Review of Aquatic Habitat Restoration Regulations and Policies under the *Fisheries Act*

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Aquatic Habitat Canada: Policy and Program Working Group

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Glossary

Third party habitat bank	A habitat bank where the agency that generated the habitat credits can allow other agencies to use or buy the habitat credits.
Adaptive management approach	A structured approach involving three major tasks: plan, do and learn. This approach is continuous with the intent of improving future efforts by learning from the previous efforts.
Degraded Site	A site with a known party or owner that is responsible for the environmental damage.
Ecosystem approach	A strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.
Full Delivery program	A program used by some agencies whereby they request a proposal for the provision of a specific number of habitat credits within a specific area.
Habitat Bank	A virtual bank into which habitat credits are deposited and withdrawn.
Habitat Creation	Forming a new habitat component or system where one did not previously exist.
Habitat Enhancement	Activities undertaken to improve existing habitat quality.
Habitat Naturalization	Establishing hydraulically and morphologically varied and dynamically stable systems that are capable of supporting healthy, biologically diverse aquatic ecosystems.
Habitat Rehabilitation	Partial recovery of habitat or ecosystem functions and processes; typically include structural and assisted recovery measures.
Habitat Restoration	Process of re-establishing the structure and function of the habitat or ecosystem as closely as possible to pre-anthropogenic disturbance.
In-lieu fee program	A program which allows proponents of projects with impacts to fish or fish habitat to pay a fee rather than implement offsetting.
Orphaned Site	A site with no known responsible party or owner or with no possibility of restoration due to company closure, bankruptcy, or other similar circumstance.
Proponent-led habitat bank	A habitat bank where the only agency that can use habitat credits from the bank is the same agency that generated the habitat credits.

Background:

Aquatic Habitat Canada (AHC) reviewed existing regulations and non-regulatory instruments governing aquatic habitat restoration to provide input on their effectiveness, limitations and to identify potential regulatory gaps. The purpose of this review is to prepare recommendations on regulatory and non-regulatory instruments governing freshwater, marine, and coastal habitat restoration. The recommendations arising from this report will be provided to AHC partners, including DFO, and to review participants. AHC brought together a working group of subject matter experts from across the country to participate in this initiative. AHC also engaged external stakeholders and rights holders from industry, conservation groups, Indigenous communities, academia, and other organizations. The intent is to help guide activities to conserve and restore aquatic habitat in Canada, as well as to inform the development and implementation of various tools under the Fish and Fish Habitat Protection Provisions of the amended *Fisheries Act*.

Objectives:

The overarching goal of this initiative is to provide recommendations on regulatory and non-regulatory instruments governing freshwater, marine, and coastal habitat restoration. Where measures are currently in place, the goal is to provide recommendations to improve or enhance their implementation. Where measures do not currently exist, the goal is to identify these gaps and provide recommendations on the development of new measures to address these gaps. Specifically, this initiative has the following three objectives:

1. Review existing Canadian regulations and non-regulatory instruments governing aquatic habitat restoration and provide input on their effectiveness, limitations, and potential gaps.
2. Propose recommendations for new regulations and non-regulatory instruments governing freshwater, marine, and coastal restoration, including:
    a. What types of projects are suitable as offsets?
    b. How can the enhancement of natural habitats be distinguished from rehabilitation of degraded habitats, and what are the implications of this difference for regulations?
    c. How to distinguish between the fulfillment of legal obligations and the delivery of altruistic restoration projects?
    d. How to regulate projects that involve both development and restoration elements.
    e. Identify the necessary components of a restoration plan.
3. Propose recommendations for evaluating both the benefits of a restoration project and the losses to other species realized by the change in habitat.

The recommendations developed from this initiative will be provided to AHC partners and will be published on AHC's website. They will also be provided to the many participants that contributed to this initiative.

Approach:

AHC brought together a working group of subject matter experts from across Canada in October 2019. Working group members included representatives from conservation groups, Indigenous communities, and subject matter experts in aquatic habitat biology, restoration, and channel design. The working group developed a framework for the collection of information for this initiative.

