PROCEDURES FOR MITIGATING IMPACTS ON ENVIRONMENTAL VALUES (ENVIRONMENTAL MITIGATION PROCEDURES)

Version 1.0

May 27, 2014

Ministry of Environment

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Summary of Revisions

The Ministry of Environment is committed to continuous improvement and welcomes feedback on the use of these procedures. Suggestions for changes may be submitted to mitigate@gov.bc.ca. Changes approved are reflected in the table below.

DATE	SECTION	DESCRIPTION AND/OR RATIONALE FOR CHANGE
27 May 2014	**6.0**	Clarified that all feasible measures at one level of the mitigation hierarchy are considered before moving to the next level.

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Note: The Environmental Mitigation Policy and Procedures are working documents and are subject to change. Please refer to the EMP website for the most current version: www.gov.bc.ca/env/emop

PART 1. INTRODUCTION TO THE POLICY AND PROCEDURES FOR MITIGATING IMPACTS ON ENVIRONMENTAL VALUES

1.0 DOCUMENT STRUCTURE

Information contained in this document is grouped into three main parts:

Part 1: Introduction and application of the Mitigation Policy and Procedures (sections 1 and 2).
Part 2: Implementation – general guidance on applying the mitigation hierarchy (sections 3 through 16).
Part 3: Appendices – additional tools and technical detail supporting implementation of the Procedures.

Figure 1-1 provides simple context for how the Environmental Mitigation Policy and Procedures fit into an environmental impact assessment process. The procedures in this document focus on how to apply the mitigation hierarchy and completion of mitigation plans, which include considerations for selecting Valued Components,[1] completing an environmental impact assessment, and developing monitoring plans. All of these actions are supported by both the collection and exchange of data and information, as well as monitoring and reporting. The Procedures are expected to be complementary to the *Guideline for the Selection of Valued Components and Assessment of Potential Effects* prepared by the Environmental Assessment Office in 2013).

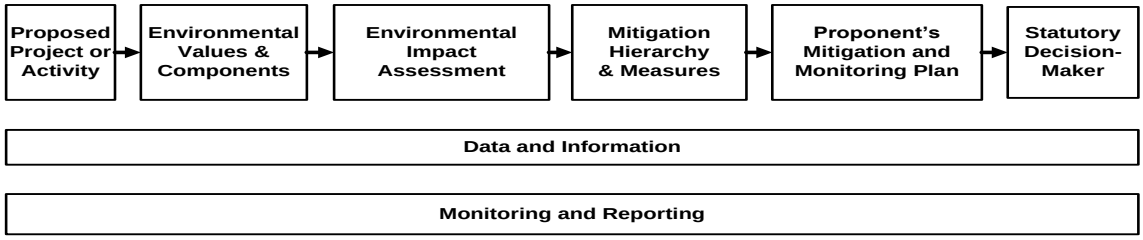

Figure 1-1. Applying the mitigation hierarchy within the overall process of environmental impact assessment.

[1] The Procedures are intended for environmental values specifically. Economic, social, cultural, archaeological, and historical values may also benefit from a similar approach; however, the Procedures do not specifically include considerations that may be relevant to those values.

2.0 APPLICATION OF THE MITIGATION POLICY AND PROCEDURES

2.1 General Intent of the Procedures

The *Procedures for Mitigating Impacts on Environmental Values* ("the Procedures") are intended to support the implementation and "on the ground delivery" of the corresponding Environmental Mitigation Policy (i.e., the *Policy for Mitigating Impacts on Environmental Values*), and provide guidance on mitigating impacts on environmental components and developing mitigation plans.

Two general applications are considered at this time for the Procedures: (1) as a tool for willing proponents who are voluntarily developing mitigation plans; and (2) for when government has identified the need for proponents to produce a mitigation plan to address impacts on specific environmental values and their associated component. In addition to these two general applications, the Procedures may be considered best practices for proponents interested in planning mitigation measures for impacts to environmental components. A proponent may choose to develop a detailed mitigation plan for a proposed project or specific environmental component for various reasons including: corporate policies; anticipation of a significant First Nations, public, or political issue; or a recommendation from a qualified professional. Likewise, government may direct that a mitigation plan be developed or establish the expectation that offsetting be considered for reasons as listed above, either (1) when there is need to address anticipated impacts to regional significant values, or (2) where there is an anticipated negative trend due to forecasted development activities.

The Policy and associated Procedures are primarily aimed at bringing consistency to existing processes. In particular, the Procedures fill a gap with regard to application of the mitigation hierarchy and associated mitigation measures, tracking impacts against specific environmental components, and quantifying change to the environmental component before considering or proposing a specific offset. It is expected that a transparent and scientifically robust mitigation plan, which documents a reasonable strategy to implement mitigation measures, can help resolve issues that may delay or prevent a proposed project or activity.

Other government initiatives, which share similar concepts and terminology, are being developed concurrently. These initiatives include the Cumulative Effects Assessment Framework, Values Framework, and Integrated Decision Making. The Environmental Assessment Office is also revising several related policy and guideline documents. When necessary, the Policy and Procedures will be revised to ensure consistency and compatibility with these other initiatives to the extent possible.

2.2 Relationship to Existing Legislation and Regulation

The Mitigation Policy and associated Procedures are not decision-making tools – they are *decision-support* tools. They do not create new legal requirements or supersede any statute. Rather, the Policy and Procedures will:

a. support existing legislation;
b. allow flexibility through guidance; and
c. facilitate understanding and consideration of environmental values, and mitigation of impacts on these values, as part of the process of supporting and making well-informed, balanced, and sound decisions for the natural resource sector.

Where mitigation plans are developed and are accepted as a part of legally binding permit conditions, the commitments become enforceable.

2.3 Intended Audience

It is expected that the Procedures will primarily be used by qualified professionals. The Procedures may also be used by natural resource sector staff when reviewing applications and proposals, providing advice and recommendations regarding mitigation, and assisting in informing the statutory decision-maker.

Table 2-1. Intent of the Procedures with respect to different audiences and users.

Who?	Intent of the Mitigation Procedures
Proponents and qualified professionals	Information for consideration and voluntary use to identify environmental values, consider mitigation of impacts on these values and associated components, and prepare complete mitigation plans
Provincial staff (for intake)	Information and guidance to consider when screening incoming applications
Provincial staff (for technical review)	Information and guidance to consider when providing best scientific/technical information, advice, and recommendations to either proponents or decision-makers
Decision-makers	Decision-support tool focusing on environmental values and mitigation of impacts, to improve understanding and better support and inform the decision-makers when making natural resource decisions

PART 2. IMPLEMENTATION: GUIDANCE AND CONSIDERATIONS FOR MITIGATION OF IMPACTS ON ENVIRONMENTAL VALUES

3.0 DEFINITIONS

Terms not defined within this document are defined by common dictionary meaning.

"area of influence" means the extent of the direct and indirect impact(s) to the environmental value(s) and associated components beyond the footprint of the project or activity. It may be defined within each of the local, subregional, or regional scale depending on the ecological scale of the processes affecting the environmental value(s).

"assessment area" means the spatial location for assessing impacts on environmental values and associated components. The boundary of the assessment area is dependent on the environmental values and associated components being measured, and needs to consider the footprint of the activity and its area of influence. This not only covers the local scale, but may also include the subregional and regional scales depending on what scale is relevant in the context of the environmental component(s).[2]

"avoid" means to fully avert any potential impact on one or more environmental components resulting from a project or activity.

"compliance monitoring" means the assessment of performance against a legal environmental standard to determine a compliance record. Did what was implemented meet the requirements of the law?

"conservation covenant" means a legal document, or contract, between parties to manage lands set aside to offset an impact on an environmental value or associated component.

"current condition" means the state of the indicator before the proposed project or activity.

"ecological equivalency" means the measure of correspondence, or "sameness," both in structure and function, between the environmental value (or its associated component or indicator) that is impacted and the environmental value (or its associated component or indicator) used in exchange, as an offset, to make up for the loss from impacts.

[2] The definition of "assessment area" used in this document is intended to complement and support the approach used to define assessment area in other processes (e.g., environmental assessment). What is important is that assessment area be defined in an ecologically relevant way that is necessary to evaluate the proposed activities.

"ecological restoration" means the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.[3] It is an intentional human activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity, and sustainability. Restoration involves returning the impacted ecosystem to a sustainable ecological trajectory or pathway, determined by the restoration target and reference conditions.

"effectiveness monitoring" means the assessment of the condition of environmental components in the context of the performance of a program, plan, or activity and its progress toward desired outcomes or effects through mitigation. Did what was implemented achieve the desired result?

"environmental component" means an attribute of the natural resource system that is measured, managed, and maintained to ensure the integrity and well-being of the environmental value with which the component is associated.

"environmental value" means an element of the natural environment that the people and Government of British Columbia care about and see as important for assuring the integrity and well-being of the province's ecological systems over time.[4]

"implementation monitoring" means the assessment of whether activities were implemented as planned or guided.

"indicator" means a metric used to measure and report the condition and trend of an environmental component.

"in-lieu payment" means a payment made by a person proposing a project or activity, to fund offsetting measures (conservation offsetting mechanisms) that will be carried out by the Province or by a third party.

"land acquisition" means the acquisition of property through purchase, exchange, donation, rezoning, or transfer of development rights, or other such means of acquiring lands for purposes of conservation offsets.

"land lease" means the acquisition of property through leasing, for use as an offset.

"management target" means a required level of performance for an indicator, established as a matter of policy or associated with a legal requirement. In the absence of a management target set through legislation or policy, a targeted condition should be described based on professional opinion.

"minimize" means to *partially* avoid or reduce the level of impacts on one or more environmental components resulting from a project or activity.

"mitigation hierarchy" means the order of priority for selection of mitigation measures.

[3] Society for Ecological Restoration International Science & Policy Working Group. 2004. The SER international primer on ecological restoration. Version 2, October 2004. Retrieved from: http://www.ser.org/pdf/primer3.pdf.

[4] Environmental component and environmental value are sometimes used synonymously. For the purposes of this document, the distinction is largely semantics; the critical aspect is that the environment component selected is interpretable in a meaningful way and has measurable indicators.

"mitigation measure" means a tangible conservation action taken to avoid, minimize, restore on-site, or offset impacts on environmental values and associated components, resulting from a project or activity.

"mitigation plan" means the proponent's commitment to mitigation and monitoring including the specific measures that will be carried out.

"non-proponent actions" means mitigation measures that may be used to reduce impacts to environmental component(s), but where the proponent is not taking direct responsibility either by providing funds for implementation or implementing themselves.

"offset" means to counteract, or make up for, an impact on an environmental component that cannot be adequately addressed through other mitigation measures in the hierarchy.

"off-site" means outside of the area of the permit/authorization.

"on-site" means within the area of the permit/authorization.

"practicable" – See the FRPA General Bulletin, *Use of the Term "Practicable" Under the Forest and Range Practices Act (FRPA) and Regulations*, for discussion of this term: http://www.for.gov.bc.ca/ftp/hth/external/!publish/Web/frpa-admin/frpa-implementation/bulletins/frpa-general-no-3-defining-practicable-under-frpa-jun-9-2005.pdf.

"project footprint" ("footprint") means the area directly impacted by a project or activity.

"proponent" means, for purposes of this Policy, a person or organization who proposes to undertake a project or activity.

"residual impact before offset" means an impact that adversely affects one or more environmental components, and remains, or is predicted to remain, after efforts to "minimize" and/or "restore on-site." Residual impact, used alone, means the adverse effects that remain or are predicted to remain after all mitigation measures are applied.

4.0 DATA AND INFORMATION

Data and information are integral to the successful application of the Mitigation Policy and Procedures, and will be required for mitigation planning and monitoring. Data may be required in the decision-making process to assess the biological assumptions made in completing a mitigation plan. New inventory data, collected by the proponent, may also be useful to the Province to support assessment and monitoring of environmental values. Open access to data and information to support science, policy development, and shared stewardship, is an underlying principle. Where data and information are sensitive, however, confidentiality or data-sharing agreements may be established.

4.1 Principles

- The best available data and information are to be used in implementing the Procedures (e.g., when determining presence and status of environmental values and associated components and associated risks, and as the basis for environmental impact assessment).
- The collection and maintenance of data, use of language, and communications regarding effectiveness and status of mitigation are to be compatible with provincial standards and approaches.
- Information, including proposed mitigation plans to support decision requests, may be shared with First Nations and with potentially affected stakeholders, including the public.
- Data and information identified as confidential, by agreement, will not be shared outside of government.

4.2 Considerations

- Scientific information should be evaluated to determine its validity and reliability.
- Types of data and information should be relevant to the ecological context of the proposed project or activity and may include statistical data, spatial data, peer-reviewed information, professional judgment, and traditional ecological knowledge.
- Either or both quantitative or qualitative approaches to describing data and information may be used.
- Rationales supporting professional judgments should be made available when requested during the decision-making process.
- Pragmatism should be exercised with respect to data and information associated with Procedures, especially when obtaining such data might be beyond the responsibility of the proponent.

