other cases, there may be additional direct or indirect positive or negative effects that are specific to a Nation and their interest that must also be identified.

When identifying effects pathways and developing interaction tables for VCs, proponents should also consider any other types of interactions or effects that may be relevant and specific to the Indigenous interest. For Indigenous interests, proponents should consider both tangible effects (such as effects on wildlife species or plants) and intangible effects (such as effects linked to spiritual, aesthetic, or educational values that are often associated with the cultural identity of a Nation). Similar to the VC assessment, an additional table outlining the interactions between project components and Indigenous interests may help to identify the key interactions. Some additional questions for proponents to consider and discuss with Indigenous nations in relation to identified Indigenous interests are:

- Environmental Conditions
    - What are potential effects of the project on the health and mortality of species that are important for or associated with the Indigenous interest?
    - What are the potential effects of the project on the habitat or food source quantity and quality of species that are important for or associated with the Indigenous interest?
    - What are the potential effects of the project on the availability (abundance and distribution) of species that are important for or associated with the Indigenous interest?

- Specific Sites or Areas of Importance
    - Are there specific sites or areas of importance associated with the Indigenous interest that may be affected by the project? If so, measure the footprint extent (hectares) and duration (time) of any area that may be affected by the project;
    - What is the relative importance of the area potentially affected by the project in relation to the Indigenous interest including a consideration of the following:
        - Are there any special characteristics, place names, or unique features of this area;
        - What are the potential effects to connectedness of tracts of lands or waterways;
        - What is the uniqueness of the area to the exercise of cultural activities, practices, customs and traditions and considering diminishing access to preferred areas due to disturbance in other area;
        - Is the project in a location that is currently and/or was historically used for the Indigenous interest;
        - What is the intensity and frequency of the use of the area by the Indigenous nation;
        - Does the area hold a specific role in relation to trade and cultural exchange; and
        - Does the Indigenous nation have future aspirations regarding an Indigenous interest in a site or area that might be affected by the project.
    - Will the project affect a site or area in a way that will change the value of the area to the Indigenous interest or associated traditional practices or customs? Consider the amount and type of disturbance to the area or the functional effect of disturbance on the attributes of the land resulting from the project.
    - Will the project directly or indirectly affect the Indigenous nation's ability to access and use these sites or areas?
        - Measure of the footprint extent (hectares) and duration (time) of any access restrictions resulting from the project.
        - Consider patterns of occupation and cultural practice (including community constraints and differential cultural practices by age and/or gender).
    - Will the project increase access for other land and resource users?

- Indigenous Peoples and Community Well-Being
  - In what way would the project affect the Indigenous nation's enjoyment and experience related to the interest and associated activities, practices, customs and traditions in this area (for example, related to health, peaceful enjoyment, safety and security, consumption)?
  - What are the potential direct or indirect effects to the health of the Indigenous community and its members? Consider physical, mental, emotional and spiritual effects.
  - Consider the potential direct or indirect effects to the social and cultural integrity of the Nation including but not limited to:
    - food or medicine;
    - sharing within the community or family;
    - ceremonial or spiritual purposes;
    - trade or bartering;
    - teaching or knowledge transfer; or
    - language transference?
  - Consider the extent of effect on the ability to derive direct or indirect economic benefits from the area now and into the future. What is the extent to which the proposed activity affects the ability of the Indigenous nation to achieve economic aspirations for the area?
  - Are resources proposed to be extracted from the area of the project and what is the relative value of the resource?

- Governance
  - Is there any required change in the legal interest or ownership to the area or resource related to the project;
  - Consider the degree of involvement of Indigenous nation in the decision-making process for the proposed project and how decisions are made in the area;
  - Would the project affect an area or a resource that has traditionally been governed by the Indigenous nation?
    - Consider the extent to which the proposed project affects Indigenous nation's ability to manage and make decisions over the area in accordance with their traditions, cultures, governance, and/or practices, now and in the future (stewardship vision).

4.4 Management of Effects to Indigenous Interests

The EAO expects proponents to work with Indigenous nations to identify options for mitigating the effects of a project to their Indigenous interests. In some cases, proponents may also work with Indigenous nations to identify enhancement options if a potential positive effect is identified with the Nation. Please refer to *Section 3.4* for additional information related to mitigation and enhancement measures.

Perspectives of Indigenous nations on the effectiveness of the proposed mitigation options should be identified as well as the level of uncertainty or risk associated with the mitigation option. Indigenous nations and proponents may develop mitigations to reduce or eliminate effects to Indigenous interests, develop compensation, or identify options for providing project benefits. The EAO is not able to consider these types of measures in informing its conclusions unless they are shared and made available to the EAO through the EA process.

4.5 Evaluate Residual Effects to Indigenous Interests

Proponents should use the same effects characterization criteria used for VCs as a starting point for describing residual effects on Indigenous interests. The EAO recognizes that participating Indigenous nations may have additional or different criteria for characterising residual effects. Any additional characterization criteria should be developed with a participating Indigenous nation through engagement with the Nation and with consideration of the nature of the effects, the nature of the Indigenous interest, the unique context of the Nation, consideration for Indigenous knowledge, and how the Nation wishes to present the information. In addition to the descriptions provided in Section 3.6.2, additional considerations are provided below for using the VC residual effects characterization criteria to characterize effects to Indigenous interests.

Context

In addition to the context considerations described in *Section 3.6.2* regarding the environmental, economic, social, health, cultural and Indigenous context, there may be other contextual factors within which potential effects may occur, specific to an Indigenous nation, that should be taken into account. Consider the governance structures of the Indigenous nation and the potential effects to governance for the Nation; the uniqueness of a location or value and including whether it is subject to conservation concerns; and the availability or lack of availability of similar values in areas not affected by the project.

Magnitude

Magnitude refers to the expected size, scale or severity of the residual effect within the context of the Indigenous interest. Specific considerations should be given to the perspectives and values of the Indigenous nation including the application of Indigenous knowledge. Also consider the consequences of the effect on the Indigenous community. In some cases, VC effects may have a disproportionate effect on a Nation's interest.

Extent

Consider the spatial extent of the potential effect in relation to the Indigenous nation's territory.

Duration/Reversibility/Frequency

Consider the frequency of the effect in relation to the nature of the Indigenous interest. Particular attention should be given to interactions between when the effect occurs and Indigenous interests in the area including consideration for characteristics of certain interests such as seasonal rounds.

