8 DEVELOPING AN OFFSETTING PLAN AND APPLYING FOR A *FISHERIES ACT* AUTHORIZATION AND/OR SARA PERMIT (STEP 7)

Overview of Step 7: Developing an Offsetting Plan and Applying for a *Fisheries Act* authorization and/or *Species at Risk Act* permit.

Purpose	• To establish parameters for the development of an offsetting plan.
Tasks	• Evaluate options for offsetting measures including type & location for offsetting. • Quantify amount of offsetting in consultation with DFO.
Decisions & Documentation	• Develop an offsetting plan in consultation with DFO and MTO. • Submit to DFO.

8.1 OVERVIEW OF OFFSETTING PROCESS

Once DFO has advised MTO that a *Fisheries Act* authorization is required, MTO must develop an Offsetting Plan to counterbalance the unavoidable death of fish or HADD of fish as part of the preparation of an Application Form for the Issuance of an Authorization under Paragraph 34.4 (2)(b) and 35(2)(b) of the *Fisheries Act* (Non-Emergency Situations).

In some circumstances, it is apparent early in the design that a *Fisheries Act* authorization will be required. In such cases, the fisheries assessment specialist should advise accordingly and discussions with MTO should be undertaken as early as possible in order to prepare for the development of an Offsetting Plan. This allows MTO and MTO Service Providers to take advantage of conducting additional investigations, if necessary, during relevant sampling seasons and provides the opportunity to document adequate offsetting locations, consult with agencies and stakeholders, and develop ideas while minimizing impacts to the project schedule to the extent possible. Decisions and actions associated with Step 7 of the MTO Fisheries Protocol are illustrated in Figure 8-1. This section is structured as follows:

8.1.1 Offsetting Principles

- Describes the various offsetting principles, including, the types of offsetting measures (habitat rehabilitation and enhancement, and habitat creation), offsetting location considerations (e.g., on-site, off-site), and offsetting types (e.g. like-for-like habitat replacement, fish passage improvements).

8.1.2 Offsetting Plans

- Provides the details on producing an Offsetting Plan, including selecting offsetting measures, determining the amount of offsetting required, and establishing monitoring and reporting. This process will typically involve multiple discussions between MTO, MTO Service Providers, and DFO. MTO Service Providers should review the Applicant's Guide Supporting the "Authorizations Concerning Fish and Fish Habitat Protection Regulations.

8.1.3 Application for *Fisheries Act* authorization and SARA permit

- Provides an overview of the application process for submitting an Application Form for the Issuance of an Authorization under Paragraph 34.4 (2)(b) and 35(2)(b) of the *Fisheries Act* (Non-Emergency Situations) and an Application for a Species at Risk Permit.

Note: Application Form for the Issuance of an Authorization under Paragraph 34.4 (2)(b) and 35(2)(b) of the *Fisheries Act* (Non-Emergency Situations) shall not be completed unless directed to do so by DFO.

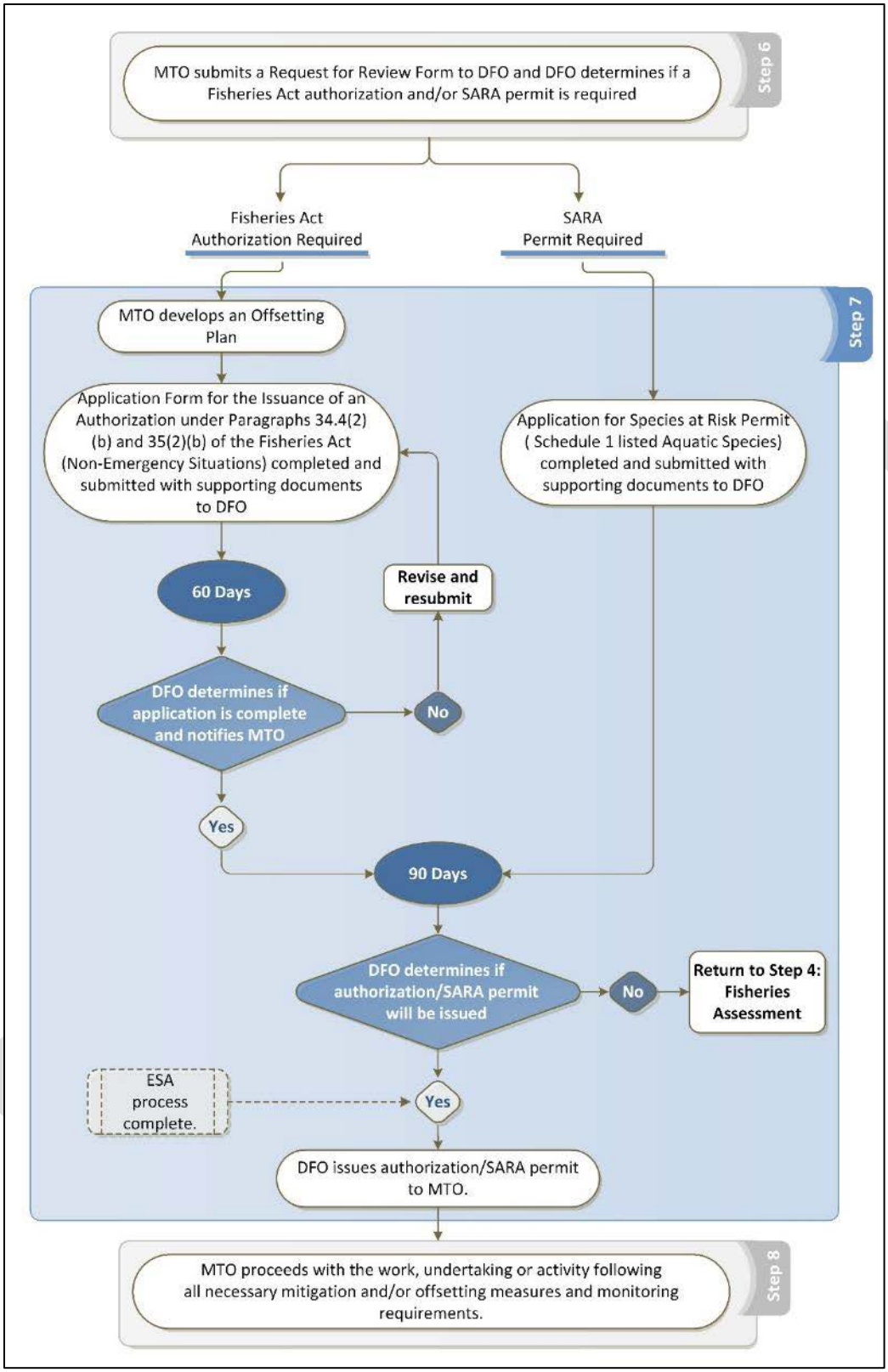


Figure 8-1. Decision and Actions for Step 7 of the MTO Fisheries Protocol

8.2 OFFSETTING: GENERAL PRINCIPLES

Offsetting measures, also known as offsets, are measures that are undertaken to counterbalance the residual effects on fish and fish habitat at a given location, with measurable benefits for fish and fish habitat. These measures may take place where the residual effects will occur or elsewhere. Measures to offset may include but are not limited to:

- Restoring degraded fish habitat to improve conditions for the production of fish;
- Enhancing fish habitat to improve conditions for the production of fish; and,
- Creating productive and sustainable fish habitat where none existed before.

When determining the location for offsetting, offsets that occur within the vicinity of the project or within the same watershed are preferable. Offsetting measures could be undertaken in waterbodies or target fish species other than those affected by the project, provided the measures are supported by clear fisheries management objectives or regional restoration priorities. Consultations, such as with MNR, or other agencies/stakeholders may also provide feasible options for offsets and shall occur as early as possible.

Offsetting Plans are negotiated on a case-by-case basis and DFO should be consulted early in the process. Some projects are complex or otherwise likely to cause lasting changes to habitat. In those cases, substantial planning by the fisheries assessment specialist will be needed to identify appropriate measures for avoidance, mitigation and offsetting of the death of fish or HADD of fish habitat.

Offsets may take a variety of forms, ranging from local improvements to fish habitat to more complex measures addressing factors limiting fish production. The choice of appropriate offsetting measures will vary based on the size, duration and intensity of the negative residual effects.

When considering the application of offsetting measures, MTO Service Providers should select measures that meet DFO's guiding principles outlined below and in DFO's Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the *Fisheries Act*.

Principle 1: Measures to offset should support fisheries management objectives and give priority to the restoration of degraded fish habitat.

Principle 2: Benefits from measures to offset should balance the adverse effects resulting from the works, undertakings, or activities.

Principle 3: Measures to offset should provide additional benefits to the ecosystem.

Principle 4: Measures to offset should generate self-sustaining benefits over the long term.

DFO's Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the *Fisheries Act* sets out the information requirements and documentation of an Offsetting Plan. These requirements include, but are not limited to:

- The geographic coordinates of the location where measures to offset will be implemented.
- A small-scale site plan identifying the general location and boundaries of the location where the measures will be implemented.
- A detailed description of the measures and an explanation of how those measures will meet their objectives.
- A detailed description of the monitoring measures that will be put in place to assess the effectiveness of the selected measures to offset.
- A description of the contingency measures and associated monitoring measures that will be put into place if the selected measures are not successful in meeting their objectives.
- A detailed description of any adverse effects on fish and fish habitat that could result from the implementation of the plan.
- A detailed description of the measures that will be implemented to avoid or mitigate the adverse effects and an explanation of how those measures will meet these objectives, and
- The timeline for the implementation of the plan.

8.3 TYPES OF OFFSETTING MEASURES

There are two typical types of offsetting measures used by MTO. These include habitat restoration and enhancement and habitat creation, which are discussed in detail in the following sections.

8.3.1 HABITAT RESTORATION AND ENHANCEMENT

Habitat restoration and enhancement includes physical manipulation of existing habitat to improve its capacity to produce and sustain fish. Examples of habitat restoration and enhancement offsetting measures may include but are not limited to:

- Increasing structure through the placement of coarse material or large woody debris to improve fish habitat components such as spawning beds;
- Increasing shoreline complexity;
- Stabilizing river banks using bioengineering methods and re-vegetating of riparian areas;

- Improving access to off-channel habitats;
- Removal of anthropogenic barriers to fish migration;
- Establishing or enhancing vegetated areas in lakes, estuaries and coastal areas;
- Improving local hydraulic conditions to favour certain functions of fish habitat; and/or,
- Habitat restoration and enhancement offsets generally focus on areas where habitat conditions are considered poor or degraded.

The time necessary for the restoration and enhancement measures to become functional are generally short when the offset involves physical manipulation of habitat or construction/placement of structures, as these are colonized quickly by fish.

Outcomes of habitat restoration and enhancement offsets are well documented in the literature. Consequently, the uncertainty about the efficacy of this type of offsetting is generally low but reported outcomes of restoration and enhancement activities are highly variable. Reviewing the current scientific literature for and applying lessons learned to the design and construction of the offset will improve success. Studies suggest that the likelihood of success (i.e., improvement of fisheries production) is higher for projects where the following are incorporated in their design:

- Restoration and enhancement structures are designed and engineered to withstand high flows, storm events, ice, etc.
- Habitats or habitat features limiting fisheries production are known and restoration and enhancement actions target those habitats or features.
- Monitoring and maintenance of offsets is included as part of the offsetting project. The length of time required for monitoring and maintenance will depend on complexity of the offsetting design and whether that type of offsetting has been successful at other sites.
- Habitat requirements of all life stages of the fish species expected to benefit from the restoration or enhancement actions are present within the watershed or landscape and can be accessed by all life stages.
- Public consultation and coordination between jurisdictions and stakeholders are integrated into the project and design.
- Hydrological conditions and channel processes are considered such that the restored or enhanced features remain stable, and restoration and enhancement can occur without affecting downstream or proximal habitats.
- Consequences of barrier removal are considered in relation to changes in predator-prey relationships or invasive species.

8.3.2 HABITAT CREATION

Habitat creation is the development or expansion of aquatic habitat into a terrestrial area. These offsetting measures are generally used when the fish habitat was degraded

by a project and cannot be restored by manipulation of the original or surrounding fish habitat. DFO typically requires some component of habitat replacement be incorporated in the offset plan if there is direct loss of habitat. Like-for-like habitat creation (i.e. replacement of the habitat lost or permanently altered with the same kind of habitat) can be expected to maintain the fish productivity within the area affected by the development project. Creation of a different habitat type must be supported by the knowledge that changing one habitat feature for another will improve productivity.

Habitat creation offsets can include:

- Creation or expansion of natural stream channels.
- Creation of lakes or ponds.
- Creation or reconnection of side channel or backwater habitats.
- Creation of wetlands.

Gains for habitat creation can be similar or greater than those of the affected area. The effectiveness of offsets where new habitats are created is influenced by a variety of physical and biological factors and as such, there is less certainty around meeting specific fisheries management goals than for habitat restoration or enhancement type offsets.

Habitat creation offsets are most successful in increasing the productivity of fish and fish habitat when:

- Factors limiting productivity of the fish and fish habitat are known and understood.
- Adult fish using the habitats are not subject to exploitation (i.e., fishing pressure) such that the potential increase in productivity is not fully realized.
- The public, Indigenous communities and government agencies have been consulted and endorse the created habitat and corresponding loss of terrestrial habitat.
- The sustainability of the habitat and associated productivity of the habitat are integrated into the structural design.
- Protection and maintenance plans are developed to ensure the habitat and productivity are sustained.
- Tenure and history of the project area are considered.
- Offsetting is “like for like”.
- Biological transplanting (invertebrates, vegetation and/or fish) is used to decrease time lag for offsets to becoming fully functional.

Habitat creation can result in negative impacts that must be considered or addressed during the planning stages. Creation of aquatic habitat can result in a direct loss of terrestrial habitat that provides other benefits for humans and terrestrial species. The

gains in aquatic habitat productivity from habitat creation must therefore be weighed against the costs to terrestrial flora and fauna.

Creating accessibility to previously isolated habitat through habitat creation can result in unintended consequences such as disruption of predator-prey relationships, unintentional benefits to productivity of non-target species, and introduction of invasive species. Similarly, expanding stream or lake habitats may have unintended indirect or secondary effects on the existing habitats (e.g., through modification of fluvial geomorphic processes, introduction or 'favouring' of unintended fish or animal species). The implications of such unintended consequences must be considered and addressed in the planning and design of habitat creation offsets.

8.4 PREFERENCES FOR LOCATING OFFSETS

The linear nature of highway transportation projects often creates situations where impacts are unavoidable. Similarly, the linear confined nature of the right-of-way (ROW) also creates challenges for offsetting and the type of offsetting opportunities.

The following general principles should be kept in mind for MTO projects:

- All feasible offsetting options should be explored on-site first. If there are no feasible on-site options, opportunities to locate offsets off site, first on public land, and as a last resort on private land, should be identified.
- Offsetting should focus on measures where the risks and effectiveness are generally understood.
- Incorporating appropriate specialist involvement in design as well as construction and inspection will also be the key depending on the nature of the offset.
- Monitoring the effectiveness of the offsetting measures will be required. It is important to avoid setting targets that may be too specific and difficult to meet.

Given the spatial and other constraints associated with highway projects, partnerships with other agencies or interest groups may provide good opportunities, especially where large offsets are required.

8.4.1 ON-SITE OFFSETS

For practical reasons, offsets should be located on-site, within the project property limits/ROW whenever possible. On-site locations are preferred because the land is owned by MTO, and the necessary equipment and construction crews are often available on-site if the offsetting is constructed during the project. Public access to the site can also be controlled, minimizing interference and disturbance/removal of materials used for the offsets (e.g., planted vegetation) and ongoing access for monitoring and maintenance is assured.

However, developing appropriate and beneficial on-site offsets within the ROW can present challenges due to many factors (e.g., physical and/or operational restrictions, safety considerations, reducing wildlife-vehicle interactions, a limited number of opportunities available, etc.). Space within a ROW, can be restricted, which may make it challenging to create new fish habitat. In addition, fish habitat offsets within the ROW may potentially be impacted by future expansion or maintenance activities.

8.4.2 OFF-SITE OFFSETS

Where it is not feasible or practical to locate offsets on-site, off-site locations can be considered. In these situations, it is important to discuss with relevant agencies, such as MNR and DFO.

8.4.2.1 OFF-SITE OFFSETS ON OTHER PUBLICLY OWNED PROPERTY

Off-site offsets on other publicly owned land should be explored first as construction and future maintenance is usually more easily negotiated and more certain than on private land. There are often on-going habitat or management/stewardship projects that provide good opportunities for joint ventures. MNR or other agencies may be aware of on-going or pending fish habitat creation or enhancement projects that could benefit from additional support, as part of broader watershed and fishery programs.

8.4.2.2 OFF-SITE OFFSETS ON PRIVATE PROPERTY

Locating offsets off-site on private land is the least preferred option but, where there are no other locations available, these locations can be considered. In some cases, there may also be on-going habitat or management/stewardship projects on private land that provide good opportunities for support. MNR or other agencies and interest groups (e.g., Ontario Streams, Trout Unlimited, local angling groups, MNR supported stewardship programs) may be aware of on-going fish habitat creation or enhancement projects that could benefit from additional support as part of broader watershed or stewardship initiatives. Typical examples include cattle fencing, off-line watering for livestock, removal of fish barriers, riparian plantings, or erosion repair/protection works.

Offsets on private land will require negotiation of an agreement between MTO and the landowner that includes consent of the landowner to the location of the offset on their land, access for construction, as well as future access to conduct any post-construction monitoring that may be required. Liability for any unanticipated alteration/changes on private land is also a consideration. In some cases, contribution of funding or materials and/or equipment to an on-going project, usually in cooperation with another public agency or interest group, may present a feasible option.

8.5 TYPICAL OFFSET TYPES

8.5.1 LIKE FOR LIKE HABITAT REPLACEMENT

Like for like offsets are where habitat that is destroyed or permanently altered is replaced by the same quantity and quality of similar habitat, with additional habitat offsetting often required to account for uncertainty and time lags. This is the preferred offsetting approach for projects with small or medium impacts, which is typically the case with MTO projects. By keeping losses and gains comparable in habitat type and area, it is reasonable to assume that the overall productivity will be maintained. However, as the amount of negative residual effects and their severity increases, there is a corresponding increase in cost and uncertainty, and it becomes less feasible to implement like-for-like replacement offsets.

8.5.2 IMPROVEMENT OF FISH PASSAGE

Movement between the different types of habitat for all life processes (i.e., spawning, nursery, rearing, feeding and seasonal refuge) is critical to the sustainability and productivity of many fish species. The barrier may be permanent or seasonal and natural or man-made. The removal of barriers to fish movement increases the sustainability and productivity by increasing fish access to previously unavailable habitats. Removal of barriers often results in the immediate upstream migration of many fish species, as well as increases in the fish stock over the longer term.

On-site opportunities are often available on existing highways. These should be discussed with MNR and possibly DFO as early as possible to determine whether these are feasible. For example:

- Removal of a ‘perched’ culvert outfall, either through replacement or channel modifications to provide access.
- Creation of a low flow channel through a culvert or narrow structure opening to provide passage under low flow conditions.
- Replacement of an undersized culvert or narrow structure opening that creates a ‘velocity’ barrier during high flow conditions.
- Replacement of over-steepened culverts or retrofit of culverts to permit fish passage (i.e., baffles, waterbody aggregate).
- Replace with a more fish-friendly crossing design (e.g., replace a culvert with a bridge).

Other opportunities on or off-site include:

- Naturalization of over-steepened sections of waterbody (i.e., recreate a meandering channel using natural design concepts) where past channelization has reduced length and increased slope.

- Removal or by-pass of on-line ponds that have weirs or dams.
- Providing access to other habitat areas, either seasonally or permanently (e.g., re-connecting wetland or floodplain habitat features, re-creating channels through dense vegetation in wetland habitats).

Removal of barriers can have unintended consequences when barriers separate different fish species that may compete with one another for habitats or food, or when they have prevented the movement of invasive/parasitic species/disease (or in some cases previously excluded top predator species). Therefore, understanding the dynamics of the fish community in conjunction with fisheries management objectives is important prior to considering barrier removal.

Removal of barriers can result in changes in channel morphology. Local reconstruction of the connecting channel sections will typically require upstream or downstream adjustments to the channel to accommodate the removal of the barrier. Channel process and morphology must be considered when barrier removals are planned and designed. Implementation, including proper construction, is also a key consideration depending on the complexity of the design that supports the barrier removal.

Sediment may have accumulated behind barriers (e.g., dams, on-line ponds, beaver dams) that have been in place for long periods of time. Removal of accumulated sediment may be required prior to or after removing the barrier. In other situations, letting the sediment naturally redistribute downstream may be preferred if the downstream areas show signs of sediment transport issues (i.e., channel degradation/hardening, lateral erosion, etc.). Removal of dams that have been in place for long periods will also trigger fluvial geomorphic adjustments (e.g., down or head-cutting up through the pond bed).

8.6 DEVELOPING AN OFFSETTING PLAN

The Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the *Fisheries Act* sets out the information requirements and documentation of an Offsetting Plan. MTO Service Providers should develop Offsetting Plans in a manner that is specific to the residual effects of the project. The key steps in preparing an Offsetting Plan which are detailed in are as follows:

Step 1: Characterize the residual effects: death of fish and HADD of fish habitat
Step 2: Select measures to offset
Step 3: Determine the amount of measures to offset required
Step 4: Establish the monitoring and reporting plan
Step 5: Submit Offsetting Plan to DFO for review

Offsetting Plan & Costs

The requirements for an Offsetting Plan are provided in the Applicant's Guide Supporting the "Authorizations Concerning Fish and Fish Habitat Protection Regulations". However, there are exemptions to the requirements when the applicant is His Majesty in right of a province.

As such, MTO projects **are not** required to provide:

- An irrevocable letter of credit to cover the costs of implementing the Offsetting Plan.
- Cost estimates for each element of the Offsetting Plan (typically associated with the letter of credit for other proponents).
- A description of the proposed steps to access lands, water sources, or waterbodies not owned by the applicant.

8.6.1 SELECT OFFSETTING MEASURES

Based on information from the fisheries assessment and the Fish and Fish Habitat Impact Documentation, including the extent, duration, and intensity of each negative residual effect on fish and fish habitat, the Offsetting Plan should include:

- Information about the objective of the proposed offsetting measure;
- Details about the measures that are proposed;
- Details on how these offsetting measures were selected. Typically, this includes the consultation and rationale that went into the decision making; and,
- An analysis of how the offsetting measure will meet their objective(s). The analysis should describe the methodology used and an estimate of the offset. Applicants should also use scientifically defensible methods and techniques in their analyses.

The proposed offsetting measures must meet the guiding principles for offsetting measures described earlier. The Offsetting Plan should include clearly articulated measures of success that are linked to the objective of the offsets and that provide benchmarks for measuring progress, as well as a schedule that reflects the timeline, start and end dates for implementing the offsetting measures.

8.6.2 DETERMINE THE AMOUNT OF OFFSETTING REQUIRED

To determine the amount of offsetting required to counterbalance the effects of a proposed project or activity, the proponent should consider that offsetting measures:

- Should provide benefits that are proportional to the loss caused by the project;
- May need to be increased to manage uncertainty associated with the proposed offset; and,

- May need to be increased when there is a time lag between the impact and the time it takes for the offsetting measures to become functional.

8.6.3 DETERMINE THE MONITORING AND REPORTING CONDITIONS

Monitoring and reporting conditions must be described in the Offsetting Plan as they will be included as conditions of the authorization. Common monitoring and reporting conditions may include the provision of:

- Dated photographs of works undertakings, activities or operations related to mitigation measures and photographs of completed offsetting measures,
- Timelines for monitoring and reporting;
- Monitoring and inspection records;
- Details of any mitigation changes, corrective actions or contingency measures that were followed if mitigation or offsetting measures did not function as described; and,
- The methodology and criteria that will be used to evaluate the success of the offsetting measures.

Monitoring and reporting of offsetting measures must be undertaken over a sufficient timeframe to allow for:

- Biological or physical changes to be reflected in the data collected;
- Possible adjustments to the monitoring to better estimate changes in productivity of fish and fish habitat; and,
- The restored habitat to reach full ecological functionality (that is, supporting fish reproduction, growth, and survival).

8.6.3.1 MONITORING

The purpose of monitoring is to determine whether the proposed offsetting measures have been effective in offsetting the death of fish or HADD of fish habitat. The description of the monitoring measures to be undertaken as part of the Offsetting Plan should include:

- A schedule and timeline of each element of the monitoring program (inspections, monitoring and reporting);
- Success criteria for compliance; and,
- Commitments to be provided including:
  - Dated photographs of works undertakings, activities or operations.
  - Photographs of completed offsetting measures.

- Monitoring and inspection records.
- As-built surveys if required in the *Fisheries Act* authorization, and
- Details of any mitigation changes, corrective actions or contingency measures that were followed.

The compliance monitoring component of the Offsetting Plan should cover a sufficient timeframe to allow for the demonstration that the offsetting measures have stabilized and are functioning as intended. Typically, DFO requires a minimum of three years post-construction monitoring of offset habitat which may be undertaken in consecutive years (e.g., year 1, 2 and 3) or staggered years (e.g., year 2, 4 and 6), and allows for:

- Biological or physical changes to be reflected in the data collected.
- Possible adjustments to the monitoring to better estimate changes in productivity of fish and fish habitat, and
- The restored habitat to reach full ecological functionality (that is, supporting fish reproduction, growth, and survival).

Additional details regarding compliance and effectiveness monitoring are provided in Section 9.

8.6.3.2 REPORTING

MTO is responsible for reporting on implementation of the offsets and the results of monitoring. The Offsetting Plan should outline the information that will be provided in both compliance monitoring and effectiveness monitoring reports. Compliance monitoring reports should include:

- Area and type/description of habitat(s) lost, including date(s) of loss.
- Area and type of habitat offset(s) including date of completion and date of measurement.
- Calculated (realized) offset ratio and comparison to the proposed ratio established in the Offsetting Plan.
- Discussion of the stability and any structural/habitat changes of the offset habitat and, if needed, a discussion of need for repairs or implementation of contingency measures.
- Quantitative targets for establishing effectiveness (habitat-appropriate biological metric taken from the Offsetting Plan).
- Measured effectiveness (mean and error of target biological metric) and date (range) of monitoring.
- Detailed field methods, sampling intensity and duration to be provided in the monitoring report.

- As-built drawings of the constructed offset habitat.
- Discussion of the effectiveness of the offset habitat (i.e., how does the biological metric relate to quantitative target, dependent on the age of the offset and benchmark targets established in the Offsetting Plan).
- Discussion of need for additional studies if targets have not been met.
- Discussion of need for additional monitoring depending on the expectation of the ongoing effectiveness, stability, and functionality of the offset habitat.

8.7 SUBMIT AN APPLICATION FOR A *FISHERIES ACT* AUTHORIZATION

MTO, as the proponent will prepare an Offsetting Plan according to the information requirements set out in the Application Form for the Issuance of an Authorization under Paragraph 34.4 (2)(b) and 35(2)(b) of the *Fisheries Act* (Non-Emergency Situations). The Offsetting Plan is submitted as part of MTO's application for a *Fisheries Act* authorization. A Fisheries Assessment Specialist (MTO or Service Provider) will complete the Application Form as well as well as the Offsetting Plan. MTO signatures are required by a MTO Manager, Engineering Program Delivery or Director of Regional Operations for Major Capital Projects and Minor Capital Projects respectfully. The submission of the Application to DFO is typically done by the MTO signing authority.

Once the application is submitted, DFO has 60 days to determine that the application is complete. If the application is not complete, DFO will notify MTO and identify the information or documentation required and the 60-calendar day review period ceases, and the timelines will be reset. MTO will then resubmit the necessary documentation and the 60-calendar day review period starts over again.

Once complete, DFO will either issue an authorization, issue a Letter Advice identifying an authorization is not required, or in rare cases notify the applicant that the authorization is refused within 90 calendar days. There are several circumstances under which the time limit ceases to apply (e.g., applicant request, change of information, Indigenous consultation).

Upon receipt of an approved authorization, MTO can proceed with the project, following all the terms and conditions outlined in the authorization. Should DFO decline to authorize the death of fish or HADD of fish habitat, MTO cannot proceed with the project without risk of being in non-compliance with the *Fisheries Act*. If declined, the project would require redesign and/or additional mitigation/relocation measures and re-submission to DFO for further review.

Detailed information on the process and time limits is provided in the Applicant's Guide Supporting the "Authorizations Concerning Fish and Fish Habitat Protection Regulations".

8.8 SUBMIT AN APPLICATION FOR A SARA PERMIT

If DFO determines that a SARA permit is required in addition to a *Fisheries Act* authorization, DFO will notify the contact listed on the Request for Review Form. The project fisheries assessment specialist shall complete the application and submit to MTO for review prior to submission to DFO with the Application Form for the Issuance of an Authorization under Paragraph 34.4 (2)(b) and 35(2)(b) of the *Fisheries Act* (Non-Emergency Situations). This process is outlined in Figure 8-1.

When DFO determines that *Fisheries Act* authorization is required in addition to the SARA permit, DFO has the option to issue a SARA-Compliant *Fisheries Act* authorization. If issued, the SARA-Compliant *Fisheries Act* authorization will contain all terms and conditions necessary to meet SARA requirements and a separate SARA permit will not be issued.

If DFO declines to issue the SARA permit or SARA-Compliant *Fisheries Act* authorization, the project must return to Step 4 and review how DFO concerns (e.g., additional/alternative avoidance or mitigation options) can be addressed.

The SARA application form and accompanying instructions are available on the DFO website: Permitting under the *Species at Risk Act*.