4.3 Procedures

- At each step in the analysis for the impact assessment, and in the development of a mitigation plan, document the data and the information sources.
- Submit data and reports for new data and information collected by the proponent to the appropriate information management system.
- Submit data and information using the appropriate forms and procedures where these are available.
- If procedures deviate from provincially accepted standards, a rationale supporting professional judgment should be made available at the time the application is submitted.

5.0 ENVIRONMENTAL VALUES, ASSOCIATED COMPONENTS, AND INDICATORS

Understanding the environmental values that may be impacted by a proposed project or activity is the basis for any mitigation planning. Environmental values are the elements of the natural environment that the people and Government of British Columbia care about and see as important for assuring the integrity and well-being of the province's ecological systems (see Figure 5-1). Environmental components are attributes of the natural resource system that we can measure and manage to maintain the integrity of the environmental value. Environmental values and associated components may be identified by the proponent and their qualified professionals and/or provincial natural resource sector staff.

Sources of environmental values include:

- natural resource legislation, treaties, and policy (e.g., *Forest and Range Practices Act*, *Environmental Assessment Act*, and Land and Resource Management Plans);
- regionally specific initiatives or assessments (e.g., cumulative effects demonstration projects, Forest Practice Board reports);
- First Nations; and
- technical experts.

Environmental components typically relate to supply, condition, connectivity, or population parameters of the value and can be identified through the same sources listed above.

The environmental values and associated components may already be determined for a particular project, either through previous environmental assessment or by government direction. This section is most relevant to those cases where the environmental values and components are not yet identified, but also serves as reference to clarify the terminology used in these Procedures and other similar terminology. See Appendix 1 for the process for selecting values, if they have not already been identified.

Table 5-1 outlines an example of how one environmental value (Grizzly Bear) and its associated environmental components and indicators could be defined and used when assessing potential impacts and developing mitigation measures and the associated mitigation plan.

- ***Environmental Values*** – elements of the natural environment that the people and government of British Columbia care about and see as important for assuring the integrity and well-being of the province's ecological systems.
    - ***Environmental Components*** – attributes of the natural resource system that must be measured, managed, and maintained to ensure the integrity and well-being of the environmental value with which the component is associated.
        - ***Indicators*** – the metrics used to measure and report on the condition and trend of an environmental component and/or the process(es) impacting an environmental component.
        - ***Benchmarks*** - reference points reflecting the risk associated with the performance of an indicator that may trigger different levels of management response.
        - ***Management Targets*** - required levels of performance for an indicator established as a matter of policy or associated with a legal requirement.

Figure 5-1. Definitions and structure of the Values Framework – adapted to focus on environmental values and associated components.

Table 5-1. Example of an environmental value (Grizzly Bear) and its associated components and indicators. The components presented are only a subset of all relevant components that may be assessed to accurately describe the value. Standard metrics and methods for assessment of indicators should be used.

Value	Component	Indicator	Management Target
Grizzly Bear	Functional Habitat Condition	Road density	< 0.6 km/km^2 road density
	Habitat Supply – Berry Feeding Habitat	% structural stage distribution on forested land base	< 30% of forested land base in mid-seral age classes
	Population Size	Number of human-induced bear mortalities per year	< 6% bear mortalities due to human interactions in Grizzly Bear Population Unit

5.1 Principles

- Identification of the environmental values and associated components impacted by a proposed project or activity is fundamental to environmental mitigation.
- The proponent and their qualified professionals, and/or provincial natural resource sector staff, will identify the environmental values and associated components that potentially may be impacted by the proposed project or activity. This may involve discussions with First Nations, stakeholders, and the public.
- Where applicable, environmental values and associated components will be prioritized to ensure the best conservation outcomes.[5]
- Selecting the appropriate indicator that is measurable and sensitive to the project activity and the proposed mitigation measure is critical to the assessment of the mitigation plans.

[5] Additional guidance to support prioritization of environmental components used in environmental assessment is available from a various sources. For example see: Beanlands, G.E. and P.N. Duinker. 1983. An ecological framework for environmental impact assessment in Canada. Institute for Resource and Environmental Studies, Dalhousie University, Halifax, N.S.

- Having a management target as the required level of performance for an indicator is critical to assessing the adequacy or acceptability of proposed mitigation.

5.2 Considerations

- Consider only those environmental values and associated components that may be impacted by the proposed project or activity. (*Note*: An interaction matrix between project activities and environmental components may be used to determine which are impacted.)
- In determining the associated components for environmental values being assessed, consider the following criteria:
  a) Comprehensive**:** As a set, the components associated with environmental values will fully describe the important aspects of the environmental values that may be impacted by the project.
  b) Concise: All environmental components are captured as succinctly as possible (to minimize redundancy or double-counting).
  c) Relevant: The environmental components accurately capture the things that matter to people; they are communicated using terminology that is understandable.
  d) Measurable: The condition of the environmental component and its sensitivity to the proposed project impact(s) can be measured directly or indirectly by indicators.
  e) Responsive: The environmental components are likely to be sensitive to the proposed project impact(s).
- To help determine which environmental values, and thus associated components, that are the highest priorities for developing mitigation measures, consider the following ecological aspects:
  - rarity,
  - sensitivity or vulnerability to disturbance,
  - current condition,
  - replaceability,
  - ecosystem structure,
  - ecosystem function, and
  - dependencies.
- In addition to the above ecological aspects, consider the following points:
  - government direction including:
    - legal or policy objectives;
    - harvest management;
    - federal *Species at Risk Act;*
    - Conservation Data Centre (CDC) assessments (e.g., Red- or Blue-listed species); and

  - direction regarding First Nations values.
- The rationale for the selection of values and associated components may include support for how the selection is representative of other values where the impacts are not being explicitly mitigated (i.e., nesting or surrogates).
- In determining indicators to be assessed, consider the following criteria:
  - Relevant: The relationship between an indicator and its associated environmental component is based on recognizable scientific principles and knowledge. Ensure that selected indicators are relevant for impact assessment of projects and activities (e.g., that the scale of the indicator is appropriate to the impact).
  - Measurable: Changes in the metrics of an indicator specifically, reliably, and clearly reflect measured changes in the environmental component in relation to the impact assessment.
  - Predictable: Indicators provide consistent and comparable assessments when reporting over time and across jurisdictions.
  - Understandable: Indicators accurately describe environmental components that matter to people, and they are communicated using terminology that is understandable.
  - Responsive: Indicators are likely to change in response to the perceived project impact(s).
  - Practical: Data are readily available, and/or assessment methods are timely and cost-effective.
  - Appropriate to the scale: Indicators are geographically and temporally relevant to the scale of the project.
  - Definable in relation to a targeted condition: A specific value of the indicator can be established *a priori* that will set the context for the predicted condition after mitigation measures are implemented.
  - Aligned with other provincial initiatives: Where possible, indicators and associated monitoring protocols should align with indicators developed and used for other provincial initiatives (e.g., Cumulative Effects Assessment Framework, Forest and Range Evaluation Program).

5.3 Procedures

- Environmental Values. Identify environmental values that may be impacted by a proposed project or activity and for which a mitigation plan may be needed.
- Environmental Component. Identify the associated components for the environmental values.
- Indicator. Describe the metric used to measure and report on the condition and trend of the environmental components.
- Area of Influence. Define the area of influence for each environmental component at the relevant ecological scale for the indicator being used and in

the temporal context relevant to the duration of the impact. This will influence the location of the assessment area and its boundaries.

- Management Target. Identify the needed level of performance, or the standard, guideline, or government objective for an indicator, established as a matter of policy or associated with a legal requirement, which the mitigation measures are aimed to achieve or avoid. If a management target does not exist, then identifying a targeted condition based on best available information is critical.
- Current Condition. Describe the environmental component, using the appropriate indicators, at the specific point in time when the assessment is completed (before project or activity). The current condition is a key variable that is used to assess the outcome of the mitigation plan. The description should also include inference of the current condition relative to the management target.
- Data and Information. At each step in the impact assessment analysis, and in the development of a mitigation plan, document data and information sources associated assumptions and uncertainties. Submit data and reports for new data and information collected by the proponent to the appropriate information management system. Submit data and information using the appropriate forms and procedures where these are available. If deviating from provincially accepted standards, a rationale supporting professional judgment should be made available when the application is submitted.

6.0 THE MITIGATION HIERARCHY

The mitigation hierarchy establishes a structure to guide development and application of measures to mitigate impacts on environmental values and associated components. The components of the mitigation hierarchy are shown in Figure 6-1. The expectation is that all feasible measures at one level are considered before moving to the next, and that a rationale is provided for the approach that is taken. In practice, the levels within the mitigation hierarchy will often be considered holistically and iteratively.

The four components of the mitigation hierarchy are prioritized in the following order starting with the highest:

1. avoid
2. minimize
3. restore on-site
4. offset (off-site or on-site)

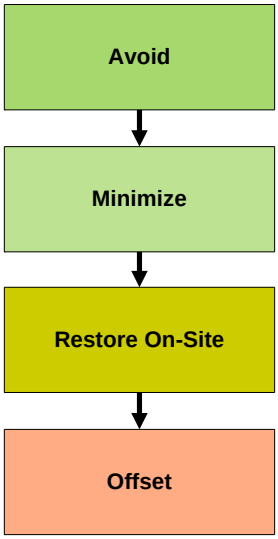

Figure 6-1. The mitigation hierarchy shows the order of priority in which mitigation measures should be considered.

6.1 General Principles

- Maintaining the integrity and natural functions and processes of ecosystems, and the resilience of ecosystems, is prerequisite to sustainable use of British Columbia's natural resources, and essential to maintaining ecosystem goods and services over time.

- Generally, the "higher" the risk to the environmental value and associated component (see section 5.2 for considerations of mitigation priority), the more protective the mitigation measures should be and the more likely that offset measures will also need consideration for any impacts remaining after "restore on-site."
- For an action or measure to be considered "mitigation," a proponent or third party must accept responsibility for implementation of appropriate mitigation measures, and there must be certainty that the mitigation measures will be carried out.
- Non-proponent actions must be listed separately from any list of mitigation measures proposed by the proponent.

6.2 General Considerations

- Where applicable, have the considerations in section 5.2 been used to determine relative priorities among environmental values and associated components to determine final selection of environmental values and associated components?
- What is the current condition of each of the identified environmental component and associated indicator(s) *actually present* within the footprint and area of influence of the proposed project or activity?
- Have mitigation measures for impacts on identified environmental values and associated components, at all spatial and temporal scales, been considered?
- Can impacts on one or more environmental component or associated indicators be more fully mitigated than impacts on other environmental components and associated indicators?
- Are there multiple environmental values and associated components with conflicting management needs and potential conflicts that need to be considered?
- Is sound guidance available and being used [e.g., are best management practices (BMPs) and guidelines available for affected environmental values and associated components]?
- Is there opportunity to collaborate with other proponents that may have interest in overlapping mitigation measures?

6.3 Overview of Mitigation Procedures

Figure 6-2 shows the application of the mitigation hierarchy and the relationship between steps in the hierarchy for building a mitigation plan.

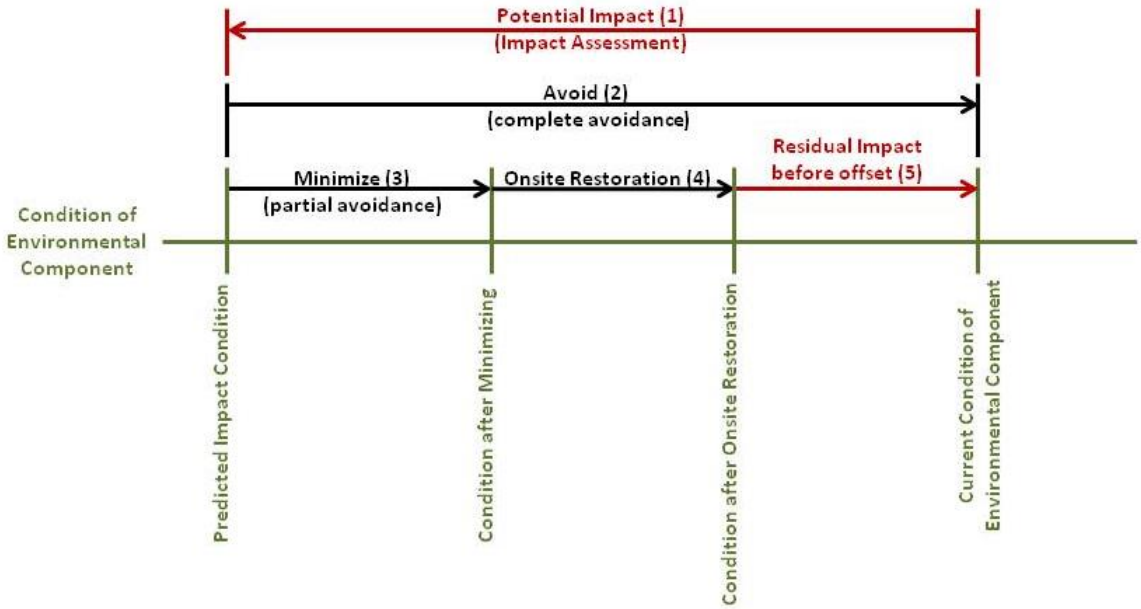

Figure 6-2. The mitigation hierarchy in relation to environmental components.