Consider whether the residual effects to the Indigenous interest can be reversed once the activity causing the residual effects ceased or mitigation measure(s) take effect. This includes incorporation of Indigenous knowledge and the perspectives of the Indigenous nation and considering the long-term effects of interruptions or significant disturbance to some interests of cultural or spiritual significance.

Consider whether there is additional temporal context or perspectives that must be included. In some cases, the duration in relation to an effect may be different within the context of an Indigenous interest than for a related VC when taking into consideration both the tangible and intangible aspects of the interest.

Affected Populations

Consider whether some effects on the Indigenous interest will be felt more substantially by specific segments of the Indigenous nation. For example, are there different groups within the Indigenous Nation who may experience the effects in a different way, such as youth, Elders, or women? Also consider, for Indigenous interest that align with VCs whether the Nation will bear the impact disproportionately to the broader population.

4.5.1 Other Considerations

Governance

Project activities may affect resources, access, and activities in an area traditionally governed by Indigenous laws and practices. The presence of a project may also affect power balances or dynamics within and between communities, as well as the ability of a community to implement their inherent right to self-government. Consideration of potential effects to Indigenous interests should include consideration of how the project could affect Indigenous interests that are related to governance, including Indigenous laws and governance systems. Governance can include consideration of both the acceptability of an effect (to what extent can the group tolerate the impact) and manageability or resiliency (what level or types of impacts can the Indigenous community absorb). Governance may be a consideration reflected in one or more characterization criteria outlined in Section 4.5 or it may be a separate consideration.

Risk and Uncertainty

Risk and uncertainty regarding effects to Indigenous interests should be considered in the same way as for VCs (*Section 3.6.3*). Additionally, proponents should ensure that the perspectives of Indigenous nations regarding the risk and uncertainty are integrated into the assessment of effects to Indigenous interests.

Importance

Proponents should consider the importance of the value to the Indigenous nation. Some values may have a different level of importance to an Indigenous nation or Indigenous community. The views of the Nation regarding importance of the Indigenous interest should be integrated where appropriate. Indigenous planning or governance information and/or Indigenous knowledge may also provide insight into the importance of a value.

Interconnectedness

Many Indigenous nations view and experience potential effects within wholistic, interconnected frameworks of the world. In order to understand the potential effects from a project, it may be necessary to understand in greater depth the Nation's views on what other values or interests are related. Proponents should work with Nations to identify how best to undertake and present the assessment of effects to Indigenous interests in a culturally appropriate manner that recognizes the perspectives and values of the Nation, including how the effects of the project can be best understood from a wholistic, interconnected perspective.

4.6 Cumulative Effects to Indigenous Interests

It is important to understand potential cumulative effects to an Indigenous nation's interest(s). When assessing cumulative effects to an Indigenous interest, the context for the effect must be considered, including past and present activities and projects that may also interact with the interest or with the Nation's ability to fully experience or derive benefit from the interest. The current condition should outline the effects of past and present project and activities to the interest and the 'context' (described above) criterion should be used to further understand how past and present cumulative effects to the VC or interest may act cumulatively with the project effects.

When a residual effect to an Indigenous interest is identified proponents should identify and discuss the future cumulative effects to the interest. See *Section 3.7.1* for more information on how to undertake a cumulative effects assessment. Proponents should work with Indigenous nations to ensure that the cumulative effects assessment is specific to the Nation and considers all potential effects that could be experienced by the Nation in relation to their project-specific interests.

4.7 Follow-Up Strategy for Effects to Indigenous Interests

The follow-up strategy should consider any additional mitigation put in place to mitigate effects to Indigenous interests. Proponents should work with Indigenous nations to develop follow-up programs specific to their Indigenous interests, where appropriate. These follow-up strategies should follow the guidance outlined in *Section 3.8.*

5.0 Effects to Other Assessment Matters

5.1 Risk of Malfunctions and Accidents

Section 25(2)(c) of the Act requires that the risk of malfunctions or accidents be considered in every assessment. Unplanned events that could arise from malfunctions or accidents associated with project activities may result in effects to environmental, economic, social, cultural or health values and/or effects to Indigenous interests.

A malfunction is considered a failure of a device, piece of equipment, or a system to function as intended. An accident is an unexpected occurrence or unintended action. Risk is identified as the likelihood or probability of a malfunction or accident and its consequences. Examples of malfunctions and accidents to consider include, but are not limited to, events involving spills of toxic or hazardous material, structural failure of infrastructure, or fires or explosions.

The proponent must conduct an analysis of the risks of malfunctions and accidents identified as important, determine the potential effects and present measures that would be implemented to reduce the likelihood of occurrence. Determining potential effects considers the spatial extent of measurable effects from a malfunction or accident and the values in that area. The assessment of risk should also include the likelihood of mitigation being successful and the time lag for mitigation to become effective. In some cases, proponents may propose measures that could be implemented to mitigate the potential occurrence of a malfunction or accident. After additional mitigation measures and design features to reduce risk have been considered, proponents may also be required to provide preliminary emergency response measures and contingency plans and/or public communication plans for malfunctions or accidents that have a moderate to high risk. The assessment will link and describe the outcome of malfunctions and/or accidents with a probability analysis of consequential effects.

Proponents are encouraged to use recognized risk assessment standards (for example, formal protocols and procedures) for risk analysis, such as the International Organization for Standardization (IS0) 31000 (Risk Management). The risk assessment should be consistent with risk disclosure standards and provincial risk management policy, including the Risk Management Guideline for the B.C. Public Sector (Province of B.C. Risk Management Branch and Government Security Office, April 2019).

A risk assessment matrix may be an effective way to evaluate potential accidents and malfunctions based on the likelihood of occurrence and severity of the consequence. The risk matrix would be developed through engagement with Indigenous nations and the TAC to provide project-specific definitions for the likelihood and consequence during the Process Planning phase. Other factors, such as frequency and magnitude, may also be considered in the risk analysis. Depending on the nature of the project, more detailed risk analysis or third-party analysis may be warranted and would be prescribed in the Application Information Requirements. es. For example, a 'Failure Modes and Effects Analysis' is an example of a structured approach for evaluating potential malfunctions or accidents, by identifying failure modes (ways in which project components or process could fail), causes and effects.

Proponents should discuss any sector-specific requirements (for example, mining) with the EAO.

