

# Guidance on Using Scientific Studies as part of an Overall Benefit Permit

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## 1 Purpose

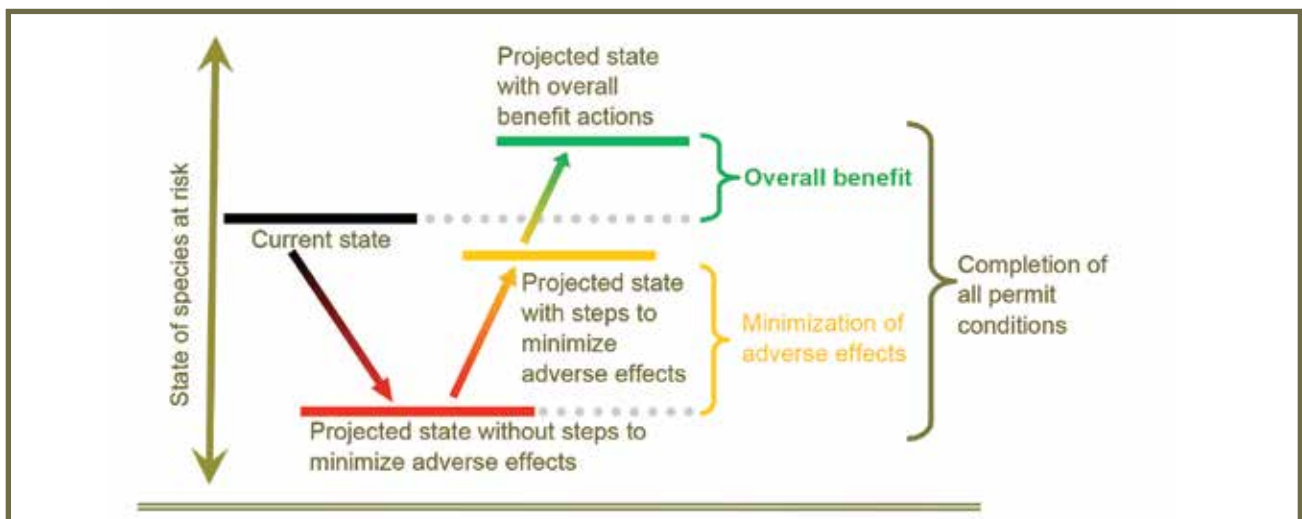
The purpose of this policy bulletin is to provide guidance on the use of scientific studies as part of an overall benefit permit. The focus is on ensuring the scientific studies are relevant, scientifically credible and the results are made available to further improve species protection and recovery efforts.

## 2 Policy Context

Clause 17(2)(c) of the *Endangered Species Act, 2007* includes a legislative requirement for the Minister to be of the opinion that an overall benefit will be achieved within a reasonable time to the species for which the permit is issued. This opinion is based on the requirements imposed by conditions of the permit. This document builds upon the policy principles provided in the *Endangered Species Act Submission Standards for Activity Review and 17(2)(c) Overall Benefit Permits* (“overall benefit policy guidance”) (MNR 2012). This document was published in February 2012 and provides a policy explanation of the term “overall benefit” and guiding principles for evaluating overall benefit actions and permits.

The overall benefit policy guidance states that achieving an overall benefit:

*“involves undertaking actions that contribute to improving the circumstances for the species specified in the permit. Overall benefit is more than no net loss or an exchange of like-for-like (Figure 1). Overall benefit is grounded in the protection and recovery of the species at risk and must include **more** than steps to minimize adverse effects on protected species or habitats. The outcome of overall benefit actions is meant to improve the relative standing of a species after taking into account the residual adverse effects of the activity on the species or its habitat that are authorized by the permit (i.e., the completion of all permit conditions achieves a net positive benefit for the species at risk)” (MNR 2012).*



**Figure 1.** A simplified representation of overall benefit concepts.

Overall benefit policy guidance indicates that “achieving an overall benefit to a species within the context of the ESA may involve providing the species with a range of benefits, including:

- an increase in the number of reproductively-capable individuals of the species living in the wild;
- an increase in the distribution of the species within its natural range;
- an increase in the viability or resilience of existing population(s);
- an abatement or reversal of a declining population trend (i.e., reduction of key threats to the species survival); or
- an increase in the quality or amount of habitat for the species at risk” (MNR 2012).