The first step in developing the mitigation plan is to describe the current condition of the environmental component (far right on x-axis). A management target must also be identified (not shown in the figure), which may be a legal or policy objective, ecological reference condition or the current condition before impact.

The potential impact of the project is assessed (1) and avoidance measures are planned (2). If complete avoidance is not possible, the predicted impact condition of the component is then described (far left on x-axis). Measures to minimize impacts may improve the predicted condition without temporal lag (3). What cannot be avoided or minimized may be restored on-site (4), but in these cases there is almost always a temporal lag to consider.

The example shown describes the residual impact before offset (5) as the difference between the current condition and the expected condition of the component after mitigation measures to avoid, minimize, and restore on-site are planned, and may or may not include temporal qualifiers. The residual impact before offset may also be described in relation to the difference between the expected condition of the component after mitigation measures to avoid, minimize, and restore on-site and a management target.

Describing the residual impact(s) before offset in relation to the management target is critical to supporting a rationale for whether to propose an offset, as well as the offset amount (not shown in figure). The Policy, in and of itself, does not require that all impacts that are predicted to remain after on-site mitigation measures are applied will be offset such that there is a return to current condition. The Policy and Procedures are about ensuring that the approach to mitigation is rationalized and documented.

Determining an acceptable level of impact for which no additional mitigation would be needed is the responsibility and role of the statutory decision-maker.

6.4 Rationales for Moving Through the Mitigation Hierarchy

A rationale should be provided to describe how the various steps in the mitigation hierarchy were considered and why it was considered reasonable to move to the next step in the hierarchy. Although moving through the hierarchy may be more of an iterative process and not completely linear, the intent is to document the rationale and thinking. The rationale may include addressing the following questions:

- Have the impacts on environmental values and associated components been considered at all scale levels (spatial and temporal)?
- How were measures to “avoid” and “minimize” the potential effects, and/or “restore on-site” the impacted environmental values and associated components, considered?
    - Why was it deemed not practicable to minimize impacts on environmental values and associated components to a greater extent?
    - Why was it deemed not practicable to restore environmental values and associated components on the site of the impacts to a greater extent?
    - If impacts remain after “avoid,” “minimize,” and “restore on-site,” why is offsetting appropriate or not?

Note: The proponent may request that draft mitigation plans be reviewed by provincial staff or request consultation with statutory decision-makers to discuss acceptability of the predicted condition of the environmental component after planned mitigation measures are implemented.

7.0 MITIGATION HIERARCHY – LEVEL 1: AVOID

7.1 Principles

- The first priority for application of mitigation measures is to *avoid* impacts on environmental values and associated components occurring within the footprint and area of influence for the duration of the proposed project or activity. Measures to "avoid" should be considered before measures to "minimize," "restore on-site," and/or "offset."
- Mitigation measures to "avoid" impacts are particularly important for higher priority environmental values and associated components (see section 5.2).
- Avoidance may be a required measure for environmental values and associated components in some circumstances, including where legal requirements to avoid impacts have been established.

7.2 Considerations

- To what degree or extent has the preliminary design of the proposed project avoided potential effects?
- To what degree or extent can the impacts of the proposed project or activity be avoided?
- Can the impacts on the environmental values and associated components be *fully* avoided ("avoid") or only *partially* avoided ("minimized")?

7.3 Procedures: Ways to Avoid Impacts

Determine the specific procedures to avoid impacts from the list of categories below when planning a project or activity:

1. location,
2. means,
3. timing, and
4. not proceeding with a particular activity.

Note: A proponent should consider documenting any reconfiguring through planning or adjustments incorporated into project design that will avoid potential impacts on environmental values and components as part of demonstrating their full scope of mitigation measures.

7.3.1 <u>Location</u>: Altering or adjusting the location of a project or activity within the permit area to fully avoid impacts on one or more environmental values and associated components.

Considerations:

- Is there an alternative location for the proposed project or activity? Is it practicable[6] to relocate?
- If/where required, plan for both project development and also for project closure (decommissioning).

Examples for alternate location:

- *A corridor for a proposed road right of way is moved laterally to avoid crossing a small wetland habitat.*
- *A water intake is moved from the shore to a deep area of a lake to avoid impacts on wildlife in shallow water and lakeshore areas.*

7.3.2 <u>Means</u>: Avoiding impacts on environmental values and associated components within the footprint and area of influence of a project or activity through application of alternative project methodologies (including tools, techniques, actions, or measures).

Considerations:

- Can alternative development approaches or alternative technology be used to avoid impacts on environmental values and associated components?
- Can the proponent collaborate with another operator in the same area to reduce the project footprint?
- Can the proponent use existing roads or other infrastructure to avoid impacts on environmental values and associated components?
- Will a measure to fully avoid impacts on one environmental value or associated component impact another one?

Examples for alternate means:

- *Underground directional drilling, rather than open trenching, is used for a pipeline crossing on a fish stream to avoid impacts on spawning habitat.*

7.3.3 <u>Timing</u>: Avoiding impacts on environmental values and associated components on the footprint and area of influence of a project or activity through application of alternative timing of the project or specific elements of the project.

[6] See the FRPA General Bulletin: *Use of the Term "Practicable" Under the* Forest and Range Practices Act *(FRPA) and Regulations* for guidance on application of this term: http://www.for.gov.bc.ca/ftp/hth/external/!publish/Web/frpa-admin/frpa-implementation/bulletins/frpa-general-no-3-defining-practicable-under-frpa-jun-9-2005.pdf.

Considerations:

- Can alternative timing of project-related activities (e.g., construction) be used to fully avoid impacts on the environmental values and associated components in the footprint and area of influence of a project or activity?
- Can short-term timing measures be used (e.g., to avoid sensitive periods within a season, or within a diurnal period through use of instream work windows)?

Examples for alternate timing:

- *Work on a project or activity is scheduled to avoid periods of fish migration or spawning, or animal calving or nesting periods.*
- *Removal of a beaver dam is delayed from winter to spring, to minimize impacts on both fish and beaver.*

8.0 MITIGATION HIERARCHY – LEVEL 2: MINIMIZE

8.1 Principles

- "Minimize" is the second highest priority or level in the mitigation hierarchy, and should be considered only when measures to fully avoid impacts on environmental values and associated components have been duly exhausted, or where avoidance is not practicable given the situation.

8.2 Considerations

- Measures to minimize should consider the scope, scale, and duration of the impacts on environmental values and associated components within the footprint and area of influence.
- Although avoid and minimize are two distinct steps within the mitigation hierarchy, they are often considered at the same time. See the first three ways outlined in Section 7.3 to avoid impacts (i.e., location, means, and timing). These same considerations generally apply when considering ways to minimize (i.e., *partially* avoid impacts).
- Guidance may be available in the form of land-use plans and other higher-level plans, park plans, strategic restoration plans, or BMPs.

8.3 Procedures

The same procedures and considerations as outlined in Section 7.0 for avoid (location, means, and timing) generally apply when considering ways to minimize impacts (i.e., *partially* avoid impacts).

9.0 MITIGATION HIERARCHY – LEVEL 3: RESTORE ON-SITE

"Restore on-site" is treated as a separate level or step in the mitigation hierarchy; "restore on-site" measures are carried out within the footprint of the project or activity, specifically within the area of the permit or other form of authorization. Compared with "minimizing" impacts, measures to "restore on-site" differ largely in *timing,* in that restoration activities may be implemented or completed at a *future* date. Although planning for restoration and implementing some restoration measures may begin at present, the impacts on environmental values and associated components will persist until the restoration is completed.

Restoration (in general) focuses on establishing appropriate composition, structure, pattern, and ecological processes necessary to make terrestrial and aquatic ecosystems sustainable, resilient, and healthy under current and future conditions.[7] In simpler terms, restoration attempts to make up for what was lost due to impacts on ecological systems.

"Restore on-site " is considered broadly here as encompassing a continuum of degrees or stages of restoration covering the various terms in different statutes and other legal mechanisms (e.g., "restoration," "rehabilitation," "remediation," and "reclamation").

Measures to remedy impacts on environmental values and associated components range from measures that immediately stabilize the site of the impacts, to measures that bring a site back to full ecosystem structure and function as existed before the project or activity, or what existed historically. It is unrealistic to expect or predict that some or all impacts on certain environmental values and components will ever be fully restored. For example, consideration of *temporal* loss of biodiversity is important with respect to species and ecosystems that are rare and threatened and to habitats that are critical to species survival. Also, restoration of ecological processes may take generations to achieve restoration targets.

Note: Restoration measures implemented *off-site* may be used as environmental offsets (e.g., at a location where another previously conducted project or activity has impacted a component associated with an environmental value).

[7] U.S. Forest Service. 2010. Ecological restoration. Retrieved from: http://www.fs.fed.us/restoration/QandAs.shtml.

9.1 Principles

- Restoration projects must clearly state goals that reflect important attributes of the restored ecosystems.[8]
- An ecosystem is considered "restored" when it contains adequate biotic and abiotic resources to continue to develop without further assistance, sustaining itself structurally and functionally.[9] The many features of restored ecosystems are context-dependent.
- Restoration can be conducted at a wide variety of scales; however, it should be approached from a landscape perspective to ensure the suitability of flows, interactions, and exchanges with contiguous ecosystems.
- The order of preference for "restore on-site" measures to rectify adverse impacts on components is as follows:
    - Restore: Return environmental components to original or pre-existing structure, composition, pattern, and ecosystem processes, productivity, and services.
    - Remediate: Eliminate, limit, correct, or counteract any contamination and/or associated adverse effects of a contaminant on environmental components.
    - Reclaim: Ensure stabilization of the terrain and restoration of the functional utility of the ecosystem with regard to the environmental components.
- Restoration measures must be planned, implemented, and monitored for effectiveness using scientific approaches.
- Monitoring and evaluation of the restoration project are integral to determine whether the restoration project is achieving what it set out to do.
- The proponent is responsible for the costs of planning, implementing, and monitoring the restoration measures.

9.2 Considerations

- It is usually much more expensive to restore environmental values than it would be to conserve them (by avoidance) or by minimizing impacts.
- Consider whether restoration techniques are known for ecological systems in the particular situation. The potential contribution of restoration to mitigation is often uncertain, particularly on heavily impacted project footprints.
- Although it is best to replace what was taken away as a result of disturbance, this is not always possible or practicable.
- *Restoration targets* represent the point of advancement along the *ecological trajectory* intended for restoration. It is anticipated that the restored ecosystem will emulate the attributes of the reference state (e.g., current condition, management target), which drives restoration goals and planning.

[8] Society for Ecological Restoration International, Science & Policy Working Group. 2004.
[9] Ibid.

- Quantitative vegetation assessment frameworks should be used to measure the progress of restoration toward restoration targets.
- Guidance for setting restoration targets and planning restoration actions may be available through land-use plans and other higher-level plans, park plans, strategic restoration plans, or BMPs. These documents may also help to establish whether restoration is suitable.
- Where restoration is deemed appropriate, the project design and planning process should determine early on what will be needed to achieve restoration targets.
- More specific considerations include the following questions:
    - How can restoration replace the pre-existing biomass at the site?
    - How can restoration bring back the site productivity?
    - Do the ecological resources adjacent to the damaged site contribute to effective restoration?
    - What is the temporal aspect influencing the ecological process that is being restored? When will the environmental value benefit from the restored habitat and is this relevant for mitigation planning?
    - Recovery of habitat for some species (e.g., species suited to late-seral conditions) may take decades to centuries to achieve. Particularly in these situations, consider the temporal effects of climate change, invasive non-native species, and altered successional pathways that may be due to past management (e.g., grazing, fire exclusion, timber harvest, and road access).
    - Is restoration to a pre-existing or historic condition possible? Such restoration may not be technically feasible given the impacts of invasive species, changing climate, etc.
- Restoration measures must be planned, implemented, and monitored for effectiveness using scientific approaches.
- Consider using the nine attributes of restored ecosystems listed below to monitor and assess effectiveness of restoration.[10] Each attribute should demonstrate the appropriate trajectory of ecosystem development towards the restoration goal(s) or restoration target as identified in the specific plan, but does not need to be fully expressed. Restoration takes time, and not all attributes can be measured readily, while most ecosystem functions can only be measured indirectly. Therefore, it is critical that for each attribute-specific evaluation, metrics are defined as part of the restoration target, considering the specific circumstance.
    1. <u>Assemblage of Species</u>: The ecosystem contains a characteristic representation of species and the degree of community structure that occurs in the restoration target.
    2. <u>Indigenous Species</u>: The ecosystem contains native species to the greatest practicable extent.

[10] Adapted from the SER International Primer on Ecological Restoration, 2004.