8.9 AMEND, SUSPEND, OR CANCEL A *FISHERIES ACT* AUTHORIZATION AND/OR SARA PERMIT

During the construction process, the contractor may encounter unforeseen/unanticipated circumstances, such as extreme weather events or other uncontrollable occurrences, changes to construction activities or equipment, unexpected site conditions etc., that have implications on the design and/or construction schedule.

If activities cannot be completed in accordance with the conditions of the *Fisheries Act* authorization, an amendment to the authorization will likely be required. Amendments can take several months to be approved as they follow the same 60-day/90-day timelines as the initial authorization application and may require additional review and consultation. There is also no guarantee that the amendment request will be approved, especially if the request is in regard to an extension of the in-water work timing window.

Rarely, there may be a need to suspend or cancel a *Fisheries Act* authorization. This would likely only occur in instances where the *Fisheries Act* authorization was obtained early in the design and the project was put on hold by MTO. DFO may also amend, suspend, or cancel an authorization under certain conditions, including determination that the authorization was obtained by fraudulent means or if new information demonstrates significantly greater impacts than anticipated.

MTO may submit a request to amend, suspend, or cancel a *Fisheries Act* authorization in whole, or in part. Applications for each of these are available on the DFO 'Projects Near Water' website.

The MTO Environmental Planner and MTO Project Manager must be notified as soon as it is determined that there may be an issue with meeting the conditions of a *Fisheries Act* authorization, regardless of the reason (e.g., change in design, change in timing/dates). Early engagement with the DFO Regulatory Review Biologist is also required to ensure the process moves as quickly as possible.

Similarly, if a SARA permit has been obtained for a project and there are necessary design or timing changes, an amendment to the permit will likely be required. There is no formal application for amending a SARA permit currently. However, as above, MTO and DFO should be engaged as soon as possible to minimize project delays.

9 PROJECT IMPLEMENTATION AND MONITORING (STEP 8)

Overview of Step 8: Project Implementation and Monitoring.

Purpose	• To ensure that during construction the work proceeds as approved and monitoring is conducted to confirm commitments are met and critical design features are installed as intended.
Steps	• Develop monitoring plan based on the complexity of the project. • Ensure monitoring and follow-up is completed. • Ensure duty to notify procedures are followed, as required.
Decisions & Documentation	• Complete appropriate monitoring forms.

The purpose of this section is to assist the user in understanding the expectations of MTO regarding monitoring of construction projects including:

- Monitoring for projects with *Fisheries Act* authorizations including:
  - Potential requirements for monitoring during construction and post-construction, and
  - Qualifications for monitoring personnel.
- Monitoring for projects without *Fisheries Act* authorizations; and
- Duty to notify of death of fish or HADD of fish habitat during construction.

9.1 MONITORING FOR PROJECTS WITH A *FISHERIES ACT* AUTHORIZATION

A *Fisheries Act* authorization typically includes construction and post-construction monitoring and often pre-construction monitoring to document compliance with the conditions of the *Fisheries Act* authorization and Offsetting Plan. This monitoring is undertaken by a fisheries contracts specialist. Section 11 details the education and experience requirements for a fisheries contracts specialist.

9.1.1 PRE-CONSTRUCTION MONITORING

The *Fisheries Act* authorization may include requirements for pre-construction monitoring. The purpose of pre-construction monitoring is to document baseline conditions very clearly, particularly for monitoring Offsetting Plans where documentation of pre-construction conditions will usually be required to support compliance and effectiveness monitoring. This typically includes photographs of the existing conditions. The photographs taken during field investigations may be sufficient for this purpose. See Section 5 for details on describing existing conditions and requirements of photographic records.

9.1.2 CONSTRUCTION MONITORING

During construction, the fisheries contracts specialist confirms and documents that MTO complies with the conditions of the *Fisheries Act* authorization. To do this, the fisheries contracts specialist:

- Reviews existing plans for the project, including but not limited to, erosion and sediment control plans, temporary flow management, dewatering plans and environmental incident management plans, and ensures these are being followed with the appropriate measures in place.
- Confirms the above-outlined and all other mitigation measures are being installed/implemented and maintained as designed including providing field advice and necessary corrective actions for non-compliance, and documents whether these

measures are protecting fish and fish habitat effectively throughout construction. Field advice should be provided where the mitigation measures are undertaken/installed as proposed/designed, but are not fully functioning as intended, to protect fish and fish habitat and recommend refinements or augmentation.

- Undertakes monitoring of offsetting measures as outlined in the approved Offsetting Plan.
- Confirms the offsetting measures were constructed as designed, and/or as intended with modification (see also post-construction monitoring) if required. Field modification of the measures as designed may be required based on the site conditions, to ensure they are installed and function as intended.
- The contractor may propose changes, reviews the change proposals for compliance with the *Fisheries Act* authorization and Offsetting Plan and undertakes any necessary fisheries assessments to fish or fish habitat determinations as per the MTO Fisheries Protocol (i.e., undertaken by a fisheries assessment specialist). In these instances, DFO must be consulted on any proposed changes to the compliance monitoring component of the approved Offsetting Plan.
- Documents and inspects any other site-specific requirements within the contract documents.

When completing the monitoring forms, it is the fisheries contracts specialist's responsibility to identify the mitigation/offsetting measures outlined in the contract documents and *Fisheries Act* authorization (if applicable) that require monitoring. As such, these will be project-specific and will likely differ from project to project.

Typically, MTO will provide site-specific monitoring requirements within the contract. The minimum level of inspection frequency to be followed for construction monitoring of mitigation and offsetting measures varies depending on the measure and may also be specified in any authorizations and/or permits obtained for the construction. For example:

- The fisheries contracts specialist should be on-site daily during the installation and removal of dewatering and temporary flow passage systems, dewatering operations, and during the installation of in-water habitat features (offsetting measures or otherwise) with weekly inspections thereafter, unless otherwise identified in the contract or deemed necessary (e.g., deficiencies follow installation).
- ESC monitoring should occur during and immediately following installation of ESC measures and at a minimum weekly thereafter.
- ESC and site isolation measures should also be monitored within 24 hours following a storm event. When a significant storm is forecast, it is beneficial to review the site prior to the storm to identify potential deficiencies so that the contractor can undertake necessary repairs/maintenance in advance and minimize or prevent impacts resulting from the storm.

- Monitoring the effectiveness of corrective actions undertaken to address previously identified deficiencies with potential to impact fish and fish habitat should be completed on an as-needed basis.

Construction monitoring is completed consistently and progressively, to enable comparison over time and to confirm that any potential concerns or recommended follow-up measures and/or corrective actions are addressed in a timely manner as warranted based on the level and imminence of the concern. The written report must include a photographic record.

Three standard types of monitoring reports are to be used:

i. APPENDIX F1: CONSTRUCTION INSPECTION CHECKLIST
ii. APPENDIX F2: NON-COMPLIANCE SUMMARY
iii. APPENDIX F3: CONSTRUCTION MONITORING REPORT

Information regarding these reports is summarized in Table 9-1 below.

Deviations from the approved plans/contract documents, work schedule or mitigation, monitoring and/or offsetting measures should be discussed with MTO and DFO prior to implementation.

Table 9-1. Construction Monitoring Reports

Construction Monitoring Reports			
Details	**Construction Inspection Checklist**	**Non-Compliance Summary**	**Construction Monitoring Report**
Purpose	Document compliance with the MTO Fisheries Protocol, the Contract and the *Fisheries Act* authorization	Document deficiencies with mitigation and/or offsetting measures and suggested corrective actions	Meet/address construction monitoring conditions of the Contract and *Fisheries Act* authorization

Construction Monitoring Reports			
Details	**Construction Inspection Checklist**	**Non-Compliance Summary**	**Construction Monitoring Report**
Distribution (Note: MTO is to identify other recipients at the design handover and/or contract start-up meeting)	Contract Administrator Others (if requested)	Contract Administrator Others (if requested)	Contract Administrator MTO Environmental Delivery DFO Others (if requested)
Warrant for Completion	Every day that an inspection is conducted by a fisheries contracts specialist	Friday of each week when the Contractor is not in compliance with waterbody and fish habitat protection measures, conditions of a *Fisheries Act* authorization, *Endangered Species Act* permit, or *Species at Risk Act* permit, as specified in the Contract Documents	Annually on multi-year construction projects and prior to the completion of construction as specified in the *Fisheries Act* authorization or unless otherwise specified in the Contract Documents
Timing	Distributed within one (1) day of inspection	Distributed by the Monday following the completion of the MTO Non-Compliance Summary	Draft to be distributed by November 15, and final to be distributed by December 15, unless otherwise specified in the Contract Documents

Construction Monitoring Reports			
Details	**Construction Inspection Checklist**	**Non-Compliance Summary**	**Construction Monitoring Report**
Contents	Inspection checklist Photographs Signature of fisheries contracts specialist	Non-compliance Summary Photographs Signature of fisheries contracts specialist	Introduction Site conditions pre-construction Mitigation measures (implementation, functioning, effectiveness, removal) Offsetting measures, Photographs (pre, during/key activities, post-construction) Other as requested by DFO or deemed appropriate by fisheries contracts specialist

9.1.3 POST CONSTRUCTION MONITORING

Post-construction monitoring is done to confirm that the offsetting measures and structures are functioning as designed and successful in providing fish habitat. MTO undertakes construction monitoring using a fisheries contracts specialist for projects with a *Fisheries Act* authorization.

9.1.3.1 MONITORING OFFSETTING

The Applicant's Guide Supporting the "Authorizations Concerning Fish and Fish Habitat Protection Regulations" provides guidance on the submission for a *Fisheries Act* authorization. It specifies that the Offsetting Plan must include:

> **"**A detailed description of the monitoring measures that will be implemented to assess the effectiveness of the measures and standards".

See Section 8 for details on developing the monitoring program for the Offsetting Plan.

The monitoring must incorporate both compliance monitoring, to ensure that the offsets were implemented as designed, and effectiveness monitoring, to demonstrate that the offset maintained or increased productivity to fish and fish habitat.

9.1.3.2 COMPLIANCE MONITORING

Compliance monitoring documents how MTO has fulfilled the conditions of the authorization through mitigation and offsetting measures. This type of monitoring involves conducting a primarily visual survey of the offsetting measures in order to assess and document their condition, stability and general functioning. Specific compliance monitoring requirements are outlined in the *Fisheries Act* authorization and based on the Offsetting Plan that was developed. Typically, these may include specific items such as:

- Photographic records.
- Survey to determine the success of vegetative plantings.
- Confirmation on the success of constructed fish habitat features.
- Effectiveness of erosion control measures and site stability.

9.1.3.3 EFFECTIVENESS MONITORING

Effectiveness monitoring documents whether the offsetting activities identified in the Offsetting Plan have been effective in counterbalancing the death of fish or HADD of fish habitat and identifies the need for implementing contingency measures should deficiencies be found. Effectiveness monitoring incorporates:

- Established success criteria:
  - At site-scale (e.g., is it performing as intended, have quantitative targets been achieved or are results trending in the right direction?).
  - Monitoring of habitat use where and as appropriate, including by type/category, (e.g., spawning, nursery, rearing, food supply, and migration habitats).
- Science based, quantitative targets to evaluate achievement of offsetting goals.
- Likelihood of success of offsetting based on documented evidence (i.e., where uncertainty of offsetting success is high, monitoring should be of higher frequency and more intense; alternatively, where uncertainty of offsetting success is low, frequency and intensity of monitoring can be lower).
- Defined metrics for monitoring (direct and indirect, linked to scale). Metrics should be the same used in the characterization of the baseline.
- Monitoring design decision (e.g., location of reference site, control, sampling intensity, sample size, etc.).

Additional monitoring may be required beyond that identified by the *Fisheries Act* authorization if offsets are found to be not as effective as intended and/or if contingency measures identified in the Offsetting Plan need to be implemented.

9.1.4 AMENDMENTS TO THE *FISHERIES ACT* AUTHORIZATION AND/OR SARA PERMIT TIMING RESTRICTIONS

As discussed in Section 8.9, if during construction it is determined that any condition of a *Fisheries Act* authorization and/or SARA permit cannot be met, an amendment to the authorization/permit may be required.

If activities cannot be completed within the appropriate in-water work timing window and there is no change in scope and/or activity, contact DFO to request an extension or an amendment to the timing window. Prior to contacting DFO, the biologist from MNR and/or MECP (if SAR are present) must be contacted to discuss if works can occur outside of the permissible in-water work timing window. This information should be included in the request to DFO. At DFO's discretion, an extension may be granted or DFO may request a new application be submitted.

9.2 MONITORING FOR PROJECTS WITHOUT A *FISHERIES ACT* AUTHORIZATION

MTO has no explicit commitments under the *Fisheries Act* for monitoring projects that do not require *Fisheries Act* authorizations. However, construction inspection/monitoring is a standard requirement for MTO projects, and all projects must ensure compliance with all legislative requirements and mitigation measures set out in the contract documents. Additional monitoring may be required to ensure the protection of fish and fish habitat throughout, and after construction.

Typically, the contract administrator and contractor both monitor during construction to ensure the proper and effective implementation of the design and all mitigation measures. If environmental incidents occur, it is the responsibility of the contractor to follow General Conditions of Contract (OPSS.PROV 100) which details environmental incident management and reporting responsibility.

For projects where monitoring requirements have not been identified, the inspection and general reporting may be done by an appropriately qualified general environmental inspector reporting to the contract administrator.

Even when a project is not likely to result in the death of fish or HADD of fish habitat, if there is in-water work or potential for effects on fish and fish habitat (e.g., sensitive fishery or presence of SAR (see Section 9.7)), MTO may elect to require that the monitoring be completed by a fisheries contracts specialist. Where applicable the contract documents will include specific monitoring requirements and provide the details to the fisheries contracts specialist. Typically, this would include monitoring to ensure

mitigation measures and habitat features are properly installed, maintained, and are functioning properly. Construction monitoring requirements are similar to projects with a *Fisheries Act* authorization (see Section 9.1.2) or as outlined in contract provisions.

It is important to note that if a new design, product, or technology is used, the project design team should consider if during/post construction monitoring is required to document how it performs, potential modifications for future use, and whether or not it has application for similar projects in the future.

Typically, post-construction monitoring is not required for a project where there is no *Fisheries Act* authorization. However, in some situations post-construction monitoring may be recommended by the fisheries assessment specialist, or requested by MTO to verify, for example:

- Survival of riparian plantings;
- Slope/soil stabilization adjacent to a waterbody;
- Stability of a low flow channel through a culvert;
- Any fish passage issues;
- Success of new design, product, or technology; and/or,
- Confirm design conditions were constructed and functioning to meet fisheries commitments.

These will be determined on a project-by-project basis in consultation with the design team and MTO.

9.3 SARA/ESA PERMIT MONITORING

Monitoring is also a requirement of SARA and ESA permits and may include pre-construction, construction, and post-construction monitoring. Monitoring requirements are specific to the project and the permit; however, the requirements typically include but are not limited to the following:

- Daily ESC monitoring;
- Monitoring the effects of the activity and the avoidance and mitigation measures to determine whether they were conducted in accordance with the permit and were successful at avoiding and mitigating the impacts of the permitted activities on the species;
- Monitoring during handling/relocation of aquatic species (SAR and non-SAR);
- Voucher specimen collection (SARA permits); and,
- Yearly monitoring report.

Monitoring is undertaken by a qualified species at risk monitoring specialist. Their qualifications will be outlined in the contract if monitoring will be conducted by the contractor or in the Environmental Specialty Plan in the Contract Administration Terms of Reference if conducted by the contract administrator. The qualified species at risk monitoring specialist does not need to be a fisheries contracts specialist; however, if both roles are required on a project, they may be fulfilled by the same individual provided that all qualifications for each role are met.

Like the *Fisheries Act* authorizations and SARA Permits, if during construction it is determined that any condition of an ESA permit cannot be met, a permit amendment will likely be required. Contact MTO Environmental Delivery for details on how to proceed.

9.4 DUTY TO NOTIFY, SPILLS, AND EMERGENCY WORK

Emergency situations and environmental incidents, such as spills and death of fish by means other than fishing can occur in both regular highway operations and during construction. In all cases, the appropriate personnel should respond to ensure the safety of onsite workers and the surrounding community, protection of the environment, and protection of property, including infrastructure. Fisheries Contracts Specialists should familiarize themselves with the appropriate processes in the event that an emergency situation arises during construction in order to provide support to the contractor and/or contract administrator, as necessary.

For construction projects, environmental incident management follows the processes outlined in OPSS.PROV 100 – General Conditions of Contract. The contractor is contractually obligated to have a detailed Environmental Incident Management Plan which includes plans and processes for the prevention of environmental incidents, response procedures and regulatory reporting requirements. Fisheries contracts specialists should familiarize themselves with this plan at the outset of the contract and verify that regulatory contact information, legislation, and management requirements are up to date.

When an environmental incident is identified, it is important for the fisheries contracts specialist to immediately notify the appropriate individuals who have ownership or are in charge, management, or control of the work. This generally includes the contractor, contract administrator, and the MTO site representative.

Please contact MTO Environmental Delivery or the MTO Environmental Policy Office for additional guidance and support.

9.4.1 DUTY TO NOTIFY – DEATH OF FISH OR HARMFUL ALTERATION, DISRUPTION, OR DESTRUCTION OF FISH HABITAT

Section 38(4) of the *Fisheries Act* requires every person who owns or has the charge, management, or control of the work, undertaking or activity to notify DFO when that

work, undertaking, or activity results in the unauthorized death of fish or harmful alteration, disruption, or destruction (HADD) of fish habitat, or where there is imminent danger that the death of fish or HADD of fish habitat could occur.

Duty to Notify — Death of Fish or Harmful Alteration, Disruption or Destruction of Fish Habitat

Obligations under the *Fisheries Act*

38 (4) Every person shall without delay notify an inspector, a fishery officer, a fishery guardian or an authority prescribed by the regulations of the death of fish that is not authorized under this Act, or of a serious and imminent danger of such occurrence, if the person at any material time

(a) owns or has the charge, management or control of the work, undertaking or activity that resulted in the occurrence or the danger of the occurrence; or

(b) causes or contributes to the occurrence or the danger of the occurrence.

38 (4.1) Every person shall without delay notify an inspector, a fishery officer, a fishery guardian or an authority prescribed by the regulations of a harmful alteration, disruption or destruction of fish habitat that is not authorized under this Act, or of a serious and imminent danger of such an occurrence, if the person at any material time

(a) owns or has the charge, management or control of the work, undertaking or activity that resulted in the occurrence or the danger of the occurrence; or

(b) causes or contributes to the occurrence or the danger of the occurrence.

During construction, the MTO contractor has the primary duty to report these incidents or risk of these incidents occurring to DFO, in accordance with the environmental incident management process in OPSS.PROV 100. For typical MTO projects, the fisheries contracts specialist would follow the notification procedure outlined in the contract and the requirements provided to them. This includes notification of observations of death of fish or HADD of fish habitat to the contract administrator, contractor, and/or MTO staff, including MTO Environmental Delivery.

The duty to notify of death of fish or HADD of fish habitat resulting from the deposit of a deleterious substance (e.g., spill, sediment release), or imminent danger of this occurring, is addressed through the spills reporting process. See Section 9.4.2 below for additional details.

If an incident occurs that results in, or more may imminently result in, the death of fish or HADD of fish habitat, and it is not related to the release of a deleterious substance, the duty to notify obligations are met by contacting DFO's Fish and Fish Habitat Protection Program - Ontario and Prairie region without delay. Be sure to provide details of the incident and associated mitigation/remedial action being undertaken, location, and site

contact information should DFO need to follow up. DFO contact information is provided in Section 13 of this Guide.

It should be noted that failure to notify DFO in these types of situations is a federal offence. Therefore, while the contractor is contractually obligated to undertake the duty to notify process, if the contractor is not present, is unable, or is unwilling to make the notification, the contract administrator, in accordance with CAIS No. 100 - MTO Construction Administration General Conditions (CAGC) must make the notification to ensure MTO's compliance with the legislation.

9.4.2 SPILLS

There are various provincial and federal statutes addressing spills to the environment and the release of pollutants and deleterious substances, including sediment, into waterbodies including:

- Federal *Fisheries Act* Section 36(3), which prohibits the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.
- Ontario *Water Resources Act* Section 30(1), which prohibits the discharge of any material of any kind into or in any waters or on any shore or bank thereof or into or in any place that may impair the quality of the water of any waters.
- Ontario *Environmental Protection Act* Part X which prohibits the discharge of pollutants to the environment.

Typically, the fisheries contracts specialist would provide immediate documentation and communication of these types of spills to the contract administrator by following the spill notification process specified in the contract documentation. However, if the fisheries contracts specialist is not on-site to document a spill, the contractor is still obligated to follow the necessary environmental incident procedures in accordance with the General Conditions of Contract and must report the spill as appropriate.

All spills and sediment releases into a waterbody (or imminent danger of these occurring) during MTO construction must be reported without delay to the MECP Spills Action Centre (SAC) by phone:

- 416-325-3000
- Toll-free: 1-800-268-6060
- TTY: 1-855-889-5775

The SAC is available 24 hours a day, seven days a week.

The potential for impacts to fish and/or fish habitat must be noted during the call so that the SAC knows to notify appropriate agencies with whom they have spills reporting agreements in place, including Environment and Climate Change Canada (ECCC). ECCC will then notify DFO of any reported spills where there may be anticipated impacts to fish and/or fish habitat.

The reporting of spills to the SAC fulfills spill reporting requirements under provincial and federal legislation, including the duty to notify obligations under the Section 38(4) of the *Fisheries Act* in the event the spill results in the death of fish or HADD of fish habitat.

Notifications for spills are the most common type of emergency notification during MTO construction and account for almost all of MTO's duty to notify obligations under the *Fisheries Act*. However, if the impacts to fish and fish habitat resulting from the spill or release of sediment are (or are likely to be) significant, it is recommended that in addition to contacting the SAC, DFO be contacted directly to ensure that they receive timely notification of the death of fish or HADD of fish habitat that has occurred or may imminently occur as a result of the spill.

If after the initial clean up there is additional remedial work in or around waterbodies, the work should be evaluated to determine if it meets the requirements of emergency work as described below or can be self-assessed through the MTO Fisheries Protocol process.

More information on spills reporting can be found at the following MECP website: https://www.ontario.ca/page/report-pollution-and-spills

Spills: Corrective Actions and Restoration

MTO is required to be in compliance with all applicable federal and provincial legislation, including those not specifically referenced in this guide.

In addition to our notification requirements, MTO is obligated by *Fisheries Act* Section 38(6) to take all reasonable measures to mitigate or remedy any adverse effects that result from the occurrence or might reasonably be expected to result from it, and by the provincial *Environmental Protection Act* Section 93(1) to do everything practicable to prevent, eliminate and ameliorate the adverse effect and to restore the natural environment.

The duty to prevent or remedy adverse effects are directly related to responses to environmental incidents such as spills or structural failures.

9.4.3 EMERGENCY WORK

Emergency work usually requires immediate action to repair damage to highway facilities or deal with situations where there is imminent risk to the public, the environment, or property.

Emergency work, includes:

1) An emergency repair of a highway facility undertaken immediately after an accident, natural disaster (including beaver dam failure), catastrophic structural failure, or on detection of an imminent failure, including containment, cleanup, and disposal of cleanup material,

   OR

2) A project that is required to address a situation where there is an imminent risk to life, public health or safety, the environment, damage, or loss of property,

   AND

3) The work under either 1) or 2) above will take place within approximately two-weeks of being identified as an emergency.

MTO's main priority is to prevent further impacts to infrastructure, public, and the environment. In doing so, the steps taken to stabilize the site and address the emergency incident must also consider all possible measures to limit impacts, including the implementation of effective mitigation.

If emergency work is required during construction as a result of an environmental incident, details of the potential impacts to fish and fish habitat and immediate works to address the incident would typically be outlined by the contractor on the Incident Notification Form, PH-CC-818, and submitted to the contract administrator. Emergency work in and around waterbodies required during construction that is not associated with an environmental incident, but that could have impacts on fish and fish habitat, would be addressed through other contract provisions, beyond the scope of this guide.

Per OPSS.PROV 182, the fisheries contracts specialist typically is responsible for assisting in the development of waterbody and fisheries protection strategies and plans and reviewing the contractor's change proposals for compliance with the *Fisheries Act*. This responsibility may also include plans or proposals related to emergency work. Depending on the scope of the emergency work, additional assessment by a fisheries assessment specialist may be required to determine impacts to fish and fish habitat (see Section 5.11 of this guide). In the event that the emergency work is likely to result in the death of fish or HADD of fish habitat, or if federally listed endangered or threatened aquatic SAR or their habitat are present, an emergency *Fisheries Act* authorization will likely be required. MTO Environmental Delivery must be consulted throughout the process to assist in this determination and to ensure MTO's legislative environmental obligations are met.

Note: In addition to the notification/reporting requirements under the *Fisheries Act*, there may be additional notification/reporting requirements associated with any permits and/or authorizations that MTO has obtained for a project. Fisheries contracts specialists should familiarize themselves with the notification/reporting requirements of all permits and authorizations in place for projects that they are undertaking monitoring for and should be aware that other regulatory agencies may need to be contacted by the contractor, depending on the nature of the environmental impacts caused by the situation, which is beyond the scope of this guide.

Notification of Indigenous Communities: In addition to notification/reporting requirements associated with environmental legislation/regulation, there may be a need to notify Indigenous communities of an environmental incident or spill, or of emergency work, that may adversely impact fish or fish habitat. MTO may be legally obligated to notify Indigenous communities should the environmental incident, spill, remedial work, or emergency work have the potential to adversely impact Aboriginal or treaty rights. MTO may also choose to notify Indigenous communities for other reasons (e.g., proximity). MTO staff notified of an environmental incident or spill, or responding to the need of emergency work, should contact their regional ILS for advice on whether notification to Indigenous communities is required.

10 DOCUMENTATION

Purpose	• To provide an overview of the documentation requirements for MTO transportation projects
Tasks	• The documentation required is project specific. • This section includes details on how and when the various forms and reports should be completed.
Decisions & Documentation	• Complete appropriate forms, templates and reports as required.

This section provides advice and guidance on the various types of forms, templates, and reports required for MTO projects. The documents are designed to support the assessment process and decisions throughout the MTO Fisheries Protocol, to support the environmental assessment process, and contract requirements.

MTO Service Providers should give consideration to Accessibility for Ontarians with Disabilities Act (AODA) requirements when developing any of the deliverables identified below.

10.1 DOCUMENTATION SUPPORTING THE ENVIRONMENTAL ASSESSMENT PROCESS

This section informs the user about MTO's expectations concerning documentation that supports the Environmental Assessment process which includes:

- Fish and Fish Habitat Existing Conditions Report, as indicated on this page
- Fish and Fish Habitat Impact Assessment Report
- Fisheries Memo

10.2 FISH AND FISH HABITAT EXISTING CONDITIONS REPORT

The purpose of the Fish and Fish Habitat Existing Conditions Report (Existing Conditions Report) is to use the collective background and field data to summarize the existing fish habitat and fish community conditions and their sensitivities. The minimum requirements for the Existing Conditions Report are provided in Table 10-1. The Existing Conditions Report is typically used as a basis for the:

- Fish and Fish Habitat Impact Assessment Report;
- MTO Project Notification Package; and,
- Relevant design components.

Table 10-1. Minimum Requirements and Table of Contents for the Fish and Fish Habitat Existing Conditions Report

Requirement	Description
a) Introduction	• A brief outline of the purpose of the report and a description of the fish and fish habitat in the study area.

Requirement	Description
b) Site Map	• Include a map outlining the project limits and watercrossings including MTO chainage. • TEMPLATE D1 Location of Work Table (see APPENDIX D) must be included as a table in the report.
c) Constraints and Opportunities Map	• Include a map that outlines all waterbodies and their sensitivities as well as all associated natural features (e.g., ESA's, ANSI's, greenbelt areas) within the project limits.
d) Background Data Collection	• Include sources investigated and used, species present and level of importance, significant features and potential issues, etc. This should include information obtained from MNR including: • Waterbody type (e.g., permanent, intermittent, cold/cool/warm water etc.). • Habitat information/locations. • Fish species present (including species at risk and aquatic invasive species information). • In-water timing work windows. • Applicable MNR fisheries management objectives (if available).
e) Field Investigations	• This section shall include a discussion of: • The fish habitat assessment and fish community inventory conducted within the study area (as outlined in Section 5). • All the data collected to augment the background data collection. • The rationale behind timing of the assessment and sampling plan. • The rationale for gear type and sampling methods used.
f) Existing Fish and Fish Habitat	• This shall include a description of the existing habitat conditions (e.g., channel/substrate characteristics, stream morphology, in-stream and riparian

Requirement	Description
	vegetation, cover, disturbance indicators, etc.) and species present in the study area. • TEMPLATE D2A Existing Fish Habitat Conditions Summary Table and TEMPLATE D2B Existing Fish Community Summary Table (see APPENDIX D) must be included in the report. Note: These tables have been combined into one Excel document Existing Conditions Table that shall be submitted separately to MTO.
g) General Assessment of Potential Impacts of the Project	• The description shall include a high-level overview of the project and associated works that could potentially be expected to affect fish and fish habitat, including whether the preliminary design is likely to meet the requirements of Fisheries BMPs or requires additional assessment, or even if a HADD is likely given the proposed scope of work. • Note: An impact assessment (i.e., using PoEs) is not completed at this stage; this section relies primarily on the specialist's knowledge and experience assessing impacts on similar projects.
h) Design Consideration Table	• Complete 1st and 2nd columns of the Design Considerations Table and identify the project-specific design considerations and provided to the project team. • The determination of how relevant design considerations are brought forward to detail design and have been incorporated into the contract (3rd column), will be described in subsequent documentation (e.g., Impact Assessment report).
i) Potential Enhancement/Offsetting Measures	• This section shall elaborate upon relevant potential design considerations identified in Table 10-1 and include a list of potential fish habitat enhancement or offsetting opportunities that have been identified through the collection of background data (including Fisheries Management Plans), discussions with agencies (e.g., MNR or Conservation Authorities) or fieldwork (e.g. removal of perched culverts/barriers to

Requirement	Description
	fish passage, bank stabilization, need for riparian plantings, etc.).
j) References Used	• This section shall list the titles and full references of the documents and/or data that were referred to in the report.
• **APPENDICES**	
k) Photographs	• Include all appropriate photographs taken during field investigations. See Section 5.5 Photographic Record for photographic requirements.
l) Field Data Collection Forms	• Include all appropriate field data collection forms completed during field investigations. See APPENDIX C: FIELD DATA COLLECTION FORMS
m) Correspondence	• Include documentation sent to and received from agencies (i.e., MNR, DFO) and supplementary data sources.