The AHC Policy and Program Working Group Members include the following:

- Brad Fairley (Chair), 5 Smooth Stones Restoration Inc.
- Dan Benoit, member of the Métis Nation
- Genevieve Morinville, Baffinland Iron Mines Corporation
- Blair Carter, Ducks Unlimited Canada
- Chris Craig, South Nation Conservation Authority
- Jack Imhof, Trout Unlimited Canada
- Karen McDonald, Toronto and Region Conservation Authority
- Rick Portiss, Toronto and Region Conservation Authority
- Jenie Cooper, Fisheries and Oceans Canada

External stakeholders and rights holders were engaged for their participation in this initiative between February and May 2020. They include representatives from industry, Conservation Authorities, and Indigenous communities. The goal of the external consultation was to provide geographic representation from across Canada, as well as to include a diverse range of sectoral representation. Stakeholders and rights holders were provided an outline of the objectives for this initiative and participated in a 30-minute interview. A total of 112 individuals from various entities across Canada were contacted to participate in this initiative. A total of 27 individual external stakeholders participated and provided their contributions to this initiative. Lucas Warner, a biologist and regulatory advisor with Dillon Consulting, led the engagement with the external stakeholders and rights holders.

AHC hosted a webinar on May 28, 2020 where the results of this initiative were presented. Invitations to this webinar and presentation were provided to those who participated and contributed in this initiative. Invitations were also extended to stakeholders and rights holders. A total of 167 individuals attended the webinar and provided feedback on the recommendations presented.

The majority of the feedback and contributions from the members of the working group, external stakeholders and rights holders, and from the webinar attendees focused on addressing items in Objective 1. Feedback and contributions were received for Objectives 2 and 3; however, the information seemed to align with several key themes that developed under Objective 1. As such, this report is not structured such that the objectives are the main subject

headings. Rather, it is organized based on these key content themes that arose over the course of this initiative which speak to all three objectives.

Results:

The review of existing regulations and non-regulatory mechanisms governing aquatic habitat restoration in Canada, through AHC's working group and external stakeholders and rights holder's engagement, identified several challenges that limit the effectiveness of aquatic habitat restoration efforts across Canada. Recommendations to address these challenges were brought forward that can inform the development and implementation of various tools under the Fish and Fish Habitat Protection Provisions of the amended *Fisheries Act*. The results from this initiative are summarized below, in no particular order, and are numbered sequentially so they can be referred to individually.

1.0 Restoration

1.1 Background:

Canada's aquatic ecosystems are impacted by both natural and anthropogenic stressors. Restoring impacted or degraded habitats is an important mechanism to improve and maintain the health, function and sustainability of aquatic ecosystems. Habitat restoration also contributes to the protection of aquatic ecosystems to provide ecosystem services into the future. There are a number of terms that are used to refer to activities associated with "habitat restoration" of aquatic habitat; these terms include habitat restoration, habitat rehabilitation, habitat naturalization, habitat creation, and habitat enhancement (see the Glossary for definition of each term). This report does not discuss each of these terms separately and in detail; therefore, for the purposes of this report, "habitat restoration" can be defined as the process of re-establishing the structure and function of the habitat or ecosystem as closely as possible to pre-anthropogenic disturbance. Restoration of aquatic habitats can lead to the development of a community of informed and involved partners, stakeholders, and rights holders.

Many restoration efforts are led by conservation and environmental stewardship groups, and non-profit organizations. These organizations partner with governments, corporations, Indigenous communities, private landowners and individuals to secure land and properties, and obtain funding and support, to complete and maintain restoration projects and their benefits over the long-term. Ducks Unlimited Canada completed its first habitat restoration project in 1938 and continues to conserve, restore and manage Canada's wetland habitats for the benefit of waterfowl, other wildlife, the environment and people. Trout Unlimited Canada was formed in 1972 to preserve and restore Canada's freshwater ecosystems and has completed a variety of fish habitat restoration projects across Canada.

In Ontario, there are 36 Conservation Authorities which represent groupings of municipalities on a watershed basis and work with other agencies and organizations to carry out natural resource management and restoration activities within their respective watersheds and jurisdictions. These organizations operate under the *Conservation Authorities Act*, which was

passed in 1946 and authorizes the formation of Conservation Authorities. Conservation Authorities worked with DFO to review projects submitted for review in their jurisdiction and would issue Letters of Advice, on DFO's behalf, if authorization under the *Fisheries Act* was not required; however, these arrangements were cancelled as part of the previous amendments to the *Fisheries Act* that came into force in 2012/13.