3. Functional Groups: The ecosystem contains the functional groups necessary for the continued development and/or stability of the system. This can include the potential for functional groups to colonize naturally.
4. Sustainable Populations: The ecosystem is capable of sustaining reproducing populations of the species necessary for its continued development and/or stability along the desired trajectory.
5. Function: The ecosystem functions normally for its stage of development and signs of dysfunction are no longer present.
6. Integration: The ecosystem is integrated into the larger ecological landscape, interacting through biotic and abiotic flows and exchanges.
7. Ecological Integrity: Threats to the ecosystem's health and integrity have been eliminated or reduced as much as possible.
8. Resiliency: The ecosystem is sufficiently resilient. The system can endure appropriate levels of stress in the local environment and maintain health and integrity.
9. Self-sustaining: The ecosystem is self-sustaining, and can persist indefinitely under existing environmental conditions, similar to the restoration target. This does not negate the fact that ecosystems are dynamic: species composition, structure, and function evolve, and periods of environmental stress and disturbance occur naturally. Restoration focuses on re-establishing the successional trajectory that will sustain the ecosystem into the future.

Additional attributes can be added based on specific restoration goals. For example, where appropriate, restored ecosystems will support local social and economic interactions.

10.0 RESIDUAL IMPACTS BEFORE OFFSET

In some other environmental assessment procedures, the residual impact before offset is simple referred to as residual impact or, in contrast, residual impact may be the impact remaining after all measures to mitigate, including offset measures, are taken into account. Therefore, in this procedure it is either residual impacts before offset and residual impact alone refers to after all mitigation measures are considered.

Defining residual impacts before offset requires measuring the difference between the predicted condition (after measures to avoid, minimize, and restore on-site) and a starting point (e.g., current condition), or a targeted end point (e.g., management target or reference condition). If the predicted condition is different from the starting point or the targeted end point, then the difference needs to be documented and explained. This identification of residual impacts before offset is intended to be a calculation based as much as possible on quantifiable data and information about impacts and is the basis for determining ecological equivalency. The size of the residual impact before offset, in relation to the current condition or targeted end point, will inform whether to propose offset measures and the size of offset.

10.1 Principles

- Transparency as to what impacts remain after measures to avoid, minimize, and restore on-site is important, and needed to inform decisions on offsetting and to ensure that all parties understand the resulting situation related to environmental values and associated components.
- All impacts may not be fully mitigated in all situations. The intent, however, in managing impacts is to sustain environmental values and components that are important to British Columbians, now and for the future.

10.2 Considerations

- Residual impacts before offset that remain in the project footprint and area of influence, for each environmental value and associated component impacted, should be clearly identified.
- The ecological context of the residual impacts before offset should be considered. For example, a small impact that remains may have a large potential effect on an environmental value or associated component. An assessment of ecological risk may be warranted to provide this context. (See Appendix 2 for approaches to assessing the risk of impacts to environmental components.)
- Residual impacts before offset should be stated quantitatively, which becomes the basis for determining the ecological equivalency (see section 11.2).

11.0 MITIGATION HIERARCHY – LEVEL 4: OFFSETS – GENERAL

Offsetting is a mitigation measure used to directly or indirectly address an impact to an environmental value or associated component that remains after mitigation measures to avoid, minimize, and restore on-site. Offsetting is the last step in the mitigation hierarchy to be considered only after previous steps have been duly considered. The proponent is responsible for offsetting, either directly or indirectly, by an in-lieu-payment to address the costs associated with offsetting.

The following section is structured around four key topic areas with corresponding principles and considerations:

11.1 General Principles for Offsets
11.2 How Much to Offset – Ecological Equivalency and Costing Approaches
11.3 Which Offset Measures (Conservation Mechanisms) Will Deliver the Best Conservation Outcomes?
11.4 Who Will Implement the Offset Measures?

More detailed information to support these topics is captured in sections 12 through 14.

11.1 General Principles for Offsets

- Offsets may be appropriate after all measures to fully avoid, minimize, and restore on-site have been duly considered and where impacts remain.
- Offsets deliver tangible, measurable, on-the-ground conservation outcomes for environmental values and associated components that are clearly linked to the impact(s) predicted to remain after all other mitigation measures are applied.
- Determining the ecological equivalency is the basis for deciding on the type (i.e., conservation mechanism) and amount of offsetting needed.
- The responsibility for offsetting rests with the proponent whose project or activity results in the impact on the environmental values and associated components.
- Offsets will be legally secured for the duration of the offset commitment.

11.2 How Much to Offset – Ecological Equivalency and Costing Approaches

Principles (Offset Amount)

- The offset should address the nature and extent of the impact(s) remaining after “avoid,” “minimize,” and “restore on-site” (see section 10.0).

- Determining the ecological equivalency (i.e., between the environmental values and associated components that will be impacted and the offset that would make up for the impact) is the basis for deciding on the type (i.e., conservation mechanism) and amount of offsetting needed.
- Ecological equivalency must be evaluated within one environmental value and its associated environmental components.
- The same unit of measurement should be used for both the impact and the proposed offset (e.g., number of hectares of impact remaining and number of hectares proposed as an offset; or a rationale for why they do not or cannot be the same unit of measure needs to be provided).
- The amount of offsetting needed to mitigate impacts will increase in accordance with the degree of uncertainty of the effectiveness of the offset measures, the risk to the environmental components, the timeline in which the offset measure will be implemented, or any combination of those factors.
- In-lieu payments are calculated based on actually carrying out a proposed offset measure (i.e., costing) and not valuation of ecological services.
- The in-lieu payment will include the full costs of implementation of the proposed measure for the duration of the offset.
- For large projects or offset funds with multiple contributors, in-lieu payments must be delivered through a governance model, to ensure strategic delivery of offset measures over time to achieve the best conservation outcomes for the environmental values and associated components.

Considerations (Offset Amount)

- Considerations for ecological equivalency and amount of offsetting:
  - the environmental values and associated components that will be impacted and its relative priority (see section 5.2);
  - the nature and extent of the impacts (scope, scale, and duration) that are predicted to remain;
  - how the proposed offset will be equivalent to the impacted environmental values and associated components (using the same measurement unit); and,
  - the use of ratios or multipliers to address uncertainty and/or risk associated with assessment of impact and the effectiveness of the offsetting measures taken.

11.3 Which Offset Measures (Conservation Mechanisms) Will Deliver the Best Conservation Outcomes?

Principles (Best Conservation Outcomes)

- Offsetting measures will be designed to obtain the best conservation outcome for environmental values and associated components in the shortest timeframe practicable, considering the effort and resources expended.

- Offsets deliver conservation outcomes that are *additional* to outcomes that would otherwise be achieved through existing natural resource management programs or activities (i.e., through normal management operations of the Province).
- Offset measures that will deliver the best conservation outcomes will be determined based on:
    - an assessment of the feasibility of recovery or protection of the impacted environmental values and associated components in ecologically equivalent terms;
    - uncertainty of implementation and effectiveness of the offset measure(s); and
    - other social and political factors, including potential jurisdictional issues, First Nations concerns, level of public support, or stakeholder conflicts.
- Offset measures should not create a need to mitigate impacts to another environmental value.

Considerations (Best Conservation Outcomes)

- Selection of offsetting measures should first consider like-for-like and on-site or in-proximity offsetting.

Like-for-like:

- A like-for-like offset is a measure that improves outcomes within the same environmental component as the one that is impacted as measured by the same metric. Metrics that may be considered include area of habitat, area of ecological community, numbers of significant features, demographic rates, and number of animals.
- For habitat or ecosystems, the offset will result in structure and function as close to the impacted habitat or ecosystem as possible.
- Any deviations from like-for-like should outline the associated assumptions and uncertainties and describe why the conservation outcomes will be a better environmental outcome (i.e., like-for-better).

On-site or in-proximity offsetting

- Locating offsets on areas with similar ecological capability will aid in attaining longer-term equivalency for a functioning ecosystem. Sometimes, current suitability will be low. However, over the longer term, those sites may offer the best opportunity to provide a similar function.
- Ensure that the offset location contributes to a functioning ecosystem, providing similar ecosystem goods and services as the soon to be impacted site, at both the site level and landscape level.

- When determining the location where the conservation offset measures will be applied, consider the potential impacts of the offset on other environmental values and associated components at the potential offset site.

See section 12 for additional information on conservation mechanisms to provide environmental offsets. Appendix 3 describes a simple approach for technically assessing like-for-like and on-site or off-site for environmental values and associated components that pertain to habitats and ecosystems. A more detailed quantitative vegetation assessment framework may be more appropriate depending on the complexity of the circumstance and proposed offset.

11.4 Who Will Implement the Offset Measures?

Principles: Which party will implement offsets?

- The responsibility for offsetting, including all costs, rests with the proponent whose project or activity results in the impact on the environmental values and associated components.
- Depending on the circumstance, the proponent or a third party may implement the offsetting measures in a manner that best achieves the environmental outcomes for which the funds were negotiated.
- In situations when a party *other than* the proponent will actually physically carry out the offsetting measures:
  - The proponent will provide an in-lieu payment (section 13) in accordance with the Province's procedures under the *Financial Administration Act;* and
  - The Province or the third party will apply the offsetting funds to carry out offsetting measures through conservation mechanisms implemented:
    - on-site (within the footprint and area of influence of the impacts on environmental values and associated components); and/or
    - off-site (at a location other than the footprint and area of influence of the impacted environmental values and associated components).

Considerations: Which party will implement offsets?

- In determining whether the proponent will carry out the offsetting or provide an in-lieu payment for a third party to implement the measures, consideration should be given to whether the party responsible for offsetting will have:
  - legal authority to implement the offsetting measure;
  - the capability to see the offsetting measures through to the "end," the point at which intended conservation outcomes are achieved; and
  - the ability to fund management and effectiveness monitoring of the footprint and area of influence for the duration of the offset.

The flow diagram in Figure 11-1 summarizes the considerations related to offsets, discussed above.

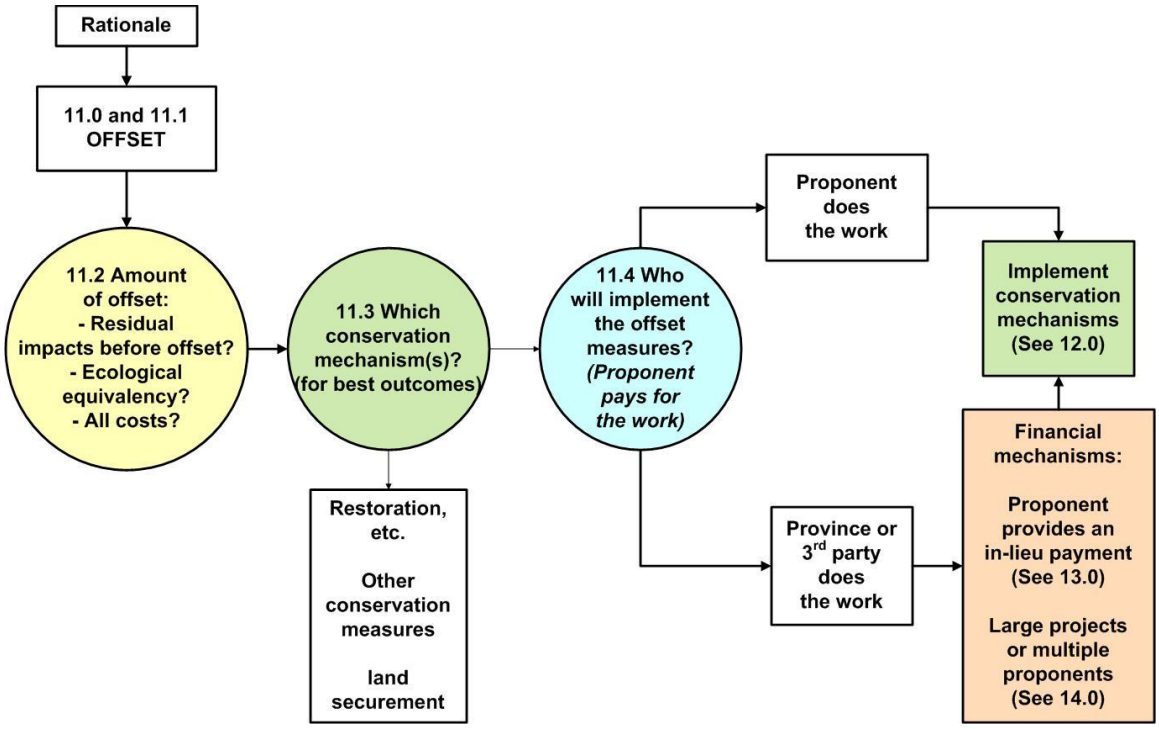

Figure 11-1. General steps for environmental offsetting. Fundamental to proposing a suitable offset is first determining the ecological equivalency of the impact remaining before offset (i.e., the biological "value"; section 11.2). This becomes the basis of both determining the best conservation mechanism (section 11.3) and the economic cost of delivering that mechanism, particularly if an in-lieu payment is being proposed.

12.0 MITIGATION HIERARCHY – LEVEL 4: OFFSETS – CONSERVATION MECHANISMS

The following section outlines a number of different conservation mechanisms that may be used to deliver environmental offsets, including:

1. restoration off-site
2. land securement
3. conservation covenants
4. population management measures

12.1 Restoration Off-Site

See section 9, Restore On-Site, for discussion of concepts and procedures related to restoration.

12.2 Land Securement

Land securement may be considered as offsetting measures to make up for impacts on environmental values and associated components by providing substitute areas of land (e.g., wildlife habitat). To be considered an offset, the land securement must maintain or improve upon the status quo.