An overall benefit permit often includes a variety of different types of actions (e.g., restoring degraded habitat, addressing an existing threat such as a road mortality hotspot, undertaking a scientific study). In combination, all the overall benefit actions proposed in the overall benefit plan must lead to the opinion that an overall benefit will be achieved for the species.

The focus of this document is on providing additional clarification about the following statement: “activities such as filling information gaps[...]may, under certain circumstances, contribute to an overall benefit plan for the species at risk but alone may not be considered as an overall benefit plan for the species” (MNR 2012). Overall benefit actions such as filling information gaps **must**:

1. be combined with other actions within the overall benefit plan; and/or
2. result in the application of study results to provide a tangible benefit to the species.

MNR (2012) recognized that proposed overall benefit actions should be based on the best available scientific information. As the Ministry of Natural Resources and Forestry (MNRF) gains further knowledge and experience, policy guidance for overall benefit permits may evolve to enhance the effectiveness and efficiency in achieving an overall benefit for species at risk.

### 3 Mandatory Requirements for using a Scientific Study in an Overall Benefit Permit

It is preferred that overall benefit permits primarily rely on actions that are anticipated to achieve a direct, and tangible benefit to the species based on the best available information. For example, habitat restoration and actions that address a primary threat are anticipated to directly benefit many species at risk, provided they can be implemented with a reasonable likelihood of success. Scientific studies themselves may not directly benefit the species; it is often the application of the knowledge obtained from these studies that provides the benefit to the species. An application involving scientific studies submitted for MNRF review must present evidence regarding the degree to which information gleaned from the study will provide a tangible benefit to the species and explain how the study is appropriately designed to do so. In circumstances where the study question being proposed is not sufficiently relevant for the protection or recovery of the species, the scientific study cannot contribute to the

broader overall benefit plan, regardless of whether the other requirements related to scientific credibility and making results available are met.

Where new information is considered particularly important to the protection and recovery of the species, it may be appropriate for the overall benefit permit to rely more heavily on a relevant, well-designed scientific study whose results have broad application and will be made publicly available. For example, important knowledge gaps may relate to identifying an effective method for safe passage of a species past an area where high mortality rates are currently being experienced. Another example may be identifying approaches to avoid or substantially reducing the spread and impacts of a disease that is threatening the continued survival of the species. The importance and relevance of a particular information gap to the protection or recovery of a species is anticipated to evolve as new information becomes available.

As with the assessment of any overall benefit permit application, the assessment of whether or not an overall benefit is likely to be achieved considers the anticipated adverse effects of the proposed activity in its entirety, including any potential adverse effects of the scientific study on the species. For further clarification, if a scientific study may have an adverse effect on the species, the benefit of the study to the species must be greater than its adverse effects.

Information gathering, impact monitoring, effectiveness monitoring and steps to minimize adverse effects to individual members of the species that are standard requirements within an overall benefit permit do not constitute scientific studies for the purpose of achieving overall benefit. In some circumstances, MNRF may determine it is appropriate to use science-based adaptive management approaches as part of an overall benefit permit (e.g., the rigorous scientific testing of the relative effectiveness of different avoidance, mitigation or overall benefit actions). Making this determination should include considering the relevance of the information gap, the related uncertainties and risks to the species or its habitat from both the proposed activity and the overall benefit plan, the species' biology, habitat characteristics, and the scientific rigour of the proposed adaptive management approach. The outcomes of scientific studies may result in technical guidance or best management practices, which would also be subject to the requirements outlined below.

This document sets out the requirements to be applied to scientific studies forming part of an overall benefit permit (Figure 2).

## GUIDANCE ON USING SCIENTIFIC STUDIES AS PART OF AN OVERALL BENEFIT PERMIT

### REQUIREMENT 1: DEVELOPMENT OF SCIENTIFIC STUDY PROPOSAL

As part of permit application, scientific study proposal submitted to MNRF.