10.2.1 CONSTRAINTS AND OPPORTUNITIES MAP

The purpose of the Constraints and Opportunities Map is to show physical and biological constraints on fish and fish habitat in relation to the highway project. This is developed earlier on in the planning and design process to relay important environmental constraints to the project team. However, this will continue to be further developed and refined with the additional information that is gathered during the field investigations as the design process continues. The Constraints and Opportunities Map must be included in the Fish and Fish Habitat Existing Conditions Report.

The Constraints and Opportunities Map is useful:

- In scoping and preparing for field investigations by identifying data gaps and/or areas that may warrant additional data collection and documentation;
- As a summary for communicating general fish and fish habitat information to design engineers, planners, and contractors in order to avoid issues and/or to investigate alternatives in design;
- To target mitigation measures required for construction;
- To flag valued ecosystem components such as environmentally sensitive areas, and important terrestrial features that may influence fish habitat constraints and

protection (e.g., watercourse-related design aspects pertaining to wildlife movement, specific timing requirements pertaining to wildlife such as breeding birds, SAR, beaver, and turtles, etc.); and,

- In considering other factors (e.g., geotechnical data, flow information, and groundwater information) during development of the construction design and mitigation measures.

Constraints and their relative importance are overlaid on a topographic map, Ontario Base Map, or aerial imagery. This may include any known:

- Significant fish habitat;
- Flow (e.g., ephemeral, intermittent, or permanent) and flow direction;
- Barriers to fish passage up or downstream of the site (e.g., dams/weirs, perched culvert, undersized CSP, beaver dam, down cutting of channel);
- Thermal regime (e.g., cool, cold, or warm water);
- Fish habitat type (e.g., not fish habitat, indirect habitat, direct habitat, spawning areas. migratory routes);
- Environmentally sensitive areas (e.g., ground water upwellings, wetlands);
- Potential areas for offsetting;
- Waterbody bank erosion;
- Special habitat features that present a constraint or allow for an opportunity to be considered in the design; and,
- Other important environmental constraints.

Note: Not all ‘sensitivity’ information (e.g., rare/significant species) should be presented on mapping that will be incorporated in the documentation or in any public forum. MNR requires users to have specific ‘species at risk sensitivity’ for provincial species training before it will release this type of information.

10.2.2 SUBMISSION INFORMATION

The Fish and Fish Habitat Existing Conditions Report may be completed:

- As a stand-alone report to document existing conditions to ensure fish habitat considerations are properly integrated into either the planning or design process; and,
- Where data in a previously written Existing Conditions Report is greater than ten years old and/or there is reason to believe the data are no longer valid, a new report should be produced.

Typically, this report is submitted during the preliminary design phase of a project in support of the provincial and/or federal EA process, unless otherwise specified by the project TOR.

10.3 FISH AND FISH HABITAT IMPACT ASSESSMENT REPORT

The purpose of the Fish and Fish Habitat Impact Assessment Report (Impact Assessment Report) is to document:

- The potential impacts of the highway project on fish and fish habitat;
- The proposed mitigation measures;
- The residual effects of the project; and,
- The likelihood of causing the death of fish or HADD of fish habitat.

This report builds upon the Existing Conditions Report and includes documentation of mitigation measures and the death of fish or HADD of fish habitat assessment.

Much of the information in the Impact Assessment Report will form the basis of the final assessment of impacts, mitigation plan, and the death of fish or HADD of fish habitat determination and Offsetting Plan (if required) that will be developed during the Detail Design stage. Therefore, clear and comprehensive documentation, mapping and drawings are required.

In some circumstances MTO will accept a combined existing conditions and impact assessment report; however, these will be highlighted in the TOR. Also, it is MTO Service Provider's responsibility in these circumstances to update the project team with critical information during the design process. This includes providing draft reports and tables throughout project delivery.

10.3.1 MINIMUM REQUIREMENTS

The minimum requirements for the report are provided below in Table 10-2 below. The requirements should be provided in the order in which they appear in the table.

Table 10-2. Minimum Requirements and Table of Contents for the Fish and Fish Habitat Impact Assessment Report

Requirement	Description
a) Introduction	A brief outline of the purpose of the report and nature and general rationale of the project and implications for fish habitat and fish communities and description of the study area.

Requirement	Description
b) Summary of Existing Fish and Fish Habitat Conditions	Summarize all information from the "Existing Fish and Fish Habitat Conditions" report. This may include TEMPLATE D2A Existing Fish Habitat Conditions Summary Table and TEMPLATE D2B Existing Fish Community Summary Table (see APPENDIX D).
c) Proposed Works	Summarize the proposed works at all locations in Proposed Works Table. The table should include all works within 30 m of the waterbody.
d) Design Considerations	Complete the 3rd column of Table 10-3 to demonstrate how design considerations were addressed. This should include the designer's rationale for inclusion/exclusion. Where it has been provided, the fisheries assessment specialist should document how the relevant design considerations have been addressed by the project team and confirm how they are specifically inserted into the contract.
e) Potential Impacts, Avoidance and Mitigation	Include a brief introductory paragraph and complete TEMPLATE D3 Aquatic Effects Assessment Table (see APPENDIX D3). The template table may be included in the body of the report, or if there are several watercrossings assessed, it may be referred to in an APPENDIX of the report. Template D3 shall identify: • The Pathways of Effects (PoE). • Project-specific design measures that have been incorporated to avoid or minimize potential harmful impacts. • Project-specific mitigation measures to address construction-related impacts. • A description of the residual effects.
f) Likelihood of Death of Fish or HADD of Fish Habitat	If the project in whole or in part can be completed following Fisheries BMPs, indicate: • The location(s) where Fisheries BMP(s) will be applied. • The applicable Fisheries BMP(s). • Rationale as to why/how the Fisheries BMP(s) is/are applicable.

Requirement	Description
	If all locations meet the requirements of Fisheries BMPs, proceed to h) below. Where Fisheries BMPs are not applicable, continue as follows: Provide a brief summary of the likelihood of death of fish or HADD of fish habitat resulting from the project and recommendations for review. Complete TEMPLATE D4 Fish and Fish Habitat Impact Documentation (see APPENDIX D4) which may be included in the body of the report, or if there are several watercrossings assessed, it may be referred to in an APPENDIX in the Impact Assessment Report. The Fish and Fish Habitat Impact Documentation shall be used to identify: • The severity of the residual effects. • The full range of potential negative effects to fish, fish movement and fish habitat. • The likelihood of death of fish or HADD of fish habitat.
g) Offsetting	If offsetting is required, discuss, and expand upon the list of potential fish habitat creation/enhancement and offsetting opportunities as outlined in the Existing Conditions Report and include information obtained from Fisheries Management Plans and through agency meetings and/or consultation.
h) Conclusions	A brief summary of the nature of the project, the impacts to fish habitat/fish communities and whether the death of fish or HADD of fish habitat is likely.
APPENDICES	
i) Correspondence with Regulatory Agencies	Include all agency input, comments, and correspondence.
j) Highway Crossing Design Drawings	Include as appropriate depending on the nature of the assignment.

10.3.2 SUBMISSION INFORMATION

Typically, the Fish and Fish Habitat Impact Assessment report is submitted during the detail design phase of a project in support of the provincial and/or federal Environmental Assessment process, unless otherwise specified in the project TOR.

10.3.3 DESIGN CONSIDERATIONS

As part of the design team, it is the responsibility of the fisheries assessment specialist is to provide important fisheries information to the design team early in the planning and design process. The fisheries assessment specialist is required to complete the design considerations in Table 10-3 below and provide these to the designer within 30 days of the fisheries field investigation. The table provides examples of factors to be considered and may need to be modified as the factors to consider differ depending on the project.

Design considerations may need to be provided to the design team in less than 30 days of the field investigation due to scheduling constraints. The fisheries assessment specialist will need to time their field investigations accordingly. If additional information is received, or new considerations are warranted, these must be communicated to the design team as soon as possible. Critical design considerations that may affect the project include items such as property requirements, surveying needs, scheduling conflicts due to potential permitting (e.g., DFO review, *Fisheries Act* authorization, ESA/SARA permits etc.). These are to be flagged as early as possible to MTO and the design team to avoid unnecessary project delays.

When completing Table 10-3, the fisheries assessment specialist is to differentiate between considerations that are warranted (timing window, fish passage, etc.) and those that may be inserted for general consideration but are not legislative requirements. It is the responsibility of the design team to review Table 10-3, discuss, and provide the rationale for how the design considerations have, or have not, been addressed. The design team should be able to confirm the rationale behind each decision and how the applicable considerations are included in the contract.

It is important that the fisheries assessment specialist communicate regularly with the design team throughout the project to ensure that any significant design considerations are flagged early to MTO and the design team. By discussing fisheries design considerations early and regularly, this will allow time for endorsement of any necessary design modifications, consideration of possible relocation or alternatives to avoid concerns, or accept non-standard items that may be required in the contract. Failure to flag fisheries concerns early in the design process can significantly impact the ability to properly consider any design considerations that may be required to avoid the death of fish or HADD of fish habitat. The design considerations table is to be included in the Fish and Fish Habitat Existing Conditions Report and the description of how relevant design considerations were integrated into the design can be inserted into the Fish and Fish Habitat Impact Assessment Report.

Table 10-3. Design Considerations

Factors to consider	Design Considerations from fisheries assessment specialist	Describe how each factor was addressed through design
In-water Work Timing Window Are the in-water works being completed within the timing window provided by MNR?	Example Confirmed that the waterbody is considered cold water. Timing Window where work can occur is June 16th- August 31st (for MNR's Northwest and Northeast Regions).	For use in Impact Assessment Report. This should include the designer's rationale for inclusion/exclusion in the final contract design.
Fish Passage Are there migratory fish species present, and if so, how does the design allow for their safe passage? Is fish passage a requirement at this location? What is the migratory (target) species that fish passage is to be designed for?	Example Migratory fish present: walleye Perched culvert (~40 cm perch during low flow conditions). This may require additional surveying and property requirements as part of the design. Culvert crossing has widened the natural channel resulting in shallow, laminar flow during low flow conditions. Design is to consider low flow channel or other means to ensure fish passage during low flows. Fish Passage is a requirement to be reinstated based on information from MNR and site conditions warrant fish passage for walleye.	
Significant Habitat Is significant habitat present at the site, and if so, how can the design avoid these areas?	Example Critical spawning habitat downstream of the culvert (see constraints and opportunities map). The final design and contract should ensure it doesn't impact this important feature. Scour protection in the culvert outlet area is not currently present and the designer should ensure properly sized rock protection is included in the design.	

Factors to consider	Design Considerations from fisheries assessment specialist	Describe how each factor was addressed through design
	Streambank on south western side of the culvert outlet is heavily eroding and should have rock protection. The designer should avoid any infilling and limit construction until rock protection is in place. Otherwise access in the south western bank, as it is already failing, should be avoided in order to prevent construction impacts from occurring to the flagged significant habitat 20m downstream of this area. If this can't be achieved further discussions should take place with the project team.	
Constraints and Opportunities Information that should be addressed through design	Example Perched culvert and re-establishing fish passage; Waterbody bank erosion issues to address; Groundwater upwellings to be protected; Critical environmentally sensitive areas to be avoided.	
Any other considerations	Example Identify any aquatic invasive species and/or species at risk and any special considerations. Permitting may require an ESA/SARA permit and DFO authorization. Timeline for completing these may exceed project delivery date. Also, additional work through change order may be necessary to complete necessary deliverables. Discussion with MTO will be required.	

10.4 FISHERIES MEMO

Fisheries Memos are a simplified form of report that may be used, instead of existing conditions and/or impact assessment reports, to document relevant fisheries information. It will be specified by MTO in the project TOR if only a fisheries memo is requested as well as any additional project specific requirements.

A fisheries memo may be applicable for situations such as:

- Projects that are proceeding using only Fisheries BMPs.
- There is a need to provide follow-up details from additional field work to help supplement an existing conditions report.
- Low complexity projects, or
- Information is received by other agencies after a report has been submitted.

Typically, the Fisheries Memo will consist of a brief, but focused, (e.g., maximum 5 pages, excluding template tables and appendices) description of fisheries information found during the investigation which may include existing conditions, MNR background data, and specific information necessary for design. Photographs and maps would be included in the appendix. This brief reporting format may be more useful for low complexity projects and the intent is to ensure the fisheries assessment specialist focuses the documentation to what is actually needed for the delivery of the project. When a Fisheries Memo is used, it is anticipated that the MTO Project Notification Package will adequately address the Impact Assessment and outline the decisions made during the death of fish or HADD of fish habitat assessment.

The content of the Fisheries Memo will depend on the design stage that the memo is being prepared for as well as the purpose of the memo. Refer to the project Terms of Reference and consult with the MTO Environmental Planner to confirm the level of detail required within the memo. The memo may include, as applicable:

- MNR fisheries information and background data;
- Sampling methodology and rationale for level of field investigations;
- Existing conditions summary including the results of the fish habitat and fish community inventory conducted within the study area;
- Summary of proposed work (including Proposed Work Table);
- Design considerations (completed for the appropriate design stage);
- Impact Drawing;
- Relevant Template Tables (D1-D4);
- Appendices (include as applicable):
  - Photographs

  - Maps
  - Agency correspondence
  - MTO Project Notification Package, and
  - Data collection forms (watercourse field records, fish habitat mapping, and fish community inventory record).
- Existing Fish and Fish Habitat Conditions Excel Spreadsheet; and,
- MTO Project Notification Package/DFO Request for Review, as required.

Documentation Requirements for Fisheries BMPs

The ability of a project to follow an MTO Best Management Practice for Fisheries (Fisheries BMP) streamlines the assessment and review process may but does not negate the need for documentation of the project's details and existing fish and fish habitat conditions.

However, as the works, undertakings or activities have, by their nature, been deemed to be unlikely of causing the death of fish or HADD to fish habitat provided that all operational constraints and protection measures are implemented, full documentation of the potential impacts is not required. In circumstances where a project has components covered by a Fisheries BMP in addition to those that require more complex assessment, these will be documented in the required fisheries documentation (e.g. Impact Assessment Report) or as outlined in the project Terms of Reference.

For small, low-complexity projects (e.g. bridge and culvert maintenance) the MTO Project Notification Form should provide sufficient documentation as both the existing conditions and rationale for use of the Fisheries BMP will be included in the form and no additional reporting may be required. The Ministry may request that documentation be included within a Fisheries Memo; however, this will be project specific and outlined in the project's TOR. If you are unsure of the documentation requirements for a project, contact MTO Environmental Delivery.

10.5 THE MTO FISHERIES PROTOCOL PROCESS DOCUMENTATION

This Section informs the user about MTO's expectations concerning documentation that supports the Fisheries Protocol process which includes the following:

- MTO Project Notification Package.
- DFO Request for Review Form.

- Develop an Offsetting Plan and submit an application for *Fisheries Act* authorization and/or *Species at Risk Act* permit.
- Monitoring Reports:
  - Construction Inspection Checklist.
  - Non-Compliance Summary.
  - Construction Monitoring Report, and
  - Post-Construction Monitoring Report.

10.5.1 MTO PROJECT NOTIFICATION FORM AND DFO REQUEST FOR REVIEW FORM

As MTO's expert representative, the fisheries assessment specialist has the responsibility and accountability to screen for the likelihood of projects resulting in the death of fish or HADD of fish habitat. This process is documented through completion of project specific deliverables including the MTO Project Notification Package and DFO Request for Review Forms and the required fisheries documentation (Existing Conditions Report, Impact Assessment Report, and/or Fisheries Memo).

All MTO Project Notification Forms and DFO Request for Review Forms must be submitted during the detail design phase, unless otherwise specified in the project TOR. It is MTO Service Providers (designers and/or fisheries assessment specialist) responsibility to flag potential issues that may impact the schedule immediately to MTO. This will allow for sufficient discussion to occur in a timely fashion and still allow for sufficient time to redesign or submit DFO Requests for Review forms without impacting the project schedule.

10.5.2 MONITORING REPORTS

The purpose of monitoring reports is to document the pre-construction, construction and post-construction conditions and to meet regulatory requirements and conditions outlined in *Fisheries Act* authorizations, SARA and ESA permits. Typically, agencies would include project specific monitoring and reporting requirements and therefore no MTO specific format is provided unless otherwise identified in the project TOR.

For projects without *Fisheries Act* authorizations MTO may specify requirements to conduct project specific detailed monitoring.

MTO has specific forms and report formats for monitoring that need to be completed for monitoring. These have been outlined in Section 9, including the templates found in APPENDIX F: CONSTRUCTION MONITORING REPORTING.

10.6 CONTRACT PACKAGE

The purpose of the contract package is to direct the contractor in constructing the project and is the key tool for communication with the contractor. As such, it outlines the requirements for the project including necessary steps to address environmental impacts during construction. It also describes how the commitments made to regulatory agencies with regards to mitigation and design requirements will be implemented. To help ensure successful implementation, clear direction is needed.

For each contract, the specific mitigation and design commitments are incorporated into the contract documents by selecting the appropriate Specifications, Special Provisions, drawings, and inclusion of items. These specific requirements are inserted to clearly highlight to the contractor the important environmental protection measures or commitments determined during detail design. As each project is different, and the potential impacts or activities associated with a project can vary, additional project-specific contract language may be required.

It is imperative that the agreed upon mitigation and offsetting measures that are outlined in the MTO Project Notification Form, *Fisheries Act* authorization, and other environmental approvals (e.g., SARA/ESA permits) be documented with sufficient detail in the contract package so that the contractor is provided with clear direction during bidding. This includes highlighting commitments and mitigation such as:

- Waterbodies to avoid;
- Adaptive measures;
- Construction approaches;
- Protection or avoidance of significant habitat or environmentally sensitive areas;
- Timing constraints;
- Creation of fish habitat and offsetting;
- Riparian plantings and vegetative cover;
- Erosion and sediment control;
- Commitments made during design; and,
- Other project-specific items.

It is not the intent of this Fish Guide to provide detailed instruction on contract preparation. The reader is encouraged to discuss the process with the professionals who develop the contract packages within their project team. It is anticipated that the fisheries assessment specialist will provide input and review relevant sections of the contract package to ensure that language within specifications, drawings etc. in the contract package reflect previously agreed upon commitments, approval requirements and environmental protection approaches.

11 FISHERIES SPECIALIST QUALIFICATIONS

Purpose

- To provide the qualification requirements for registration on MTO Registry, Appraisal and Qualification System (RAQS) as an MTO fisheries assessment specialist and fisheries contracts specialist to support meeting the requirements under the MTO Fisheries Protocol.

Tasks

- To be registered as an MTO fisheries assessment specialist and fisheries contracts specialist, applicants must meet the training, education and experience requirements of the specialty(ies).
- Appropriate documentation must be submitted to MTO for review and approval prior to carrying out the role on MTO projects.

Decisions & Documentation

- This section includes details on:
  - Education requirements
  - Experience requirements
  - Process for submitting specialty applications for review and consideration by MTO.

11.1 QUALIFICATIONS

MTO uses qualified consultants to deliver the design and contract administration components of its projects.

There are two MTO Fisheries Specialist Categories:

1. Fisheries assessment specialist (FAS).
2. Fisheries contracts specialist (FCS).

Qualification requirements for each of the fisheries specialties are outlined below.

11.1.1 FISHERIES ASSESSMENT SPECIALIST

The fisheries assessment specialist is required to complete the required field investigations and assessments in order to meet the requirements of Steps 4 through 7 of the MTO Fisheries Protocol.

As a minimum the Fisheries Assessment Specialist shall possess the following:

Education:

- Graduation with a degree or diploma from a recognized university or college in a natural or physical science with specialization in fisheries biology, aquatic biology, ecology, or another related discipline.
- Successful completion of MTO Fisheries Protocol Training.

Experience:

- Demonstrated related work experience.
- Demonstrated experience in conducting fisheries inventories and habitat assessments.
- Demonstrated experience in conducting impact assessments.
- Demonstrated experience and/or knowledge of the application of DFO's Pathways of Effects and the *Fisheries Act* authorization process, gained through project experience.
- Demonstrated experience in planning and designing fish and fish habitat mitigation measures.
- Demonstrated knowledge of federal and provincial legislation, policies and procedures for fish and fish habitat in Ontario.

11.1.2 FISHERIES CONTRACTS SPECIALIST

A fisheries contracts specialist is used on projects for which a Fisheries Act Authorization has been issued. This ensures the proper implementation of all mitigation measures included in the construction contract and the terms and conditions of the *Fisheries Act* authorization including the Offsetting Plan, in order to meet the requirements of Step 8 of the MTO Fisheries Protocol.

A fisheries contracts specialist may also be used on projects where no Fisheries Act Authorization is required but it has been deemed appropriate by MTO staff. In these situations, the Fisheries Contracts Specialist may work for either the consultant contract administrator, the Contractor, or for MTO directly.

As a minimum, the fisheries contracts specialist shall possess the following:

Education:

- Graduation with a degree or diploma from a recognized university or college in a natural or physical science with specialization in fisheries biology, aquatic biology, ecology, or another related discipline.
- Successful completion of MTO Fisheries Protocol Training.
- Completion of Erosion and Sediment Control Monitoring Training*.
- Trained as a Crew Leader in the safe operation of electrofishing equipment through successful completion of an Electrofishing Certification Course (e.g. Ontario Streams, Fleming College, Trout Unlimited etc.) or demonstrated equivalent, comprehensive, internal training, and in accordance with MTO Service Provider's Occupational Health and Safety plans and procedures.**

* Proven completion of a training course on Erosion and Sediment Control monitoring (e.g., Certified Inspector Sediment and Erosion Control (CISEC), International Erosion Control Association (IECA), or equivalent).

** Applicants will be required to attest to having the appropriate training, knowledge, and experience to be a Crew Leader to train and lead field crews safely, using proper electrofishing sampling methodologies. Prior to undertaking field investigations, field staff assisting the Crew Leader must receive sufficient and appropriate training to be aware of the safe operation of electrofishing equipment and of MTO Service Provider's Occupational Health and Safety Plans.

Experience:

- Demonstrated related work experience.
- Demonstrated experience in monitoring construction activities in and around fish habitat, (e.g., identifying risk situations, recommending corrective actions/solutions).

- Demonstrated experience in the application of erosion and sediment control measures.
- Demonstrated experience in the application of fish and fish habitat mitigation measures.
- Demonstrated experience in the construction/installation of fish habitat enhancement/ offsetting measures.
- Demonstrated knowledge of federal and provincial legislation, policies and procedures for fish and fish habitat in Ontario.

11.2 QUALIFICATION REQUIREMENTS & PROCESS

Consultants must meet the educational and work experience requirements under the fisheries specialist category that is being applied to. Where the education criterion is unable to be met, extensive experience may be considered as an equivalent on a case-by-case basis and upon request. A request for this type of review should be made when submitting the application(s) to MTO RAQS.

In addition to educational and work experience, applicants must also successfully complete the MTO Fisheries Training program and associated knowledge assessment. Please note that passing the course does not guarantee that you will be qualified with MTO. For those seeking to become qualified as Fisheries Contracts Specialist, you will need to have successfully completed ESC training as noted above, prior to submitting your application.

Following receipt of the MTO Fisheries Training Certification of Completion applicants must complete and submit the qualification tables. They can be accessed online through the MTO Technical Documents website. To find these documents, search for the title or click the Environmental tab and browse to the specific document. As different firms have different processes for RAQS submissions, please consult with your administrative staff to determine the appropriate method.

Once received, MTO will evaluate your application and if you meet all of the requirements, you will be considered qualified and listed on MTO RAQS.

APPLICATION HINTS:

- Be sure your application is complete and submitted in a timely manner. If your application does not provide sufficient details, you will receive written notification and the process will be repeated.
- When providing details, specify your role/participation in the projects and what types of work (methods/techniques) the project involved, to clearly demonstrate your competency with each of the criteria. Simply including the number of projects you've been involved in and/or the title and location of the project is not sufficient information.

- For example, if you have worked on several projects that have required you to complete a PoE assessment, you should briefly describe some of these in your application table, including what your overall assessment was, and what the outcome was (DFO Letter of Advice, Fisheries Act authorization) and provide examples of any Fisheries Act authorizations you were involved with. Not every single project you have worked on needs to be discussed or listed; identify the approximate total number you have worked on and then provide brief descriptions for a few key projects.

11.2.1 GAINING EXPERIENCE

Staff that are not yet registered as a fisheries specialist on MTO RAQS and who are seeking experience in order to become qualified, may do so by conducting the duties of a fisheries specialist under the direct supervision of an individual who is qualified on MTO RAQS for that specialty.

In the case of fisheries assessment specialists, this means that they may develop field investigation plans according to Section 4 of the Fish Guide, provided that an MTO fisheries assessment specialist reviews and approves the plan. Additionally, they may complete an impact assessment and the associated documentation, as long as that is also reviewed and approved by the RAQS specialist. However, MTO Project Notification Forms, DFO Request for Review Forms etc. must be signed by the MTO fisheries assessment specialist that provided the supervision.

For fisheries contracts specialists, this means that both the RAQS qualified and non-RAQS qualified staff members must be in the field together, so that the qualified individual can provide training to their staff, teach them what to look for, what corrective actions to suggest for different issues, how to complete the monitoring reports as well as how to appropriately communicate with the contract administrator and contractor. A fisheries contracts specialist cannot sign-off on a monitoring report that they were not on-site for.

12 SUPPORTING DOCUMENTS AND REFERENCES

Purpose

- To provide a list of policies, guides, statutes, and other supporting materials to support meeting the requirements under the Fisheries Protocol.

Tasks

- Documents should be referred to as appropriate for the individual project.

Decisions & Documentation

- This section includes details on:
  - Supporting documents
  - Federal Statutes, Policies, and Guidelines
  - Provincial Statutes, Policies, and Guidelines
  - Ontario Provincial Standard Specifications

12.1 SUPPORTING DOCUMENTS

- Environmental Guide for Fisheries - Best Management Practices

12.2 FEDERAL STATUTES

- *Fisheries Act*, R.S.C., 1985, c. F-14
- *Species at Risk Act* (S.C. 2002, c.29)

12.3 FEDERAL POLICIES AND GUIDELINES

- *Fish and Fish Habitat Protection Policy Statement*
- Applicant's Guide Supporting the "Authorizations Concerning Fish and Fish Habitat Protection Regulations"
- Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the *Fisheries Act*
- Permitting under the *Species at Risk Act*
- Protocol for the Detection of Fish Species at Risk in Ontario Great Lakes Area (OGLA)
- Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Areas (OGLA)
- DFO Guidelines for the Use of Explosives in or near Canadian Fisheries Waters
- DFO Code of Practice: End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater

12.4 PROVINCIAL STATUTES

- *Endangered Species Act*, S.O. 2007, c.6
- *Fish and Wildlife Conservation Act*, S.O. 1997, c. 41
- O.Reg. 230/08: Species at Risk in Ontario List
- O.Reg. 242/08: General
- O. Reg. 832/21: Habitat
- O.Reg. 664/98: Fish Licensing

12.5 PROVINCIAL POLICY AND GUIDELINES

MTO documents can be found on the MTO Technical Publications website: https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/tdViews.aspx

- MTO Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects
- MTO Drainage Management Manual
- MTO Drainage Design Standards

12.6 ONTARIO PROVINCIAL STANDARD SPECIFICATIONS

The following is the list of applicable Ontario Provincial Standard Specifications:

- OPSS.PROV 100 MTO General Conditions of Contract
- OPSS.PROV 180 General Specification for the Management of Excess Materials
- OPSS.PROV 182 Environmental Protection for Construction In and Around Waterbodies and on Waterbody Banks
- OPSS.PROV 517 Dewatering and Temporary Flow Passage Systems
- OPSS.PROV 803 Vegetative Cover
- OPSS.PROV 804 Temporary Erosion Control
- OPSS.PROV 805 Temporary Sediment Control
- OPSS.PROV 810 Rootwad Structures
- OPSS.PROV 811 Large Woody Debris
- OPSS.PROV 812 Lunkers
- OPSS.PROV 820 Riffles
- OPSS.PROV 821 Pools
- OPSS.PROV 822 Rocky Ramps
- OPSS.PROV 823 Low Flow Channel
- OPSS.PROV 824 Baffles in a Culvert
- OPSS.PROV 825 Aggregates in Waterbodies
- OPSS.PROV 832 Bioengineering Measures
- OPSS.PROV 1005 Aggregates - Waterbody

Note: this list is inclusive but not exhaustive and is subject to updates.