Land securement may be achieved by various means, such as:

- Land Acquisition: Lands may be acquired (e.g., by purchase, exchange, or donation) to the extent necessary to offset impacts on environmental values and associated components resulting from project or activity.
- Relinquishment of Tenure: In such a case, the tenure would be relinquished to the Province or a third party.
- Land Lease: Lands may be leased to the extent necessary to offset impacts on environmental values and associated components resulting from a project or activity.
- *Land Act* Reserves and Notation of Interest.
- Rezoning and transfer of development rights: Private and Crown lands can be rezoned to transfer development rights elsewhere. These actions usually involve the cooperation of other levels of government and/or provincial ministries.

12.2.1 Principles

- The purpose of land securement is to secure capable and/or suitable habitat for the environmental values and associated components that would otherwise be threatened by activities outside the footprint of the proposed project or activity (i.e., the land securement should provide additional protection not already realized or planned through government management activities).

- Where circumstances allow, land acquisition is preferred to other land securement options.
- The amount of land to be acquired for an environmental offset should be commensurate with the impact predicted to remain after avoid, minimize and restore on-site on environmental values and associated components.
- First Nations consultation is required where acquisitions involve a land exchange which will result in Crown land being transferred to private ownership.
- All costs and payments, including for administration and ongoing maintenance, and monitoring to ensure effectiveness of the offset, are the responsibility of the proponent.
- In accordance with the Province's financial procedures and policies, acquired lands will be managed by the Province, or by a recognized conservation organization, for conservation purposes directly related to offsetting the impacts on environmental values and associated components.
- Land will not be expropriated for use as an environmental offset.

12.2.2 Considerations

- Partnerships may be useful to increase the conservation benefit of the land securement, but do not negate the proponent's responsibility for the costs of offsetting.
- Land securement should be substantial enough to warrant the administrative costs.
- First Nations consultations or accommodation requirements may lead to other assessment requirements such as traditional use studies or archaeological assessments.
- Properties should be independently appraised by accredited appraisers.

12.2.3 Procedures

1. Determine the land securement budget based on the ecological equivalency of the residual impact before offset. Document all assumptions and uncertainty related to methodology used.
2. Identify potential lands for securement and the most appropriate method for securement.
3. Identify potential partners that may contribute to an improved conservation outcome.
4. Determine if land surveys are required (e.g., when subdivision of a property is required, if boundaries are not well enough defined, if easements or right of ways are involved, or any trespass needs to be resolved).
5. Complete all required assessments on lands identified for securement.
6. Complete technical assessments as required.

7. Determine whether there are First Nations consultation or accommodation requirements (e.g., transfer of Crown land to private lands) and complete those requirements.
8. Determine if there are other stakeholder interests in the lands proposed for securement and complete consultation requirements if appropriate.
9. Complete legal transactions.

Financial and legal input is critical for any offset arrangement that would involve Crown assets (e.g., any land arrangements). Staff must contact the Procurement Policy and Compliance (PPC) Unit of Finance and Administration Branch, Corporate Services Natural Resources (CSNR) before drafting and signing an agreement for land securement.

12.3 Conservation Covenants

Conservation covenants should be used cautiously as they may be difficult to maintain or enforce (e.g., sale of the property or failure of the organization) and thus will not fully address offsetting.

12.3.1 Principles

- The purpose of conservation covenants is to give reasonable assurance that capable and/or suitable habitat for the environmental values and associated components that would otherwise be threatened by activities outside the footprint of the proposed project or activity are secured.
- The area of land to have a conservation covenant placed on it for an environmental offset should be commensurate with the impact predicted to remain on environmental values and associated components after avoid, minimize and restore on-site.
- All costs and payments, including administration and ongoing maintenance, and monitoring to ensure effectiveness of the offset, are the responsibility of the proponent.
- Conservation covenants need to be enforceable in perpetuity, or until other mitigation measures have completely mitigated the on-site impact (e.g., impacted habitat is fully restored).
- The restrictions in the covenant for the use of lands need to provide adequate protection and monitoring of the environmental values and associated components that are being used to provide an offset.

12.3.2 Considerations

- Management responsibility for conservation covenants should be assigned to a conservation organization.

- There should be a plan for how the covenant will be regularly monitored
- Include only those provisions that can be monitored or enforced or that the covenant holder intends to monitor and enforce.

12.3.3 Procedures

1. The Province determines whether other offsetting measures would be more appropriate and more effective, given the circumstances.
2. The proponent should determine the level of contribution of the conservation covenant to the offsetting target.
3. Land covenants require B.C. legal survey and registry with Land Titles.
4. Where a covenant is proposed, the proponent should obtain conservation organization participation.
5. The proponent should obtain an agreement-in-principle with the partner conservation organization.
6. The parties will sign-off on the contract.
7. A performance bond may be necessary.
8. Signing and fencing may be required as deemed appropriate.
9. Encroachments on land covenants are to be dealt with immediately by the proponent and require concurrence by provincial staff.
10. Maintenance of the land under conservation covenant is the responsibility of the landowner (e.g., fence repair).
11. Covenants should allow for the Province and third-party entry onto land for monitoring and other activities relevant to the use and effectiveness of the covenant as an environmental offset.

12.4 Population Management Measures

In some circumstances, it may be ecologically appropriate to implement measures that directly or indirectly affect wildlife populations to offset impacts on environmental values and associated components. Methods could include: transplanting wildlife species individuals from one area to another; penning wildlife species individuals to increase neonate survival; managing invasive species; or managing predators or their primary prey.

Note: Population management measures may generate controversy. For example, there may be strong public opposition to population management practices that involve direct mortality to individuals of one species of wildlife in seeking to benefit individuals of another species. The proponent must realize that the costs, including costs of seeking and attaining public support for such measures as “offsets” will be their responsibility.

12.4.1 Principles

- Population management measures may be appropriate when there is strong evidence that factors other than habitat are limiting.
- Any offsetting with population management measures to address impacts on habitat-based components needs to provide a clear rationale for how the offset amount was determined. This will include a description and explanation of the ecological equivalency expected to be achieved, and a rationale for the economic costing methods used over the duration necessary for the mitigation measures to deliver the proposed mitigation outcomes.
- By legal authority, only the Province can authorize population management measures. Therefore, the proponent's responsibility is to identify the needed offsetting activities and provide an in lieu payment sufficient to fund the associated consultation, on-the-ground activities, and sufficient monitoring to ensure that wildlife population objectives are achieved.
- Where population management measures fall under the jurisdiction of the Province to deliver (e.g., predator management) these measures will only be considered as offsetting where the proponent provides an in-lieu payment to fund implementation of the measures. Where the obligation is transferred to the Province in the absence of funding to support implementation, these management actions are not considered offsetting measures.
- Population control will not be used to raise revenue.

13.0 MITIGATION HIERARCHY – LEVEL 4: OFFSETS – FINANCIAL MECHANISMS (In-Lieu Payments)

For the purposes of the Mitigation Policy and Procedures, financial mechanisms mean in-lieu payments (i.e., payment to provide mitigation). As with all offsets, in-lieu payments are the responsibility of the proponent whose project or activity results in the impacts on environmental values and associated components.

The in-lieu payment mechanism applies when it has been determined that proponents cannot themselves carry out the environmental offset measures, but instead will provide funds to the Province or a third-party who will then implement conservation measures to offset impacts on environmental values and associated components.

Large offset programs (e.g., BC Hydro Fish and Wildlife Compensation Programs) can be appropriate in some situations (see section 14.0).

13.1 Principles

- The acceptability of in-lieu payments will be considered case-by-case, as appropriate to the specific situation.
- In-lieu payments will cover all costs of implementing (locating, securing, managing, and monitoring) the offset, for the duration of the offset.
- The duration of the offset is equivalent to the duration of the impact.
- In-lieu payments are intended to result in adequate funds being received to achieve an offset outcome that is ecologically equivalent to the extent of the residual impact before offset on the environmental value or associated component.
- The Province or third party will manage information, resources, and funds related to financial offsets in a way that best achieves the environmental outcomes for which the funds were negotiated.
- Payments received from proponents for offsetting will be applied to implementation of the appropriate conservation mechanisms for environmental offsetting.
- “Fees” are not a part of this Policy and the associated Procedures. For purposes of the Policy and Procedures, however, it is assumed that natural resource authorization fees and royalties, where required by existing legislation, *could be* considered as a financial offsets only if those fees were specifically designated to cover remaining impacts on environmental values and associated components.

13.2 Considerations

- Determination of the amount of the in-lieu payment should be based on ecological equivalency and should include all costs to offset the residual impacts before offset.
- The importance of including costs for monitoring and adaptive management programs increases with increased uncertainty regarding the risk of the impacts to the environmental value and associated components and the predicted effectiveness of the mitigation measure.
- If monies are collected for offsetting *before* knowing to which relevant conservation offset project(s) the funds will be applied, this situation may not equate to environmental "offsetting."

13.3 Procedures

1. The statutory decision-maker determines whether an in-lieu payment is appropriate for the situation.
2. Having determined the ecological equivalency, determine the amount of the in-lieu payment that is needed to cover full costs of implementing (including locating, securing, managing, monitoring, and adaptive management) the offset, for the duration of the offset.
3. Multipliers can be used to account for uncertainty or risk of the impacts to the environmental value and associated components, as well as uncertainty in estimates of potential costs for implementation, monitoring, and associated adaptive management.
4. Document methods used to determine ecological equivalency and amount of in-lieu payment.
5. Financial and legal input is critical for any offset arrangement that would involve in-lieu payments. Staff must contact the Procurement Policy and Compliance (PPC) Unit of Finance and Administration Branch, Corporate Services Natural Resources (CSNR) before drafting and signing an agreement for receiving an in-lieu payment for offsetting.
    a. Negotiations involving a proposed in-lieu payment may involve mutual agreement on the placement of an agreed-upon monetary amount into a specific financial mechanism with appropriate controls, disbursement and specified use of the funds, payment schedule, timelines, reporting requirements, etc. The source of the in-lieu payment (i.e., government reporting entity source or non-government reporting entity source) determines the financial mechanisms that can be used.
    b. Upon negotiation of an in-lieu payment, forward the final unsigned funding agreement to the PPC Unit for oversight review of the agreement before signing. PPC will provide approval via an e-mail message to the government staff involved in the negotiation and the agreement can proceed to the

signing phase by senior ministry officials with the appropriate revenue matrix authority.

6. When the in-lieu payment is received by the Province, funds are to be deposited in accordance with the province's *Financial Administration Act* and procedures associated with this statute.
    a. All funds must be deposited in a government transit account on the same day that such funds are received.
    b. Contact the Client Services Manager (in CSNR) for information on appropriate coding and procedures.
7. Disposition of funds received for offsetting will be in accordance with the province's *Financial Administration Act* and procedures associated with this statute.
8. The Province will manage information, resources, and funds related to financial offsets in a way that best achieves the outcomes for which the funds were negotiated.
9. In-lieu payments may be directed to a non-government agency with reasonable assurance that those funds will be directed towards the implementation of the appropriate conservation mechanisms for environmental offsetting as determined for the specific situation.

See Figure 13-1 for a summary of financial procedures for offset funds.