### REQUIREMENT 2: PEER-REVIEW OF SCIENTIFIC STUDY PROPOSAL

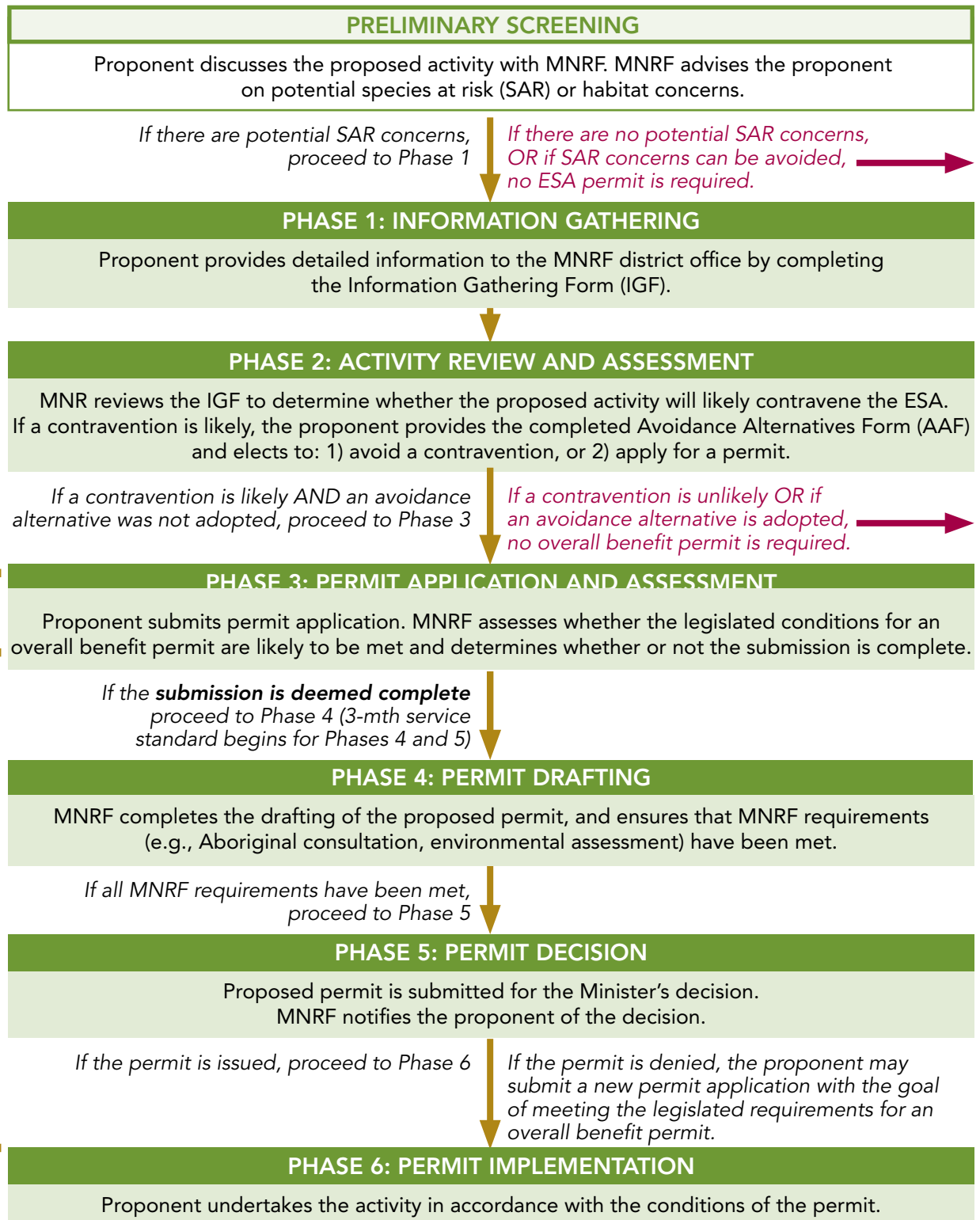
Scientific study proposal peer-reviewed by qualified and approved reviewers. A copy of each review and a revised study proposal provided to MNRF for approval as a part of the permit.

### REQUIREMENT 3: PEER-REVIEW OF FINAL RESULTS AND REPORT

Peer-review of report. A copy of each review and the final report/journal article provided to MNRF. Final reports must reflect outcomes of reviews.