13 AGENCY AND CONTACT INFORMATION

FISHERIES AND OCEANS CANADA, CENTRAL AND ARTIC REGION		
CONTACT	**ADDRESS**	**TELEPHONE**
All Ontario	Fisheries Protection Program Fisheries and Oceans Canada 867 Lakeshore Road Burlington, ON L7S 1A1 **Email:** FisheriesProtection@dfo-mpo.gc.ca	Tel: 1-855-852-8320

MINISTRY OF TRANSPORTATION	
CONTACT	**ADDRESS**
Environmental Policy Office – Head Office	Garden City Tower 301 St. Paul Street, 2nd Floor St. Catharines, ON L2R 7R4 **Email:** enviromgmtMTO@ontario.ca

MINISTRY OF NATURAL RESOURCES
CONTACT INFORMATION AND LOCATIONS FOR MAIN AND REGIONAL OFFICES
Online: https://www.ontario.ca/page/ministry-natural-resources-work-centres

MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS	
CONTACT	**TELEPHONE (AVAILABLE 24/7)**
Spills Action Centre	In Toronto: 416-325-3000 Toll-free: 1-800-268-6060 TTY: 1-855-889-5775

14 GLOSSARY

Term	Definition
Aquatic Invasive Species	Means aquatic organisms that, upon introduction to areas or waters where they do not originate naturally, could have harmful effects on fish or fish habitat in Canada or the use of fish by Canadians.
Aquatic Species at Risk	Means a fish and/or a freshwater mussel provincially or federally listed as extirpated, endangered, threatened species or species of special concern. For the purpose of this guide, species of special concern are not afforded protection under SARA.
Aquatic Vegetation	Means a plant that grows partly or wholly in water whether rooted in the waterbody bed, floating without anchorage, or rooted along a waterbody bank.
Artificial Waterbodies	Means a waterbody that is not connected to a waterbody that contains fish at any time during any given year, such as: private ponds, commercial ponds (e.g., stocked fishing ponds, stormwater management ponds, irrigation ponds or watercourses, roadside drainage ditches and quarries and aggregate pits).
Braided	Means a watercourse that does not occupy a single channel, but the flow is diverted into many separate ribbons of water with sand bars between.
Contractor (MTO)	Means the individual, business or corporation that is contracted by MTO to undertake construction of a project and/or undertake maintenance work.
Contract Administrator (MTO)	Means the individual, business or corporation hired by MTO as a liaison between the contractor and MTO and is responsible for the day-to-day administration of the contract and compliance of the contractor with the terms and conditions of the contract.
Critical Habitat (SARA)	Means, as defined by the *Species at Risk Act*, as the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species.
Culvert	Means a conduit, usually covered by fill, whose primary function is to convey surface water through an embankment.

Term	Definition
Debris	Means branches, stumps, logs, boulders, ice build-up, garbage or any other organic or inorganic materials that prevent the passage of water and/or fish, or that damages or impairs the proper functioning of infrastructure.
Deleterious Substance	Means, as defined by the *Fisheries Act*, any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the se by man of fish that frequent that water.
Dewatering System	Means the components required to remove groundwater and/or carry out unwatering from within an excavation or work area to permit construction work to proceed under specified conditions, and may include a groundwater control system, impermeable barriers, pumps, and/or equipment.
Ditch	Means part of the highway drainage system that generally conveys water for short periods of time following precipitation or snowmelt and typically outlet to a waterbody that may support fish and fish habitat.
Duty to Consult	Refers to the Crown's constitutional obligation to consult an Indigenous community when it has knowledge of an established or credibly asserted Aboriginal or treaty right and contemplates conduct that may adversely affect that right. Aboriginal rights are practices, customs or traditions integral to the distinctive culture of the Indigenous community (e.g., rights to hunt, fish, trap, gather). Treaty rights are specific rights of Indigenous peoples set out in the treaties they entered into with Crown governments.
Effect	Means the impact that an activity will have on fish and fish habitat in the absence of mitigation.
Embedment	Means the portion of the culvert opening that is countersunk below the natural waterbody bed.
Emergency Situation	Means an accident, natural disaster, catastrophic structural failure, spill, or other incident that has occurred, or may imminently occur, and which poses an imminent risk to life, public health or safety, the environment, damage, or loss of property.

Term	Definition
Emergency Work (MTO)	Means an emergency repair of a highway facility undertaken immediately after an accident, natural disaster (including beaver dam failure), catastrophic structural failure, or on detection of an imminent failure, including containment, cleanup, and disposal of cleanup material; or a project that is required to address a situation where there is an imminent risk to life, public health or safety, the environment, damage, or loss of property.
***Endangered Species Act* (ESA)**	Means provincial legislation enacted to protect species that are at risk and their habitats, and to promote the recovery of species that are at risk.
Entrainment	Means when a fish is drawn into a water intake and cannot escape.
Erosion	Means the process by which the natural (earth) or unnatural (embankment, slope protection, structure, etc.) land surface is naturally worn away by the actions of water, wind, ice, or other geologic agents.
Excess Material	Means earth, vegetation and debris removed during ditching activities.
Fish	Means, as defined by the *Fisheries Act*, parts of fish, shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans, and marine animals.
Fish Habitat	Means, as defined by the *Fisheries Act*, water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply, and migration areas.
Fisheries BMP (MTO)	Means a Best Management Practice that has been endorsed by MTO and that is intended to provide MTO staff and MTO Service Providers direction on how to undertake routine activities in a manner that avoids impacts to fish and fish habitat.
Fluvial Geomorphology	Means the study of the form and function of streams and the interaction between streams and the landscape around them. 'Fluvial' refers to the processes associated with running waters, 'geo' refers to earth and 'morphology' refers to channel shape.
Harmful Alteration, Disruption, or	Means, as interpreted by DFO in the *Fish and Fish Habitat Protection Policy Statement*, any temporary or permanent

Term	Definition
Destruction of Fish Habitat (HADD)	change to fish habitat that directly or indirectly impairs the habitat's capacity to support one or more life processes of fish.
High Water Level	Means the elevation of the top of the bank of the channel. In watercourses this refers to the "bankfull channel" which is often the 2-year flood flow return level. In inland lakes and wetlands, it refers to those parts of the waterbody bed and banks that are frequently flooded by water that leaves a mark on the adjacent land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation.
Impingement	Means when a fish becomes entrapped and is held in contact with the intake screen and is unable to free itself.
In-Water Work	Means any work, activity or undertaking occurring at or below the high water level that may impact the waterbody bed or flow in the waterbody.
In-Water Work Timing Windows	Means a restriction to in-water work related to an activity during certain periods in order to protect fish from impacts of works or undertakings in and around water during spawning migrations and other critical life stages. They are established by the Ontario Ministry of Natural Resources.
Maintenance	Means the activities required to keep the roadway in a safe, passable condition and prolong the life of the infrastructure.
Management Plan (SARA)	Means an action-oriented planning document that identifies the conservation activities and land use measures needed to ensure, at a minimum, that a species of special concern does not become threatened or endangered.
Meander Bends	Means a loop-like bend in a sinuous stream channel. Meander bends typically occur where watercourses erode a section of its bank from water velocities or flows.
Mitigation	Means, as defined by DFO's *Fish and Fish Habitat Protection Policy Statement*, measures to reduce the spatial scale, duration, or intensity of harmful impacts to fish and fish habitat when such impacts cannot be avoided.
MTO Environmental Delivery	Means the MTO environmental staff in the region the work, undertaking, or activity is occurring. Typically, the contact will be the MTO Environmental Planner.
Pathways of Effects (PoEs)	Means a tool developed by DFO to assist proponents in determining the potential effects of projects on fish and fish

Term	Definition
	habitat. These diagrams describe a range of activities, the type of cause-effect relationships that are known to exist and the mechanisms by which stressors ultimately lead to effects in the aquatic environment.
Perched Culvert	Means a culvert structure which has an outlet with invert elevation at or above the waterbody bed.
Project Area	Means the area within with a provincial transportation undertaking will occur, as defined by MTO in the project's Terms of Reference.
Realigning (waterbody)	Means the construction of a new watercourse or a new alignment which may include the clearing, widening, and/or deepening of the existing watercourse.
Right-of-Way	Means the strip of land within the limits of which a roadway is built and is usually indicated by a fence line or bush line.
Riparian Vegetation Areas	Means trees, shrubs and other vegetation on waterbody bank from the high water level upland for 30 metres.
Sediment	Means soils or other surface material transported by wind or water as a result of erosion. Sediment is considered a deleterious substance.
Service Provider (MTO)	Means consultants, contract administrators, and contractors hired by MTO to assist in the planning, design, construction, operations, and maintenance of provincial transportation projects.
Significant Fish Habitat	Means fish habitat that meets one or more of the following criteria: • Rare or uncommonly found habitat that may (but may not) be one of the limiting factors to the fish population. • Specialized habitat that fish populations are highly dependent on to support critical life functions. • Areas contributing to fisheries productivity that are exceptionally productive, likely to be limiting and are rare or relatively uncommon.
***Species at Risk Act* (SARA)**	Means federal legislation enacted to prevent Canadian indigenous species, subspecies, and distinct populations from becoming extirpated or extinct, to provide for the recovery of endangered or threatened species and encourage the management of other species to prevent them from becoming at risk.

Term	Definition
Spill	Means the release or discharge of a pollutant, contaminant, or other deleterious substance, including sediment, into the natural environment. For the purpose of this guide, the areas of concern are those areas in or near a waterbody, or that may discharge to a waterbody.
Stressor	Means a site or environmental condition that can ultimately result in an effect on fish and fish habitat if not fully mitigated.
Study Area	Means the broader area beyond the immediate project site. The size and features of the study area depend on the complexity of the project and potential impacts on the surrounding area.
Temporary Flow Passage System	Means the temporary flow control devices, channels, pipes, pumps and operation plans used to manage sustained flow and flow resulting from precipitation events in order to separate and/or isolate a work area within an existing waterbody to permit work as specified in the Contract Documents. A temporary flow passage system may include temporary drainage facilities (e.g., channels, pipes, culverts and bridges) constructed as a temporary alignment of a natural watercourse.
Waterbody	Means any permanent or intermittent, natural, or constructed body of water including lakes, ponds, wetlands, and watercourses, but does not include stormwater management ponds.
Waterbody Bank	Means the land adjacent to a waterbody from the high water level to the top of slope.
Waterbody Bed	Means the bottom and sides of the waterbody over which the water flows, up to the high water level.
Watercourse	Means a stream, creek, river, or channel, including ditches, in which the flow of water is permanent, intermittent, or ephemeral.
Watercrossing (MTO)	Means a culvert or bridge structure used on a roadway to cross a waterbody.
Wetlands	Means lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the earth's surface.

15 APPENDICES: FORMS AND TEMPLATES

Note: All forms and templates can be downloaded from the MTO Technical Documents website.

APPENDIX A: REQUESTING INFORMATION FROM MNR

APPENDIX A1: MNR INFORMATION REQUEST/REQUEST TO CONFIRM: TEMPLATE LETTER

Date

Address

Re:

Attention: [CONTACT NAME]

In accordance with the MTO Fisheries Protocol and understanding between the Ministry of Transportation (MTO) and the Ministry of Natural Resources (MNR), this letter is to provide notification to the MNR that the MTO is undertaking the following works:

> [INSERT WORK/UNDERTAKING/ACTIVITY DETAILS; i.e., type of activity and a concise description of the proposed work in and around waterbodies].

Please see the attached for details regarding the [INSERT THE NAMES AND LOCATION OF WATERBODY (IES)] within the project limits.

> [INSERT one of the follow two paragraphs based on the data request need].

As per Step 2 of the MTO Fisheries Protocol within the MTO Environmental Guide for Fisheries (2023), we are requesting that MNR complete the attached table that includes information on fish community and habitat.

OR

We have data on file in relation to these watercourses (attached) from (insert YEAR) and are requesting that MNR confirm whether these data are still valid and provide updated information where applicable.

We look forward to MNR's response to our request within **30 working days**.

[Name]

[Title]

APPENDIX A2: MNR INFORMATION REQUEST/REQUEST TO CONFIRM: TEMPLATE TABLE

MTO PROJECT TITLE:

Location*	**Waterbody Name***	**Waterbody GPS*** (Attach Google Earth map)	**Watercourse Classification** (i.e., warmwater, coldwater)	**Habitat Information** (Include details/locations for aquatic invasive species fish passage barriers, known spawning habitats, groundwater upwellings, migratory corridors, etc.)	**Historical Data** (Include details on the historical fish species present.)	**MNR Fisheries Management Objectives** (If applicable, include details)	**In-Water Timing Window(s) for Construction** (Provide dates)

*Applicant **must** complete these columns as part of the submission.

Where information is available from other sources (e.g., existing MTO reports, GEOmapping), include in the appropriate column with source reference prior to submission to MNR.

APPENDIX B: SUPPLEMENTAL SOURCES OF DATA

B1 Federal Sources of Data

B2 Provincial Sources of Data

B3 Municipal Sources of Data

B4 Other Sources of Data

The following tables provide a listing of various sources of information that may be used to support the review of the study area, including the presence of fish species, fish habitat, and the environmental features of the area.

TABLE B1. FEDERAL SOURCES OF DATA

FEDERAL	
SOURCES	**EXAMPLES OF TYPES OF INFORMATION**
Fisheries and Oceans Canada (DFO) Ontario Aquatic SAR mapping Aquatic invasive species Reports, studies, etc. SAR database/ Canadian Freshwater Fisheries Database and risk (‘Red Zone’) reach mapping (Aquatic Landscape Inventory System (ALIS))	• Possibly fisheries and habitat information • Species at Risk (SAR) information/mapping • SAR risk mapping - Note SAR sampling permit* required for ‘Red Zones’
Environment and Climate Change Canada Fact sheets Federal water quality and quantity monitoring system	• SAR information (for non-aquatic species) • Species distribution and habitat requirements • Surface water quality and quantity data

TABLE B2. PROVINCIAL SOURCES OF DATA

PROVINCIAL	
SOURCES	**EXAMPLES OF TYPES OF INFORMATION**
Ontario Ministry of Natural Resources (MNR) - MNR Regional, District and Area Work Centres and Lake Management Units • Natural Heritage Information Centre (NHIC) database • Natural Resource Values Information System (NRVIS) database • Consultation with relevant agency and municipal staff including biologists, planners, Conservation Officers • Wetland evaluations and mapping (and related habitat) • Fisheries Management Plans and other conservation and monitoring plans and objectives • Watershed and Sub-Watershed Studies and Management Plans • In-water work timing windows	• Fish and fish habitat – Distribution/fish community data and thermal regime classification (e.g., cold water/warm water), spawning data – Significant habitats features – Stocking, hatchery information – Important angling areas, fish sanctuaries • Stewardship and habitat enhancement/restoration initiatives, Fisheries Management Plans and Objectives, wetland evaluations, mapping, ANSIs • Groundwater recharge and discharge, water quality and temperature information **Note: This information is to be provided by MNR upon receiving notification of the project – see Step 2 Gathering of Existing Fisheries Information**
• **Ontario Ministry of Natural Resources (MNR) -** Geospatial Ontario Aquatic Resource Area data/mapping • Aerial photographs • Topographic/base mapping, • Digital Terrain/elevation mapping • Soils • Quaternary Geology • Physiography • Groundwater	• Fish and fish habitat – Distribution/fish community data and thermal regime classification (e.g., cold water/warm water) – Waterbody connectivity, potential barriers to movement • Watershed and sub-watershed • Drainage patterns • Waterbody names (Note- Gazetteer to be used for consistent naming)

PROVINCIAL	
SOURCES	**EXAMPLES OF TYPES OF INFORMATION**
	• General waterbody size • Watercourse sinuosity, gradient, riparian and floodplain topography, valley form • Accessibility (ownership, access for field surveys etc.), • General vegetation cover and land use • Groundwater sources • Potential soil erodibility and permeability
Ministry of Transportation • Previously conducted Fisheries Assessments and Reports • Other consultant reports and information (Geotechnical/Foundations, Hydrology, Environmental Assessments) • Drainage/Hydrology Reports • Fluvial Geomorphology Reports	• Fisheries and habitat • Groundwater • Waterbody • Vegetation cover • Land use • Potential soil erodibility and permeability • Geotechnical, groundwater, flow and contaminant information • Drainage mosaics
Ministry of the Environment, Conservation, and Parks (MECP) • Species at Risk records • Well records • Provincial water quality and quantity monitoring system • Water-taking information	• Species at Risk and their habitat • Groundwater information • Surface water quality and quantity data • Potential contaminant site information • Contaminant levels in sport fish

TABLE B3. MUNICIPAL SOURCES OF DATA

MUNICIPAL	
SOURCES	**EXAMPLES OF TYPES OF INFORMATION**
Conservation Authorities • Fisheries Management Plans and other conservation and monitoring plans and objectives • Agricultural Drain classification • Drainage, sub-watershed, and watershed studies • SAR database and risk ('Red Zone') reach mapping • Wetland evaluations and mapping (and related habitat) • Environmentally Significant Areas and natural area information, Ecological Land Classification (ELC) vegetation mapping	• Fish and fish habitat – Distribution/fish community data, spawning data, migration information – Significant habitats – Known and potential presence of significant species and features, sensitivities, etc. – Potential habitat enhancement opportunities • Conservation Authority Values mapping, typically produced for specific area upon request • Floodplain/hazard land mapping • Agricultural land discharge • Groundwater recharge and discharge, water quality and temperature information • Surface water quality and quantity • Watercourse characteristics • Groundwater • Locations/management of dams and other water management objectives
Municipalities • Official plan • Natural features/natural heritage systems mapping and studies • Natural area and Environmentally Sensitive Areas mapping • Agricultural Drain classification • Drainage, sub-watershed, and watershed studies, Master Drainage Plans	• Fish and fish habitat information – Regionally rare species • Surface water/watercourse • Groundwater • Land-use - including potential contaminant sources and 'influential' land uses

MUNICIPAL	
SOURCES	**EXAMPLES OF TYPES OF INFORMATION**
• Development proposals • Management and monitoring studies	

TABLE B4. OTHER SOURCES OF DATA

OTHER SOURCES	
SOURCES	**EXAMPLES OF TYPES OF INFORMATION**
Royal Ontario Museum - Ichthyology in the Department of Natural History	• Fisheries • Species distribution and habitat requirements
Other interest groups and resource users • Anglers/angling groups and outfitters • Bait fishermen • Commercial fishermen • Local Indigenous communities/groups • Stewardship groups such as Ontario Streams, Trout Unlimited, naturalists • Universities and colleges • Ontario Hydro • Great Lakes Fisheries Commission (GLFC) • Knowledgeable local residents	• Fisheries and habitat – Habitat use, species distribution and migration information • Stewardship and habitat enhancement/restoration initiatives and projects • Habitat restoration specifications • Navigation maps • Barriers to movement • Sea Lamprey mapping (GLFC)

APPENDIX C: FIELD DATA COLLECTION FORMS

C1 Watercourse Field Collection Form and Guidance

C2 Ponds/Lakes Collection Form and Guidance

C3 Fish Community Inventory Form and Guidance

APPENDIX C1: WATERCOURSE FIELD COLLECTION FORM

GENERAL INFORMATION			
Project #	Project Description:		Date:
Is Stream Realignment required for this section: ○ Yes ○ No ○ Unknown			
Collectors:		Time Started:	Time Finished:
Weather Conditions:			
Air Temp (°C):	Water Temp (°C):	Conductivity (µS/cm):	Velocity (m/s):
Photos Numbers and Descriptions:			
LOCATION			
Name of Waterbody:	Drainage System:	Crossing #:	Station #:
Location Of Crossing:			
GPS Coordinates:		MTO Chainage:	
Township:		MNR District:	

LAND USE AND POLLUTION	
Surrounding Land Use:	Sources of Pollution:

EXISTING STRUCTURE TYPE				
Bridge ○	Box Culvert ○	Open Foot Culvert ○	CSP ○	N/A ○
Other ○ (Describe)		Size: (w x h) m^2		

SECTION TYPE AND MORPHOLOGY				
Section (Reach) Identifier:		Section Location: (Include On Habitat Map)		
Associated Wetland				
Stream / River ○	Channelized ○	Permanent ○	Intermittent ○	Ephemeral ○
Total Section (Reach) Length (m):				

Sub-Sections:	Run ○	Pool ○	Riffle ○	Flats ○	Culvert ○	Other ○
Percentage of Area:						
Mean wetted depth (m)						
Mean wetted width (m)						
Mean bankfull depth (m)						
Mean bankfull width (m)						
Substrate (type & %)						

Substrate Type:

Bedrock (Br)	***Boulder (Bo)***	***Cobble (Co)***	***Gravel (Gr)***	***Sand (Sa)***	***Silt (Si)***	***Clay (Cl)***	***Muck (Mu)***	***Detritus (D)***

BANK STABILITY				
	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Bank	○	○	○	○
Right Bank	○	○	○	○
	Deposition Zone	Protected Bank	Vulnerable Bank	Eroding Bank
Left Bank	○	○	○	○
Right Bank	○	○	○	○

HABITAT				
In-Stream Cover (% surface area):				
Undercut banks:	Boulders:	Cobbles:	Organic Debris:	None ○

Vascular Macrophytes: Instream: Overhanging:	Woody Debris: Instream: Overhanging:

Shore Cover (% stream shaded):				
100-90% ○	89-60% ○	59-30% ○	29-1% ○	None ○

Vegetation Type:				
Vegetation Type (%)	Submergent:	Floating:	Emergent:	None ○
Predominant Species:				

MIGRATORY OBSTRUCTIONS		
Permanent	Seasonal	None
POTENTIAL CRITICAL HABITAT		
Spawning	Groundwater	Other
POTENTIAL ENHANCEMENT OPPORTUNITIES		
ADDITIONAL COMMENTS		
Additional Notes Appended? O No O Yes Number of Pages _____		

APPENDIX C1: WATERCOURSE FIELD COLLECTION FORM - GUIDANCE

Completing the Field Collection Forms: The field record form provided is to be filled in as completely as possible for each reach within the Zone of Detailed Assessment (for example, one for upstream of a structure, one for within the structure, and one for downstream of the structure; or one for each 'homogeneous' reach (See Section 5.3 Field Investigations of the Guide).

Sections of the form that do not pertain to the location or study being conducted should be crossed out or marked with an "N/A" to show that the information was omitted on purpose and not forgotten. Because the information being collected may be used several years later, any inconsistencies or omissions may shed doubts on the accuracy of all the data.

GUIDANCE ON COMPLETING THE WATERCOURSE FIELD COLLECTION FORM:

Information	Purpose/Description/Directions
GENERAL INFORMATION	
PROJECT	To identify the MTO project use WP number or other unique identifier.
PROJECT DESCRIPTION	A concise description of the project.
DATE	Enter the date of the field investigations.
IS STREAM REALIGNMENT REQUIRED FOR THIS SECTION?	Where sufficient project details are known at the time of survey, the possibility that a section of channel will require realignment should be noted. Situations that will require potential realignment include culvert extensions that will not match with the existing channel alignment, widening that will encroach into a parallel section of channel, or enclosure of meandering channel sections in culverts or small structures.
COLLECTORS	Identify all members of the field crew and identify the crew leader. Identify person doing the field work. For example: ABC Consultants – Crew Leader: AR; field crew: AH, DC

Information	Purpose/Description/Directions
TIME STARTED/FINISHED	It is important to record the time of day the sampling is done as well as the date. When the information is reviewed it may be important to know if water temperatures were taken early in the morning or early afternoon (typically the warmest time of the day). Local or regional weather conditions could be reviewed and related to the water levels.
WEATHER CONDITIONS	Record the general weather conditions at the time of sampling. This should include rain or snow during the sampling, or if the sky is clear or overcast. To record any adverse weather conditions that may affect data, (e.g. Freezing Rain/Snow)
AIR TEMP (ºC)	Enter the air temperature as measured for the specific reach.
WATER TEMP (ºC)	Enter the water temperature as measured for the specific reach from mid-stream and mid-depth if possible.
CONDUCTIVITY (µS/cm)	Make conductivity measurements from mid-stream and mid-depth if possible. Electrical conductivity (EC) is dependent on the total dissolved salts concentration (TDS) in the water; the higher the conductivity, the higher the salt (e.g., sodium, calcium, sulphate) concentration. Measure EC in the field using a portable conductivity meter (e.g. YSI, HydroLab). Most conductivity meters automatically convert conductivity measurements to 25°C. If your meter does not automatically standardize to 25°C, record the water temperature at the same time as conductivity and use a conductivity nomograph to convert the reading to 25°C.
CURRENT VELOCITY (m/s)	Velocity measured by floating an object downstream and timing it over a predetermined distance is an acceptable estimation. Oranges or perforated golf balls are often used because they float just below the water surface thereby reducing the influence of wind and providing a better estimate of water velocity. Three or more passes should be made over the same section and an average taken.

Information	Purpose/Description/Directions
PHOTO NUMBERS AND DESCRIPTIONS	To record what photographs were taken and what each shows, for example, Pic #4 – Upstream, looking at culvert inlet; Pic #5 – Beaver dam, downstream of culvert. Number each photograph and provide a brief description of the photo. Writing a description as the photos are taken in the field will assist the fisheries specialist when putting the required documentation together as it may be weeks/months after the field investigations are completed. Photographs can look alike and often, what seemed memorable in the field, may not be memorable once in the office. Photos must also be identified on the habitat map. See Section 5 of the Fish Guide for further details on photographing watercourses and the minimum required photographic vantage points to be included.
LOCATION	
NAME OF WATERBODY	Many waterbodies have had an official name gazetted and this will be published in the Ontario edition of the "Gazetteer of Canada". If the name does not appear in the Gazetteer, then the name used on a published map should be used. If there is a commonly used local name it should be included with the official name and flagged as a local name.
DRAINAGE SYSTEM	The drainage system refers to the main river or lake which all tributaries and small lakes eventually drain into.
CROSSING #	Assigned number of crossings or adjacent reach of watercourse.
STATION #	Assigned number of the station within crossing and included on the Habitat Map.
LOCATION OF CROSSING	A concise description of the geographic location of the station site should be made. Attempt to relate it to a feature easily identified on a map such as a bridge or stream confluence and local roads.
GPS COORDINATES	Record the GPS coordinates (latitude & longitude) of the station.
MTO CHAINAGE	The station (e.g. 10+123) as obtained from design plans and should include an offset (6.75) distance as necessary.
TOWNSHIP	Lower level municipality in which the station is located

Information	Purpose/Description/Directions
MNR DISTRICT	https://www.ontario.ca/page/ministry-natural-resources-work-centres
LAND USE AND POLLUTION	
SURROUNDING LAND USE	A concise description of the surrounding land uses to assist in determining potential impacts to fish or fish habitat.
SOURCES OF POLLUTION	A concise description of any visible sources of: 1. Point or non-point source pollution including outfalls, bank seepage, oil slicks, etc. 2. Nutrient loading evident by the presence of algal blooms or dense growth of aquatic macrophytes. 3. Sedimentation evident by the presence of turbid waters, sediment plumes, infilling, accumulation of fines on submergent macrophytes and along watercourse bank.
EXISTING STRUCTURE TYPE	
Check circle for type and size	To record the type and size of crossing. CSP refers to corrugated steel pipe.
SECTION TYPE AND MORPHOLOGY	
SECTION IDENTIFIER	Unique Identifier name for the reach
SECTION LOCATION	A concise description of the geographic location of the section. Including GPS locations of upstream and downstream boundaries
ASSOCIATED WETLAND	Name and/or describe any wetland that appears to be hydrologically connected to the stream reach.
TYPE	Check appropriate type **(**natural/altered and flow regime)
Stream/River	'Natural' watercourse containing flowing water at least part of the year.
Channelized	Constructed or altered/straightened channel, drain, ditch, canal or aqueduct that is straight and uniform in structure.
AND check either:	

Information	Purpose/Description/Directions
Permanent	Flows that are continuous throughout the year.
Intermittent	Flow that occur at certain time of the year, only when groundwater levels are adequate and may cease entirely in low water.
Ephemeral	Flows that are short-lived or transitory and occur from precipitation, snow melt, or short-term water releases.
TOTAL SECTION LENGTH (m)	Length of each section/reach should not exceed 50 m.
SUB-SECTIONS	Check appropriate type:
Run	Areas typically found at the head of a pool with rapidly flowing water and a similar hydraulic head (≥8 mm) and velocity (0.25-0 – 4 m/s) as a riffle but greater depth. The water's surface is typically not agitated by bed material but may be turbulent.
Pool	Deep areas of a stream with a relatively low velocity and a smooth unagitated surface. Pools have a hydraulic head of 0 to 3 mm and a velocity less than 0.05 – 0.15 m/s.
Riffle	Areas of relatively shallow fast, turbulent flow where the water's surface is typically broken. Riffles have a hydraulic head of 8 mm or greater and fast velocities ranging from 0.25 – 0.40 m/s
Flats	Low flowing water with a smooth unagitated surface (not as deep as a pool). Flats have a hydraulic head of 4-7 mm and a velocity between 0.15 – 0.30+ m/s.
CHANNEL DIMENSIONS	

Information	Purpose/Description/Directions
Mean depth wetted (m)	Maximum within the specific morphological feature (e.g. pool). Provide average and range if several features (e.g. pools) within section. For larger crossings, measure at least five locations spread equally across a transect. It should be the same transect used to measure the wetted width of the waterbody. Measurements can be made easily using a meter stick ensuring it is not sinking into the substrate. The mean should be calculated using the formula: Mean depth = (D1 + D2 + ... Dn)/n Where D=depth measurement, and n =total number of measurements.
Mean width wetted (m)	The distance from high water mark on one stream bank to the opposite stream bank. It is a transect taken perpendicular to the direction of flow. High water marks are either visibly stained on the stream bank or taken at the beginning of rooted vegetation on the stream bank/lakeshore or at top of bank. When measuring the wetted width of the stream subtract the width of islands and include undercuts, to the nearest tenth of a metre.
Mean bankfull depth (m)	The average depth measured at the elevation point of incipient flooding and should be measured at the same transect used to measure the bankfull width and calculated as per mean wetted depth.
Mean bankfull width (m)	The width at the elevation point of incipient flooding, indicated by deposits of sand or silt at the active scour mark, break in stream bank slope, perennial vegetation limit, rock discoloration, and root hair exposure.
Substrate (%)	An estimate of percent cover of substrate type can be made visually. Substrate should be classified according to the categories described below:
Bedrock	Exposed rock with no overburden.
Large Boulder	Particles with an intermediate width (median axis) of >1024 mm.
Small-Medium Boulder	Particles with an intermediate width (median axis) of 256-1024 mm.