In British Columbia (which is part of DFO's Pacific Region), DFO's Salmonid Enhancement Program (SEP) has had a restoration group since its inception, over 40 years ago, and the majority of their projects involve partnerships with other groups. During these projects, DFO's SEP typically provides oversight that would be provided by the DFO's Fish and Fish Habitat Protection Program if the SEP was not involved and the project was submitted for review through the Request for Review Process; or in other regions of the country, where there is no SEP. The SEP provides a mechanism for restoration projects to be completed with DFO oversight without having to go through the same laborious regulatory approval process as development projects.

The Recreational Fisheries Conservation Partnerships Program (RFCPP) was administered by DFO and supported recreational fisheries habitat restoration projects led by angling/fishing groups, conservation organizations and Indigenous groups to rebuild and rehabilitate fish habitat across the country. Recreational fisheries face many environmental challenges, with habitat loss being the most common threat. The RFCPP provided an average of $10 million annually to support local and community partners to restore Canada's recreational fisheries habitat. While eligibility for the RFCPP was limited to recreational fishing and angling groups, as well as conservation groups; Conservation Authorities and Conservation Districts were eligible recipients for RFCPP funding. Unfortunately, this program no longer exists.

Restoration of aquatic habitat also occurs through legislated requirements when habitat is impacted through economic development. Under the *Fisheries Act*, proponents are required to offset unavoidable impacts to the fish and fish habitat that occur as a result of their project(s) (see Section 3 for more information on offsetting). While these restoration efforts are not altruistic, offsetting provides a mechanism to restore, enhance, or create aquatic habitat when impacts from anthropogenic development cannot be avoided or mitigated.

1.2 Challenges:

While there are many organizations that lead and contribute to aquatic restoration efforts across Canada, and many restoration projects are completed through legal requirements such as offsetting, there remain many challenges and opportunities for improvement. Perhaps the most common feedback received was for a more collaborative and strategic approach to restoration activities in Canada. An important component of this strategy could be the introduction of economic instruments to provide incentives for restoration projects. These incentives could facilitate the implementation of more restoration projects, particularly in areas with degraded habitats, as well as provide a mechanism for larger "high-value" restoration

projects (i.e., large-scale projects with more quantity, quality, and complexity of aquatic habitat), for which is often difficult to find partners and sufficient funding to implement. The discussion of economic instruments, such as in-lieu fee programs, are discussed more in Section 4.

Under a more strategic approach to habitat restoration, ecosystem services (e.g., natural water filtration services provided by natural wetlands) could be counted in market prices to align those services with our economic priorities. While our current approach to the preservation of aquatic habitat has focused on the protection and restoration of these natural systems, identifying their economic value (e.g., the costs of maintaining natural wetlands vs constructing, maintaining, and decommissioning mechanical water filtration systems) will encourage these natural systems to be considered along with other important economic drivers when allocating resources.

Along with the economic value of aquatic habitats, the assessment of the "value" of aquatic ecosystems requires a review of some fundamental questions. Who determines the value of our aquatic ecosystems? What are the guiding principles that determine the value of an ecosystem? How is this value being calculated? Answering these important questions will inform the development of future policies and regulations that will enable the protection and restoration of ecosystem value and biodiversity, as well as counting the economic benefits.

An integrated management approach could be developed under legislation to promote, facilitate, and regulate the implementation of projects that involve both development and restoration elements. While proponents are required to offset for unavoidable impacts to aquatic habitat (see Section 3 for more information on offsetting), this approach does not effectively promote incorporating restoration components into these projects; this approach promotes avoidance and mitigation of potential impacts and restoration components are only incorporated as offsetting, where required. Through the development of regulations that facilitate and promote the inclusion of restoration elements into all projects, more restoration projects will be completed.

New regulations should be developed to encourage the development of restoration projects that are not tied to development (i.e., altruistic projects); projects where the restoration and maintenance of these aquatic habitats and their function is the sole objective. While DFO's Pacific Region has the SEP for restoration projects associated with salmon habitat, this program may not apply to all restoration projects within the region. Furthermore, other regions do not have a similar program that provides DFO oversight on restoration projects. In regions without a SEP-equivalent program, and for projects that this program does not address, restoration projects are reviewed and approved under the same process as development projects, which requires significant effort (i.e., time and expense) to complete. Many of these projects are led by conservation groups and volunteers who face staff and financial resource challenges to complete the approval process and meet project timelines and budgets. As a result, the existing regulatory framework does not encourage important habitat restoration work, and in turn,

many of these projects are not completed, are significantly scaled back, or experience lengthy delays due to the aforementioned complex project review and approval process. Furthermore, while development projects are required to complete offsetting as a legal obligation under the *Fisheries Act*, altruistic projects restore aquatic habitat without first causing impacts. However, the new tools and provisions under the current (2019) *Fisheries Act* provides an opportunity to establish a separate process for the development, review, and approval of these altruistic projects, which could include the development of standards and codes of practice (see Section 2 for more information on published standards and codes of practice) for typical restoration projects, and design and monitoring standards, that is less onerous than development projects.