### REQUIREMENT 4: AVAILABILITY AND DISSEMINATION

Final revised report and supporting data provided to MNRF and made available in the public domain.



**Figure 2:** Outlines the overall benefit flow chart (from the *Endangered Species Act Submission Standards for Activity Review and 17(2)(c) Overall Benefit Permits*) and the requirements to be applied to scientific studies forming part of an overall benefit permit.

The scientific study must be designed so the results can be applied within a reasonable time to provide a tangible benefit to the species. This requires that the scientific study meet **each** of the following requirements:

- 1.1 Relevance:** The study addresses, at an appropriate spatial and temporal scale, an important knowledge gap directly tied to the protection and recovery of the species (i.e. saliency of the study question);
- 1.2 Scientific Creditability:** The study is designed and undertaken in accordance with established scientific methods, including peer-review with final conclusions that are supported by the accumulated evidence/data; and
- 1.3 Availability:** The study results are available and broadly disseminated in the public domain.

Peer-review by qualified individuals with expertise related to the species/taxon and appropriate study design and methodology is the primary mechanism for evaluating the relevance, scientific credibility and feasibility of a scientific study. Within the context of overall benefit permits, requiring the peer-review of the scientific study proposal is important to evaluate whether an overall benefit to the species will be achieved within a reasonable time. Peer-review of the final report contributes to ensuring the scientific credibility of the results and their interpretation prior to their being made available. In its role as approver, MNRF may determine that these reviews should be undertaken by experts internal or external to MNRF, or a combination of the two. An individual involved in undertaking the scientific study is not eligible to be a formal peer-reviewer of either the study proposal or final report. At the permit application and/or study proposal stage, MNRF may assess and determine that the study is not appropriate in the context of an overall benefit permit or that no further studies are required or supported for a given species based on work completed to date (see section 4.2 for more information).

### **3.1 Relevance – Addressing an important knowledge gap directly tied to the protection and recovery of the species**

Relevant (i.e., salient) scientific studies address an important short-term or long-term knowledge gap directly tied to improving the protection or recovery of the species. Considering the relevance of the study question must also consider whether there is sufficient time or opportunity for the knowledge acquired through the study to benefit the species. The following should be explored when identifying relevant scientific studies that can contribute to an overall benefit permit:

- the recovery goal and actions identified for the species in its Government Response Statement ([GRS](#)) (if available);

- scientific advice provided in provincial or federal recovery strategies or management plans (if available) that identify specific priority knowledge gaps<sup>1</sup>;
- species status reports, including information on threats to the species;
- best available information, including science and local Traditional Ecological Knowledge;
- information on the fine and broad-scale ecological processes affecting the species and/or its habitat;
- the opinions of professionals with expertise related to the species and type of work involved in the scientific study; and
- overall benefit policy guidance, including the guiding principles, action-specific requirements and species-specific approaches to overall benefit (if available).

Not all of the information gaps identified by the above sources will be appropriate to use in the context of an overall benefit permit given the nature of the activity being undertaken and the legislative requirements for the issuance of the permit. Although the development of the permit application is the proponent's responsibility, MNRF may be able to provide advice on species-specific knowledge gaps that are appropriate to address.

### **Requirement 1: Development of a Scientific Study Proposal**

To enable an appropriate assessment of whether the scientific study is relevant, scientifically credible and feasible, MNRF must be provided with a proposal that clearly articulates:

- the need to fill the knowledge gap to protect and recover the species, including how the GRS has been considered;
- the specific scientific question to be answered by the study and associated hypotheses;
- the study design, including methodology that addresses relevant statistical considerations and that is likely to gather meaningful quantitative and/or qualitative information;
- the outcome to be achieved (i.e. how the proposed methodology will test the specific hypotheses or answer the particular study question(s));
- the rationale for how the results will be applied to benefit the species within a reasonable time for the species;
- who will be completing the scientific study on the behalf of the proponent if a third party is involved; and
- the timelines for the study, which must be adequate for addressing the question being posed. For longer-term studies, it may also be required to report on progress and interim results.