Information	Purpose/Description/Directions
Cobble	Particles with an intermediate width (median axis) between 64 and 256 mm.
Gravel	Particles with an intermediate width (median axis) between 2 to 64 mm.
Finer textures	Particles with an intermediate width (median axis) of less than 2 mm. For the finer textured material, place about ½ to 1 tablespoon of sediment in the palm of the hand. Feel the mass by rubbing between fingers.
Sand	Loose and single grained. The individual grains can readily be seen or felt. If squeezed in the hand, it will form a cast but will crumble when touched.
Silt	Very fine substrate (between sand and clay) that is moved by currents and deposited in slower moving water. It usually does not feel sticky and feels like flour when dry but has a somewhat slippery feel when wet.
Clay	The finest of the substrate types. It is quite plastic and usually sticky when wet. When the moist soil is pinched out between the thumb and fingers, it will form a long flexible ribbon.
Muck	Mixture of decomposing organic matter, silt and/or clay. It tends to be dark in colour and greasy to the touch.
Detritus	Organic material with large pieces of sticks and leaves accounting for at least 85% of mass.
BANK STABILITY	
Stable Slightly Unstable Moderately Unstable Unstable	Stable banks are characterized by the presence of boulders, rocks, or rooted vegetation that reduces the bank's susceptibility to erosion, while unstable banks are characterized by the presence of exposed raw dirt, lack of rooted vegetation, steep sloped banks, undercuts, and often slumping banks. Determine the category of bank stability for the left upstream bank and right upstream bank separately.
Deposition Zone	Gentle, <45-degree slope. Generally, materials which have been deposited by the river during its flood condition.

Information	Purpose/Description/Directions
Protected Bank	Steep, >45-degree non-erodible materials (e.g. rock, boulders or hardened clay). Vegetation may or may not be present and includes banks armoured by humans.
Vulnerable Bank	Steep, >45-degree erodible materials which show no recent signs of erosion (i.e. undercuts or slumping) and protected by a mat of live vegetation.
Eroding Bank	Steep, >45-degree erodible materials undercut (by at least 5 cm) or shows signs of recent slumping (i.e. no or little vegetation present).
HABITAT	
IN-STREAM COVER (% Surface area)	In-stream cover provides an area for resting, shelter and predator avoidance for fish. Different types of cover are important in different habitat types, so it is important to note in which part of the waterbody the features occur. A cover particle is any object that touches the water within the sample area, is at least 100 mm wide along the median axis and of sufficient density to block >75 % of sunlight from reaching the stream bottom.
Undercut banks	A bank that has had its base eroded away and now overhangs the water. These often occur under tree root systems. The undercut area should be probed with a meter stick to determine its size and depth.
Boulders	In-stream rocks larger than 25 cm in diameter are considered suitable cover for many larger fish. They create back eddies for fish to rest out of the current and are also large enough to hide fish from predators.
Cobbles	In-stream rocks 8 to 25 cm in diameter provide interstitial spaces (gaps between rocks) that can be used as cover by small or juvenile fish. These interstitial spaces are important overwintering and/or spawning areas for many fish.
Organic Debris	Branches, leaves and other material will often collect in piles in streams and lakes creating areas of good cover.

Information	Purpose/Description/Directions
Vascular Macrophytes	Living aquatic and terrestrial non-woody plants in-stream or overhanging (< 1 m above water surface) vegetation can provide shelter, protection and an attachment surface for food items.
Woody Debris	Living or dead woody materials (includes fallen trees, stumps, logs, mats of twigs, shrubs).
SHORE COVER (% Stream shaded)	A visual estimate of the percent of the waterbody that is shaded by overhanging trees or shrubs that are more than 1 m above the water surface.
VEGETATION TYPE (%)	In-stream vegetation is a very important component of fish habitat. It provides cover for fish to seek shelter from predators and provides shade from the sun. Food production is usually excellent in areas with a variety of vegetation. A visual estimation of the percent of the waterbody bed covered by each vegetation type should be made and plant species (at least predominant species) identified.
Submerged	Group of plants that remains under the water surface at most times. Both vascular and non-vascular plants are included. Examples of these plants include pondweeds and milfoil. Algae often form an extensive mat covering the waterbody bed. However, the value in terms of fish cover is limited so it should not be included in that category.
Floating	Vascular plants usually with broad leaves floating on the water surface. Common in calm, still waters (e.g. water lilies).
Emergent	Vascular plants which root to the stream or lake bottom while their stems extend above the water surface (e.g. cattails, bulrushes, and sedges). Insects with aquatic life stages are often abundant in areas with emergent vegetation. These insects are an important food source for many fish.

MIGRATORY OBSTRUCTIONS	
	Natural or constructed obstructions (e.g. dams, weirs, perched culverts) that block the movement of fish. Barriers may also result from insufficient water depth for example through a culvert with no low flow channel, or due to high slope and/or velocity. A description of the obstruction should be provided.
Permanent	Barrier is present under all flow conditions and during all times of year.
Seasonal	Barrier is only present during lower water levels (i.e. is low enough that fish can move over it during higher flow periods/water levels; insufficient depth during low flow period may develop in culvert with no low flow channel) or high flow periods (i.e. extreme velocities).
POTENTIAL SIGNIFICANT HABITAT	
Spawning	All evidence of spawning fish should be recorded in relation to the specific habitat. Potential spawning habitats should be identified in relation to the fish community. Known spawning areas (from background data) should be specifically inspected.
Groundwater	The locations of all evidence of potential groundwater discharge such as springs, Watercress, iron 'floc' or staining, bank seepage should be recorded.
Other	Other types of habitat that may provide significant habitat functions or are limiting should be identified, such as nursery habitat, seasonal refugia, deep holding or staging pools, etc., should be recorded. These areas may be evidenced by concentrations of fish.
POTENTIAL ENHANCEMENT OPPORTUNITIES	
	Opportunities to improve existing habitat conditions, such as: removal of barriers to movement, rehabilitation of degraded conditions (e.g. bank failure, debris clean-up), diversification of homogeneous habitats or addition of features that may be limiting productivity (e.g. pools, gravels).
ADDITIONAL COMMENTS	

APPENDIX C2: PONDS/LAKES FIELD COLLECTION FORM

GENERAL INFORMATION			
MTO Work Project #	Project Description:		Date:
Collectors:		Time Started:	Time Finished:
Weather Conditions:			Air Temp (°C):
Surface Conditions:			
Calm ○	Rippled ○	Wavy ○	Rough ○
Photo Numbers and Descriptions:			

LOCATION		
Name of Waterbody:	Station #:	Location Of Station:
GPS Coordinates:	MTO Chainage:	
Township:	MNR District:	

LAND USE AND POLLUTION	
Surrounding Land Use / Terrain:	Sources of Pollution:

WATERBODY TYPE AND MORPHOLOGY					
Large Lake ○	Small Lake ○	Pond ○	Reservoir ○	Dug-out ○	Wetland ○
Intermittent ○	Run-off ○	Spring-Fed ○	In-stream ○	Bypass ○	Not connected ○
Waterbody Dimensions:					
Length (m)			Mean Width (m)		

WATER CHEMISTRY			
Water Colour:			
Colourless ○	Yellow / Brown ○	Blue / Green ○	Other (Describe): ○
Secchi Depth (m):		pH (as required):	
Conductivity (µS/cm):			
Surface:		Bottom:	

DISSOLVED OXYGEN / TEMPERATURE PROFILE							
Depth (m)	**0.0**	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**
Water Temp (°C)							
Dissolved Oxygen (mg/L)							
Depth (m)	**3.5**	**4.0**	**4.5**	**5.0**	**5.5**	**6.0**	**6.5**
Water Temp (°C)							
Dissolved Oxygen (mg/L)							
Depth (m)	**7.0**	**7.5**	**8.0**	**8.5**	**9.0**	**9.5**	**10.0**
Water Temp (°C)							
Dissolved Oxygen (mg/L)							

Max Depth (m):	**Bottom Substrate:**

Bedrock (Br)	***Boulder (Bo)***	***Cobble (Co)***	***Gravel (Gr)***	***Sand (Sa)***	***Silt (Si)***	***Clay (Cl)***	***Muck (Mu)***	***Detritus (D)***

BANK HABITAT						
Bank Cover (% surface area):						
Undercut banks	Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	None
						○
Near Shore Slope (%):						

Shoreline Substrate (%):									
Bedrock	Boulder	Cobble	Gravel	Sand	Silt	Clay	Muck	Marl	Detritus

Shore Cover (% shaded):				
100-90% ○	89-60% ○	59-30% ○	29-1% ○	None ○

IN-WATER HABITAT					
Underwater Cover (% surface area):					
Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other

Vegetation Type:				
Vegetation Type (%)	Submerged	Floating	Emergent	None ○
Predominant Species:				

MIGRATORY OBSTRUCTIONS		
None	Seasonal	Permanent
POTENTIAL CRITICAL HABITAT		
POTENTIAL ENHANCEMENT OPPORTUNITIES		
ADDITIONAL COMMENTS		
Additional Notes Appended? ○ No ○ Yes Number of Pages _____		

APPENDIX C2: PONDS/LAKES FIELD COLLECTION FORM - GUIDANCE

The field record form provided is to be filled in as completely as possible for each section within the Zone of Detailed Assessment, (e.g. one for upstream of a structure, one for within the structure, and one for downstream of the structure). Typically, a section should be no more than 30 m long. This is the largest area that can easily be visually surveyed at one time. Information from each section should be compiled to complete the form for the station.

Sections of the form that do not pertain to the location or study being conducted should be crossed out or marked with an "N/A" to show that the information was omitted on purpose and not forgotten. Because the information being collected may be used several years later, any inconsistencies or omissions may shed doubts on the accuracy of all the data.

GUIDANCE ON COMPLETING PONDS/LAKES FIELD COLLECTION FORM:

Information	Purpose/Description/Directions
GENERAL INFORMATION	
PROJECT	To identify the MTO project use WP number or another unique identifier.
PROJECT DESCRIPTION	A concise description of the project.
DATE	Enter the date of the field investigations.
COLLECTORS	Identify all members of the field crew and identify the crew leader. Identify person doing the field work. For example: ABC Consultants – Crew Leader: AM; field crew: CG, BC
TIME STARTED/FINISHED	It is important to record the time of day the sampling is done as well as the date. When the information is reviewed it may be important to know if water temperatures were taken early in the morning or early afternoon (typically the warmest time of the day). Local or regional weather conditions could be reviewed and related to the water levels.
WEATHER CONDITIONS	Record the general weather conditions at the time of sampling. This should include rain or snow during the sampling, or if the sky is clear or overcast. To record any adverse weather conditions that may affect data, e.g. freezing rain/snow.
AIR TEMP (ºC)	Enter the air temperature as measured for the specific reach.

Information	Purpose/Description/Directions
SURFACE CONDITIONS:	Waterbody surface conditions.
Calm	Nearly or completely motionless.
Rippled	Small waves.
Wavy	Large waves.
Rough	Very large waves.
PHOTO NUMBERS AND DESCRIPTIONS	To record what photographs were taken and what each shows, for example, Pic #1 – East shoreline, looking confluence of stream; Pic #2 – Boulder cluster, 10m west of boat launch. Number each photograph and provide a brief description of the photo. Writing a description as the photos are taken in the field will assist the fisheries specialist when putting the required documentation together as it may be weeks/months after the field investigations are completed. Photographs can look alike and often, what seemed memorable in the field, may not be memorable once in the office. Photos must also be identified on the habitat map. See Section 5 of the Fish Guide for further details on photographing lakes and ponds.
LOCATION	
NAME OF WATERBODY	Many waterbodies have had an official name gazetted and this will be published in the Ontario edition of the "Gazetteer of Canada". If the name does not appear in the Gazetteer, then the name used on a published map should be used. If there is a commonly used local name, it should be included with the official name and flagged as a local name.
STATION #	Assigned number of station and included on the Habitat Map.
LOCATION OF STATION	A concise description of the geographic location of the station site should be made. Attempt to relate it to a feature easily identified on a map such as a pier or dock and local roads.
GPS COORDINATES	Record the GPS coordinates (latitude & longitude) of the station.
MTO CHAINAGE	The station (e.g. 10+123) as obtained from design plans and should include an offset (6.75) distance as necessary.

Information	Purpose/Description/Directions
TOWNSHIP	Lower level municipality in which the station is located.
MNR DISTRICT	https://www.ontario.ca/page/ministry-natural-resources-work-centres
LAND USE AND POLLUTION	
SURROUNDING LAND USE	A concise description of the surrounding land uses to assist in determining potential impacts to fish or fish habitat such as resorts, tree harvest areas, and agriculture.
SOURCES OF POLLUTION	A concise description of any visible sources of: 1. Point or non-point source pollution including outfalls, bank seepage, oil slicks, etc. 2. Nutrient loading evident by the presence of algal blooms or dense growth of aquatic macrophytes. 3. Sedimentation evident by the presence of turbid waters, sediment plumes, infilling, accumulation of fines on submergent macrophytes and along shoreline.
WATERBODY TYPE AND MORPHOLOGY	
TYPE	Check lake type or pond type.
Large Lake	A natural body of deep standing freshwater larger than a small pond >5 ha.
Small Lake	A natural body of deep standing fresh water larger than a pond.
Pond	A shallow body of standing water. It may dry seasonally; typically, smaller than 0.5 ha.
Reservoir	A manmade lake with a dam controlling discharge flows.
Dug-out	An excavated “pond” usually for water collection for agricultural purposes.
Wetland	An area that is seasonally or permanently covered by shallow water and supports vegetation adapted to the wet conditions.
Intermittent	A pond that is seasonally dry.
Run-off	Waterbody is supplied primarily by surface run-off (e.g. a shallow pond).

Information	Purpose/Description/Directions
Spring-fed	Waterbody is supplied primarily by groundwater. Ground surface is permeable (e.g. kettle lake).
In-stream	Waterbody is behind an impoundment in a watercourse.
By-pass	Water by-pass.
Not Connected	Waterbody is not connected to a watercourse.
LAKE/POND DIMENSIONS:	
Length (m)	Estimated length.
Mean Width (m)	Estimated average width.
WATER CHEMISTRY	
Water Colour:	Determine the colour of the water visually by holding a sample up to a white sheet of paper and record the closest match from the colours listed.
Colourless	No particular condition; low productivity.
Yellow/brown	Staining from tannic acids: may also be zooplankton or solids.
Blue/green	Due to zooplankton blooms; likely indicative of higher productivity and/or marl deposits.
Other	Describe any other visible colouration of the water sample.
SECCHI DEPTH (m)	Determining the Secchi Depth 1. Lower the Secchi disk until it disappears. 2. Note the depth to nearest tenth of a metre. 3. Raise the Secchi until it reappears. 4. Note the depth. 5. The Secchi depth is the midpoint between these 2 depths. NOTE: Take the reading on the shady side of the boat. Do not wear sunglasses. Take the reading as close to mid-day as possible (10am - 2pm). Record depths in tenths of meters (from MOE Lake Partner Program). Also, conduct Secchi depth determinations after the dissolved

Information	Purpose/Description/Directions
	oxygen/temperature profiles have been conducted so that the water column is not disturbed.
pH	pH is a measure of the hydrogen-ion concentration in water. It operates on a scale of 0 (highly acidic) to 14 (highly basic), with pH of 7 being neutral. Measure pH in the field using a hand-held pH meter (a low ionic strength electrode and calibration standards may be required). Record the pH to the nearest tenth (e.g. 7.1).
CONDUCTIVITY (µS/cm)	Make conductivity measurements from lake surface and bottom samples. Electrical conductivity (EC) is dependent on the total dissolved salts concentration (TDS) in the water; the higher the conductivity, the higher the salt (e.g. sodium, calcium, sulphate) concentration. Measure EC in the field using a portable conductivity meter (e.g. YSI, HydroLab). Most conductivity meters automatically convert conductivity measurements to 25°C. If your meter does not automatically standardize to 25°C, record the water temperature at the same time as conductivity and use a conductivity nomograph to convert the reading to 25°C.
DISSOLVED OXYGEN/TEMPERATURE PROFILE	
	Collect dissolved oxygen concentrations and temperature at 0.5 m intervals to bottom or to a maximum of 10m. Take vertical dissolved oxygen (DO) and temperature profiles simultaneously, as your meter (e.g., YSI, HydroLab) will provide a temperature reading for every depth at which the DO is measured. Take two sets of readings at each depth interval: one during descent and the other during ascent, to minimize bias due to adjustment of the meter to the water conditions at the subsequent depths. Dissolved oxygen is a measure of the concentration of oxygen dissolved in water expressed in mg/L, or in parts per million (1 mg/L is equivalent to 1 ppm).
Max Depth (m)	As measured during dissolved oxygen/temperature profile.
Bottom Substrate	An estimate of percent cover of substrate type can be made visually (if possible). Substrate should be classified according to the categories described below (see Shoreline Substrate).

BANK HABITAT	
IN-WATER COVER **(% Surface area)**	In-water cover provides an area for resting, shelter and predator avoidance for fish. Different types of cover are important in different habitat types, so it is important to note in which part of the waterbody the features occur. A cover particle is any object that touches the water within the sample area, is **at least 100 mm wide** along the median axis and of sufficient density to block >75 % of sunlight from reaching the stream bottom. A cover particle can consist of a mat of materials such as twigs, macrophytes, or the bank. The mat must still meet the median diameter size and light penetration restrictions.
Undercut banks	A bank that has had its base eroded away and now overhangs the water. These often occur under tree root systems. The undercut area should be probed with a meter stick to determine its size and depth.
Boulders	In-water rocks larger than 25 cm in diameter are considered suitable cover for many larger fish. They create back eddies for fish to rest out of the current and are also large enough to hide fish from predators.
Cobble	In-water rocks 8 to 25 cm in diameter provide interstitial spaces (gaps between rocks) that can be used as cover by small or juvenile fish. These interstitial spaces are important overwintering and/or spawning areas for many fish.
Woody Debris	Living or dead woody materials (includes fallen trees, stumps, logs, mats of twigs, shrubs).
Organic Debris	Branches, leaves and other material will often collect in piles in streams and lakes creating areas of good cover.
Vascular Macrophytes	Living aquatic and terrestrial non-woody plants in-water or overhanging vegetation (<1 m above water surface) can provide shelter, protection and an attachment surface for food items.
NEAR SHORE SLOPE (%)	A reasonable measurement of slope can be obtained using a handheld clinometer. Tie a ribbon or mark up the shore at eye level. While standing on the shoreline, use the clinometer to determine the angle of slope. Record gradient in %.
SHORELINE SUBSTRATE (%)	An estimate of percent cover of substrate type can be made visually (total 100%). Substrate should be classified according to the categories described below:
Bedrock	Exposed rock with no overburden.

Large Boulder	Particles with an intermediate width (median axis) of >1024 mm.
Small-Medium Boulder	Particles with an intermediate width (median axis) of 256-1024 mm.
Cobble	Particles with an intermediate width (median axis) between 64 and 256 mm.
Gravel	Particles with an intermediate width (median axis) between 2 to 64 mm.
Finer textures	Particles with an intermediate width (median axis) of less than 2 mm. For the finer textured material, place about ½ to 1 tablespoon of sediment in the palm of the hand. Feel the mass by rubbing between fingers.
Sand	Loose and single grained. The individual grains can readily be seen or felt. If squeezed in the hand, it will form a cast but will crumble when touched.
Silt	Very fine substrate (between sand and clay) that is moved by currents and deposited in slower moving water. It usually does not feel sticky and feels like flour when dry but has a somewhat slippery feel when wet.
Clay	The finest of the substrate types. It is quite plastic and usually sticky when wet. When the moist soil is pinched out between the thumb and fingers, it will form a long flexible ribbon.
Muck	Mixture of decomposing organic matter, silt and/or clay. It tends to be dark in colour and greasy to the touch.
Marl	White to gray accumulation on lake bottoms caused by precipitation of calcium carbonate (CaCO3) in hard water lakes. Marl may contain many snail and clam shells, which are also calcium carbonate. Marl also precipitates phosphorus, resulting in low algae populations and good water clarity.
Detritus	Organic material with large pieces of sticks and leaves accounting for at least 85% of mass.
SHORE COVER (% Shaded)	Shoreline cover refers to the debris and overhanging vegetation present at the shoreline and one metre above the water**.**

IN-WATER HABITAT	
UNDERWATER COVER (% Surface area)	Underwater cover provides an area for resting and predator avoidance for fish. Different types of cover are important in different habitat types, so it is important to note in which part of the waterbody the features occur. Most types of cover should fit into the categories provided. Any additional features should be identified. The percentage should total 100% (of the surface area).
Undercut banks	A bank that has had its base eroded away and now overhangs the water. These often occur under tree root systems. The undercut area should be probed with a meter stick to determine its size and depth.
Boulders	In-water rocks larger than 25 cm in diameter are considered suitable cover for many larger fish. They create back eddies for fish to rest out of the current and are also large enough to hide fish from predators.
Cobble	In-water rocks 8 to 25 cm in diameter provide interstitial spaces (gaps between rocks) that can be used as cover by small or juvenile fish. These interstitial spaces are important overwintering and/or spawning areas for many fish.
Woody Debris	Living or dead woody materials (includes fallen trees, stumps, logs, mats of twigs, shrubs).
Organic debris	Branches, leaves and other material will often collect in piles in streams and lakes creating areas of good cover.
Vascular Macrophytes	Living aquatic and terrestrial non-woody plants in-water or overhanging vegetation (<1 m above water surface) can provide shelter, protection and an attachment surface for food items.
VEGETATION TYPE (%)	Vegetation type refers to the vegetation emerging and present at the shoreline and in the water**.** Estimate and record to the nearest 10% of the lakeshore perimeter and include the most predominate species. Record the dominant aquatic plant species, to the genus level, or the species level if possible.
Submerged	Group of plants that remains under the water surface at most times. Both vascular and non-vascular plants are included. Examples of these plants include pondweeds and milfoil. Algae often form an extensive mat covering the waterbody bed and should be included in this group. However, the value in terms of fish cover is limited so it should not be included as fish cover.

Floating	Vascular plants usually with broad leaves floating on the water surface. Common in calm, still waters (e.g. water lilies).
Emergent	Vascular plants which root to the stream or lake bottom while their stems extend above the water surface (e.g. cattails, bulrushes, and sedges). Insects with aquatic life stages are often abundant in areas with emergent vegetation. These insects are an important food source for many fish. An estimate of the amount of water interspersion and water depths in the emergent vegetation will be important in determining the value of this vegetation type as fish cover.
MIGRATORY OBSTRUCTIONS	
None	Natural or constructed obstructions that block the movement of fish to/from the lake or pond. Barriers may also result from insufficient water depth. A description of the obstruction should be provided.
Seasonal	Barrier is only present during lower water levels (i.e. is low enough that fish can move over it during higher flow periods/water levels).
Permanent	Barrier is present under all flow conditions and during all times of year.
POTENTIAL SIGNIFICANT HABITAT	
	All evidence of spawning fish should be recorded in relation to the specific habitat. Potential spawning habitats should be identified in relation to the fish community. Known spawning areas (from background data) should be specifically inspected. Other types of habitat that may provide significant habitat functions or are limiting should be identified, such as nursery habitat, seasonal refugia, etc., should be recorded. These areas may be evidenced by concentrations of fish.
POTENTIAL ENHANCEMENT OPPORTUNITIES	
	Opportunities to improve existing habitat conditions, such as: rehabilitation of degraded conditions (e.g. shore/bank failure, debris clean-up), diversification of homogeneous habitats or addition of features that may be limiting productivity.
ADDITIONAL COMMENTS	

APPENDIX C3: FISH COMMUNITY INVENTORY FORM

GENERAL INFORMATION						
Project #	Project Description:				Date:	
Collectors:		Time Started:			Time Finished:	
Weather Conditions:		Surface Conditions (If Applicable):				
		Calm ○	Rippled ○	Wavy ○	Rough ○	
LOCATION						
Name of Waterbody:		Crossing #:			Station #:	
Location Of Crossing/Station:						
GPS Coordinates:		MTO Chainage:				
Township:		MNR District:				

SAMPLING LOCATIONS AND WATER CHEMISTRY						
Location:	Length (m)	Air Temp. (˚C)	pH	Dissolved Oxygen (mg/L)	Water Temp (˚C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						

Water Colour:				
Colourless ○	Yellow/Brown ○	Blue/Green ○	Turbid ○	Other ○ _____

GEAR				
Electrofisher:				
Length (m):	Settings:	Seconds:		
Nets and Traps:				
Minnow Trap: ○ #	Dip Net ○ #	Trap Net ○ #		
Seine: ○	Gill ○	Other ○ Specify:		
Hauls (#):	Period Of Time (24 Hour Clock):			
	Set Time:	Clear Time:		
Size of Net:				
Length (m):	Mesh Size:	Depth of Capture:		
	Smallest (cm):	Minimum (m):		
	Largest (cm):	Maximum (m):		
SAMPLE COLLECTION				
Fish Kept? ○ Yes ○ No	Number of Bags	Preservative:		
		Formalin ○	Frozen ○	Alcohol ○	Other (specify) ○
ADDITIONAL COMMENTS				
Additional Notes Appended? □ No □ Yes number of pages _____				

CAPTURE INFORMATION					
MTO Work Project #:		Crossing/Station #:			
No.	Scientific Name / Common Name	Physical Condition		Top Predator	
		# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult

Note: circle number if a sample was kept

APPENDIX C3: FISH COMMUNITY INVENTORY FORM – GUIDANCE

Information	Purpose/Description/Directions
GENERAL INFORMATION	
PROJECT	To identify the MTO project use WP number or other unique identifier.
PROJECT DESCRIPTION	A concise description of the project.
DATE	Enter the date of sampling.
COLLECTORS	Identify all members of the field crew and identify the crew leader. Identify person doing the field work. For example: ABC Consultants – Crew Leader: AH; field crew: SS, RT
TIME STARTED/FINISHED	It is important to record the time of day the sampling is done as well as the date. When the information is reviewed it may be important to know if water temperatures were taken early in the morning or early afternoon (typically the warmest time of the day). Local or regional weather conditions could be reviewed and related to the water levels.
WEATHER CONDITIONS	Record the general weather conditions at the time of sampling. This should include rain or snow during the sampling, or if the sky is clear or overcast. To record any adverse weather conditions that may affect data, e.g. freezing rain/snow.
SURFACE CONDITIONS:	Waterbody surface conditions.
Calm	Nearly or completely motionless.
Rippled	Small waves.
Wavy	Large waves.
Rough	Very large waves
LOCATION	

Information	Purpose/Description/Directions
NAME OF WATERBODY	Many waterbodies have had an official name gazetted and this will be published in the Ontario edition of the "Gazetteer of Canada". If the name does not appear in the Gazetteer, then the name used on a published map should be used. If there is a commonly used local name it should be included with the official name and flagged as a local name. Note the source of the name if different than Gazetteer.
CROSSING #	Assigned number of crossings or adjacent reach of watercourse.
STATION #	Assigned number of the station within crossing and included on the Habitat Map.
LOCATION OF CROSSING/STATION	A concise description of the geographic location of the station site should be made. Attempt to relate it to a feature easily identified on a map such as a bridge, dock, stream confluence and local roads.
GPS COORDINATES	Record the GPS coordinates (latitude & longitude) of the station.
MTO CHAINAGE	The station (e.g. 10+123) as obtained from design plans and should include an offset (6.75) distance as necessary.
TOWNSHIP	Lower level municipality in which the station is located.
MNR DISTRICT	https://www.ontario.ca/page/ministry-natural-resources-work-centres
SAMPLING LOCATIONS AND WATER CHEMISTRY	
LOCATION	Enter associated information for each location, upstream, downstream, within the culvert/ROW, and other, as necessary (e.g. for sampling in lake/pond)
LENGTH	Length of section in meters.
AIR TEMP (°C)	Enter the water temperature as measured for the specific reach.
pH	pH is a measure of the hydrogen-ion concentration in water. It operates on a scale of 0 (highly acidic) to 14 (highly basic), with pH of 7 being neutral. Measure pH in the field using a hand-held pH meter (a low ionic strength electrode and calibration standards may be required). Record the pH to the nearest tenth (e.g. 7.1).