Although not specifically identified in the objectives for this initiative, feedback and contributions were consistently received related to concerns over the restoration efforts for species at risk and their habitat. Species at risk face many challenges to recover historic habitat ranges and population numbers. Specific species populations are listed under Canada's *Species at Risk Act* (SARA) and recovery plans are developed to protect and restore these populations. While recovery plans provide a mechanism to protect and restore these species and their habitat, there are opportunities to implement and enforce protection measures before these populations are listed under SARA. Opportunities to monitor species and their habitat should be developed and measures should be implemented and enforced before a population needs federal protection and recovery plans.

Concerns were raised regarding orphaned sites (i.e., sites with no known responsible party or owner, or with no possibility of restoration due to company closure, bankruptcy or other similar circumstances) and degraded sites (i.e., sites for which the proponent, person, or organization responsible for the impacts is known but, for whatever reason restoration has not been undertaken). Enforcement of restoration of degraded sites should be enhanced if the responsible party is known; collaborative opportunities to restore these sites, such as with conservation groups, is one option. While orphaned sites are available for restoration, including through offsetting measures (see Section 3 for more information on offsetting), proponents and regulators are often not aware of these sites. A database of both degraded and orphaned sites could be developed to improve awareness of orphaned sites that could be available for restoration.

1.3 Recommendations:

1.3.1 Develop policies and regulations to encourage and enable the restoration and protection of ecosystem values and biodiversity.
1.3.2 Consider ecosystem services when putting a price on restoration projects to better align our economic and ecological priorities.
1.3.3 Adopt an integrated management approach that is part of the legislation process that promotes and facilitates the regulation and implementation of projects that involve both development and restoration elements.

1.3.4 Adopt a more strategic and collaborative approach to restoration policies, regulations, and efforts that focuses on ecosystems and supporting watershed health and priorities.
1.3.5 Review the following fundamental questions regarding ecosystem value to develop a better approach to restoration:

a) Who determines the ecosystem value?
b) What are the principles of determining the value of an ecosystem?
c) How is the value being calculated?

1.3.6 Apply economic instruments to enhance regulations and polices that protect wildlife and biodiversity.
1.3.7 Develop and implement actions to protect species at risk before they become endangered and require legal protection and recovery plans.
1.3.8 Establish a process and guidance specific to altruistic habitat restoration projects, possibly through a separate regulation or standards and codes of practice, to lessen the regulatory burden on altruistic projects.
1.3.9 Apply a collaborative approach to facilitate the development of larger "high-value" habitat restoration projects to improve funding opportunities.
1.3.10 Enhance enforcement for the restoration of degraded sites with known responsible parties.
1.3.11 Develop and publish a list of degraded and orphaned sites, with no known responsible party or with no possibility of restoration, that are available for restoration.

2.0 Published Standards and Codes of Practice

2.1 Background:

Published standards and codes of practice provide guidance and specify procedures, practices, or standards for maintaining compliance with the *Fisheries Act* by avoiding the death of fish or the harmful alteration, disruption or destruction (HADD) of fish habitat. These standards and codes apply to works, undertakings or activities during construction, operation, maintenance, or decommissioning phases of their life cycle. Standards and codes of practice are developed for routine project types that have well-understood construction methods, as well as potential impacts to fish and fish habitat, including species at risk. These practices do not apply to unique or complex projects that require more detailed assessment to characterize and assess the potential impacts to fish, fish habitat, or species at risk. Standards and codes of practice include a voluntary notification form that is submitted to the appropriate regulatory agency in advance (typically 10-14 days) of initiating the work.