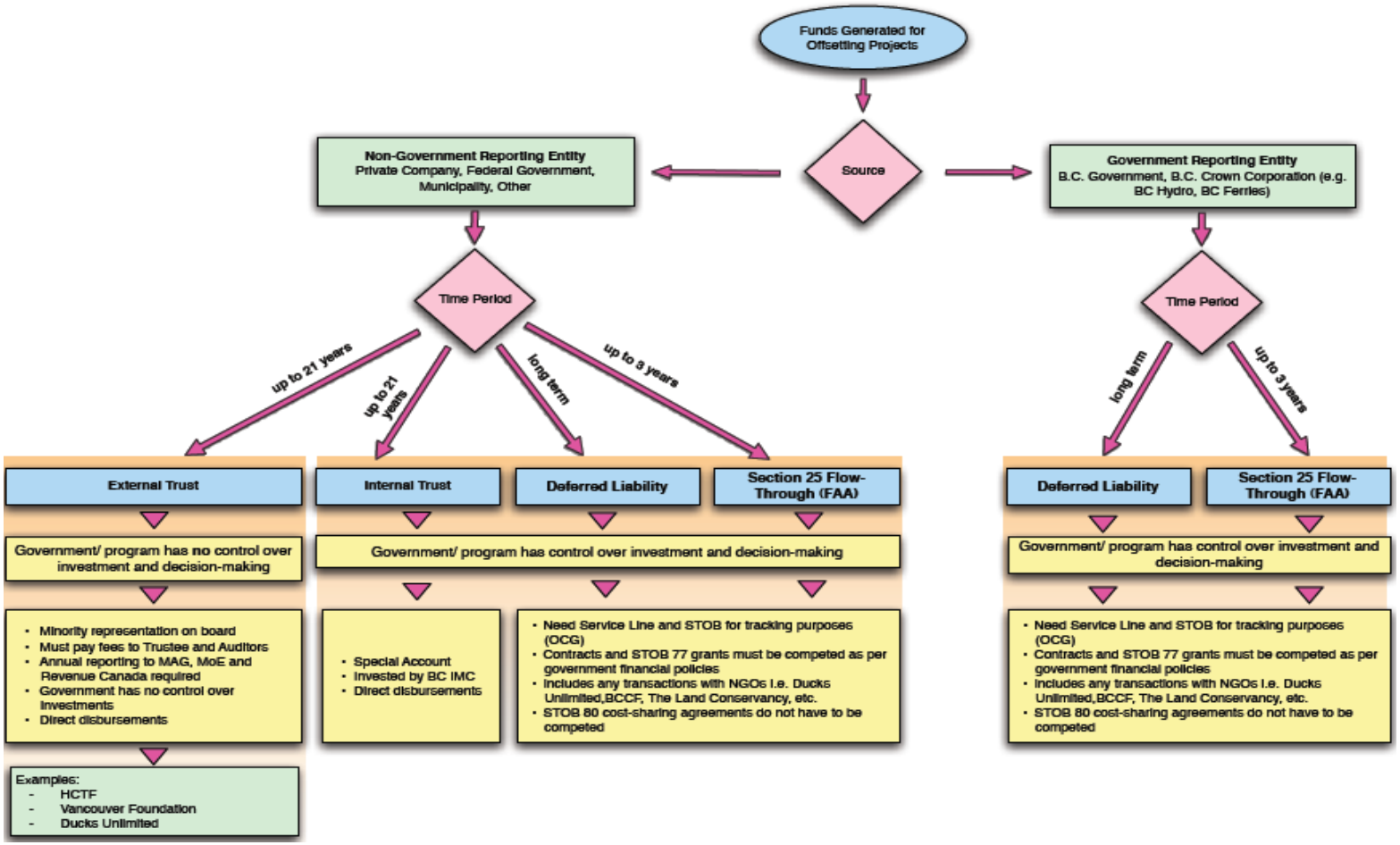

Figure 13-1. Provincial financial mechanisms for offset funds.

14.0 MITIGATION HIERARCHY – LEVEL 4: OFFSETS – LARGE PROJECTS OR MULTIPLE PROPONENTS

The following points, collectively, describe the types of situations in which larger offsetting funds may apply or multiple offset measures may be used (i.e., combination of conservation mechanisms and financial mechanisms):

- The project is large, or there are multiple projects, with an extensive (collective) footprint, that will result in a permanent loss or reduction in the productive capacity of a habitat or ecosystem, or some key aspect(s) of the habitat or ecosystem.
- Effective offsetting measures and approaches, to achieve all of the needed offsetting, cannot be defined at present for the duration of the offsetting and are expected to be long term and extend beyond the immediate footprint of the project.
- Flexibility will be needed to adjust offsetting approaches over time to deliver the agreed-to offsetting outcomes (i.e., adaptive management).
- A program for adaptive management will be developed up front. This program, including commitments for offsetting to deliver certain outcomes, is part of informing decisions on the project or activity. Agreement on this larger fund for offsetting is reached before the project is considered for approval.
- Monitoring will be needed over a long timeframe to evaluate the effectiveness of offsetting measures and approaches, and to demonstrate the need for any adjustments to these measures and approaches.
- A governance structure is needed to oversee strategic delivery of offsets over time to achieve the best conservation outcomes.

The following points generally describe the funding mechanisms and governance structures associated with larger offset funds or programs, and which are defined and considered before project approval.

- Funding mechanisms will:
    - provide sufficient funds to enable and guarantee a long-term approach to achieving the offsetting outcomes; or
    - contain sufficient funds (large enough) to generate interest to fund offsetting and monitoring over a long and/or unknown period of time (e.g., endowment).

- The governance structure for the fund is established up front, and will include:
  - principles; i.e., to define the mandate of the fund and dispersal requirements) ;
  - roles and responsibilities of parties who will manage the fund and oversee its use for offsets; and
  - other criteria, as appropriate.

15.0 MONITORING AND REPORTING

The purpose of monitoring is to ensure that mitigation measures are implemented as planned and that they effectively meet the intended mitigation commitments and goals. Monitoring and reporting should be considered a best practice of mitigation and not an offset for impacts that remain after the restore on-site mitigation measure.

15.1 Principles

- The proponent is responsible for carrying out the relevant monitoring, or alternatively and where appropriate, for providing funds for another party or government to carry out monitoring.
- Planning for monitoring needs to be done early, ideally during project scoping, and revised as needed as the project and mitigation plans develop.
- Monitoring objectives and commitments need to be established before finalization of the mitigation plan.
- Any monitoring will involve the appropriate qualified professional(s).
- The type and scope of monitoring will be commensurate with the uncertainty of the proposed mitigation measures and the resulting risk to environmental values (i.e., the greater the uncertainty associated with a mitigation measure, the greater the need to monitor the implementation and/or effectiveness of the measure).
- Monitoring results should be used to improve the approach to mitigation for the current project activity, if appropriate.
- Monitoring data will be reported and shared with the Province.
- Monitoring results should be used to improve future mitigation efforts and reduce uncertainty associated with specific mitigation measures.

15.2 Considerations

- Monitoring of effectiveness of mitigation measures should use a before/after control study design.
- Where possible and appropriate, indicators and associated monitoring protocols should align with indicators and protocols developed for and used for other initiatives (e.g., Cumulative Effects Assessment, Forest and Range Evaluation Program [FREP]).
- Data and lessons learned from project monitoring should benefit monitoring procedures for environmental values and components generally.
- Data should be submitted and stored in a way to be available for future monitoring.
- Modelling should be considered part of the monitoring suite of tools.

15.3 Monitoring Procedures

Two types of monitoring are addressed by these procedures: implementation monitoring and effectiveness monitoring. Implementation monitoring will be conducted for most projects; whereas effectiveness monitoring will be conducted where risks to environmental values and associated components and uncertainty of the effectiveness of mitigation are high. Effectiveness monitoring is typically conducted by proponents; however, government may also conduct effectiveness monitoring based on priorities and capacity (see Table 15-1).

Figure 15-1 provides an overview of the monitoring procedures.

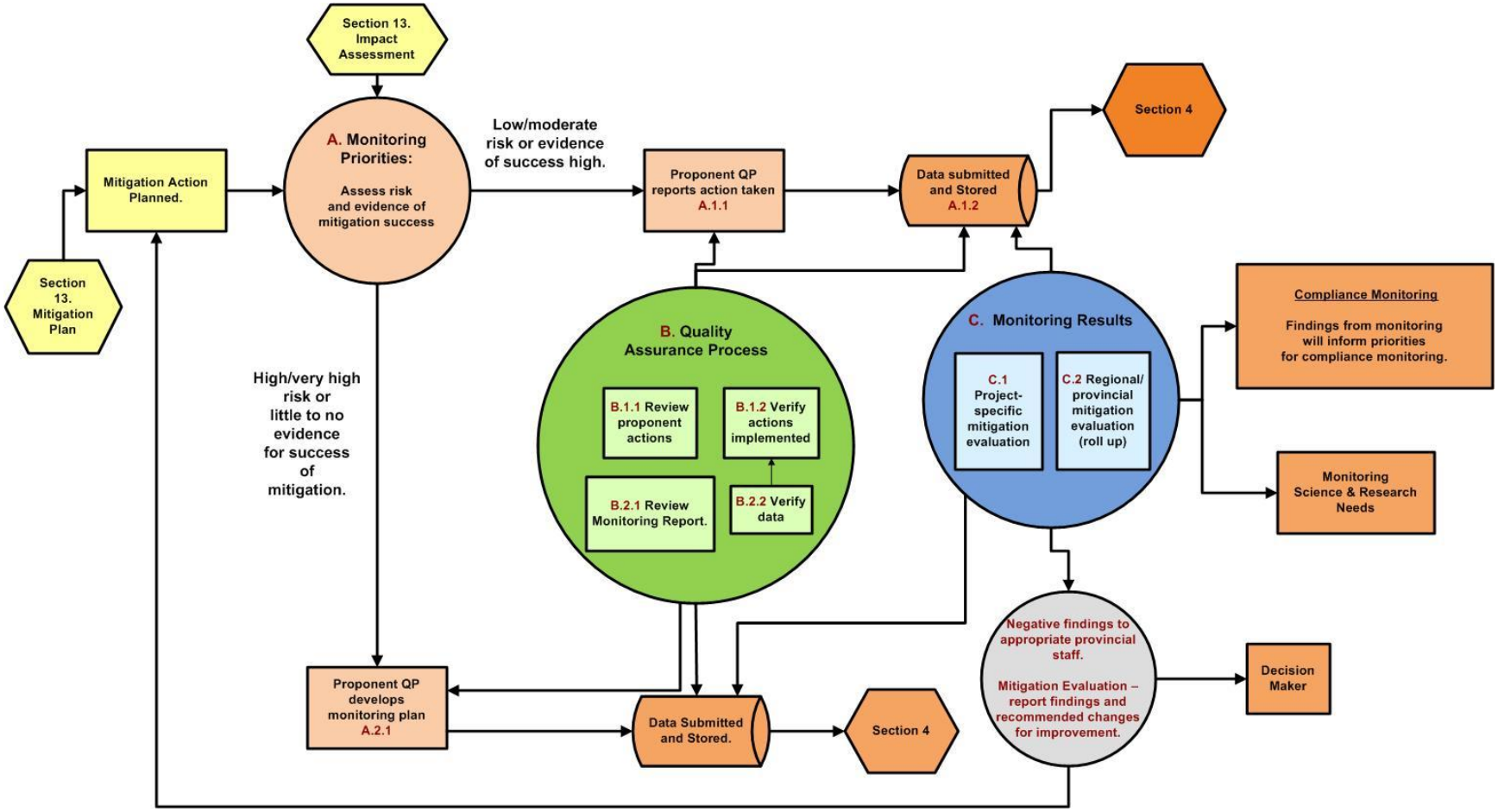

Figure 15-1. Monitoring procedures. (Numbers correspond to the numbers in the procedures.)

A. Monitoring Priorities

Determine the level of monitoring required. For example, Table 15-1 provides a framework for the consideration of risks associated with the impact of proposed activities and the uncertainty of the effectiveness of proposed mitigation. Examples of assessing risk may be part of the impact assessment (see Appendix 2) and can be categorized as high, moderate or low. Uncertainty of effectiveness is based on the evidence of the proposed mitigation success. Evidence refers to scientific support, either published literature, past monitoring, or expert opinion that indicates the proposed mitigation is likely to be successful. Systematic review of literature combined with local knowledge of success results in the lowest level of uncertainty associated with a particular mitigation measure; whereas, no information, no expert opinion, or the presence of conflicting opinion results in the highest level of uncertainty.

Note: Adaptive management is an important complement to effectiveness monitoring programs. Adaptive management commitments, to adjust actions based on the lessons learned from effectiveness monitoring, will increase the probability of achieving mitigation commitments.

Table 15-1. Type of monitoring recommended based on risk and uncertainty of effectiveness of proposed mitigation.

Uncertainty of Effectiveness of Proposed Mitigation	***Risk to Environmental Values after Avoid, Minimize, and Restore On-Site***		
	High Risk	**Moderate Risk**	**Low Risk**
High Uncertainty (No supporting evidence)	Effectiveness Monitoring	Effectiveness Monitoring	Implementation Monitoring
Moderate Uncertainty (Some supporting evidence)	Effectiveness Monitoring	Implementation Monitoring	Implementation Monitoring
Low Uncertainty (Well-supported by evidence)	Implementation Monitoring	Implementation Monitoring	Implementation Monitoring

A.1. Report Mitigation Measures

A.1.1 **Report.** The proponent/qualified professional submits a report that details the mitigation measures that were implemented, the implementation date, and location. All measures taken in a given calendar year should be submitted by March 15th of the following calendar year (see section 4).

A.1.2 <u>Submit and Store Data</u>. (See section 4 procedures.)

A.2. Effectiveness Monitoring

A.2.1 <u>Develop Monitoring Plan.</u> The Monitoring Plan should be developed and made available. The Monitoring Plan should include the following components and information:

- PURPOSE AND OBJECTIVES
  - Describe objectives (includes scope) and purpose of mitigation activities.
  - Specify management objective or target condition and monitoring objectives.
- MONITORING QUESTIONS
  - Clearly communicate key monitoring questions (e.g., Are you interested in changes over time, comparison among groups or treatment categories, or achieving target conditions?)
- INDICATORS (FOR ENVIRONMENTAL COMPONENTS)
  - If not already completed within a standard monitoring protocol, select indicators and provide a description and rationale for each indicator. The rationale includes a discussion of important relationships and how the selected indicator demonstrates whether objectives have been achieved. Include supporting literature.
- METHODS
  - Use standard monitoring protocols where available. Where not available, describe field procedures in detail or refer to a more detailed protocol if it exists.
- SAMPLING DESIGN AND ANALYSIS
  - Describe where, how often, and for how long monitoring will be conducted pre- and post-mitigation.
  - Describe sampling design including what kinds of comparisons will be made.
  - Define population of interest (target population).
  - Describe and justify sampling unit (size/shape); how sampling units will be distributed (e.g., define any strata) and positioned (e.g., simple random sample, systematic, multi-stage); and whether sampling sites are permanent or temporary, or some combination.
  - Describe how many samples, and when samples will be collected.
  - Describe potential sources of detection or measurement error and actions taken to prevent errors.
  - Describe how data are intended to be analyzed.
- SUMMARY OF IMPLEMENTATION
  - Include description and documentation of mitigation measures that were implemented.