Information	Purpose/Description/Directions
DISSOLVED OXYGEN/WATER TEMP	Take dissolved oxygen (DO) and water temperature simultaneously, as your meter (e.g., YSI, HydroLab) will provide a temperature reading for every depth at which the DO is measured. For watercourses, take measurements from mid-stream and mid-depth if possible. For lakes/ponds take measurements at 0.5 m intervals to bottom or to a maximum of 10m. DO is a measure of the concentration of oxygen dissolved in water expressed in mg/L, or in parts per million (1 mg/L is equivalent to 1 ppm).
CONDUCTIVITY (µS/cm)	Low conductivity may affect electrofishing results. Take conductivity measurements from mid-stream and mid-depth in watercourses and from lake surface and bottom in lakes/ponds. Electrical conductivity (EC) is dependent on the total dissolved salts concentration (TDS) in the water; the higher the conductivity, the higher the salt (e.g., sodium, calcium, sulphate) concentration. Measure EC in the field using a portable conductivity meter (e.g. YSI, HydroLab). Most conductivity meters automatically convert conductivity measurements to 25°C. If your meter does not automatically standardize to 25°C, record the water temperature at the same time as conductivity and use a conductivity nomograph to convert the reading to 25°C.
WATER COLOUR:	Determine the colour of the water visually by holding a sample up to a white sheet of paper and record the closest match from the colours listed.
Colourless	No particular condition; low productivity.
Yellow/brown	Staining from tannic acids: may also be zooplankton or solids.
Blue/green	Due to zooplankton blooms; likely indicative of higher productivity and/or marl deposits.
Turbidity	Turbidity indicates the concentration of suspended sediments and particulate matter in water. It is subjective and is estimated visually.
Other	Describe any other visible colouration of the water sample.

GEAR	
Identify gear type/sampling equipment and record the amount of effort spent fishing in a single section of the stream/lake, for example, record the time spent sampling and the distance or the number of passes made over the same section. The sampling area should be marked on the habitat map.	
ELECTROFISHER	
Length (m)	Length of channel electrofished. If multiple passes, indicate length of each pass.
Settings	Enter the settings on the electrofisher used for sampling (i.e. voltage, frequency, duty cycle, etc.)
Seconds	Number of seconds electrofished for each pass.
NETS AND TRAPS:	It is important to record the time of day that the net is set and the time it is retrieved to record the overall period of sampling and the time of day (i.e. fish use of an area often varies with time of day).
Minnow trap	Enter the number of minnow traps set.
Dip net	Enter the # of times dip netting was performed.
Trap net # sets Time set and cleared	Enter the number of trap nets set. It is important to record the time of day that the net is set and the time it is retrieved to record the overall period of sampling and the time of day (i.e. fish use of an area often varies with time of day).
Seine # hauls	Enter the number of seine net hauled.
Gill net # sets Time set and cleared	Enter the number of gill nets set. It is important to record the time of day that the net is set and the time it is retrieved to record the overall period of sampling and the time of day (i.e. fish use of an area often varies with time of day).
Other	Specify the gear type and/or sampling equipment used.
SIZE OF NET:	If a net is used to collect fish, record the dimensions of the net including length, height, mesh size and number of hauls. This information can be used to calculate an estimated population size by looking at the success of consecutive efforts to sample an area. Twine size and number also affect the gill net's ability to catch fish.

Length (m):	Enter the length of the net used.
Mesh Size:	Enter the smallest and largest mesh sizes in centimeters.
Depth of Capture:	Enter the minimum and maximum depths at which fish were sampled in meters.
SAMPLE COLLECTION	
FISH KEPT	This section is only completed if fish are collected/kept. When fish are collected a record should be kept on the reverse side of the form.
# OF BAGS	Enter the number of sample bags kept.
PRESERVATIVE:	Any fish to be kept should be preserved for storage. The most common methods for preserving a specimen are storing in 10% formalin or 70% ethanol. Large specimens stored in a solution should have their abdominal cavity cut open so internal organs are preserved. After measurements and observations are recorded, the specimen should be stored in a glass jar or plastic bag then filled with preservative. A label should be included with the specimen. Waterproof labels filled out in pencil should include information on where, when and how the fish was caught, who caught it and a specimen number should be assigned. Information should also be recorded on the field record form.
ADDITIONAL COMMENTS	
	Enter any additional comments that may be pertinent to the sampling such as potential impacts on catch sizes, effort etc.
CAPTURE INFORMATION	
The intent of individual fish sampling is usually to determine the characteristics of the fish community present. All fish captured should be counted and that number recorded. Length information should be recorded for top predators only. The total number of each species captured in each sampling "event" is recorded in the fish summary section of the fish collection form. Sampling "events" are referenced by site, method and number (e.g. Site =1, Method = EF, No. = 1). Recording by Haul #/Pass #, Stage, or Age group within species is allowed but is not required for standard reconnaissance sampling.	
PROJECT	Same as GENERAL INFORMATION.

CROSSING/ STATION #	Same as in LOCATION.
NO.	The total number of each species captured in each sampling "event" is recorded here.
SCIENTIFIC NAME/COMMON NAME	Accurately identify and record all fish sampled. If a fish species cannot be identified, record that a voucher specimen of the unidentified species has been collected and submitted. Voucher specimens should also be submitted if there is any doubt about the identification.
PHYSICAL CONDITION:	
# fish with blackspot	Identify the # of fish with 'blackspot' (external cysts caused by parasitic trematodes).
# fish with lesions, tumors, maturity etc.	Identify the # of fish with visible tumours, lesions, lamprey scars, maturity features
TOP PREDATOR	For top predators only.
Total Length (mm)	Record the fork length (FL) or the total length (TL), in mm, of each fish sampled. Fork length is the length of a fish (in mm) from nose tip to fork of tail and is measured only for fish with forked tails (e.g. salmonids, sunfishes). Total length is the distance from the most anterior part of the head to the tip of the longest caudal fin ray and is measured only for fish that do not possess a forked tail.
Age Class	Categorize as either young of the year (YOY) or adult.

APPENDIX D: TEMPLATES

TEMPLATE D1: LOCATION OF WORK TABLE

MTO WP No.	Waterbody ID	Highway	Municipality	Latitude	Longitude

Notes: Template D1 - Location of Work Table must be included in the Fish and Fish Habitat Existing Conditions Report or Fisheries Memo, as applicable.

Table Description:

MTO WP No.	Enter the project's Work Project Number (i.e. W.P. or G.W.P)
Waterbody ID	Name of waterbody and Crossing # / Station
Highway	Insert Highway #
Municipality	Enter the municipality the waterbody is located in
Latitude	Enter the latitude of the waterbody / structure in decimal degrees
Longitude	Enter the longitude of the waterbody / structure in decimal degrees

TEMPLATE D2A: EXISTING FISH HABITAT CONDITIONS SUMMARY TABLE

Waterbody ID	Date	Flow	Thermal Regime	Fish Habitat*	Substrate Type	Channel Morphology	Vegetation	Constraints & Opportunities	Significant Fish Habitat

* Fish habitat is defined in subsection 2(1) of the *Fisheries Act* as water frequented by fish and any other areas upon which fish depend directly or indirectly to carry out their life processes. The types of areas that can directly or indirectly support life processes include but are not limited to: spawning grounds and nursery, rearing, food supply and migration areas.

Table Description:

Waterbody ID	Name of waterbody and Crossing # / Station
Date	Insert date field investigations occurred (DD/MM/YYYY), as applicable
Flow	Ephemeral, Intermittent, Permanent
Thermal Regime	Warm, Cool, Cold
Fish Habitat	Direct, Indirect, Not Fish Habitat
Substrate Type	Boulder, Cobble, Rubble, Gravel, Sand, Muck, etc.
Channel Morphology	E.g. Riffles, Runs, Pools, Undercut banks, etc.
Vegetation	Riparian & In-stream species; emergent, submergent and floating aquatic vegetation
Constraints and Opportunities	E.g. Perched culvert, eroding bank, fish passage barrier, undersized CSP
Significant Fish Habitat	E.g. specialized habitat that supports critical life functions, areas contributing to fisheries productivity, etc.

TEMPLATE D2B: EXISTING FISH COMMUNITY SUMMARY TABLE

Waterbody ID	Date	Fish Species Present	Year Class	Species at Risk Present	In-water Work Timing Window

Table Description:

Waterbody ID	Name of waterbody and Crossing # / Station
Date	Insert date sampling occurred (DD/MM/YYYY), as applicable
Fish Species Present	Indicate if the information is from background secondary source data (indicate source) or if obtained through field investigation
Year Class(es)	E.g. Young of year, juvenile, adult
Species at Risk Present	Indicate / describe the species at risk and / or critical habitat present
In-water Work Timing Window	Timing window for when in-water work can occur

TEMPLATE D3: AQUATIC EFFECTS ASSESSMENT TABLE

Waterbody/ Watercrossing	Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation Measures	Residual Effects

NOTES:

- See Section 5 of the Fish Guide for a complete explanation of the Aquatic Effects Assessment, including examples.
- The “Master List of Mitigation Measures” in Appendix G of the Fish Guide, provides guidance for the types of mitigation that should be considered in design. When completing this table, the mitigation measures can be based on that guidance but should be specific to the project and reference appropriate contract documentation where appropriate.
- In the Residual Effects column, list the actual residual effect(s) and indicate if they are positive, negative, or neutral.
- Rationale and discussion of the impacts is to be provided in Template D4 and should not be included in this table.

TEMPLATE D4: FISH AND FISH HABITAT IMPACT DOCUMENTATION

MTO Work Project No.	Project Title	Waterbody Name
[Insert the MTO Work Project #]	[Insert MTO Project Title]	[Insert Waterbody Name/ID]

Fisheries Assessment Specialist	Date
[Insert name of fisheries assessment specialist that conducted the impact assessment]	[Insert the date the assessment was completed]

PROPOSED WORKS, ENVIRONMENTAL AND MANAGEMENT CONTEXT	
Proposed Works	Briefly describe, the works/undertakings/activities proposed for the project that may affect fish and fish habitat.
Fish and Fish Habitat	As fish and fish habitat features can factor greatly into the intensity of the residual effect and are important background information, briefly describe the fish community (e.g., warm/cool/coldwater; baitfish/sport fish/salmonids; tolerant/intolerant species, etc.) and significant fish habitat features present and identify whether SAR and/or their critical habitat is present and will be affected by the activity within the Working Area and immediately adjacent to the Working Area that may be affected by the activity.
Fish Passage	Briefly describe any issues or concerns regarding fish passage and identify the design features that will be used to ensure safe fish passage (e.g., WC12 – width of culvert, embedment depth, substrate of materials to be used, and low flow channel; rocky ramp, appropriately sized aggregate, etc.). Provide confirmation that fish passage is required at the crossing location in order to fulfill target species life history requirements. This includes confirming whether or not significant permanent barriers exist adjacent to the project area which may negate the need to provide fish passage at the crossing if it doesn't already exist.

Fisheries Management Objectives (FMO)/In-Water Work Timing Window	As FMOs and timing windows can factor into the intensity of the residual effect, and are important background information, briefly identify any specific FMO and how the design supports those objectives, if applicable (e.g., MNR's response may provide direction that the fishery is being managed for invasive species etc.); note the timing window provided by MNR for works in the water.

RESIDUAL EFFECTS

Are there any positive/neutral residual effects? YES ☐ NO ☐

If yes, list all the positive/neutral residual effects findings from Template D3 Aquatic Effects Assessment Table for the waterbody(ies) here. Please describe why the resulting effects are anticipated to be positive or neutral.

-

Assessment of negative residual effects: List all the negative residual effects findings from Template D3 Aquatic Effects Assessment Table for the waterbody(ies) here (add additional rows as necessary)

1.

2.

Spatial Scale	Describe for each negative residual effect listed, the spatial scale of harmful impacts.
Duration	Describe for each negative residual effect listed, the duration of harmful impacts.
Intensity	Describe for each negative residual effect listed, the intensity of harmful impacts. Note that this estimate requires consideration of the Fish and Fish Habitat Features, as well as FMO/timing window, as described in the Fish Guide.

DOCUMENTATION OF FISH AND FISH HABITAT IMPACT - Rationale and Conclusions Considering that the severity (spatial scale, duration, intensity) of all negative residual effects, taken together, are used to determine death of fish or HADD of fish habitat, provide a brief rationale for why death of fish and/or HADD of fish habitat is or is not likely to occur by addressing the following questions below:		
1.0 Will the project result in the death of fish? Describe rationale	**YES** ☐	**NO** ☐
2.0 Will the project result in harmful alteration, disruption, or destruction of fish habitat? Describe rationale, considering all the temporary or permanent changes to fish habitat that directly or indirectly impair the habitat's capacity to support one or more life processes of fish	**YES** ☐	**NO** ☐

Fisheries Assessment Specialist Recommendation:

Check one of the boxes based on the summary of findings.

☐ Proceed with project with identified mitigation measures and complete MTO Project Notification Package (death of fish and/or HADD of fish habitat not likely)

☐ Recommendation to send project for review by DFO (death of fish and/or HADD of fish habitat likely or unknown)

MTO Review of the Fisheries Assessment Specialist's Recommendation (to be completed by MTO):

All projects identified by the fisheries assessment specialist as likely to result in the death of fish or HADD of fish habitat require a review by MTO prior to completion of any forms or submission to DFO. Only once advised by MTO should the fisheries assessment specialist complete a DFO Request for Review Form to submit to MTO for signature and submission to DFO.

APPENDIX E: PROJECT NOTIFICATION FORMS

Notes:

E1 and E2 can be downloaded from MTO Technical Documents website.

E3 and E4 can be downloaded from DFO website.

APPENDIX E1: MTO PROJECT NOTIFICATION FORM

MTO PROJECT NOTIFICATION FORM

MTO Project Title:	**MTO Project W.P. No.:**	
PART 1: PROPONENT INFORMATION		
Ministry of Transportation Office:		**MTO Region:**
Mailing Address:		
City/Town:	**Province:** Ontario	**Postal Code:**
MTO Service Provider:	**MTO Project Manager:**	
Telephone #:	**Telephone #:**	
Email:	**Email:**	
PART 2: PROJECT INFORMATION		
Federal or Provincial Aquatic Species at Risk (SAR) Present Within Project Limits: **YES ☐ NO ☐** **List Species:**	**SAR Location:**	
Summary of Fish and Fish Habitat Present at the Worksite, if applicable (i.e. species, substrate type, vegetation; refer to Templates D2A and 2B):		
Location of Project:	**Geographic Coordinates (Lat/Long):**	
Name of Nearest Community:	**Name of Waterbody(ies):**	
Description of Works/Undertakings/Activities:		

Proposed Start and End Date of Works/ Undertakings/Activities:	**In-water Work Timing Window:**

Attached Documents and Photos (check all that apply)

☐ **Site Map**	☐ **Site Photos**	☐ **Drawings**	☐ **Template D1**
☐ **Template D2A**	☐ **Template D2B**	☐ **Template D3**	☐ **Template D4**
☐ **Impact Drawing**	☐ **Other:**		

PART 3: TYPE OF NOTIFICATION

☐ **Step 3 – MTO Fisheries Best Management Practice(s)/DFO Code(s) of Practice** **(COMPLETE PARTS 1-3 AND 5 ONLY)** **Which Fisheries BMP(s)/DFO Code(s) of Practice are you following?**	☐ **Step 4 – No likelihood of the Death of Fish or Harmful Alteration, Disruption or Destruction (HADD) of Fish Habitat** **(COMPLETE ALL PARTS)**

Rationale (for applicability of Fisheries BMP/DFO Code of Practice or No Death of Fish or HADD of Fish Habitat determination):

PART 4: MEASURES TO PROTECT FISH AND FISH HABITAT (CHECK APPLICABLE MEASURES TO BE INCLUDED IN CONTRACT)

Mitigation Measures	**Applicable Contract Provisions**
Timing Constraints: ☐ Temporary in-water work will be completed during the in-water work timing window	**OPSS.PROV 182** ☐ SSP101F23 – Table A
Dewatering/Flow Control: ☐ All in-water work shall be completed in the dry by isolating and dewatering the work area or by temporary flow control around the work area	☐ OPSS.PROV 517 ☐ SSP 517F01
Erosion and Sediment Control:	☐ OPSS.PROV 804 ☐ SSP 804F02

☐ Vegetation removal shall be limited to only the extent required for the proposed works ☐ Use of effective sediment and erosion control measures shall be implemented and maintained to function as intended ☐ Sediment and erosion controls shall remain in place and maintained until such time as the vegetation has taken sufficiently to provide adequate protection for the watercourse	☐ OPSS.PROV 805 ☐ SSP 805F01 ☐ Operational Constraint – Erosion and Sediment Control NSP # (from CPS):_____ ☐ NSSP ENVR0012 ☐ NSSP ENVR0013 ☐ NSSP ENVR0015 ☐ NSSP ENVR0016
Culvert Installation: ☐ Culvert(s) shall be embedded a minimum of 10% ☐ Low flow channel shall be installed to ensure fish passage	**OPSS.PROV 182** ☐ OPSS.PROV 823
Protection of Fish: ☐ Safe fish passage shall be maintained/provided ☐ Any fish trapped in the isolated area during de-watering shall be captured and released as directed in the Licence to Collect Fish for Scientific Purposes ☐ Water intakes or outlet pipes shall have screens to prevent entrainment or impingement of fish according to the DFO End-of-Pipe Fish Screen Code of Practice.	**OPSS.PROV 182**
Equipment and Machinery: ☐ All equipment shall be clean and in good working order (no leaks of fuel, grease or oils) ☐ A spill management plan shall be kept on site ☐ Areas for refuelling and maintenance of machinery shall be 30m or as far away as practicable from any waterbody	**OPSS.PROV 100** **OPSS.PROV 182**
Materials Management: ☐ All construction debris, including removed sheet piling and litter shall be removed on a regular basis	**OPSS.PROV 100** **OPSS.PROV 180** **OPSS.PROV 182**

☐ Stockpiles shall be located and isolated to ensure material will not enter any watercourse ☐ Excess materials shall be disposed of in accordance with the Contract Documents	
Site Restoration: ☐ All disturbed areas shall be restored to original site conditions or better	**OPSS.PROV 182** ☐ OPSS 802 ☐ OPSS.PROV 803 ☐ OPSS.PROV 804 ☐ SSP 804F02
Oversight: ☐ An MTO fisheries contracts specialist shall monitor the site for compliance with the contract documents relating to the protection of fish and fish habitat and installation and maintenance of mitigation measures	☐ SSP 101F23 – Table B
Additional Mitigation Measures (list measures):	**Additional Contract Provisions (list relevant Special Provisions, Items, OPSSs, OPSDs, etc.):** ☐ SSP 101F23 – Table C

PART 5: SIGNATURE

I, the undersigned, have reviewed the fish and fish habitat information and the proposed mitigation measures. In accordance with the MTO Fisheries Protocol, I have determined that the proposed works will not likely result in the death of fish or the harmful alteration, disruption or destruction of fish habitat.

Name:	☐ **Fisheries assessment specialist** (check if applicable)
Signature:	**Date:**

Ontario

APPENDIX E2: MTO PROJECT NOTIFICATION PACKAGE

For convenience, a complete MTO Project Notification Package can be downloaded from the MTO Technical Documents website for projects not likely to result in the death of fish or HADD to fish habitat and where there are no federal aquatic species at risk present (Step 4).

The package includes:

1. QA/QC checklist
2. Location of Work Table (Template D1)
3. Existing Fish Habitat Conditions Summary Table (Template D2A)
4. Existing Fish Community Summary Table (Template D2B)
5. Aquatic Effects Assessment Table (Template D3)
6. Fish and Fish Habitat Impact Documentation (Template D4)
7. MTO Project Notification Form

All of the above documents shall be submitted as part of the draft package to MTO, where applicable. This enables MTO to verify the decision process.

APPENDIX E3: DFO REQUEST FOR REVIEW FORM

The fisheries assessment specialist should ensure the most recent version of the DFO Request for Review Form is being used by checking the DFO website.

In addition to the form, DFO also provides guidance on submission requirements and how to properly fill out the form.

This DFO Request for Project Review Form must be submitted to MTO for signature and approval.

Do not submit this form directly to DFO unless otherwise directed by MTO Environmental Delivery.

APPENDIX E4: APPLICATION FORM FOR THE ISSUANCE OF AN AUTHORIZATION UNDER PARAGRAPH 34.4 (2)(B) AND 35(2)(B) OF THE FISHERIES ACT (NON-EMERGENCY SITUATIONS)

Following the submission of the DFO Request for Review form, DFO will advise if a *Fisheries Act* authorization is required. The Application Form for the Issuance of an Authorization under Paragraph 34.4 (2)(b) and 35(2)(b) of the *Fisheries Act* (Non-Emergency Situations) is only to be completed if directed by DFO.

To ensure the most recent version of the form is used, go to the DFO website.

APPENDIX F: CONSTRUCTION MONITORING REPORTING

APPENDIX F1: CONSTRUCTION INSPECTION CHECKLIST

SECTION A

Project Information	
Monitoring Dates: Monitoring Time:	Status of Project: ☐ Work is on-going during the site visit ☐ Work is completed • Date Completed: _____ ☐ Work has not yet started ☐ Follow-up site visit required
Weather Conditions: (e.g., Temperature, Sunny, Precipitation etc.):	Purpose of Inspection: ☐ General Inspection ☐ Observe specific works. • Specify: _____
DFO File Number:	MTO Contract #:

Types of Activities:

☐ Ditching/Storm water management	☐ Bridges
☐ Channel modifications	☐ Culverts
☐ Shoreline infilling	☐ Fords
☐ Shoreline stabilization	☐ Other, specify _____
☐ Riparian vegetation management	

Location Details	
Highway # and Project Limits:	Name of nearest community to the activity (e.g., city, town)

Signature

I, the undersigned, have made the observations documented in this Construction Inspection Checklist.

Name:	Signature: (Fisheries Contracts Specialist)	Date:

Distribution

☐ Contract Administrator	Name: _____
☐ Contract Services Administrator	Name: _____
☐ MTO Environmental	Name: _____
☐ DFO (if requested)	Name: _____
☐ Other (if requested)	Name: _____

SECTION B

Location Information

Waterbody Name:	Station No.:	UTM Coordinates:

Compliance with Measures to Protect Fish and Fish Habitat (reference Authorization Section)

Mitigation and Offsetting Measures to Protect Fish Habitat	Compliance with Measures	Maintenance Required	Not in Compliance	Unknown or N/A	Photo (# and location)
A) Mitigation (as specified in the *Fisheries Act* authorization and contract package)					
	☐	☐	☐	☐	
	☐	☐	☐	☐	
	☐	☐	☐	☐	
	☐	☐	☐	☐	

Comments (including actions taken and required follow-up):

	B) Offsetting (as specified in the *Fisheries Act* authorization and contract package)					
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
	Comments (including actions taken and required follow-up):					

APPENDIX F2: NON-COMPLIANCE SUMMARY

<table>
<tr><td rowspan="8">SECTION A</td><td colspan="2">Project Information</td></tr>
<tr><td>Monitoring Dates:

Monitoring Time:</td><td>Status of Project:
☐ Work is on-going during the site visit
☐ Work is completed
Date Completed: _____
☐ Work has not yet started
☐ Follow-up site visit required</td></tr>
<tr><td>Weather Conditions:
(e.g. Temperature, Sunny, Precipitation etc.):</td><td>Purpose of Inspection:
☐ General Inspection
☐ Observe specific works.
Specify: _____</td></tr>
<tr><td>DFO File #:</td><td>MTO Contract No.:</td></tr>
<tr><td colspan="2">Types of Activities:
☐ Ditching/Stormwater management
☐ Channel modifications
☐ Shoreline infilling
☐ Shoreline stabilization
☐ Riparian vegetation management
☐ Bridges
☐ Culverts
☐ Fords
☐ Other, specify _____</td></tr>
<tr><td colspan="2">Location Details</td></tr>
<tr><td>Highway # and Project Limits:</td><td>Name of nearest community to the activity (e.g. city, town)</td></tr>
</table>

	Signature		
	I, the undersigned, have made the observations documented in this Construction Inspection Checklist.		
	Name:	Signature: (Fisheries Contracts Specialist)	Date:
	Distribution		
	☐ Contract Administrator	Name: _____	
	☐ Contract Services Administrator	Name: _____	
	☐ MTO Environmental	Name: _____	
	☐ DFO (if requested)	Name: _____	
	☐ Other (if requested)	Name: _____	
SECTION B	**Location**		
	Waterbody Name:	Station No.:	UTM Coordinates:
	Summary of Construction and Fisheries Issues		
	Summary of Related Weekly Construction Activities:		
	Summary of Key Issues with Respect to Fish and Fish Habitat (i.e. Mitigation/Offsetting measure not in compliance):		
	Recommended Actions		
	Corrective Actions Taken:		
	Corrective Actions Still Required (specify timelines):		
	Consultation:		
	Summary of any related consultation/discussions with MTO, Contract Administrator, Regulatory Agencies (e.g. DFO, MNR):		

SECTION C	**Photo Log**		
	Photo #	Date	Description/Location (Attached)

APPENDIX F3: CONSTRUCTION MONITORING REPORT

OUTLINE OF CONTENTS FOR CONSTRUCTION MONITORING REPORT

1. Introduction and Purpose

2. Site Conditions

- Site diagram and representative photographs of the site prior to construction. Show photograph locations and direction of view. Document the fish and fish habitat present at the site. This information may be taken from the Existing Conditions, Impact Assessment or Offsetting Plan Reports.

3. Mitigation Measures

- Document that the mitigation measures used during construction met the conditions of the *Fisheries Act* authorization (include photographs).
- If applicable, discuss any major modifications to the mitigation outlined in the *Fisheries Act* authorization as well as rationale for the modification.

4. Offsetting Measures

- Please refer to details on monitoring in the Offsetting Section of this Guide

5. Photographs

- Pre-construction photographs of watercourses
- Construction photographs of all required mitigation and offsetting measures.
- All photographs must be taken from the same vantage point(s), direction and angle of view for easy comparison.
- Site plan showing photograph locations.

6. Other Contents as required in the *Fisheries Act* authorization

- For example, “as constructed” drawing. As constructed drawings are intended to document the works as they were built. This may include contract plate(s) with notes or sketches showing additions or modifications to the design. These are not intended to be new surveyed engineering drawings.

APPENDIX F4: POST-CONSTRUCTION MONITORING REPORT

OUTLINE OF CONTENTS FOR POST-CONSTRUCTION MONITORING REPORT

1. **Introduction and Purpose**

2. **Monitoring Methodology**

3. **Offsetting Measures**

   - Document and discuss all post-construction monitoring required in the *Fisheries Act* authorization (use photos); for instance:
     - Viability of vegetation
     - Stability, integrity and condition of offsetting structures.
   - Document and discuss if the offsetting measures are functioning as intended. If applicable, identify any problems and remedial action taken or proposed.

4. **Photographs**

   - Post-construction photographs at times indicated in the *Fisheries Act* authorization.
   - All photographs must be taken from the same vantage point(s), direction. and angle of view as the Construction Monitoring Report for easy comparison.
   - Site drawing showing photograph locations.

5. **Conclusions**

   - Make conclusions regarding the success of the offsetting measures in this site location.
   - Make recommendations for future use of offsetting measures in similar or different site conditions.