The relevant details of the study proposal, including the study question and its general methodology, must be established prior to the review and assessment of the permit application to enable its peer review. This also enables the inclusion of adequate and appropriate permit conditions related to the study, if applicable.

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1. Where a GRS exists for the species, the policy direction within it on the actions that are needed for the protection or recovery of the species take precedence over those approaches recommended within a recovery strategy or management plan. Specific priority information gaps identified in the recovery strategy should be cross-checked against the actions articulated in the GRS.



It is recommended that where a study is proposed within local First Nation and Métis communities' traditional territories, the study proposal outlines opportunities for the engagement of the communities, where appropriate. Early engagement facilitates the sharing of information about the proposed research and helps foster strong relationships with local communities. Willing communities may choose to share their Traditional Ecological Knowledge with researchers. There is an important role for Traditional Ecological Knowledge in the implementation of the *Endangered Species Act* and Traditional Ecological Knowledge can contribute to scientific studies. The considerations relating to the collection or incorporation of Traditional Ecological Knowledge as part of an overall benefit permit are not included within this policy document as approaches will vary and will need to be developed jointly with each community.

### 3.2 Scientific Credibility

Scientific credibility depends on adherence to appropriate scientific methods and refers to the scientific adequacy of the technical evidence and arguments. For the purpose of this policy, scientific methods are understood to be established methods of empirical inquiry and analysis accepted by the scientific community, employed to increase the collective body of knowledge. These methods are tightly linked to quality assessment mechanisms such as peer-review.

#### Study proposal

Peer-review serves different purposes at different stages of a scientific study (i.e., proposal versus final reporting stages). The purpose of the peer-review at the proposal phase of the scientific study is:

- to contribute to assessing the relevance of the study question ([see section 3.1](#));
- to evaluate the anticipated feasibility of the study;
- to evaluate whether appropriate methodology is being used to achieve scientifically credible results given the nature of the specific question being posed; and
- to assess whether the results of the study can be applied to benefit the species in a broader context within a reasonable time (e.g., development of new or improved avoidance, steps to minimize adverse effects or overall benefit action such as habitat restoration).

Assessing the feasibility of the study includes assessing:

- the potential risks to the species or habitat;
- potential technical or logistical constraints on its implementation;
- uncertainties, such as the likelihood of being able to answer the specific study question (e.g., given the study design); and
- the qualifications or experience of the lead scientist(s)<sup>2</sup> related to the species/taxa and the methodology being used.

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2. Proponents may choose to engage a third party, such as an academic research scientist or qualified consultant, to undertake the scientific study. Where a permit holder uses a third party to fulfil the conditions of the permit, the permit holder remains responsible for ensuring the permit conditions are satisfied.

Assessing the study methodology for scientific credibility includes confirmation that:

- it makes biological and ecological sense for the species;
- it is being carried out by or under the direct supervision of a person or persons with the appropriate expertise and experience related to the species, its habitat and the proposed scientific methodology;
- it includes a sufficiently large sample size;
- if applicable, it employs appropriate statistical techniques to account for spatial and temporal variability and to control for confounding variables;
- appropriate types of data will be collected and, where available and appropriate, the collection will be done using standardized data collection protocols; and
- the study design enables appropriate analyses for quantitative or qualitative data (e.g., before-after or control-impact study design).

### **Requirement 2: Peer-review of Scientific Study Proposal**

Prior to undertaking the study, the proposal (including its proposed methodology) must be peer-reviewed to ensure relevance and scientific credibility. This review will be undertaken by:

- at least two qualified<sup>3</sup> reviewers who are approved by MNRF and have attested to be objective towards both: 1) the activity for which a permit is being sought, and 2) the scientific study being proposed

and,

- one or more MNRF staff who have combined familiarity with the species/taxa being studied, the proposed methodology (e.g., study design, methodology, and analytical techniques) and a responsibility for reviewing the permit application and drafting the permit.

The combined expertise of the qualified and reputable reviewers must include knowledge of the species or, if applicable, taxon being studied and the methodology proposed to be used to answer the study question. This assessment will include consideration of best available information related to the species in question, which may vary widely across taxa.

A copy of each review must be provided to MNRF upon submission of the revised study proposal for approval by MNRF as part of the overall benefit permit.