        - Report any early findings and establish baseline data for future monitoring reports.
    - LITERATURE CITED
        - Include references and personal communications.

B. Quality Assurance Process

B.1. Implementation Monitoring

B.1.1 **Review Actions.** For all projects, review actions reported by proponents (A.1.1) to confirm that all measures were implemented by proponent as planned.

B.1.2 **Field Verification**. For a sample of projects, conduct field inspections to verify that measures were implemented as reported. Prioritize inspections based on results and available resources.

- Where mitigation measures were implemented as planned, check at least 10% of the submissions to confirm that what was reported is what actually exists in the field, and match the commitments in the mitigation plan.
- Where mitigation measures were *not* implemented as planned, follow up with proponent to determine why the plan was not followed, whether an alternate method was proposed or implemented, and whether follow-up monitoring is needed.
- Where the status of work is unknown (i.e., no report submitted), follow up with the proponent to determine whether the activity was completed but not reported.

B.2. Effectiveness Monitoring

B.2.1 **Review Monitoring Report.** Perform quality assurance on all effectiveness monitoring reports. Ensure that with submitted reports:

- Information provided is complete;
- Standard protocols were used; where no standard method exists, methods and rules (i.e., adaptations/decisions regarding consistent measurements not documented before implementation in the field) are detailed and rationale provided;
- Data are within the normal range expected; and
- Conclusions are based on the data provided.

- Quality assurance should answer the following questions:
  - Did the monitoring follow a standardized methodology? If not, is a clear rationale provided for why not, and is the methodology clearly stated?
  - What quality assurance practices were used during the monitoring project? (Training, data checks, peer review, were data geo-referenced, photos, etc.)

B.2.2 **Verify the Submitted Data.** Include field verification of data where risk is high and where possible.

C. Monitoring Results

C.1. Project-specific mitigation evaluation

For all projects, report "negative" findings (i.e., mitigation measures *not* implemented or not effective) to the statutory decision-maker or other appropriate provincial staff. This step is most important to inform future mitigation but may also include recommendations regarding potential compliance and enforcement follow-up.

C.2. Regional/provincial mitigation evaluation

Regional or provincial mitigation evaluations are an interpretation of results of multiple mitigation monitoring projects across a geographic area (e.g., watershed, region). Monitoring results will be compiled to enable a broader review of the effectiveness of specific mitigation measures. Reporting in this way helps to support continuous improvement and provide evidence to support changes to BMPs, policies, and legislation. When mitigation measures are found to be not effective, recommendations for changes should be made to the statutory decision-maker or appropriate provincial staff).

16.0 MITIGATION PLAN

A recommended mitigation plan template, which describes and structures mitigation information, is listed in section 16.1.

In addition to the mitigation plan template provided, Appendix 2 contains an example of an environmental impact assessment table, which may also be used to supplement the mitigation plan. The table was developed as a tool to assist the proponent or qualified professional through their assessment of impacts on environmental values and associated components using these procedures. The results may then be used in developing a mitigation plan to support the decision process. The table approach may be particularly useful when applying the procedures at the outset of project design and mitigation planning. The table can be easily modified to track mitigation measures and changes to assessment values through time. Using the table does not replace the mitigation plan document, which provides the narrative to document the considerations and decisions made for choosing the complement of mitigation measures.

The sections described above outlining mitigation measures [avoid (7.0), minimize impacts (8.0), and restore on-site (9.0) the environmental values], as well as the identification and description of residual impacts before offset (10.0), should be considered at the *beginning* of the planning and design stage of a proposed project or activity. It is recommended that mitigation measures to avoid, minimize, or to restore on-site impacts to the environmental values may thus be *built into* the design of the project or activity, rather than being considered only at the end of the design process.

Clearly separating the potential impacts on the component before mitigation and assessing final (mitigated) risk allows for a clearer assessment of the success of all proposed mitigation measures and recognizes measures incorporated early into project design and included when making determinations about the application. In other words, the reviewer should understand what the risk of impacts would be *without* mitigation, and how the mitigation has reduced the risk of impacts.

16.1 Mitigation Plan Template

Table of Contents for a Mitigation Plan

1. Overview

a. Regulatory Context

Provide the regulatory context of the mitigation plan, what the requirements and expectations for the plan are, and what the plan will address.

b. Project Description

Describe the project, including the following:

a. Background of Project. Provide a general description of the project, previous activities at the site, and authorizations to date.
b. Project Elements. Describe the high-level elements of the project (e.g., open pits, roads, transmission lines, water management structures, conveyors, support facilities, processing plants, tailings) to give context for the mitigation plan.
c. Project Footprint. Physical boundary to capture project elements.

c. Boundaries of Assessment Area

Identify the boundaries of the assessment area (i.e., project footprint and area of influence) based on the proposed project or activity. The assessment area should consider (1) the provincial and regional physiographical context of the project; (2)

[11] This section will be repeated for each environmental component for which a mitigation plan is being developed.

the anticipated scope of impact of the proposed activity; and (3) the geographic scale of influence of the proposed activity.

d. Environmental Values and Associated Components

Provide an assessment of (each) environmental value, including the following:

i. Environmental Value. Identify the environmental value(s) in the footprint area and the area of influence (see section 5) expected to be impacted. Support the selection of the priority environmental values that specific mitigation measures are planned (i.e., impacted environmental values for which no mitigation is planned specifically may still be listed).

ii. Environmental Component. Identify the associated components for the environmental values in the footprint area and area of influence (see section 5).

iii. Indicator. Describe the metric used to measure and report on the condition and trend of the environmental components.

iv. Management Target. Identify the needed level of performance, or the standard, guideline, or government objective for an indicator, established as a matter of policy or associated with a legal requirement, which the mitigation measures are aimed to achieve or avoid. If a management target does not exist, then identifying a targeted condition is critical and should be supported by a rationale that provides scientific evidence and/or expert opinion that the proposed target is appropriate.

v. Current Condition. Describe the environmental component at the specific point in time when the assessment is completed (before project or activity). The current condition is a key variable that is used to assess outcome of the mitigation plan. The description should also include inference of the current condition relative to the management target.

vi. Data and Information. At each step in the impact assessment analysis, and in the development of a mitigation plan, document data and information sources, associated assumptions and uncertainties. Submit data and reports for new data and information collected by the proponent to the appropriate information management system. Submit data and information using the appropriate forms and procedures where these are available. If deviating from provincially accepted standards, a rationale supporting professional judgment should be made available when the application is submitted.

e. Potential Project Impacts

i. Impact Description. Identify the potential project effects on the environmental components that are associated with the proposed activities within the footprint and area of influence (i.e., forest clearing, linear development, drilling, water extraction). Indicate the project phase that the potential impact is occurring (e.g., pre-construction, construction, commissioning, operations, de-commissioning, and post-closure) and general project timelines.

ii. Project Impacts. Describe the potential ecological consequences on the environmental components (i.e., the predicted change). Use the same indicators that were used to describe current condition. This impact description is the impact before implementation of mitigation measures other than those impacts that have already been avoided in the initial project design.

iii. Impact Boundary. Describe the spatial and temporal extent of the impact. The impact boundary is the footprint and area of influence of the proposed project or activity. Should consider the appropriate scale given the environmental component and the regional context. The appropriate impact boundary may vary depending on the project activity, environmental component, or both.

iv. Rationale. If applicable, provide a rationale for why there is no impact to the environmental components (i.e., to support selection of environmental values in the overview).

v. Data and Information. Capture the sources of data and information for the quantification and characterization of the project impacts.

2. Mitigation Hierarchy for Each Environmental Component

Note: Where multiple environmental components are identified for mitigation planning, this section is repeated for each environmental component.

a. Avoid

i. Proposed Proponent Mitigation for Avoid. Determine the specific strategies and actions (mitigation measures) that will be used to avoid impacts on environmental components on the footprint and area of influence to avoid impacts.

ii. Results and Discussion. Where appropriate, describe the science that supports the effectiveness of the types of avoidance measures being proposed and the validity and reliability of the measures. Describe any potential barriers to the mitigation measures being implemented including logistical uncertainty.

b. Minimize

i. Proposed Proponent Mitigation for Minimize. Determine the specific strategies and actions (mitigation measures) that will be used to minimize impacts on environmental components on the footprint and area of influence.

ii. Results and Discussion. Describe the science that supports the effectiveness of the types of mitigation measures being proposed and the validity and reliability of that science. Describe any potential barriers to the mitigation measures being implemented including logistical uncertainty.

c. Restore On-Site

i. Proposed Proponent Mitigation for Restore On-site. Determine the specific strategies and actions (mitigation measures) that will be used to restore the impacted environmental components on the footprint area. The description will include reference to the end condition that is being planned relevant to the current condition and the length of time it is expected to achieve that target.

ii. Results and Discussion. Describe the science that supports the effectiveness of the types of mitigation measures being proposed and the validity and reliability of that science. Describe any potential barriers to the mitigation measures being implemented including logistical uncertainty.

d. Residual Impacts Before Offset

i. Residual impacts after avoid, minimize, and restore on-site. Identify the impacts that are expected to remain after the proposed implementation of mitigation measures to avoid, minimize, or restore on-site impacts to environmental components are considered. This should include both direct and indirect impacts and may be quantitatively and/or qualitatively described.

ii. Provide context to enable assessment of the residual Impacts before offset. What were the considerations used to assess the implications of the residual impacts before offset? This can be a qualitative or quantitative description or can take the format of a more detailed risk assessment describing the consequence of the impact and its probability of occurrence on the environmental component. (See Appendix 2 for potential approaches to risk assessment).

e. Offsetting

The proponent may propose that the impacts, after measures to avoid, minimize, and/or restore on-site measures are implemented, should be offset. The decision of whether an offset is required, or how much offset, ultimately rests with the statutory decision-maker within the regulatory context of the decision being made. Otherwise, offsets may be proposed voluntarily.

i. Offset measures. Specify and describe the measures being proposed to address remaining impacts, including the type and location of the proposed offset measures. Provide details around how the offset measure(s) were determined (i.e., how is the offset ecologically equivalent to the impact).

ii. In-lieu Payments. Specify and describe any commitments to financial offsetting that are being proposed to address the impacts that remain. Provide details around how the amount of financial offsetting was determined.

iii. Risk and Uncertainty of Offsetting Measures. Describe the risk and uncertainty that is associated with the proposed offset measures and a description of multipliers/ratios if used to manage the potential costs/outcomes associated to that risk and uncertainty.

f. Rationale for Moving Through the Mitigation Hierarchy

A rationale should describe how the various steps in the mitigation hierarchy were considered and why it was considered reasonable to move to the next step in the hierarchy. Moving through the hierarchy may be more of an iterative process and not completely linear, but the intent is to document the rationale and thinking.

3. Summary of Mitigation Commitments

Summarize the mitigation that the proponent commits to (avoid, minimize, restore on-site, and offset) that will form the commitment of the proponent as part of their application. The commitment should be discussed in the context of the certainty that the mitigation measure proposed will be effective. The amount of certainty will influence the level to which monitoring is planned and whether adaptive management or contingency measures may be appropriate.

4. Monitoring and Reporting

a. Monitoring. Specify what type(s) of monitoring will be used based on assessment of known effectiveness of mitigation measures and risks to the environmental component and who will be responsible for carrying out monitoring to determine the net effect of the mitigation measures. Include contingency plans for the application of alternative mitigation measures if the mitigation measures are not having the expected and desired effect.
b. Reporting. Outline how and when reporting will be done that details the mitigation measures that were implemented, the implementation date, and location.

5. Non-Proponent Actions

Describe any actions that other parties (e.g., the Province) may implement that may reduce impacts to environmental components and that the proponent is not contributing to through offsets. These types of actions are not to be included as a mitigation measure, or as a measure that reduces the impact of the project. These actions are separate from any list of proposed offset measure for which a proponent provides in-lieu payments, but may help inform the overall risk to the environmental values and associated components.

6. Conclusion

Describe the final expected condition of each environmental component, relative to the current condition and/or the management target. Provide the overall implications of the development activities and the proposed mitigation on each of the environmental values based on the analysis done in the mitigation plan.

It is the statutory decision-maker who determines whether the risk(s) to the environmental value(s) and associated component(s) are acceptable.

APPENDICES

APPENDIX 1. Process for Selecting Environmental Values

The Environmental Assessment Office recently released a guideline for the selection of Valued Components. The guidance included here is intended to support proponents and staff not subject to that environmental assessment process. Although the process noted below is complementary to the Environmental Assessment Office guideline, the proponent is responsible for ensuring that they follow the appropriate guidance to meet the expectation of the application process they are entered under. The selection of environmental values may include the following key steps:

1) *Establish the team involved in identifying environmental values*:

   The proponent and their qualified professionals should identify environmental values and associated components. Provincial staff may provide additional input and there may be a need for consultation with a broader cross-section of agencies, First Nations, the public, and/or persons with relevant scientific expertise.