5.2 Effects to Distinct Human Populations

The effects of a project may not affect all members of the population in the same way. Some individuals and sub-groups may be more vulnerable to adverse effects; others may be better positioned to experience positive effects. Section 25(2)(d) of the Act requires that every assessment consider the disproportionate effects on distinct human populations, including populations identified by gender. This consideration should be included when selecting spatial and temporal boundaries, selecting VCs, undertaking the effects assessment and characterizing potential residual effects and adverse cumulative effects.

Refer to the Human and Community Well-being: Guidelines for Assessing Social, Economic, Cultural and Health Effects in Environmental Assessments, found here, for best practices, factors that influence experience of effects and guidance for considering a project's potentially disproportionate effects on distinct human population in the effects assessment.

5.3 Biophysical Factors that Support Ecosystem Function

Section 25(2)(e) of the Act requires that every assessment consider effects on biophysical factors that support ecosystem function. Ecosystem function relates to the different physical, chemical and biological components of an ecosystem (for example, vegetation, water, soil, atmosphere and biota) and how they operate and interact with each other within ecosystems and across ecosystems. The function of an ecosystem depends upon the long-term integrity of its physical, chemical and biological elements. Biophysical factors that support ecosystem function are assessed through the VC framework, as described below.

5.3.1 Assessment Methods

The effects assessment should identify and consider the specific biophysical factors that may be directly and indirectly affected by a project. The assessment should be of a temporal and spatial scope that is relevant to both the potential project effects and the identified biophysical factors.

Proponents should complete the following in order to assess the biophysical factors that support ecosystem function in EAs:

1. Identify how the project interacts with biophysical factors that support ecosystem function using the Ecosystem Function Scoping Tool (Appendix 1);
2. Consider relevant biophysical factors in the selection of VCs and indicators, which will be reflected in the Application Information Requirements (refer to the Application Information Requirements Guidelines, found here);
3. Assess the biophysical factors that support ecosystem function, as appropriate under the relevant VC, which will allow consideration of potential effects on landscapes, watersheds and ecosystems; and
4. Develop a *summary of biophysical factors that support ecosystem function* chapter that collectively describes how these factors were assessed in the EA; provides an overview of the current ecosystem function in the vicinity of the project at a landscape and watershed level; what the potential positive and negative effects are, including adverse cumulative effects, on biophysical factors that support ecosystem function, and any new mitigation that has been proposed; and provides a summary of any predicted changes to ecosystem function as a result of the project.

Further guidance on how to complete an assessment of biophysical factors that support ecosystem function is provide in Appendix 1.

5.4 Current and Future Generations

Section 25(2)(f) of the Act requires that effects on current and future generations are considered in every assessment. This means that positive and negative project effects on current and future generations must be considered for environmental, economic, social, cultural and health values and in relation to Indigenous interests for a project. This information will allow decision makers to understand whether the environment, people and communities would be better or worse off as a result of the project. The results of this analysis synthesize all of the components of the effects assessment to provide the decision makers with greater insight into the sustainability of the project, particularly how it may protect the environment and foster a sound economy and the well-being of British Columbians and their communities.

5.4.1 Assessment Consideration

The focus of this analysis should be to present how the impacts and benefits identified in the assessment of the project effects would be distributed over time (i.e. across generations). The effects assessment must consider the full temporal scale of potential project effects to adequately assess effects on current and future generations. For example, effects on future generations may be longer than the project lifespan if there are project related effects anticipated after closure or decommissioning.

Proponent's should start to consider potential project effects on current and future generations during early project planning. During the Early Engagement phase, proponents may need to consider adjustments to the project that would:

- Consider the distribution of project benefits and impacts across generations based on input from Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders;
- Align with government policy or planning priorities; or
- Mitigate negative effects or enhance positive effects with a consideration for the temporal distribution of effects.

It is important that this assessment consider any strategic direction from the Province of B.C. regarding sustainable development in the province,[15] and that the effects of the project be considered in relation to these stated objectives or goals. In addition, during the EA proponents' assessment should ensure it provides answer to questions such as the following:

1. How are existing conditions being protected, maintained, enhanced and/or degraded as a result of the project?
2. How are the positive and negative project effects distributed temporally (i.e. across generations)? And are there differences in distribution within the population (for example is there one distinct population that will benefit while another will be adversely affected)?
3. What type(s) of economic growth does the project create and how is this growth distributed?
4. How is the project aligned or not with any relevant regional or provincial growth strategies?

Proponents should provide supporting evidence and rationale for their responses that incorporates the results of the effects assessment undertaken for the project and considers the best available scientific, local, and Indigenous knowledge.

[15] An example of this is *A Framework for Improving British Columbians' Standard of Living: Economic Plan 2019-2020*. Available at: *https://rightforyou.workbc.ca/app/uploads/sites/587/2020/01/BC-Economic-Framework-2019-20.pdf*

5.5 Land Use Plan

As discussed in Section 1.3.2, *Section 25(2)(g)* of the Act requires every assessment to consider a project's consistency with any land use plan of the government or an Indigenous nation if the plan is relevant to the assessment.

During Early Engagement, the proponent will identify relevant land use plans including provincial and Indigenous land use plans, identify how the project is consistent or inconsistent with the plans and provide a rationale for any inconsistencies identified. The Process Order may identify additional project specific information requirements to ensure an adequate consideration of how a project may or may not be consistent with a relevant land use plan.

Proponents should also identify and consider any other relevant land use plans, including those of a local government.

Further details are in the Early Engagement Policy and the Application Information Requirements Guidelines, found *here*.

5.6 Greenhouse Gas Emissions

Section 25(2)(h) of the Act requires that every assessment considers a project's GHG emissions and the potential effects of those emissions on the Province being able to meet its legislated emission reduction targets. The Province's *Climate Change Accountability Act* (CCAA) (formerly the *Greenhouse Gas Reduction Targets Act*) establishes targets for reducing provincial GHG emissions.

The provincial EA process does not consider GHG emissions using the VC framework. Proponents are required to provide sufficient information to demonstrate what their project's emissions are and how they may affect the provincial GHG reduction targets. The Application Information Requirements and effects assessment will be scaled to each project based on estimated GHG emissions. A facility's product(s) or activity(ies) emissions intensity and a project's potential impacts to carbon sinks may also be considered when determining the information needed to adequately understand the GHG emissions of a project.