Prior to the 2012 amendments to the *Fisheries Act*, published standards and codes of practice, called operational statements, were available. The operational statements were developed for several routine project types (e.g., Bridge Maintenance, Isolated or Dry Open-Cut Stream Crossings, and Maintenance of Riparian Vegetation in Existing Rights-of-Way). These were also regionalized by province and region-specific operational statements, as well as region-specific

guidance, procedures, conditions, or mitigation measures developed. The operational statements required the submission of a Notification Form ten working days in advance of starting the work. The operational statements were discontinued under the 2012 amendments to the *Fisheries Act*.

The current (2019) version of the *Fisheries Act* includes standards and codes of practice for certain works, undertakings, and activities. However, at the time of the publication of this report, only four interim codes of practice have been released: 1) Routine Maintenance Dredging, 2) End-of-Pipe Fish Screens, 3) Culvert Maintenance, and 4) Temporary Stream Crossings. Additional codes of practice will be developed and published, as well as a notification form, similar to the previous operational statements.

The development and publication of standards and codes of practice provides several benefits to proponents undertaking works associated with development, as well as restoration, projects. They provide a streamlined approach to completing projects under a voluntary notification submission timeline. They provide clear guidance, methods, and conditions that need to be met for their use. Through the notification form, they provide an efficient mechanism for notifying regulatory agencies of their use on projects. This provides a mechanism for documenting and tracking projects, as well as arranging site audits to confirm projects were successfully completed according to the avoidance and mitigation measures outlined in the standards and codes of practice. Finally, this mechanism also saves both the proponent and DFO financial and staff resources associated with permitting low-risk projects.

2.2 Challenges:

A number of issues and concerns have been raised related to the development and use of published standards and codes of practice. The amendments to the *Fisheries Act* received royal assent on June 21, 2019 and the protection provisions came into force on August 28, 2019. DFO has provided guidance to determine if a project should be submitted for review, which includes determining if the codes of practice apply; however, as noted, at the time of publication of this report, only four codes of practice have been developed and published. In addition, these new interim codes of practice were published without consultation or posting in the Canada Gazette. The lack of a comprehensive set of codes of practice will result in more project submissions and review through DFO's Request for Review process that could otherwise have been completed under a code of practice. This will result in more projects being delayed and creating more review burden on DFO staff.

A main criticism of the previous operational statements, as well as the new codes of practice, is that the notification form is voluntary; meaning it is not an enforceable requirement. The notification form is not onerous to complete and making it mandatory would likely be well received. Mandatory notification would also allow the documentation and tracking of all projects that use codes of practice.

When the previous operational statements were available, numerous routine project types with well understood implementation methods and potential for impacts did not have published standards or codes of practice. Some examples provided by respondents include specific restoration practices, such as shoreline, bank, and riparian restoration work commonly undertaken by Conservation Authorities and the work conservation organizations do to replace aging infrastructure associated with existing wetland conservation projects. Additional standards or codes of practice could be developed for these types of restoration projects.

The current four codes of practice are not region-specific, and while the previous operational statements were regionalized, they do not adequately represent Canada's diversity of aquatic habitat. During the development of the previous operational statements, as well as the current interim codes of practice, it appears that a public consultation was not conducted; it is also not know if additional public consultation will be conducted during the development of additional standards or codes of practice.

Concerns were also raised that the previous operational statements, as well as the new codes of practice, do not fully avoid negative impacts to fish and fish habitat. Specifically, guidance and mitigation measures included in these codes of practices still have the potential to cause harm. Some feedback received suggested the adoption of an in-lieu fee program (see Section 4 for more information on in-lieu fee programs) could provide a mechanism for habitat restoration or offsetting for these types of projects.

2.3 Recommendations:

2.3.1 Published standards and codes of practice should be prepared and released simultaneously when new or amended legislation comes into force.
2.3.2 Additional codes of practice should be developed through consultation to address the variety of routine projects that are regularly completed.
2.3.3 In the absence of completed and published standards and codes of practice, general guidance that allows for adjustments of approaches for specific conditions should be developed.
2.3.4 Regional standards and non-regulatory mechanisms should be developed to address the regional differences and the diversity of Canada's aquatic ecosystems.
2.3.5 The Notification Form process should be made mandatory when completing projects under published standards or codes of practice.
2.3.6 The Notification Form process should be expanded to include all developments, rather than just those covered under the current codes of practice; a standard form could be developed where proponents could indicate the specific criteria is being met to avoid impacts and why additional review or permitting by DFO is not required.