### **Results and Final Report**

The purpose of the peer-review at the final reporting phase of a scientific study is:

- to assess whether the results are reported and made available in a way that enables them to be applied and expanded upon by others (e.g., appropriate details provided);

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3. It is the proponent's responsibility to approach and identify reviewers for MNRF's approval. In some circumstances, MNRF may also identify reviewers meeting the applicable requirements who may be experts internal and/or external to MNRF.

- to provide an objective analysis of any deviations from the approved requirements and methodologies of the study, including an assessment of the consequences and what might be done to address them;
- to ensure the final report includes identification and discussion of the underlying assumptions, and sources of uncertainty (e.g., effect sizes, standard errors);
- to ensure that adequate sampling was conducted to ascertain an effect if one exists (i.e., results are not misleading; that non-significant results have adequate power);
- to ensure practical and useful solutions and/or recommendations are proposed to benefit the species within a reasonable time; and
- to identify the appropriate context(s) and limitations for the application of the study results.

### **Requirement 3: Peer-review of Final Results and Report**

After completing the study, two options exist for the peer-review requirement for the final results and report:

#### **Option 1** (\*Only an option if findings are going to be published in a peer-review journal)

- review by MNRF staff overseeing the overall benefit permit;
- review by peer-reviewers selected by the editorial body of a scientific journal;
- submission of the draft journal article to MNRF to hold on file as a record of the partial completion of the permit requirements; and
- reviews should include an objective analysis of any deviations from the approved requirements and methodologies of the study, including an assessment of the consequences of any deviations and what might be done to address them.

OR

#### **Option 2**

- review by MNRF staff overseeing the overall benefit permit (as normal);
- review by a minimum of three qualified reviewers<sup>4</sup> who are approved by MNRF and have attested to being objective towards the activity for which a permit is being sought and the scientific study that was undertaken;
- reviews should include an objective analysis of any deviations from the approved requirements and methodologies of the study, including an assessment of the consequences of any deviations and what might be done to address them.

#### **For both options:**

- a copy of the approved scientific study proposal must be provided to reviewers; and
- a copy of each review and final report/journal article must be provided to MNRF.

Based on the reviews, the final report must be revised to address comments about scientific credibility prior to publication or dissemination.

4. It is the proponent's responsibility to approach and identify reviewers for MNRF for approval. In some circumstances, MNRF may also choose to identify reviewers meeting the applicable requirements who may be experts internal and/or external to MNRF.

### 3.3 Availability

It is necessary that new knowledge resulting from the study be applied and/or built upon in order to provide a benefit to the species. It is therefore necessary that the study results be available and disseminated within the public domain for other stewards or proponents to be able to apply them or build upon the information.

#### **Requirement 4: Availability and Dissemination**

At a minimum, the following will be provided to MNRF:

- the final report that has been revised and finalized based on the feedback received during peer-review; and
- the supporting data (including raw data).

The report and, if appropriate, supporting data will be made available by the proponent in the public domain (e.g., available on a publicly accessible website or otherwise published) in accordance with data sharing protocols, privacy and intellectual property laws and best practices for sensitive data.

It is preferred that final reports are made available through publication in a reputable peer-reviewed scientific journal.

Particular caution should be paid to avoiding the distribution of sensitive observational data for species if the distribution of this information could lead to unnecessary adverse effects to a species or its habitat, including further population declines.

As with any overall benefit action, the proponent is responsible for the costs associated with undertaking the scientific study, the review of the proposal and final report, the distribution of the results (e.g., publication page charges, distribution of final reports), and any other costs associated with undertaking the scientific study as part of an overall benefit permit or meeting the requirements described in throughout this document.

## 4 Considering the Contribution or Weighting of the Scientific Study to the Overall Benefit Plan

The degree to which a scientific study contributes to an overall benefit plan will vary on a contextual basis, including but not limited to:

- the extent or importance of the knowledge gap being addressed;
- the contribution of the study to filling the knowledge gap;
- the linkage of the study to the protection and recovery efforts for the species;
- the linkage of the study to threats to the species;
- the other overall benefit actions committed to in the permit; and
- the relevant uncertainties and risks.