5.6.1 Greenhouse Gas Emissions Assessment

Proponents should refer to the most up to date guidance from provincial agencies in preparing their GHG emissions assessment, including the use of appropriate and accepted methods to quantify emissions. Emissions factors and methods required by the *Greenhouse Gas Industrial Reporting and Control Act* should be used where applicable. Where no provincial standards are available or for a substituted EA process, Canadian federal guidance may also be used.

Where there is uncertainty in the GHG emissions forecast, the source and level of uncertainty should be clearly and transparently identified and discussed. In some cases, it may be appropriate to provide a range of GHG emissions values or identify different possible emissions scenarios. Emissions estimates should consider both current and announced policies and legislation that may affect forecasted GHG emissions. For example, estimates of GHG emissions should consider the policies described in Government of B.C.'s *CleanBC: our nature. Our power. Our future.*[16] at a minimum.

Upstream Greenhouse Gas Emissions Assessment Requirements

For some projects, such as those undergoing a substituted federal process, proponents will be required to identify if their project is associated with the production of equal to or more than 500 kilo tonnes (kt) carbon dioxide equivalent (CO_2e) during operations. If a project's upstream GHG emissions are forecasted to be equal or greater than 500 kt CO_2e annually

[16] *CleanBC: our nature. our power. our future* is available at *https://cleanbc.gov.bc.ca/*

during operations, proponents may be required to provide additional information and data on upstream GHG emissions in their Application.

When providing upstream GHG emission quantities, proponents should identify the methods, including emissions factors, that they used to estimate upstream GHG emissions. These methods should be based on the best available scientific information and current provincial and federal guidance, where applicable. Upstream GHG emissions that may occur outside of B.C. should also be identified and clearly delineated.

Environmental Assessment Information Requirements

Proponents are required to use best available information to provide an estimate of annual GHG emissions by project phase (for example, construction, operations, decommissioning) in their IPD.

The methods used to estimate the annual GHG emissions should be identified. The IPD may also contain a description of proposed mitigation and/or design changes that will be implemented or are being considered to reduce GHG emissions. This could include a discussion of alternative means of undertaking the project. Mitigation may also include offsetting measures proposed by the proponent.

In the DPD, proponents will be required to update the information in the IPD, including a justification for updates or changes and a description of how information and feedback gathered via engagement was considered. Proponents will also be required to provide:

- A description of the potential effects on the Province being able to meet its targets under the CCAA; and
- Potential impacts on carbon sinks.

For more information regarding information requirements related to GHG emissions in the Early Engagement phase, refer to the Early Engagement Policy. The information provided in the DPD will be used to inform the Readiness Decision. In making a Readiness Decision for a project, the decision maker must consider several factors, including if the project will have extraordinarily adverse effects or if the project, on the advice of the minister, is clearly incompatible with a government policy. Please refer to the Readiness Decision Policy for further information, found *here*.

The potential effects of the project on the province being able to meet its targets under the CCAA must be provided in every assessment. The specific information requirements for the Application will be confirmed during Process Planning in the Process Order. The information requirements and effects assessment will be scaled to each project based on estimated direct and upstream GHG emissions and the potential for impacts to carbon sinks. Additional information may be required for projects forecasted to emit 10,000 tonnes or more of CO_2e per year.

Additional information required could include, but is not limited to:

- A description of each of the project's main sources of GHG emissions by GHG type;
- Updated assessment of annual GHG emissions;
- A description of the project's potential positive or negative impacts on carbon sinks;
- Updated assessment of the project's product/activity GHG emissions intensity;
- Measures identified to mitigate GHG emissions, including through the use of Best Available Technologies and project design;
- Identification of alternative means of carrying out the project that are technically and economically feasible that considers, amongst other factors, GHG emissions;
- Identification of GHG emissions monitoring, follow-up and reporting requirements to confirm findings from the EA;

- Identification of emissions offsetting options;
- Identification of other relevant emissions targets, including those of a local, federal, or Indigenous government and how the project would affect those targets;
- Identification of carbon capture and storage options; and
- Any other information requirements identified during process planning.

In some cases, the EAO may recommend attaching a condition(s) to an EA Certificate for the management or mitigation of GHG emissions. The need for this type of condition will be determined on a project-by-project basis based on a variety of factors, including the estimated overall project GHG emissions, potential effect on the Province achieving its emission reduction targets, emissions product/activity intensity (for example, tonnes of CO_2e per unit of production or activity), impacts on carbon sinks and ability for further emissions reductions over the life of the project.

5.7 Alternative Means of Carrying out the Project

Section 25(2)(i) requires that every assessment must consider the alternative means of carrying out the project that are technically and economically feasible, including through the use of best available technologies, and the potential effects, risks and uncertainties of those alternatives. Alternative means are the different ways in which the project could be carried out. The alternative means analysis should identify, discuss, and compare other technically and economically feasible options for carrying out the project to the project design option that has been selected. The criteria used to determine whether an alternative is technically and economically feasible should also be provided.

The purpose of assessing alternative means is to:

- Consider other options that can address the potential for positive and negative effects to environmental, economic, social, cultural and health values, other *Section 25(2)* matters and Indigenous interests;
- Address issues or concerns raised by the Indigenous nations, the public, local governments, provincial and federal government agencies, and stakeholders;
- Consider the potential risks and implications of the project design option selected and have a technically and economically feasible plan to address the potential risks and implications; and
- Provide clear and transparent methods for evaluating technical and economic feasibility and rationale for the selected options(s).

Alternative means analysis is intended to bring biophysical and human considerations into the earlier stages of development planning — project identification and earlier—as well as the later stages of site selection, design and implementation. Early Engagement will provide an opportunity to identify and address, as appropriate, issues of concern before the project design is finalized. The Application Information Requirements will prescribe the steps to be taken, any specific consideration of project components (for example, tailings management) and set the evaluation criteria and methods to be used to evaluate alternatives. The proponent must consider the views or information provided by Indigenous nations, the public and other participants in establishing parameters to compare the alternative means.