3.0 Offsetting

3.1 Background:

Work that occurs in or near water has the potential to impact fish and fish habitat. Proponents that work in or near water first prioritize efforts to avoid and mitigate these potential impacts. However, in many cases, these works cannot completely avoid or mitigate potential impacts to fish and fish habitat. After efforts have been made to avoid and mitigate harmful impacts to fish and fish habitat, remaining residual impacts must be addressed by offsetting. Offsetting counterbalances unavoidable death of fish and harmful alteration, disruption or destruction (HADD) of fish habitat resulting from a work, undertaking or activity with the goal of protecting and conserving fish and fish habitat.

Activities that cause the death of fish or HADD contravene the *Fisheries Act* and, therefore, require an authorization under paragraphs 34.4(2)(b) or 35(2)(b) to proceed. The information and documentation requirements to apply for authorization are captured in regulation in the Authorizations Concerning Fish and Fish Habitat Protection Regulations. Under these regulations, an offsetting plan is a required component of an application for authorization.

Following the 2019 amendments to the *Fisheries Act*, DFO published the "Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat under the *Fisheries Act*" to provide guidance on how to prepare an offsetting plan to support an application for authorization. Previous versions of this policy also existed under the 2012-2019, and pre-2012 version of the *Fisheries Act,* however, offsetting was referred to as “compensation” under the pre-2012 *Act*. The 2019 policy document outlines the process for developing offsetting measures with the objective of supporting the conservation of fish and fish habitat by counterbalancing the residual impacts from works authorized under the *Fisheries Act*. DFO has outlined their guiding principles when considering the development and application of offsetting, and has outlined four general categories for offsetting measures that can be implemented. The policy also provides options for implementing offsetting measures through project-specific measures, or through credits established from a fish habitat bank (see Section 4 for more information on habitat banking). A monitoring plan to document the effectiveness of the offsetting measures is required, which outlines specific criteria success thresholds, as well as contingency measures if offsetting is not successful (see Section 5 for more information on monitoring). Proponents are required to provide a financial guarantee, in the form of an irrevocable Letter of Credit (LOC) issued by a recognized Canadian financial institution; the amount of credit needs to be sufficient to complete construction of the offsetting measures and monitoring program. The LOC provides DFO with the funding required to complete the offsetting measures and monitoring program if the proponent is unable to complete them.

3.2 Challenges:

The offsetting of impacts to fish and fish habitat is required to maintain Canada's fisheries resources; however, a number of issues have been raised with the approaches taken for offsetting impacts. Offsetting, and compensation before it, focuses on individual species and their important habitats; these are often native species that have high commercial or recreational value, or they are listed as species at risk on Schedule 1 of the *Species at Risk Act* (SARA). While it's important to prioritize native species with economic or societal value, as well as species that are "at risk", this approach has often focused on the local area and specific habitats impacted, and does not consider the limiting factors within the stream, catchment, or watershed; these limiting factors are also usually not well understood. As such, this local and species-specific approach does not effectively account for their role and function in the ecosystem and maintaining ecosystem health and sustainability.

The current approach to offsetting, which was previously referred to as "no-net-loss", has failed to meet its goal; therefore, a new approach that promotes "net-gain" is needed. Many have pointed to insufficient ratios (i.e., offsetting: impacts) as one of main reasons for the failure of the no-net-loss approach. Feedback suggests that there has been an inconsistent approach to the use of ratios for offsetting and that a standardized approach should be developed. Other regions have developed standard compensation ratios for impacts, such as Alberta's Wetland Policy, and these approaches could be adapted for offsetting impacts to fish and fish habitat. One of the main challenges with a standardized approach to offsetting ratios is a clear and standardized approach to establishing the value of habitat(s) that are impacted. While there are many approaches available (e.g., Habitat Suitability Index, Resource Selection Function, Weighted-Area), a standardized and consistent approach is lacking and results in uncertainty and inconsistency with how habitat is valued and offset. As a result, area (m^2) is often used as a surrogate for productivity.