The following subsections highlight important considerations for MNRF's assessment of the contribution of a scientific study to an overall permit.

### 4.1 Urgency or Degree of Necessity for Protection & Recovery

- How urgently is the answer to the question needed to address a threat limiting the protection or recovery of the species (e.g., priority action listed in the GRS, development of effective avoidance or mitigation measures)?
- How necessary is the answer to the question for:
  - providing a direct benefit to the species; or
  - undertaking future actions to achieve an overall benefit for the species?

### 4.2 Acquisition of New Information

- Is a new relevant question being asked related to the protection or recovery of the species?
- To what degree is the knowledge that is being sought already available?
- To what degree will the scientific study lead to new information (e.g., derived from existing sources through meta-analyses, collection of new information)?
- Does the study comprehensively address the knowledge gap?
- To what degree will the new information contribute to a coordinated effort for the accumulation of scientifically-sound information related to the species?
- Is the study using standardized methodologies and protocols that can be more broadly applied (e.g., incorporated into meta-analyses)?

### 4.3 Feasibility or Ability to Answer Question Posed

- What is the technical feasibility of the scientific study to be completed (e.g., availability of appropriate data sources or analytic tools, likelihood of proposed methods to obtain sufficient meaningful data)?
- Does the study enable science-based adaptive management through the study design (e.g., using scientific methods to test the relative effectiveness of multiple approaches to minimizing adverse effects or achieving an overall benefit)?
- What course of action will be taken if it becomes apparent that the scientific study cannot be completed as proposed (e.g., due to logistical challenges requiring a change to the study methodology)?
- What conditions will trigger the implementation of the supplementary or contingency measures when the intended outcome (i.e. answering the study question(s)) is not being or is not likely to be achieved?

### 4.4 Applicability

- To what degree will the study results be applicable to the species beyond the immediate study site?
  - Will the results be relevant to the local, regional and/or provincial population?
  - For example, results that are relevant for populations at a regional or provincial scale (if applicable), may be considered to contribute more substantially to the protection and recovery of the species.
- What is the level of evidence that the outcome of the scientific study will provide a tangible benefit to the species within a reasonable amount of time?
- When will the results of the study be applied (e.g., as part of the current permit, by an already identified partner organization)?
- How likely is it that the outcome of the scientific study will lead in the short-term to an effective new approach to overall benefit (e.g., through conditions included in other permits), undertaking recovery actions, avoiding impacts to the species, and/or minimizing adverse effects to the species?

### 4.5 Availability/Dissemination

- To what extent will the study results and supporting data be disseminated and made available in the public domain?

If a successful new technology has been developed as part of an overall benefit permit, the more it is made available in the public domain, the more it may contribute to an overall benefit plan.

## 5 Explanation of Related Terms

**Scientific study:** For the purposes of this document, scientific studies that contribute towards achieving an overall benefit to the species include research and, in some circumstances, monitoring and assessment studies that are designed to address a relevant knowledge gap that extend beyond the standard impact and effectiveness monitoring requirements of an overall benefit permit.

**Research:** For the purposes of this document, research involves the development and synthesis of fact-based knowledge derived through rigorous scientific methods. Research projects are framed within the context of a specific research question and the process for answering of the question is supported by an appropriate study design, data collection, analysis and interpretation.

**Impact monitoring:** a standard requirement in overall benefit permits that involves the collection and summary of scientific data on the adverse effects of the authorized activity on the species. The results of impact monitoring can be used to improve future predictions of the potential adverse effects of particular activities on species at risk. Impact monitoring is tied to the impact of the activity being undertaken that requires the permit.

**Effectiveness monitoring:** a standard requirement in overall benefit permits that involves the collection and summary of scientific data on the success of steps taken to minimize adverse effects of the activity on the species and approaches taken to achieve an overall benefit for the species. The results of effectiveness monitoring should be used to increase the success of mitigation measures and overall benefit actions for species at risk.

## 6 Reference

MNR. 2012. Endangered Species Act Submission Standards for Activity Review and 17(2)(c) Overall Benefit Permits. Ontario Ministry of Natural Resources, Peterborough, Ontario. 14 pp.