The alternative means analysis must address project components for all project phases, where relevant to the project activities and design. Considerations for identifying relevant project components include, but are not limited to alternative technologies, processes, mitigation and design for:

- Project site location;
- Route or corridor and means options (for example, electrical transmission, transportation of liquified natural gas/ oil/natural gas/concentrate);
- Access to the project site;
- Facility design;
- Location of key project components;

- Energy sources to power the project;
- Water and wastewater management;
- Water management and location of the final effluent discharge points;
- Construction alternatives;
- Timing options for various components and phases of the project;
- Suspension, abandonment or decommissioning options;
- Mining operations (open pit, underground);
- Mining processing facilities location; and
- Mine waste management facilities.

The approach and level of effort applied to the assessment of alternatives will differ depending on:

- The project type and the potential for options;
- The potential effects associated with potential alternative means;
- The current status of VCs that may be affected by potential alternative means;
- The potential for mitigation and the extent to which mitigation measures may address potential environmental effects; and
- The level of concern expressed by Indigenous nations or the public.

Generally, the process of assessing alternative means includes the following:

- Step 1: Identify technically and economically feasible alternative means;
    - Develop criteria to determine the technical and economic feasibility of the alternative means. This information should be transparent and publicly available;
    - Describe alternative means in sufficient detail to establish how to assess them relative to the criteria developed for determining their technical and economic feasibility, as well as to support the analysis;
    - Establish which of the alternative means are technically and economically feasible using a qualitative approach, where possible, to establish how the alternative means relates to the criteria, based on evidence and professional judgement. Thresholds or other quantitative decision-making tools may be used where available and relevant for specific criteria; and
    - Document the rationale for the technically and economically feasible alternative means retained for further consideration;
- Step 2: Identify the potential effects, risks and uncertainties of each alternative means;
    - Identify the VCs and Indigenous interests potentially affected by each alternative means; and
    - Identify the potential effects on the relevant VCs and Indigenous interests for each alternative mean. A full examination of effects is not necessary at this stage. The intent is to have sufficient understanding of potential effects to inform the selection of an approach to analyze alternative means;
- Step 3: Select the approach for analysis of alternative means to identify the preferred means that would be the focus of the EA;
    - Determine and apply the analysis criteria to assess the effects of the technically and economically feasible alternative means;
    - Compare the alternative means based on predicted effects, as well as technical and economic feasibility. Thresholds, governmental standards, scientific, local and Indigenous knowledge, and public input may support the criteria used in the comparative analysis;
    - Identify the preferred alternative means based on the relative consideration of effects and of technical and economic feasibility; and
    - Document the analysis and the rationale for the preferred means in sufficient detail to provide context for Indigenous nations, the TAC, any CAC, the public, local governments, provincial and federal

government agencies, and stakeholders to understand the decision-making process and information choice;

- Step 4: Assess the potential effects, risks and uncertainties of the preferred means;
    - Provide sufficient information to allow the decision maker to decide whether, based on the effects, the project is likely to cause significant adverse effects after implementing mitigation.

In cases where the proponent is not able to identify a preferred means, multiple alternative means may be brought forward in the project EA. For efficiency, the proponent is encouraged to identify a preferred scenario that will become the focus of the EA. The other alternatives would be the subject to further analysis only in terms of how they differ from the scenario relative to potential effects on VCs. If a proponent requests alternative options available in their EAC, each alternative needs to be assessed in the EA.

The EAO will use the information in the Application to evaluate design options and to determine whether the plans and strategies presented by Proponent adequately address any potential risks or effects.

5.8 Effects of the Environment on the Project

Section 25(2)(j) of the Act requires that every assessment consider potential changes to the reviewable project that may be caused by the environment. The effects of the environment include natural hazards or processes and climate change. Potential effects of the environment on a project are typically a function of project design in the context of the receiving environment, resource use and availability (such as water) and ultimately how the project is affected by the environment in which it is situated.

Local environmental conditions, including natural hazards (for example, severe and/or extreme weather conditions) and influences of nature (for example, flooding, drought, ice jams, permafrost conditions, landslides, tsunamis, avalanches, erosion, subsidence, fire, outflow conditions and seismic events) could negatively affect the project and result in effects to environmental, economic, social, cultural and health values, other *Section 25 (2)* matters, and Indigenous interests.

Identifying potential environmental effects as a result of climate change should be informed by local, Indigenous and scientific knowledge. Proponents should refer to current guidance and information from Indigenous governments, B.C. provincial ministries and the Government of Canada when conducting the assessment. The B.C. Climate Action Secretariat, academic institutions (for example, Pacific Climate Impacts Consortium) and other knowledge centres may also have valuable information to contribute to understanding the current and forecasted environmental risks to a project.

Proponents should identify the different environmental events that may affect their project. The environmental events may be considered in different probability patterns (for example 5-year flood vs. 100-year flood). The focus should be on credible events that have a reasonable probability of occurrence and for which the resulting environmental effects could be harmful without appropriate management. When identifying the type and probability of events climate change must be considered, as the likelihood and severity of many of these events are increasing with climate change. This may also include new or different types of events, or more frequent or severe events. Proponents should use best available scientific information, Indigenous knowledge and local knowledge when collecting and analyzing relevant information. Indigenous nations, the TAC, any CAC, the public, local governments, provincial and federal government agencies, and stakeholders may also provide valuable input to proponents when identifying the key risks to their project from the environment and understanding potential future risks.

6.0 PROVINCIAL DATA SUBMISSION STANDARDS AND STORAGE

Proponents may be required to submit specific data and their associated reports, collected in support of the development of their Application, to the EAO at various points in the EA. Proponents are also encouraged to submit this data and associated reports, to the provincial agency responsible for managing that specific type of data, where data standards and data warehouses exist. Submitted data will need to meet data submission standards to allow for the storage of data. Data may be subject to quality assurance (QA) by the responsible provincial agency and the proponent can work with the provincial agency to ensure the accuracy of the data. Data may be submitted to the appropriate provincial agency before or at the time the final revised Application is submitted to the EAO.

Appendix 2 provides a table of the types of data that may be submitted to the province.

APPENDIX 1 ECOSYSTEM FUNCTION SCOPING TOOL

The biophysical factors that support ecosystem function are: habitats supporting ecosystem function, habitat patches, natural disturbance regime, structural complexity, hydrologic or oceanographic patterns, nutrient cycling, purification services, biotic interactions, population dynamics and genetic diversity. If there are additional biophysical factors that support ecosystem function that do not fit into one of these categories, then new categories can be added to the assessment.