While DFO has provided guidance documents and policy for the development of offsetting measures, a standardized process for the selection of suitable offsetting measures, and a consistent application of this process by DFO, is still lacking. Industry, in particular, is calling for clearer guidance and a more consistent approach to the selection of suitable offsetting projects to manage risk and uncertainty in their development projects. While many areas have known impacted or degraded habitats, a list of priority sites, including orphaned and degraded sites, that could be available for offsetting has either not been developed, or has not been publicly shared. This list of priority sites should be developed in collaboration with DFO, Indigenous communities, as well as conservation and environmental stewardship groups. While DFO prioritizes Fisheries Management Objectives (FMOs) during the selection of offsetting measure, many regions do not have published FMOs, while those that do are not widely known or available. The development of FMOs requires a collaborative approach with other regulatory agencies, as well as stakeholders and rights holders, and this process should be prioritized so that FMOs are developed and available for consideration during the selection of suitable

offsetting measures. Design standards for suitable offsetting measures are also lacking; however, several Conservation Authorities have prepared standard design and submission requirements that identify the necessary components of a restoration plan (e.g., Channel Modification Design and Submission Requirements; published by the Toronto and Region Conservation Authority; available in the Appendix to this report) that could be adapted for use in offsetting.

While the restoration of orphaned sites (i.e., sites with no known responsible party or owner or with no possibility of restoration due to company closure, bankruptcy or other similar circumstances) could be considered as suitable offsetting, proponents and regulators are often not aware of these sites. A database of known orphaned sites could be developed to improve awareness of these sites for offsetting opportunities; this database could be combined with the list of priority impacted or degraded sites (discussed in the paragraph, above). Currently, the restoration of degraded sites (i.e., sites for which the proponent, person, or organization responsible for the impacts is known but has not restored) are not considered suitable offsetting projects because these sites should be brought into compliance by the responsible party. Enforcement of restoration of degraded sites should be enhanced if the responsible party is known or these sites should be made available for offsetting through collaborative opportunities with the responsible party.

Indigenous communities expressed concerns with previous and current approaches to offsetting. First, concerns were raised regarding impacts on traditional lands that do not receive direct offsetting and the fact that project-related offsetting requirements are fulfilled elsewhere. While it is understood that there are many areas that could benefit from offsetting projects, they would like to see offsetting measures implemented where impacts occur on their traditional lands. Second, concerns were expressed that, if offsetting measures are implemented on traditional lands, these measures will result in further impacts; most of these lands are pristine and non-developed, particularly in Canada's northern territories. While impacts should be offset, the solution is not to cause further impacts where they can be avoided; therefore, effective solutions may require offsetting measures that do not meet DFO's current guidance criteria for the selection of suitable offsetting measures. Third, concerns were raised regarding previous consultation practices where impacts affect multiple communities, who may have differing opinions on what offsetting measures should be implemented and will be most beneficial to their communities. Examples of effective consultation include those where consultation was conducted early during the project schedule, local languages were spoken and respected, technical terminology was effectively translated and communicated, and consideration was given to communities' schedules and timelines to provide responses.

Proponents should have the option of paying into an in-lieu fee program which would then allow DFO to retain service providers to restore habitat in a desired or needed location; particularly in areas of pristine habitat, such as in Canada's northern territories, and in

situations where impacts to aquatic habitat, and associated offsetting, are small (see Section 4 for more information on an in-lieu fee program).

3.3 Recommendations:

3.3.1 Develop an ecosystem-level approach for the selection and implementation of offsetting projects that consider the major functional elements and limiting factors within a site, stream, catchment, and watershed.
3.3.2 Develop a standardized process with clear guidance that outlines the requirements and criteria for suitable offsetting projects.
3.3.3 Develop design standards for offsetting projects that consider the nature of local and regional habitats.
3.3.4 Provide the option of paying into an in-lieu fee program for offsetting projects, particularly in areas of pristine habitat.
3.3.5 Develop and publish regional Fisheries Management Objectives (FMOs).
3.3.6 Develop and publish a list of priority orphaned sites for offsetting projects.
3.3.7 Develop a standardized approach for establishing the value of habitat and habitat types, as well as how to calculate the residual impacts to fish and fish habitat and the amount of offsetting required.
3.3.8 Develop a standardized approach for offsetting ratios based on habitat types, the nature of local and regional watersheds, and scientific evidence.
3.3.9 Degraded sites should be made more available for offsetting through collaborative opportunities with the responsible party, particularly in areas of pristine habitat.
3.3.10 Impacts on traditional lands should be offset on traditional lands so the benefits are local to the affected Indigenous communities.