2) *Identify the boundaries of the assessment area*: The proponent will identify the boundaries for the extent of the assessment area (i.e., the spatial location of the project footprint and area of influence) based on the proposed project or activity. This assessment area should consider (1) the provincial and regional physiographical context; (2) the anticipated scope of impact; (3) the geographic scale of influence; and (4) the temporal aspects of the impact.

3) *Identify the impacts associated with the proposed activity and the corresponding impact boundary*: The proponent and their qualified professionals, in consultation with provincial natural resource sector staff, will identify the impacts associated with the proposed activity (e.g., forest clearing, linear development, drilling, water extraction) and the corresponding boundary associated with those impacts. This is the assessment area.

4) *Identify a comprehensive set of environmental values and associated components for the assessment area*: In accordance with the Principles in section 5.1., the established team may use the following information sources to identify the suite of environmental values and associated components:
   - Conservation Data Centre data – identify species and ecosystems within the assessment area that have provincial and/or federal conservation status (e.g., Red- or Blue-listed; threatened or endangered) or legal listing under statute (e.g., *Forest and Range Practices Act, Species at Risk Act*);
   - First Nations treaties – identify environmental values identified within treaties;
   - Land and Resource Management Plans and other regional plans – identify any regionally important environmental values within the assessment area;
   - government objectives identified through legislation and policy; and

- other sources of values (e.g., provincial natural resource sector staff with specific expertise; First Nations consultation; information from local communities; and holders of other natural resource sector tenures).

5) *Identify a relevant subset of environmental values and associated components for the assessment area*: Based on the comprehensive set of environmental values identified in accordance with considerations in section 5.2, and the predicted impacts, create a relevant subset of the environmental values and associated components to prioritize for use in the impact assessment. This is sometimes referred to as an interaction matrix.

   To further refine the list of values to be assessed, also consider the following questions:
   - Would more than one environmental value or associated component be expected to respond similarly to predicted impacts and management actions? (Avoid duplication.)
   - Are there environmental values that will be captured by managing other environmental values (e.g., species and communities are conserved if the ecosystem within which they occur is in properly functioning condition)? (Nested values.)

6) *Provide a rationale:* Document the rationale for selection and prioritization of environmental values and associated components, the indicators, and management targets.

7) *Submit information:* Information compiled for the above steps should be submitted to the Province for the benefit of future projects and activities, and future authorizations. Proponents may identify confidential data and information.

APPENDIX 2. Guidance for Planning Mitigation Measures and Approaches for Assessing Risk to Environmental Values and Their Associated Components

Table A.2-1. Workbook tool for selection and description of impacts to environmental values and their associated components.

ENVIRONMENTAL VALUE AND COMPONENT									POTENTIAL IMPACT		RATIONALE
Environmental Value	**Environmental Component**	**Impact and Project Phase**					**Indicator**	**Management Target**	**Current Condition**	**Potential impact**	**Assessment Area**	**Final Selection of Environmental Components**
		Pre-Construction	**Construction**	**Operations**	**Post Closure**	**Decommissioning**						
The environmental value found within the study area. One value may have several components.	What are the environmental components within the study area?	Will there be an impact to the environmental component? If there is no impact, then the rest of the table will not need to be filled out for this row. To what phase of the project will the potential impact be applied?					This is measureable within a broad impact category (e.g., winter range or population fragmentation or mortality)	What is the standard, guideline, or government objective that is trying to be achieved or avoided? If for any reason an established management target is being proposed to vary, must also be supported by a rationale.	What is the current condition of the environmental component?	This is the type of potential impact (e.g., direct loss of habitat, indirect loss of habitat, change in demographic rates).	What is the spatial extent of the impact assessment? The assessment area is the boundary for the project footprint plus the area of influence. Should consider the appropriate scale given the component and regional context.	Summary of considerations made to include or exclude the environmental component. May include high level impact assessment where no impact ultimately is identified, some type of risk assessment of potential impacts, prioritization process, or nesting process. Should be in the ecological context of the impact given no mitigation measures (other than avoidance in the design phase); therefore, supports the development of more detailed mitigation plans.

Table A.2-2. Workbook tool for selection and planning of mitigation measures and assessment of final condition.

AVOID/MINIMIZE/RESTORE ON-SITE				RESIDUAL IMPACTS BEFORE OFFSET	RATIONALE	OFFSET	FINAL CONDITION		RATIONALE	NON-PROPONENT ACTIONS
Proposed Measures for Avoid	**Proposed Measures for Minimize**	**Proposed Measures for Restore On-site**	**Uncertainty of Effectiveness of Proponent Mitigation**	**Predicted Condition After Measures to Avoid, Minimize, and Restore On-site**	**Implications of Residual Impacts before offset**	**Offset Measures**	**Residual Impacts**	**Effectiveness Monitoring and Reporting**	**Conclusion - Final Mitigated Risk**	
The measures that attempt to avoid impacts to environmental components?	The measures that attempt to reduce impacts to the components ?	The measures that are planned to restore impacts to environmental components within the footprint area. The description should include reference to the end condition that is being planned and the length of time it is expected to achieve that target.	Describe the support for the effectiveness of the types of mitigation measures proposed and its validity and reliability. Describe any barriers to mitigation measures being implemented (e.g., level of public support, lack of jurisdiction, conflicts engineering costs, capacity of the applicant, etc).	The predicted condition of the environmental component within the assessment area after avoid, minimize, and restore on-site mitigation measures have been applied.	Summary of considerations made to assess the implications of the impacts remaining within the assessment area after proposed measures to avoid, minimize, and restore on- site are implemented (e.g, relative comparison of the predicted condition to the management target, a qualitative or quantitative assessment of the ecological risk to the environmental component). The outcome of these considerations become the evaluation of whether offset measures are proposed.	The measures that are being proposed to counteract residual adverse impacts, and where are they proposed (on-site, off-site)?	What is the expected condition of the components within the footprint and area of influence after all mitigation measures (avoid, minimize, restore on-site, and offset, combined) are completed.	What monitoring will be used, and by whom, to determine the net effect of the mitigation measures?	Requires relating the final expected condition, relative to the management target, to determine the implications of the environmental outcome. May include an ecological risk assessment of the final predicted condition as well as the certainty of that outcome.	Are there any actions that could be implemented by others (e.g., government)? This is neither part of mitigation, nor the calculation of residual impacts before offset, but highlights that these additional actions can reduce impact.

Table A.2-3. Risk Assessment (Approach 1). An example an approach that may be used to support the development of any or all the rationales for moving through the mitigation hierarchy or the ecological implications of the predicted final condition of the environmental component. This approach is similar to the guidelines for determining the significance of final impacts in an environmental assessment model, but would focus on environmental components only.

RISK ASSESSMENT													
Context	Magnitude	Duration				Frequency				Reversibility		Consequence	Probability of Occurrence	Risk.
		Immediate	Short-term	Medium-term	Long-term	Single event	Occasional	Regular	Continuous	Reversible	Irreversible			
The specific ecological setting that the environmental component will be assessed within (e.g., rare and irreplaceable, critical for an aspect of life history, common).	The assessed size of severity of the impact. Could be categorical or quantitative.	What is the duration of the impact? Time consideration of process influencing the component (e.g., life history or population dynamics).				How often is the impact going to occur?				Is the impact permanent and therefore irreversible?		Consideration of Context, Magnitude, Duration, Frequency, and Reversibility to determine Consequence. If multiple impacts to the environmental component, then a summation row is required that gives a total consequence to the environmental component.	What is the likelihood of the impact? Could be categorical or quantitative.	Consideration of consequence and likelihood to determine risk for each (1) potential impact, (2) impacts after avoid, minimize, and restore on-site, and (3) final mitigation commitment.

Table A.2-4. Risk Assessment Approach 2. Potential approach to classifying risks of project impacts to the environmental values, components, or indicators used for planning mitigation measures using a matrix.

Step 1. Establish the consequence or severity and assign a rating of level 1 to 5. Definitions for the environmental impacts may be altered, as appropriate, to meet the specific circumstances.

Consequence	Environmental Impact (Examples)
Level 1	Limited damage to minimal area of low significance
Level 2	Minor effects on biological or physical environment
Level 3	Moderate short-term effects but affecting ecosystem
Level 4	Serious medium-term environmental effects
Level 5	Very serious long-term environmental effects

Step 2. Establish the probability of the event. Definitions may be altered, as appropriate, to meet the specific circumstances.

Description	Frequency Examples
Happens often	More than 1 event per month
Could easily happen	More than 1 event per year
Could happen and has occurred here or elsewhere	1 event per 1 to 10 years
Has not happened yet but could	1 event per 10 to 100 years
Conceivable, but only in extreme circumstances	Less than 1 event per 100 years

Step 3. Using the definitions from Step 2, inserted into this matrix below, determine the risk category.

		Consequence Severity				
		level 1	level 2	level 3	level 4	level 5
Probability Factor	Happens	High	High	Extreme	Extreme	Extreme
	Could easily happen	Moderate	High	High	Extreme	Extreme
	Could happen and has occurred here or elsewhere	Low	Moderate	High	Extreme	Extreme
	Has not happened yet but could	Low	Low	Moderate	High	Extreme
	Conceivable	Low	Low	Moderate	High	High

APPENDIX 3. Technical Guidance for Offsetting Impacts: Conservation Mechanisms

Offset Procedures: <u>Analysis based on like-for-like and on-site/off-site potential</u>

While the intent of the offset is to achieve a *similar function* compared with the environmental values and components that would be adversely impacted by the proposed development project or activity, it may only be feasible to successfully assess whether the offset provides a *similar structure*. The following site-level considerations may be used in determining suitability of an offset site:

1. Patch size – The offset contributes to a similar patch size, or one that is deemed deficient.
2. Fragmentation – The offset area is not more fragmented.
3. Connectivity – At the stand, landscape, and regional levels, connectivity is similar.
4. Special features – These are similar in type and present at a similar rate (e.g., wildlife trees, winter ranges, spawning areas).
5. Seral stage – The seral stages are not significantly different on the areas being compared.
6. Condition – The offset area is in a similar, or preferred, condition (e.g., with regard to the presence of invasive species, or some other conditions).

Table A3-1 provides a generalized assessment procedure that would allow for a comparative analysis between the site proposed for the development project or activity, and the site being considered for an off-site environmental offset. The level of detail required in the analysis depends on the scope of the proposal (e.g., geographical extent, and environmental values and components involved).

Table A3-1. Generalized site-level comparative assessment.

Site Characteristics	State of Existing Site	State of Off-Site Offset Site	Relative Difference: Positive [+], Negative [-], or Neutral [0]	Where Negative, Is Upgrading Feasible? / $ Needed?	Appropriate-ness of Offset Site and Conditions	Is There a Remaining Residual Adverse Impact?
Patch Size						
Fragmentation						
Connectivity						
Special Features						
Seral Stage						
Condition						

Locating offsets on areas with similar biophysical characteristics will aid in attaining the longer-term equivalency for a functioning ecosystem. *(In some cases, however, those characteristics may not*

currently be present at the offset location, but over the longer term, those sites may have the best opportunity to provide a similar function.) The following broader ecosystem units need consideration:

1. Site series – This ensures that the offsetting would occur on a site with similar soils, and moisture and nutrient regimes.
2. Biogeoclimatic subzone variant – This ensures very similar biophysical characteristics and elevation range.
3. Biogeoclimatic zone – This ensures relatively similar biophysical characteristics, though there may be minor differences in elevation, climax vegetation species, and fauna.
4. Watershed – This ensures the same regional geographic area.
5. Landscape unit – This ensures the same regional geographic areas, usually including several adjacent watersheds.
6. Ecosection – This ensures similar assemblages of flora and fauna.

Table A3-2 can be used to consider combinations of the broader ecosystem units of priority. This table can be used to determine the appropriateness of the location, relative to other sites. For example, it would not be appropriate to locate an offset in a Priority 3 area, if there was the opportunity to locate the offset in a Priority 2 area. However, exceptions to this step-down procedure will occur, based on the stand-level considerations (e.g., patch size, fragmentation) discussed above. Therefore, determining the appropriateness of a location for an off-site offset will be based on a combination of local site factors, with the current structural characteristics as a surrogate for function, and the longer-term capability of the site.

Table A3-2. Priorities for locating offsets (on-site or off-site).

Priority	Site Series	BEC Subzone Variant	BEC Zone	Watershed	Landscape Unit	Ecosection
1 On-site	Same	Same		Same		Same
2 Off-site	Same	Same		Same		Same
3	Same		Same	Same		Same
4	Same	Same			Same	Same
5	Same	Same				Same
6	Same		Same			Same
7	Same	Same				Adjacent

In a fisheries-based offsetting procedure, the primary considerations are similar to those in the Department of Fisheries and Oceans (DFO) compensation process. Key considerations include:

- stock,
- habitat types (e.g., spawning vs. rearing),
- same habitat unit,

- net gain in habitat,
- performance bond, and
- monitoring.