These biophysical factors can vary in their contribution to ecosystem function and may be affected by potential project impacts at a landscape or watershed level, ecosystem level or ecological community level. Biophysical factors should be assessed at the level that coincides with the potential effect.

Examples of biophysical factors at a landscape level include:

- Landscape connectivity;
- Composition of habitats across the landscape; and
- Trophic function and structure.

Examples of biophysical factors at a watershed level effects include:

- Sediment production and transport;
- Hydrologic processes;
- Upslope and riparian vegetation cover; and
- Watershed connectivity.

Components of landscape and watershed level effects can for the most part be captured in the VCs outlined in EAO's Application Information Requirements Guidelines, but some projects may warrant having a separate landscape and/or watershed VC if a project will have measurable effects at these levels.

An assessment of ecosystems should also include a comparison of the amount of ecosystem to what is in the RAA. Examples of terrestrial ecosystems include forest, grassland and alpine/subalpine ecological communities as defined by Biogeoclimatic Ecosystem Classification system. Examples of aquatic ecosystems include wetlands, river and streams, lakes and marine ecosystems.

Because various effects to biophysical factors that support ecosystem function are being assessed at different levels and within different VCs, it will be necessary to have a discussion of the overall impact at the landscape, watershed and ecosystem levels in the biophysical factors that support ecosystem function chapter. For example, the ecosystem function of a lake would not typically be assessed through a lake-specific VC but instead effects may be assessed through the following VCs:

- Potential effects to surface water quality and quantity would be assessed in the Surface Water and Groundwater VCs;
- Potential effects to fish would be assessed in the Freshwater Fish VC;
- Potential effects to vegetation would be assessed in the Vegetation VC; and
- Potential effects to wildlife that use riparian habitat would be assessed in the Wildlife VC.

While the various potential effects are assessed in the applicable VCs, the assessment of how they relate to the overall functioning of the lake ecosystem would be discussed in the '*summary of biophysical factors that support ecosystem function*' chapter.

Biophysical factors that support ecosystem function can be grouped in the following ten categories[17]:

1. Habitats Supporting Ecosystem Function - At a landscape or regional level, unique or critical habitats that disproportionately support ecosystem function and are of special value, especially areas that integrate the flow of water, nutrients, energy and biota such as wetlands and tend to be biodiversity hotspots. Potential effects to other biophysical factors as a result of changes to habitats supporting ecosystem function are: the abundance and distribution of unique or critical habitats such as wetlands, in conjunction with hydrological patterns, strongly influence the transport of nutrients and purification services; and unique or critical habitats support biotic interactions, population dynamics and genetic diversity.

2. Habitat Patches - Pattern, quantity, size and connectivity of habitat patches that support the movement of species and the transfer of materials. Fragmentation of habitat into disconnected and isolated patches can disrupt ecological integrity. Edge effects[18] can further reduce the ecological function of habitat patches. Potential effects to other biophysical factors as a result of changes to habitat patches supporting ecosystem function are: changes to the connectivity and pattern of unique or critical habitats; the pattern of habitat patches in wetlands can affect nutrient cycling and purification services; and connectivity of habitat patches can affect biotic interactions, population dynamics and genetic diversity.

3. Natural Disturbance Regime - The type, magnitude and frequency of disturbances that could occur within a landscape in the absence of human intervention. Disruption of the natural disturbance regime could be through activities like controlling stream water levels, fire suppression in grasslands or forests, or forest clearing and can result in impacts to the natural disturbance regime by suppressing disturbances or causing abnormally large disturbances. Potential effects to other biophysical factors as a result of changes to natural disturbance regimes are: natural disturbance regimes can maintain unique and critical habitats, their structural complexity and the nature of habitat patches; natural disturbances can disrupt nutrient flow and waste processing which can create pulses of unassimilated waste; and natural disturbances can disrupt biotic interactions, population dynamics and genetic diversity.

4. Structural Complexity - Physical features that increase structural complexity and provides for a greater variety of unique niches for species, such as snags and multiple layers in a forest or coarse woody debris in a stream. Examples that may result in a change in structural complexity are clearcutting of a forest or channelization of a stream. Potential effects to other biophysical factors as a result of changes to structural complexity supporting ecosystem function are: alter the structural complexity of unique or critical habitats; structural complexity may change hydrologic patterns, nutrient cycling or purification services; structural complexity such as coarse woody debris in streams can form nutrient pools; structural complexity can act as physical filtering mechanisms for waste; and structural complexity creates physical heterogeneity of species habitats that influences biotic interactions, population dynamics and genetic diversity.

5. Hydrologic or Oceanographic Patterns - Movement of freshwater, groundwater and saline waters within and through ecosystems. Examples that may lead to a change in these patterns include a change in water flows and changes to the transfer of biotic and abiotic materials through an ecosystem. Potential effects to other biophysical factors as a result of changes to hydrologic or oceanographic patterns supporting ecosystem function

[17] U.S. EPA. 1999. *Considering Ecological Processes In Environmental Impact Assessments.* https://www.epa.gov/sites/production/files/2014-08/documents/ecological-processes-eia-pg.pdf

[18] The edge of a patch can have different habitat values than the interior of a patch.

are: the amount and duration of water flows determines the extent of wetlands or a type of unique or critical habitat; ocean currents can determine the pattern and location of sediment deposits for marine habitat such as eelgrass beds; networks of waterbodies provide connectivity between habitat patches; variability in flow regimes can be an agent of natural disturbance; transport and scouring of aquatic habitat affects structural diversity, as well as carries nutrients downstream; water flow is important for assimilating and purifying waste inputs; and hydrological and oceanographic patterns influence the degree to which biotic interactions structure aquatic communities.

6. Nutrient Cycling - Nutrient flow in and out of an ecosystem (for example, nitrogen, phosphorus, carbon). Examples of this are project inputs of nutrients into the natural nutrient cycle through waste discharges, or the loss of future nutrients into soils through the removal of vegetation. Potential effects to other biophysical factors as a result of changes to nutrient cycling supporting ecosystem function are: degraded nutrient cycling can reduce the ability of an ecosystem to purify waste inputs.

7. Purification Services - Physical, chemical and biological mechanisms of removing, sequestering, assimilating and changing chemicals in an ecosystem. An example of a change in purification services is waste discharges that are beyond the ability of an ecosystem to manage and that leads to an accumulation of waste or chemicals in an ecosystem. Potential effects to other biophysical factors as a result of changes to purification services supporting ecosystem function are: Waste or chemicals can affect the health of vegetation and wildlife populations.