6. **Other Contents as Required in the *Fisheries Act* authorization**

APPENDIX G: PATHWAYS OF EFFECTS

APPENDIX G1: MTO MODIFIED PATHWAYS OF EFFECTS DIAGRAMS

Land Based Activities

L1 Vegetation Clearing

L2 Grading

L3 Excavation

L4 Riparian Planting

Water Based Activities

W1 Placement of Materials or Structures in Water

W2 Dredging

W3 Organic Debris

W4 Addition or Removal of Aquatic Vegetation

W5 Change in Timing, Duration, and Frequency of Flow

W6 Fish Passage Issues

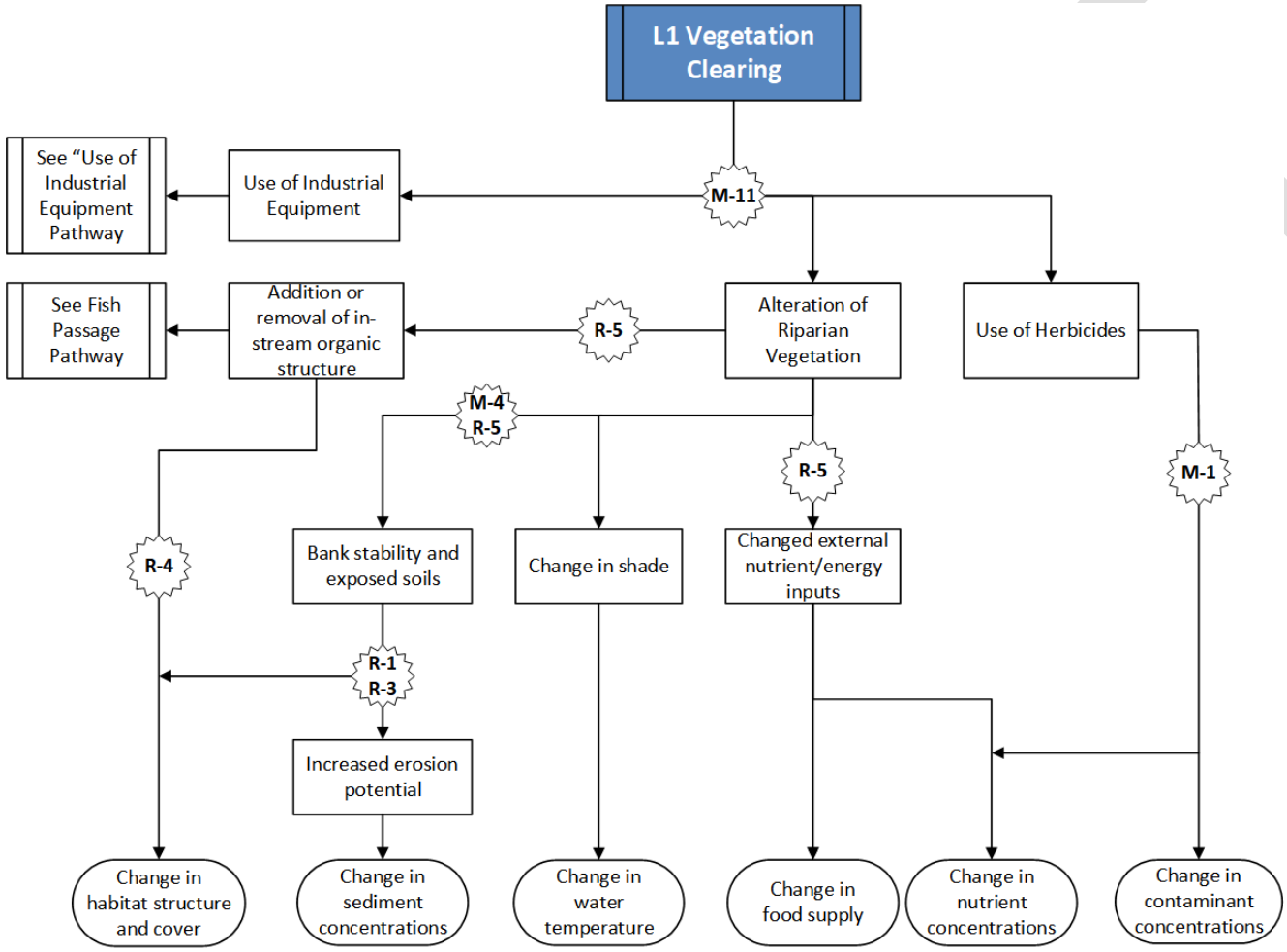
W7 Structure Removal

Both Land and Water Based Activities

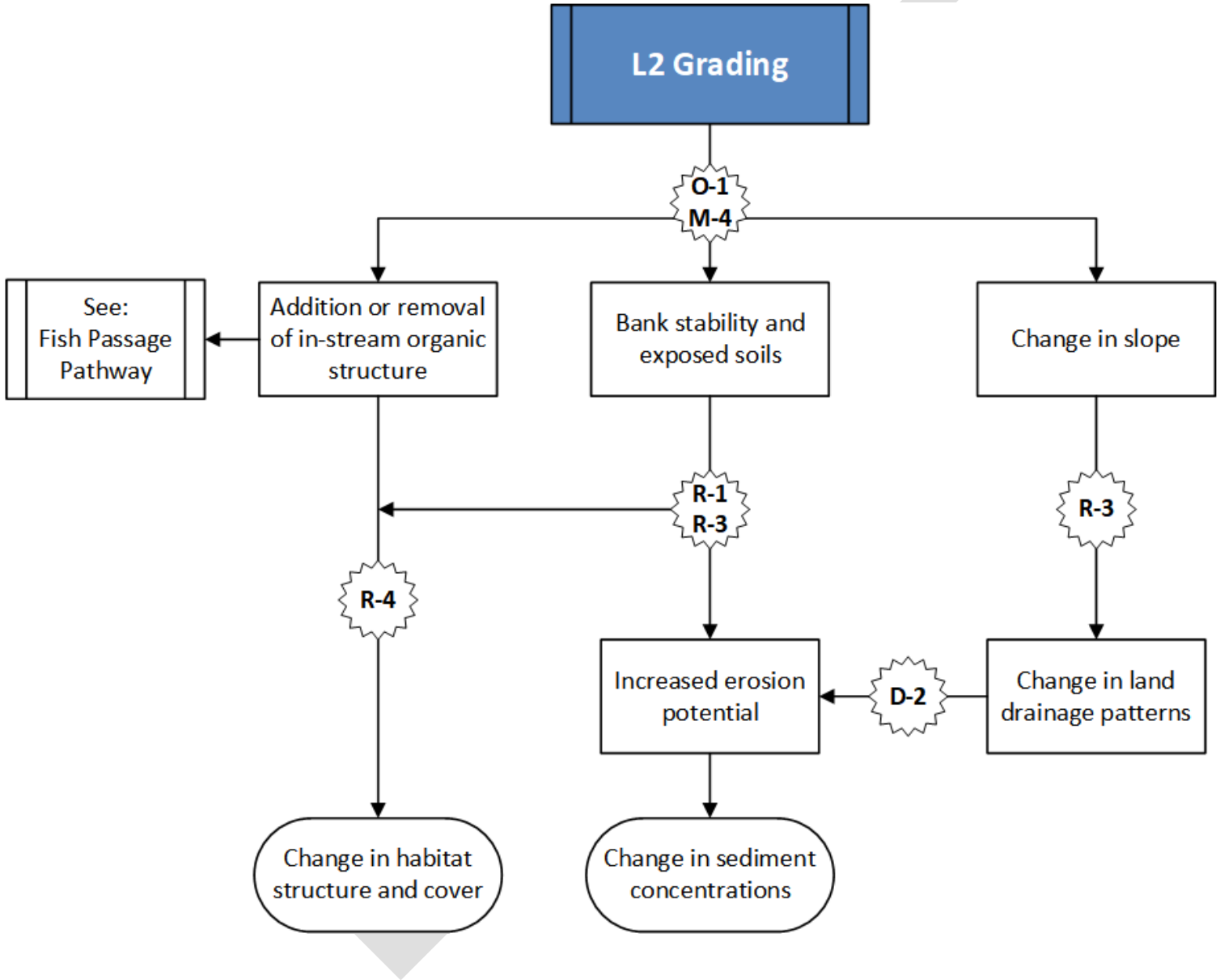
B1 Use of Explosives

B2 Industrial Equipment

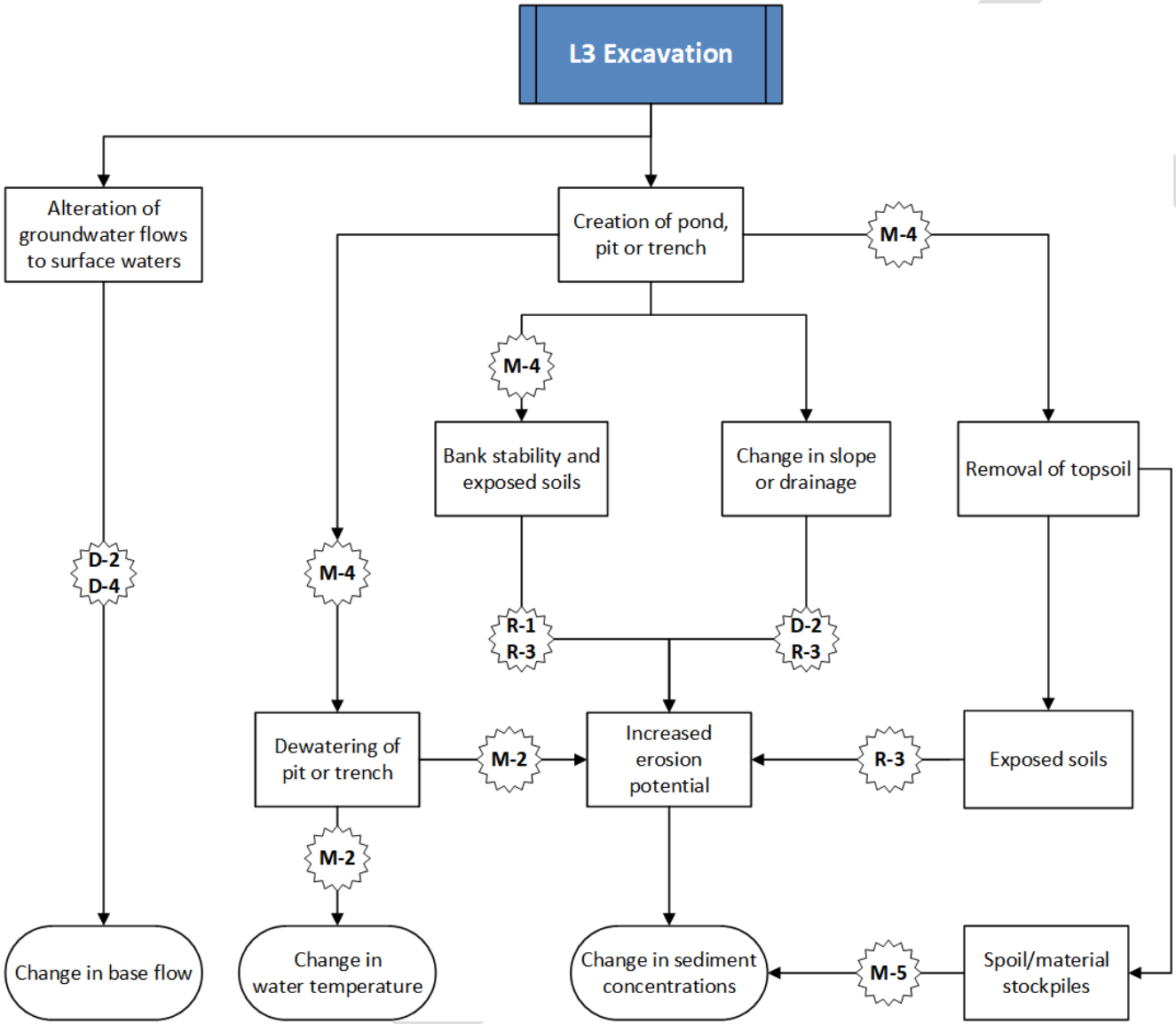
PATHWAYS OF EFFECTS – VEGETATION CLEARING



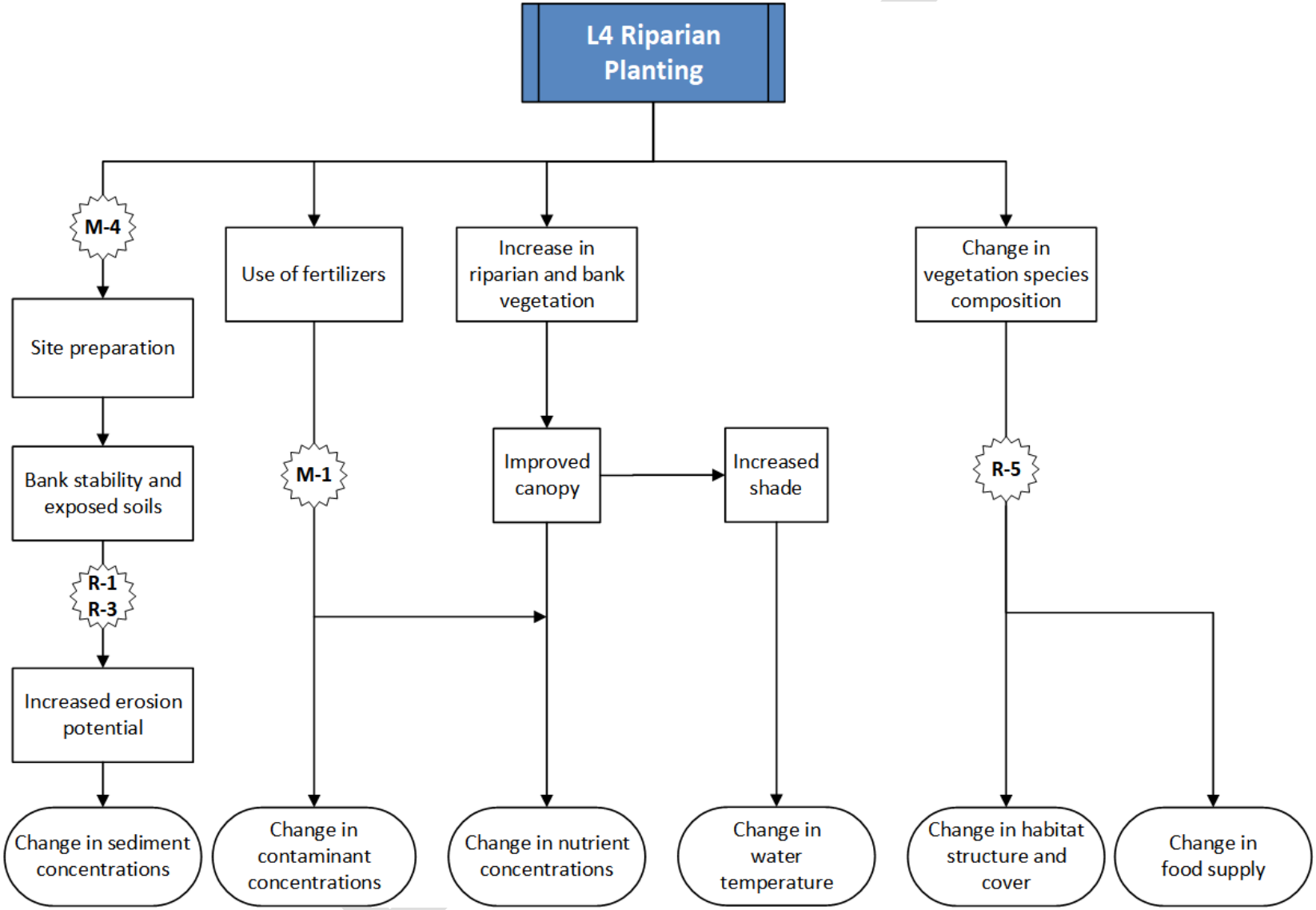
PATHWAYS OF EFFECTS - GRADING



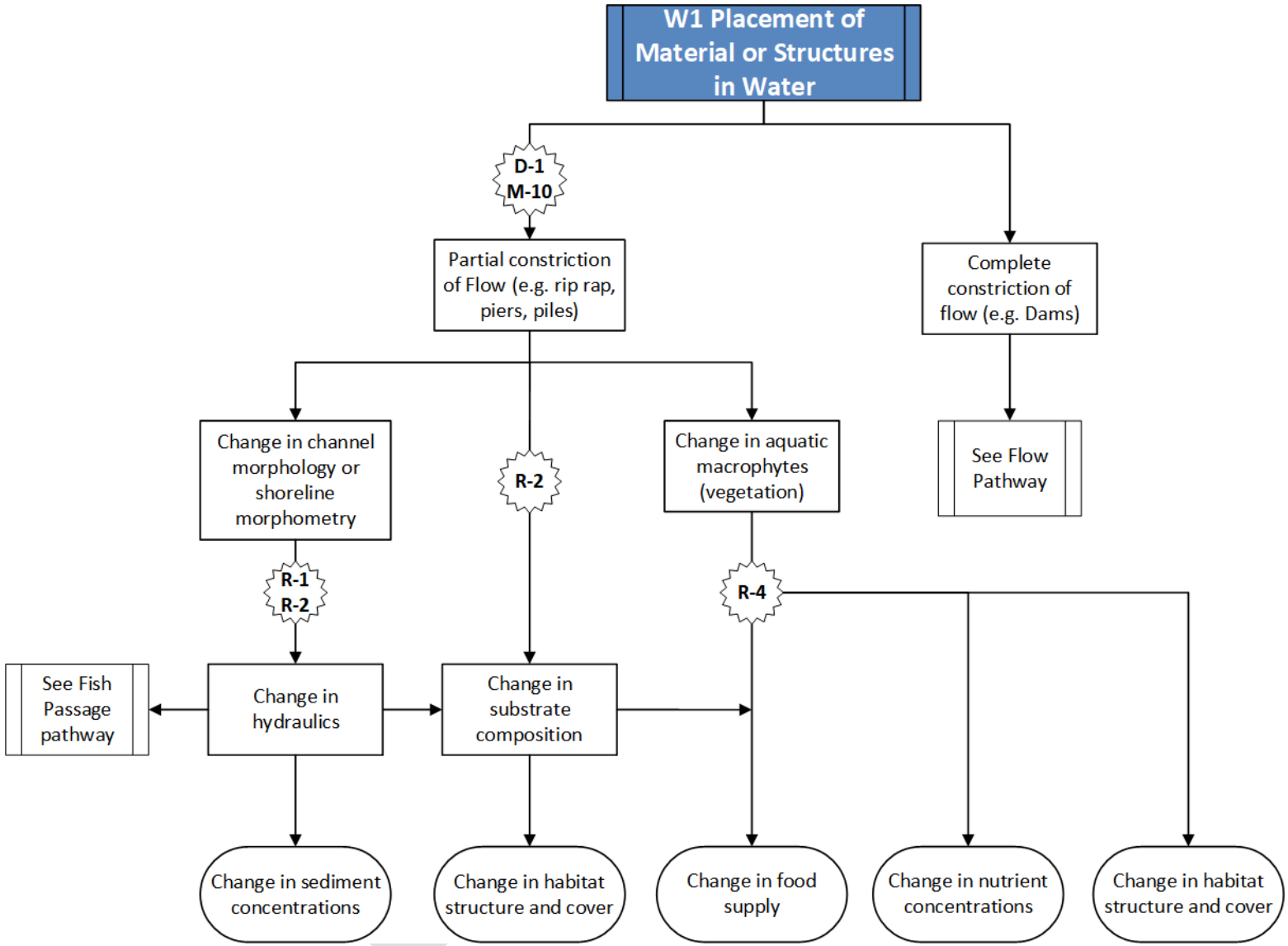
PATHWAYS OF EFFECTS - EXCAVATION



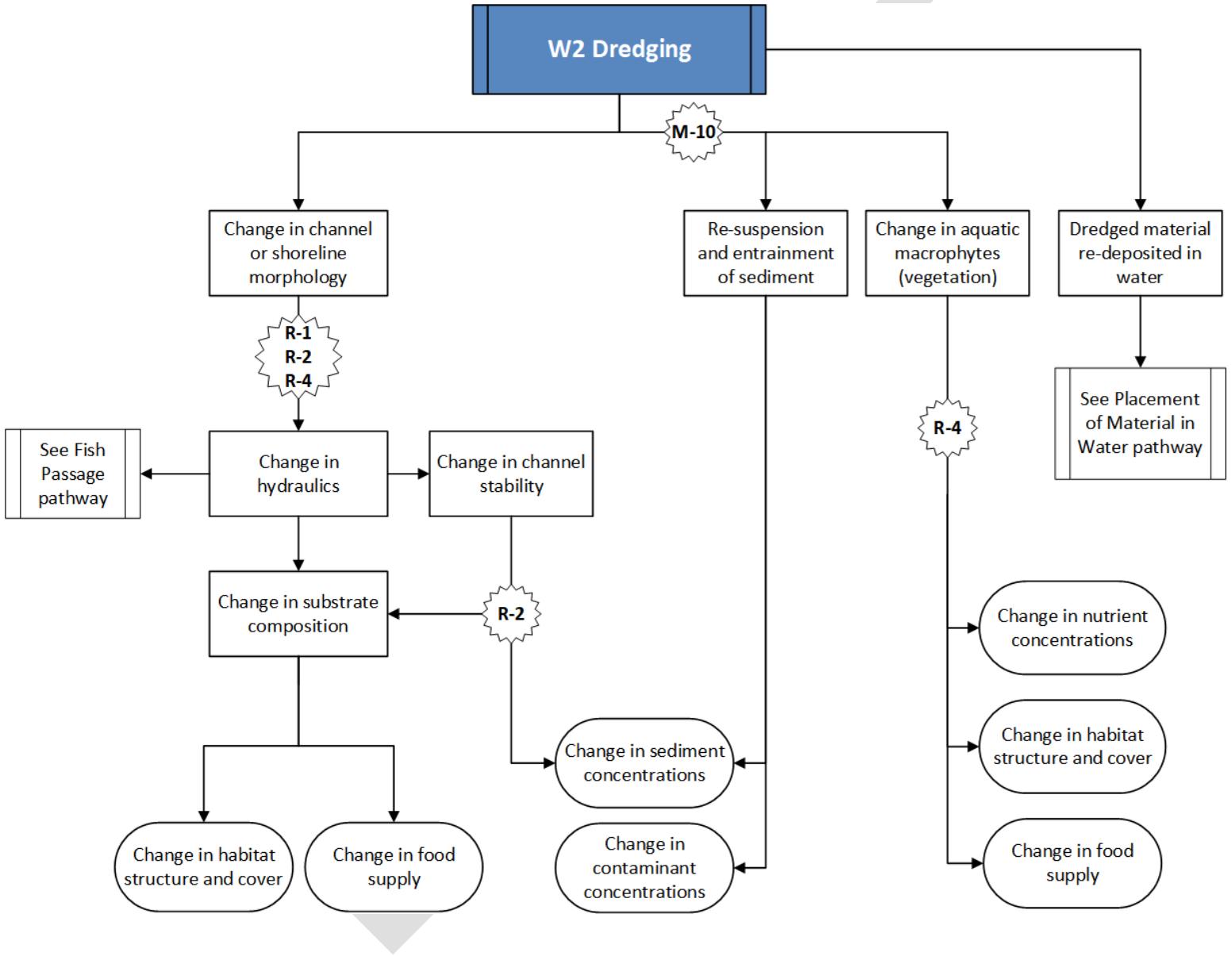
PATHWAYS OF EFFECTS – RIPARIAN PLANTING



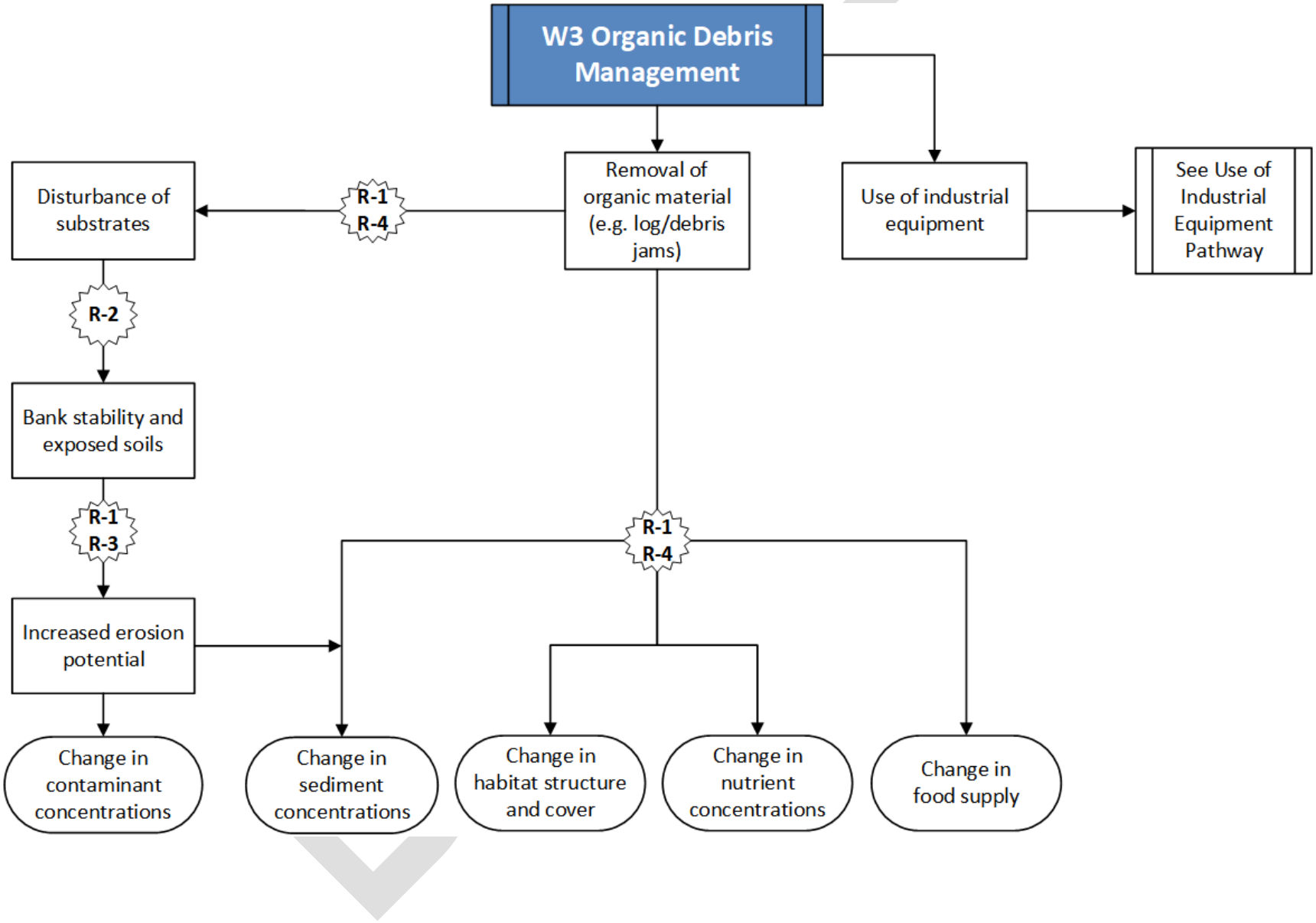
PATHWAYS OF EFFECTS – PLACEMENT OF MATERIALS OR STRUCTURES IN WATER



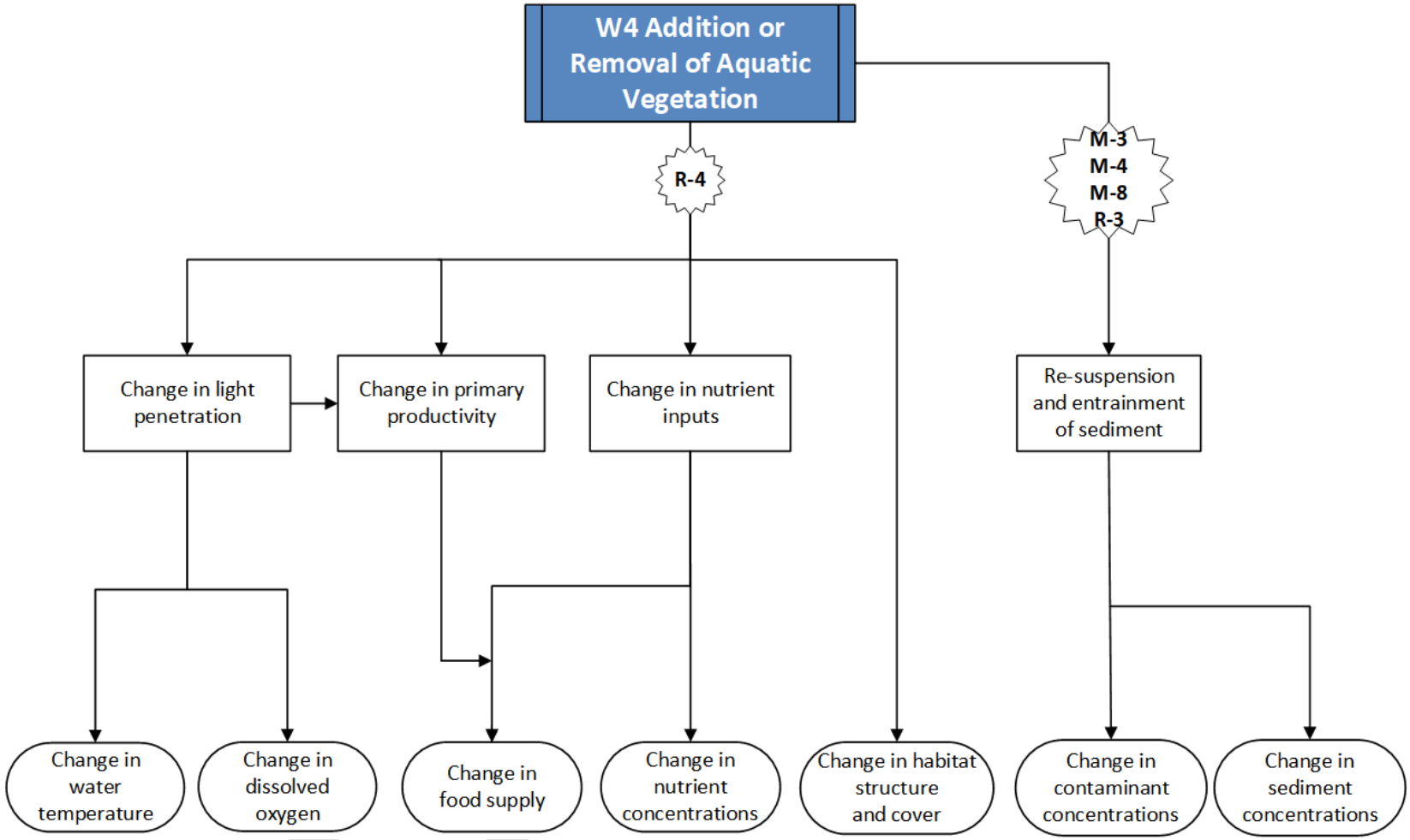
PATHWAYS OF EFFECTS – DREDGING



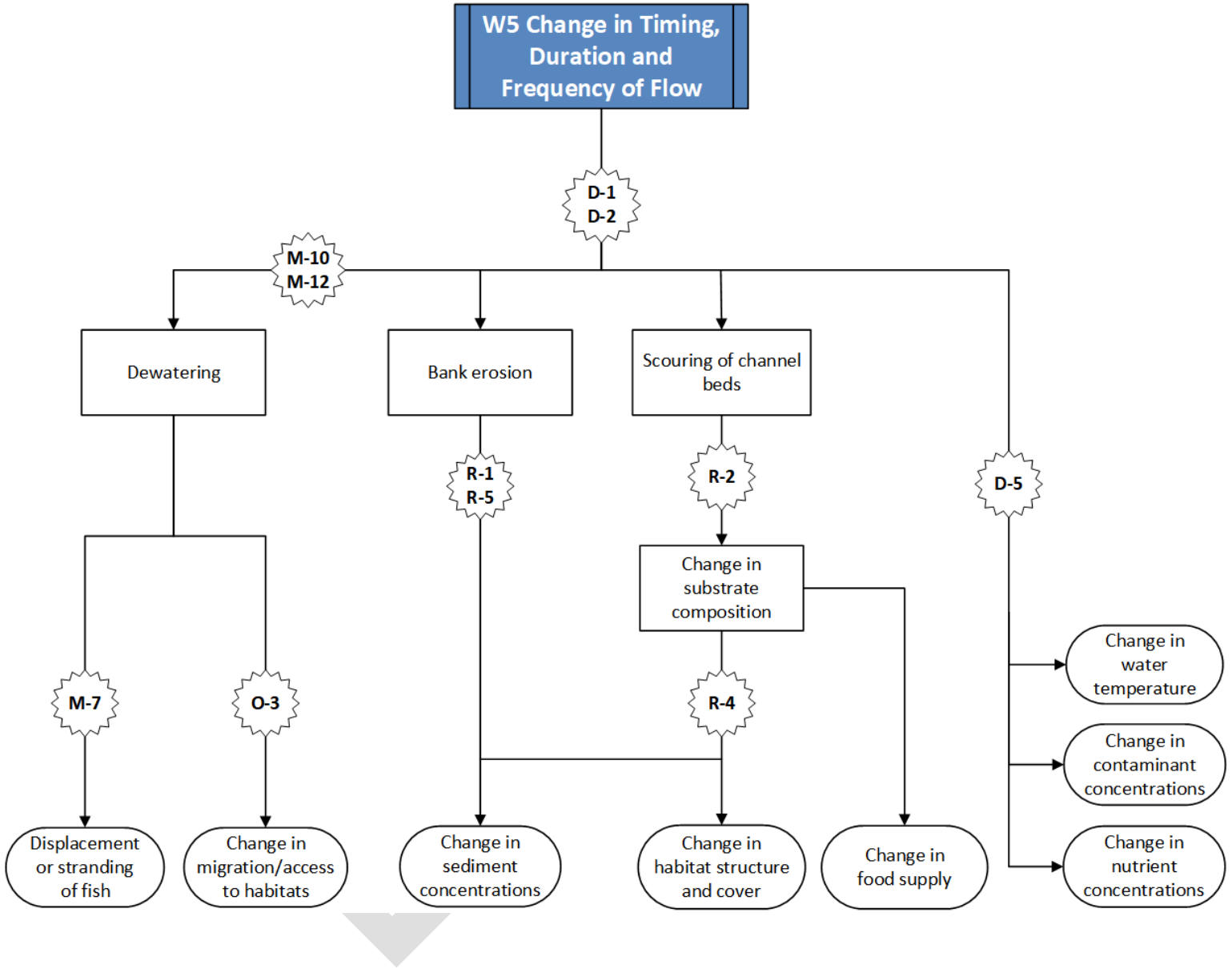
PATHWAYS OF EFFECTS – ORGANIC DEBRIS MANAGEMENT