8. Biotic Interactions - Antagonistic or symbiotic interactions among organisms, which can include competition for resources, predation, parasitism and mutualism. Keystone and foundation species[19] have strong interactions with other organisms and often provide vital functions in the ecosystem. Examples of effects on biotic interactions are:
   - A disruption of predator-prey dynamics;
   - Disruption to pollinators or seed distributors, or plants that support pollinators or seed distributors;
   - Impacts to species that modify habitat that may lead to a reduction in habitat modifications that support entire communities; or
   - An introduction or facilitation of invasive species.

   Potential effects to other biophysical factors as a result of changes to biotic interactions supporting ecosystem function are: an increase or decrease in biotic interactions could alter population dynamics and genetic diversity.

9. Population Dynamics - Populations and subpopulations are the units for species success in an area. For example, changes in habitat for a critical life stage or on a population behaviour may affect the success of a wildlife population to the point where it can no longer sustain itself. Potential effects to other biophysical factors as a result of changes to biotic interactions supporting ecosystem function are: the reduction in species that alter habitat can alter unique or critical habitats; species like salmon can provide biomass and nitrogen for nutrient cycling; and population dynamics are important to biotic interactions and is closely tied to genetic diversity.

10. Genetic Diversity - Genetic diversity enables a population to respond to natural selection, helping it adapt to changes in selective regimes. An example of potential effects on genetic diversity might include an increase in mortality of a distinct fish population leading to the potential reduction in the species' genetic diversity. Potential effects to other biophysical factors as a result of changes to genetic diversity supporting ecosystem function are: genetic diversity can be important to the success of populations.

[19] Keystone species are species that have a greater functional importance than suggested by their biomass. Foundation species are functionally important because of their commonness within an ecosystem.

The Ecosystem Function Scoping Tool (Table 7) can be used to identify the topics that may be relevant for an effective assessment of biophysical factors that support ecosystem function. The tool is organized around the biophysical factors described above. The proponent should consider all of these factors when identifying the relevant biophysical factors to consider in the selection of VCs and indicators.

Instructions for using the Ecosystem Function Scoping Tool:

1. Within each row, check the box if there is a possible project interaction with the key consideration.
2. In the Interaction Description column, describe the possible project interaction.
3. In the VCs and Indicators column, describe the relevant VCs and indicators for that project interaction. All post-Certification project phases should be considered (for example, construction, operations, decommissioning).

This tool does not provide a threshold for determining whether or not a topic should be included in the EA. Ultimately, that decision requires professional judgment, discussions with the EAO, Indigenous nations, government agencies, and TAC. In addition, some considerations may be more important than others; for example, government may have management interests, it is of an Indigenous nations interest, or there is local or community concern that may drive the inclusion of a topic.

Ecosystem Function Scoping Tool

Possible Interaction	Key Considerations	Examples of VCs and Indicators	Interaction Description	VCs and Indicators
Habitats Supporting Ecosystem Function				
☐	Could the project cause impacts to ecosystems that provide unique or critical habitats that support ecosystem function? (for example, wetlands, old forest)	**Vegetation** • Ecosystems of interest • Terrestrial, wetland, river/stream and lake ecosystems **Geology and Terrain** • Ecological resource features **Wildlife** • Indicator species		
☐	Could the project cause impacts to potential or listed ecological communities (check B.C. Conservation Data Centre)?	**Vegetation** • Ecosystems of interest • Terrestrial, wetland, river/stream and lake ecosystems		
☐	Could the project make an ecosystem more susceptible to change?	**Vegetation** • Terrestrial, wetland, river/stream and lake ecosystems **Geology and Terrain** • Ecological resource features		

Habitat Patches				
☐	Could the project result in barriers to species movement? Or could species be inhibited from moving between habitat patches?	**Vegetation** • Areal extend and distribution • Fragmentation **Wildlife** • Habitat		
☐	Is there the potential for habitats to be isolated and/or fragmented by the project?	**Vegetation** • Areal extend and distribution • Fragmentation • Ecosystem condition **Wildlife** • Habitat		
☐	Will there be project effects to ecological corridors or key habitats in a migration route?	**Vegetation** • Areal extend and distribution • Fragmentation **Wildlife** • Habitat		
Natural Disturbance Regime				
☐	Could natural disturbance regimes be altered as a result of the project (for example, fire suppression, flood control, forest clearing)?	**Surface Water** • Quantity **Vegetation** • Ecosystem condition		
☐	Could there be a change in project effects in the future due to natural disturbance regimes changing as a result of future climate?	**Vegetation** • Ecosystem condition		
Structural Complexity				
☐	Are there potential project effects to specific features within an ecosystem that are important for the life stage of a species?	**Vegetation** • Ecosystem condition **Geology and Terrain** • Ecological resource features **Wildlife** • Habitat		

☐	Could the project cause a reduction in the structural complexity of an ecosystem?	**Vegetation** • Ecosystem condition **Wildlife** • Habitat		
☐	As a result of the project, will an ecosystem be managed to a certain seral stage (for example, transmission line corridor)?	**Vegetation** • Ecosystem condition **Wildlife** • Habitat		
Hydrologic or Oceanographic Patterns				
☐	Could hydrologic patterns and/or flow be altered by the project	**Surface Water** • Surface water flow/hydrology		
☐	Could oceanographic patterns be altered by the project?	**Marine Water Quality** Marine hydrology		
Nutrient Cycling				
☐	Will the project result in an input of nutrients into the ecosystem (for example, waste discharges)?	**Air Quality, Surface Water, Soil** • Acidification and eutrophication on air quality, surface water quality and soils		
☐	Will the project cause a change in the flow of nutrients through an ecosystem (for example, land clearing, erosion or scouring, changes to water flow)?	**Surface Water** • Surface water flow/hydrology **Soil** • Soil quality and erosion features		
Purification Services				
☐	Could project discharges lead to accumulation of waste or chemicals in an ecosystem?	**Air Quality** • Criteria air contaminants • Volatile organic compounds **Surface Water** • Water quality		
Biotic Interactions				
☐	Could the project have effects to keystone or foundation species that	**Vegetation** • Ecosystem indicator species		

	have the potential to alter ecosystems?	**Wildlife** • Wildlife population, health and behaviour		
☐	Could project effects allow for invasive species to change ecosystem function?	**Vegetation** • Change in abundance or condition		
☐	Will there be species impacts that could change predator prey dynamics?	**Wildlife** • Wildlife population, health and behaviour		
Population Dynamics				
☐	Could the project impact wildlife species at a population level?	**Wildlife** • Wildlife population, health and behaviour		
Genetic Diversity				
☐	Will there be the possibility of reducing the genetic diversity of wildlife populations?	**Wildlife** • Wildlife population, health and behaviour		

APPENDIX 2 PROVINCIAL DATA SUBMISSION STANDARDS[20]

Data Type	Database	Data Submission Standard	Quality Assurance
Air Quality	ENVISTA	Must be compatible with *Envista Importing routines* Provider must make sites and air monitoring equipment available for audits at applicable rates as defined by the *Environmental Data Quality Assurance Regulation*	Provincial standards for monitoring and QA/QC are in development *- current drafts available*. *National Air Pollution Surveillance Program* *Ambient Air Monitoring and Quality Assurance/Quality Control Guidelines* Additional Guidance available: • *EPA Quality Assurance Handbook for Air Pollution Measurement Systems Volume II* • BC MOE Meteorological Data and Sensing Requirements - available upon request *bcairquality@gov.bc.ca* • BC MOE Air Monitoring Instrumentation available upon request - *bcairquality@gov.bc.ca*
Climate	ENVISTA - Air Quality Network Meteorological Data	ENVISTA - Must be compatible with *Envista importing routines* National Data Transmission Standards under development	National siting, data qualification, transmission and operational guidelines in development
Climate	AQUARIUS time series software	Continuous Water Data *format and submission process*	RISC Hydrometric Manual provides guidance on grading hydrometric data by a Qualified Professional. RISC Continuous Water Quality Manual provides guidance on grading water quality data. No grading standards exist for snow, groundwater data at this time.

[20] The provincial data submission standards have been prepared using best available information at the time this document was developed. Proponents should confirm the data requirements with the appropriate government agency. The EAO may provide specific direction on data submission standards through the Process Order that differs from the standards noted above.

Data Type	Database	Data Submission Standard	Quality Assurance
Fish and Fish Habitat	FDIS - Field Data information System (Oracle) For reports, Ecological Reports Catalogue (EcoCat)	Online Fish Data Submission process following "*1:20,000 Reconnaissance Standards*" (RISC) *FDIS data QA Tool and Data Submission Standards*	Data manually reviewed by biologists, automated QA scripting against FDIS data standards before being entered into FDIS database
Surface Water and Groundwater Quality and Quantity	Environmental Monitoring System (EMS) - biotic and abiotic analysis of water, air, solid waste discharges and ambient monitoring sites	Data format and submission process: *Environmental Monitoring System*	*BC Field Sampling Manual*
Surface Water and Groundwater Quality and Quantity	AQUARIUS time series software	Data format and submission process: *Continuous Water Data*	RISC Hydrometric Manual provides guidance on grading hydrometric data by a Qualified Professional. *RISC Continuous Water Quality Manual* provides guidance on grading water quality data. No grading standards exist for snow, groundwater data at this time.
Surface Water and Groundwater Quality and Quantity	Groundwater Wells and Aquifers (GWELLS) - Application for the collection, storage and disclosure of well and aquifer data. Includes a register of individual well drillers and well pump installers authorized to work on wells within the Province.	Reporting requirements outlined in Schedules 1-6 of the *Groundwater Protection Regulation* *Groundwater Wells Information*	No grading standards exist at this time
Wildlife Inventory	SPI - Species Inventory Database (Oracle) For reports, Species Inventory Web Explorer (SIWE)	Online Wildlife Data Submission process following *Wildlife Species Inventory Data Standards/Templates and RISC manuals: Species Inventory Fundamentals (RISC 1998, 2011), Wildlife Camera Metadata Protocol (RISC 2019)* *SPI Data Submission Standards and Templates*	Data manually reviewed by biologists, automated QA scripting against SPI data standards before being entered into SPI database.

Data Type	Database	Data Submission Standard	Quality Assurance
		Species Inventory Fundamentals (1998)	
Aquatic Ecosystems	Canadian Aquatic Biomonitoring Network (CABIN)	Sampling must follow *standard methods (EC 2012)* and data is uploaded using on-line template.	Formal training required to access the database, collect and upload data; Sampling follows standardized protocols.
Rare Plant and Lichen Inventory	SPI - Species Inventory Database (Oracle) For reports, Species Inventory Web Explorer (SIWE)	Online Data Submission process following Species Inventory Data Standards/Templates and "*Inventory and Survey Methods for Rare Plants and Lichens*" (RISC 2018)	Data manually reviewed by biologists, automated QA scripting against SPI data standards before being entered into SPI database *Data Submission Standards and Template*
Terrain Mapping	TEIS - Terrestrial Ecosystem Inventory Systems (ESRI File Geodatabase - BCGW oracle tables)	*Standard for Terrestrial Ecosystem Mapping (TEM) - Digital Data Capture in British Columbia. Version 3.0, 2015*	*Quality Assurance Guidelines for TEM* *Quality Assurance Guidelines for TSM, 2010* *Digital QA scripts and processes for data QA and loading to corporate data systems* *Contractor package templates and tools*
Soil Survey	Soil Environment Master (ESRI File Geodatabase - BCGW oracle tables) BCSIS database (MS Access and ESRI File Geodatabase) Soils Information Finder Tool (ESRI ArcGIS online)	*Data templates, mapping and inventory standards* Digital standards and data dictionaries Draft contractor package templates and tools	Scripts and digital checking tools VPRO application for data entry

Data Type	Database	Data Submission Standard	Quality Assurance
Ecosystem Mapping	TEIS - Terrestrial Ecosystem Inventory Systems (ESRI File Geodatabase - BCGW oracle tables)	*Standard for Terrestrial Ecosystem Mapping (TEM) - Digital Data Capture in British Columbia. Version 3.0, 2015* Contractor Package templates and tools	*Protocol for Accuracy Assessment of Ecosystem Maps* *A Protocol for Assessing Thematic Map Accuracy Using Small-area* TEM Quality Assurance: *Quality Assurance Guidelines for TEM* *Quality Assurance Guidelines for DTEIF* *VPRO application for data entry*