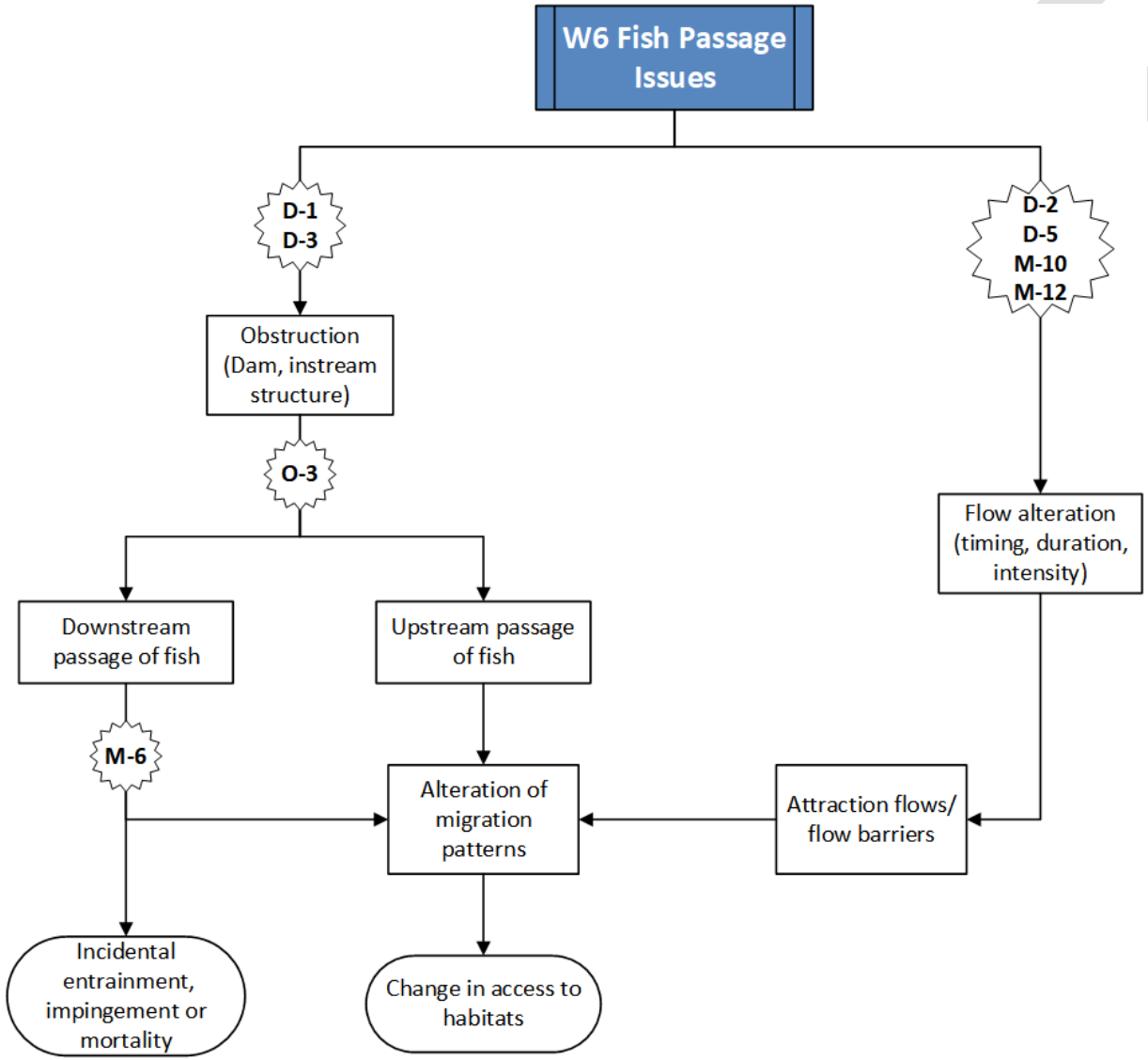
PATHWAYS OF EFFECTS – ADDITION OR REMOVAL OF AQUATIC VEGETATION



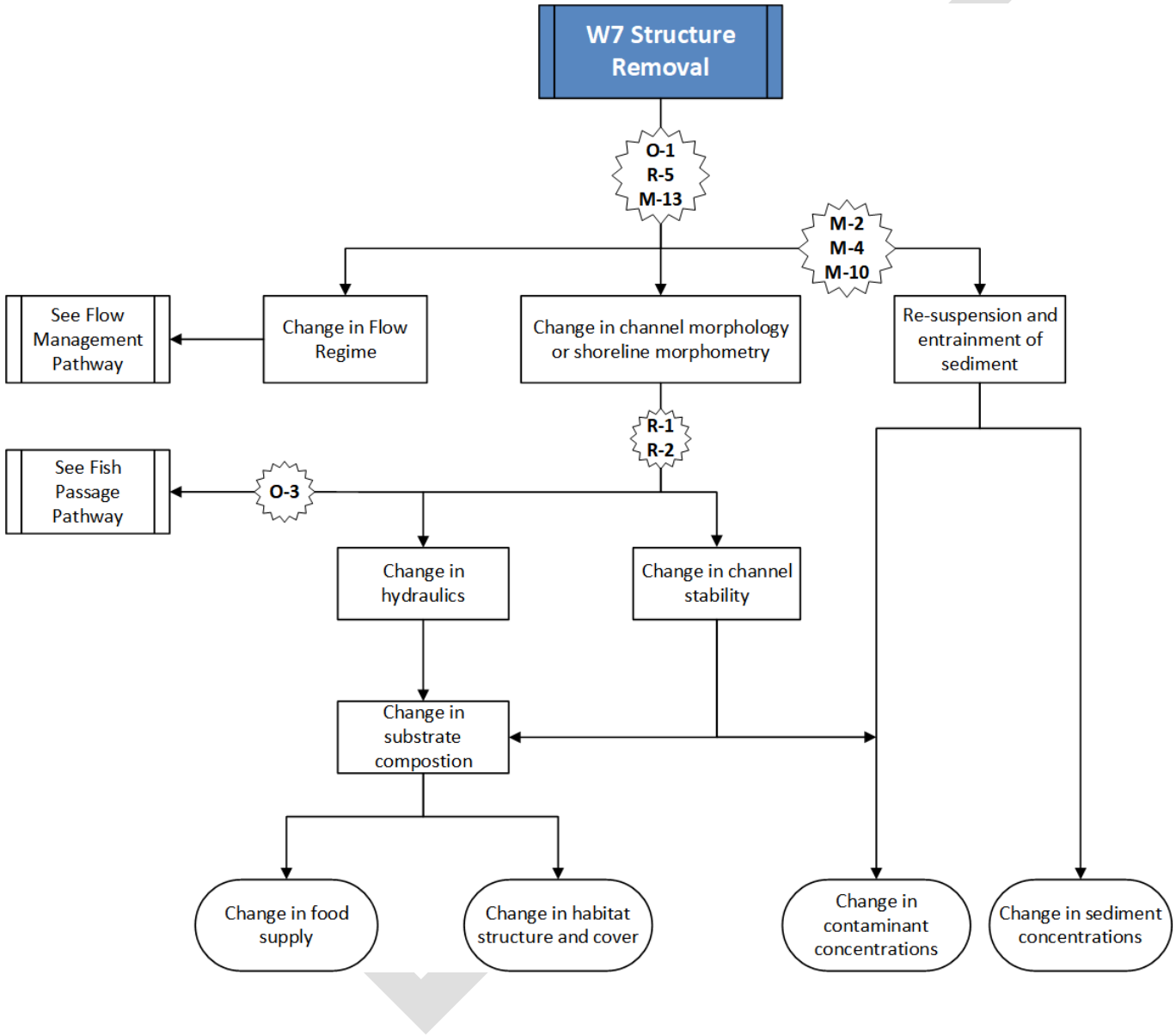
PATHWAYS OF EFFECTS – CHANGE IN TIMING, DURATION, AND FREQUENCY OF FLOW



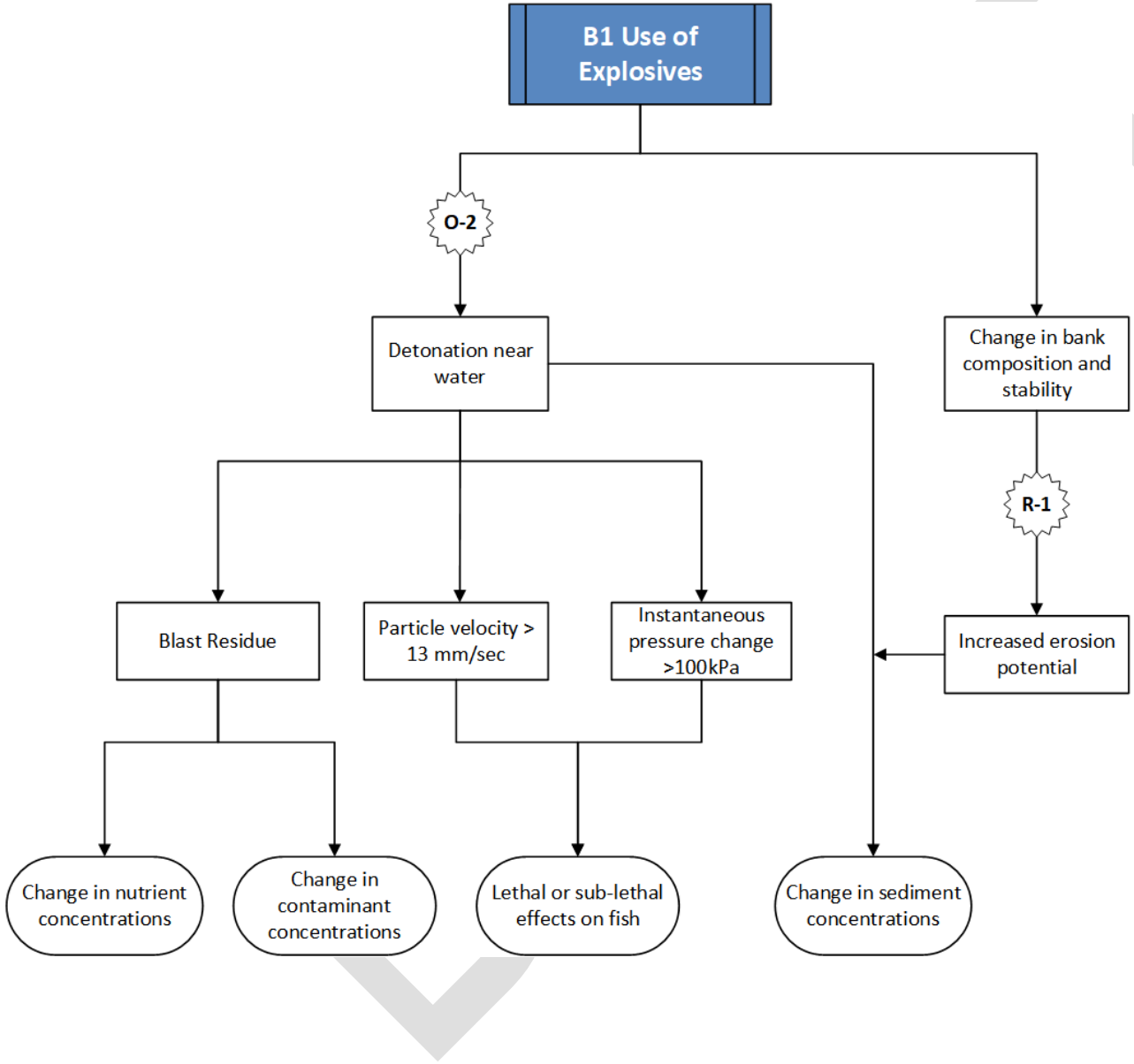
PATHWAYS OF EFFECTS – FISH PASSAGE ISSUES



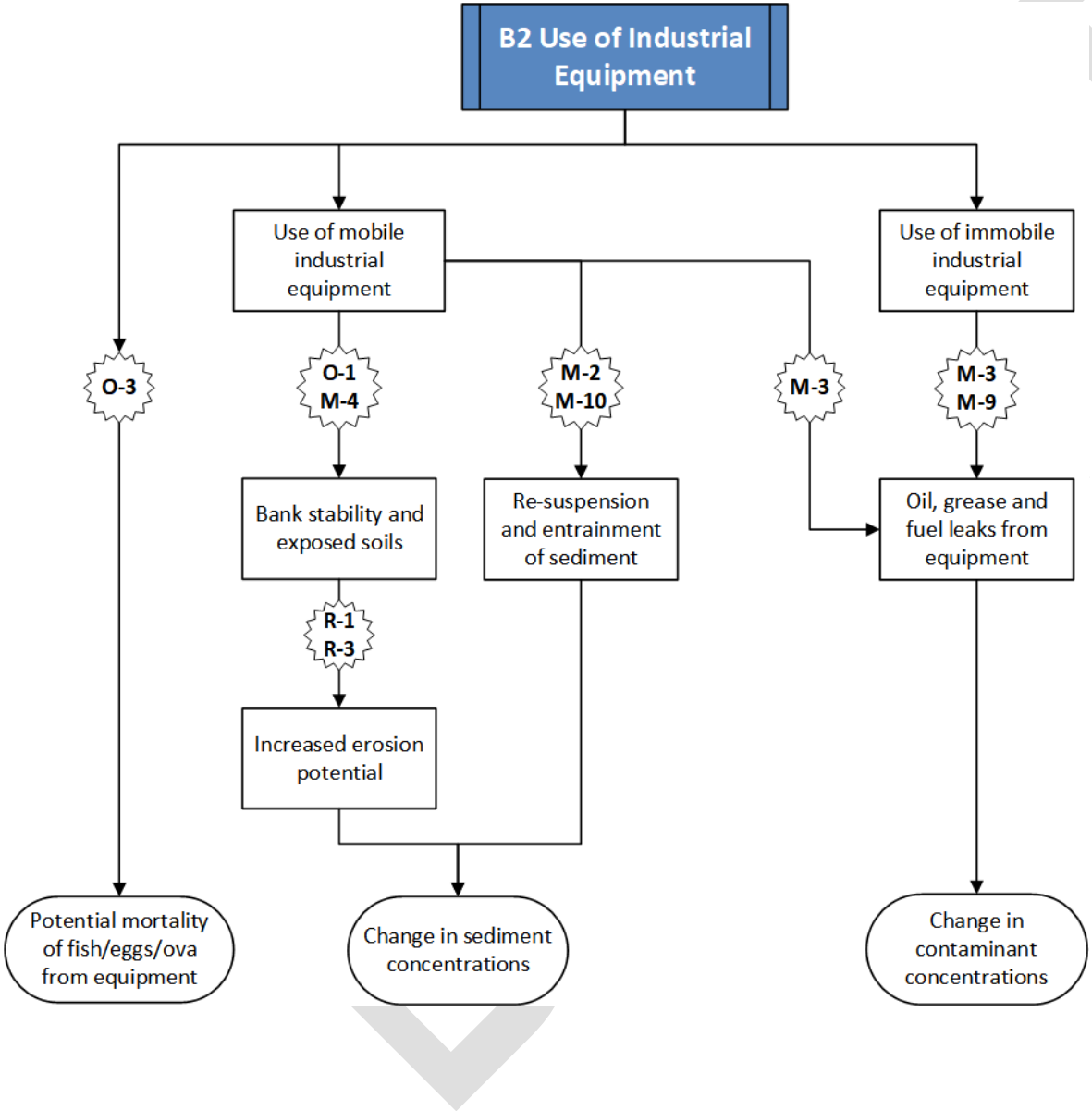
PATHWAYS OF EFFECTS – STRUCTURE REMOVAL



PATHWAYS OF EFFECTS – USE OF EXPLOSIVES



PATHWAYS OF EFFECT – USE OF INDUSTRIAL EQUIPMENT



APPENDIX G2: MASTER LIST OF MITIGATION MEASURES USED IN POE DIAGRAMS

Design		
Code	**Mitigation Measure**	**Description**
D-1	**Bridge, Culvert or Other In-water Structures**	• Reduce or eliminate constriction of flow through structure design. Design and site piers, abutments and other structures to avoid or otherwise minimize encroachment into waterbody and avoid sensitive habitats. Design structure to avoid or minimize effects on existing or natural flow regimes. Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains, or any other area that is inherently unstable and may result in erosion and scouring of the waterbody bed or the built structures. • Additional considerations for bridges and culverts: – Design deck drainage to avoid direct discharge into waterbody. – Design and construct approaches to the waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation. – Consider access requirements in siting structures (e.g., need to access floodplain of deep pristine valley for construction). – Design and install culverts to prevent creation of barriers to fish movement, and maintain bankfull channel functions and habitat functions to the extent possible, including proper sizing, embedment, re-instatement of low flow channel and properly designed and sized substrates to stay in place under full range of flow conditions, compatible with existing native substrate, maintaining channel slope, etc.
D-2	**Drainage System**	• Design drainage system to avoid diversion of or otherwise minimize changes in drainage to or from a waterbody (do not divert across watershed boundaries).

Design		
Code	**Mitigation Measure**	**Description**
D-3	**Fish Passage**	• Design to maintain fish passage and minimize risk for fish passing upstream or downstream of an obstruction (e.g., downstream migration diversion methods, upstream migration via fish ladders, bypass channels).
D-4	**Site Selection**	• Design and plan activities and works in waterbody such that loss or disturbance to aquatic habitat is minimized and sensitive spawning habitats are avoided. • Design and construct approaches to the waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation and select narrow, straight channel sections to minimize requirements for piers and/or abutment fills. • Consider alignment of channel section (align crossing along channel if feasible) as well as inlet and outlet orientation in selecting crossing alignment of roadway. • Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains, or any other area that is inherently unstable and may result in erosion and scouring of the waterbody bed or the built structure. • Consider future highway expansion requirements and potential impacts on fish habitat to avoid significant issues. • Where possible, avoid watercourse reaches along wetlands with deep organics and/or groundwater discharge areas to avoid extensive excavation and other construction issues.
D-5	**Stormwater Management Measures**	• Design stormwater management (SWM) measures to manage runoff to waterbody considering discharge (e.g., velocities to avoid erosion) as well as quality (e.g., formal SWM ponds, enhanced ditches, and filtration).

Operational Constraint		
Code	**Mitigation Measure**	**Description**
O-1	**Access**	• Prohibit or limit access to banks or areas adjacent to waterbodies, to the extent required to protect the structural integrity of banks or shorelines. • Limit machinery fording of the watercourse to a one-time event (i.e., over and back), and only if no alternative crossing method is available. • If repeated crossings of the watercourse are required, construct a temporary crossing structure. • Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds. • For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.
O-2	**Blasting**	• Implement requirements and limitations for the use of confined explosives, in or near, fisheries water. • Refer to DFO fish protection measures for use of explosives http://www.dfo-mpo.gc.ca/Library/232046.pdf
O-3	**Timing of In-Water Works**	• Implement timing restrictions for in-water work to protect sensitive life stages/processes of migratory and resident fish. • Additional timing considerations: – Minimize duration of in-water work. – Conduct in-stream work during periods of low flow to allow work in water to be isolated from flows.

		– Schedule work to avoid wet, windy, and rainy periods that may increase erosion and sedimentation and allow for proper re-stabilization and re-vegetation as appropriate prior to winter.

Management		
Code	**Mitigation Measure**	**Description**
M-1	**Chemicals**	• Use only specified amounts and types of fertilizer in areas draining to waterbodies. • Avoid use of chemical dust suppressants, pesticides, and herbicides in areas near or draining to waterbodies. • Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.
M-2	**Dewatering Discharge**	• Manage and treat dewatering (or other) discharge water to prevent erosion and/or release of sediment-laden or contaminated water to the waterbody. • Considerations: – Use of appropriately designed and sited temporary settling basin, filter bag, etc. such that sediment is filtered out prior to the water entering a waterbody. – Use of energy dissipation measures to prevent bank or bed erosion.

Management		
Code	**Mitigation Measure**	**Description**
M-3	**Equipment**	• Whenever possible, operate machinery on land above the high water level, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody. • Operate, store, and maintain (e.g., refuel, lubricate) all equipment, vehicles and associated materials in a manner that prevents the entry of any deleterious substance from entering the water. • Any part of equipment entering the water or operating on the bank shall be free of fluid leaks, invasive species and noxious weeds and externally cleaned/degreased to prevent any deleterious substance from entering the water.
M-4	**Erosion and Sediment Controls**	• Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed soils and migration of sediment to adjacent waterbody during all phases of the project. • Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear. The plan should, where applicable, include: – Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the waterbody. – Regular inspection and maintenance of erosion and sediment control measures and structures during construction. – Repairs to erosion and sediment control measures and structures if damage occurs. – Removal of non-biodegradable erosion and sediment control materials once site is stabilized.

Management		
Code	**Mitigation Measure**	**Description**
M-5	**Excess Materials**	• Temporarily store, handle and dispose of all materials used or generated (e.g. organics, soils, uprooted or cut aquatic plants, woody debris, dredging spoils, commercial logging waste, temporary stockpiles, construction waste and materials such as concrete, sheet pile, wood forms, etc.) during site preparation, construction and clean-up in a manner that prevents their entry to waterbody, including temporarily storing and stockpiling materials a safe distance from waterbody and stabilizing/containing them.
M-6	**Fish Screens**	• Use fish screens to avoid entrainment and impingement of fish at water intakes. • Refer to DFO fish protection measures for design, installation, and operation of fish screens DFO Code of Practice: End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater
M-7	**Fish Transfer**	• Avoid impacts to fishes by excluding, moving, or frightening fishes downstream or away from work area. Retain a qualified environmental professional to ensure applicable permits for relocating fish are obtained. • Capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them to an appropriate location in the same waters using appropriate capture, handling and release techniques to prevent harm and minimize stress. Fish may need to be relocated again, should flooding occur on the site.
M-8	**In-water Turbidity Curtains or Other Appropriate Measures**	• Use properly sized, anchored, and maintained in-water silt boom, turbidity curtains or other effective measures to contain suspended sediments.

Management		
Code	**Mitigation Measure**	**Description**
M-9	**Spills**	• Ensure Spill Management Plan (including spill kit materials, instructions regarding their use, education of contract personnel, emergency contact numbers) on-site at all times for immediate implementation in event of accidental spill.
M-10	**Temporary Flow**	• Design and implement isolation/containment plan to isolate temporary in-water work zones to maintain clean flow downstream/around the work zone at all times. The design should: – Use only clean materials free of particulate matter for temporary coffer dams. – Situate or otherwise manage flow withdrawal and discharge (e.g., see dewatering discharge) to prevent erosion and sediment release to the waterbody. – Ensure the work zone is stabilized against the impacts of high flow events during the work period. – Remove fish from isolated in-water work zones if necessary. • See: Management - Fish Screens and Management - Fish Transfer for managing fish.

Management		
Code	**Mitigation Measure**	**Description**
M-11	**Vegetation**	• Use existing trails, roads, or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction. • Clearing of riparian vegetation should be kept to a minimum and if removal is necessary use proper clearing techniques and protect retained vegetation. When practical, prune or top the vegetation instead of grubbing/uprooting. • Selective or phased vegetation removal or species management to maintain or reduce shade may be desirable for the management of certain species and/or to provide specialized riparian communities or habitat, such as for warmwater species at risk or coldwater species. • Salvage and re-instate of seedbank materials or root mats may be appropriate for certain vegetation communities such as wetlands and/or to expedite re-establishment of vegetation cover.
M-12	**Water Flow**	• Flow management (e.g., minimum flows, seasonal flow augmentation, flushing flows) for specific aquatic habitat management goals or to mitigate other effects of flow management (e.g., fish passage, fish stranding).
M-13	**Work Site Containment**	• Design and implement containment plan to isolate all work occurring above water and keep all deleterious substances (e.g., dust, particulates, air-borne contaminants, paint, grout, poured concrete etc.) from entering the waterbody. The design should include: – Regular inspection, removal and disposal of materials generated. – Use of in-water scaffolding, floating platforms and/or barges where appropriate.

Rehabilitation		
Code	**Mitigation Measure**	**Description**
R-1	**Waterbody Bank**	• Minimize the removal of natural woody debris, rocks or other materials from the banks or the shoreline of the waterbody. • Stabilize and reinforce banks of waterbody to pre-disturbance condition (or better) using properly designed and installed stabilization measures: – Avoid hard engineering (sheet pile or other vertical walls). – May include vegetation (e.g., tree and shrub plantings, bioengineering), rock/stone material (e.g., rip-rap, boulders). – If rock reinforcement/armouring is required, ensure that appropriately-sized material is used and is installed at a similar slope to the existing, maintains a uniform bank/shoreline and maintains a natural bank/shoreline alignment such that it does not interfere with fish passage or alter the bankfull channel profile. – May incorporate temporary measures (e.g., biodegradable materials, 'nurse'-crop vegetation) to provide interim stabilization until vegetation fully established.
R-2	**Waterbody Bed and Substrate**	• Restore and re-stabilize any portion of the waterbody bed disturbed during construction to preconstruction (or better) condition, including: – Restoration of the original contour and gradient – Morphological elements, e.g., pools and riffles – Substrates, which may include salvage and re-instatement of native materials

Rehabilitation		
Code	**Mitigation Measure**	**Description**
R-3	**Exposed Soils/ Surfaces**	• Stabilize and re-vegetate (or use other materials appropriate to site conditions) all areas of disturbed/exposed soil that drain to a waterbody using: – Targeted planting of appropriate vegetation. – Rolled erosion control blankets, topsoil, seed, mulch etc. – Installation of appropriately designed structural materials and vegetation if feasible on steep slopes to maintain slope stability for the long term. Direct drainage away from slopes unless structure provided to take drainage into valley without erosion and risk of sedimentation.
R-4	**In-stream Cover**	• Minimize the removal of natural woody debris, rocks or other materials from below the high water level. • Add/re-establish appropriate in-stream structure and cover for habitat, in such a way as to not destabilize the channel through negative impacts to hydraulics. Where possible, match structure/substrate type with previous or adjacent types removed, altered or disturbed during construction. • This may include salvage and re-instatement of existing in-stream structure such as large woody debris, boulders or in-stream aquatic vegetation.

Rehabilitation		
Code	**Mitigation Measure**	**Description**
R-5	**Riparian Vegetation Plantings**	• Design and implement vegetation rehabilitation plan following construction to re-plant riparian vegetation to pre-construction or better condition (e.g., trees for shade to cool water and provide overhead cover). • Considerations: – Design and install riparian plantings to avoid or minimize encroachment into and/or alteration of bank and bed profile. – Usually includes re-instatement of native soils or replacement with topsoil/suitable planting medium. – May include local seed bank or root mass/mat salvage, vegetation transplant or bioengineering (e.g., live stakes, cuttings) techniques. – Use native species compatible with site conditions. – Integrate provision of fish cover where feasible. – Integrate appropriate techniques for interim stabilization measures such as biodegradable blanket, tackifier to maintain soil stability until vegetation becomes established.