4.0 Habitat Banking

4.1 Background:

Habitat banking is based on the idea of providing offsetting before impacts occur. That is, offsetting projects are completed, and credits are banked in advance of a project. Habitat banks offer many advantages. Advantages for the regulators include increased certainty that the offsetting will occur and that it will provide the required offsetting. Regulators do not have to spend a lot of time chasing proponents to complete offsetting or fixing failed offsetting. Habitat banks provide greater certainty to project proponents that their project will be permitted in a timely manner. It has also been shown in other jurisdictions that by bringing habitat banking into the marketplace and allowing market forces to act, banking lowers the price and improves the quality of offsetting projects.

DFO has recognized the value of habitat banking. Section 42 of the new *Fisheries Act* allows for the use of habitat banks and spells out how they are to work. While the new *Act* encourages the use of habitat banks, DFO has chosen to limit the use of habitat banks to only those

developed by the project proponent. DFO considered the idea of allowing third-party banking when rewriting the *Act*, but ultimately decided against it. DFO does not currently allow third-party banks. These banks are developed by a third-party who then sells the credits to a proponent who needs the offsetting for their project. Third party banking offers benefits beyond those offered by proponent-led banks. By creating a market and allowing market forces to work, third-party banking improves the quality and lowers the cost of offsetting projects. Thus, third-party banking benefits both the proponent and the public.

In-lieu fee programs are based on the idea of allowing a project proponent to pay a fee to a regulatory agency rather than undertake an offsetting project. In jurisdictions with an in-lieu fee program, proponents are given the option of paying a fee where offsetting opportunities are not readily available (e.g., remote or unspoiled areas). Project proponents are also given the opportunity to pay a fee where the impacts are small and where offsetting is not likely to provide functional uplift and improve habitat (e.g., urban areas). In essence, in-lieu fee programs provide a way to offset the cumulative impact of many small projects, which over time, results in significant loss of habitat. The money collected through in-lieu fee programs can be pooled and then used to implement large scale projects which provide the functional uplift and successfully offset for the loss of habitat. Many jurisdictions have used in-lieu fee programs to allow project proponents to offset impacts in areas where offsetting credits are not available from banks. In-lieu fee programs offer the additional advantage of allowing the program manager to undertake offsetting in an ecosystem context. For example, they can focus their efforts and do large projects in a specific watershed or portion of a watershed where restoration will yield significant results, rather than doing a series of small projects scattered throughout the watershed.

Habitat banking and in-lieu fee programs provide for a strategic and collaborative approach to the restoration and enhancement of aquatic habitat across Canada.

While DFO is allowing proponent-led banks, they have not yet established many of the policies and procedures. For example, the monitoring requirements for proponent-led banks are more extensive than monitoring requirements for development projects that result in impacts to fish and fish habitat and require authorization and offsetting. DFO is also having trouble working with some government agencies which have overlapping jurisdictions. For example, some Conservation Authorities undertake offsetting projects on behalf of their funding municipalities. But DFO does not want to allow the municipalities to access the credits generated by the Conservation Authorities. The same issue exists in areas with municipal and regional governments. Despite overlapping responsibilities and geographies and a desire to share credits, DFO does not want to allow a regional government to access credits held within a bank created by a municipal government.

4.2 Challenges:

With DFO still working to implement proponent-led banking, the Fisheries and Oceans Canada is not prepared nor equipped to implement an in-lieu fee program. Fortunately, there are many examples of such programs that are successfully operating which DFO could adapt to suit its purposes. One of the challenges of such a program is that it requires an ability to successfully undertake offsetting projects without creating a large bureaucracy. Other jurisdictions have found ways to cost-effectively convert revenue generated by in-lieu fee programs to habitat restoration projects using the private sector (e.g., North Carolina's full delivery program is an excellent example). Alternately DFO could look to partner with government agencies that have a proven track record with successful and timely implementation of offsetting projects (e.g., Conservation Authorities).

Similar to an in-lieu fee program, DFO is not well equipped to implement third-party banking at the present time. However, given the significant benefits of such programs, DFO should begin the process of developing the infrastructure required to implement third-party banking. As with in-lieu fee programs, there are several examples of third-party banking programs that have been operating for decades. DFO could use these proven programs as models to develop a program that meets DFO's needs. That is, there is no need to reinvent the wheel. It should be noted that DFO's recent efforts at standardizing monitoring protocols for offsetting projects represents an important first step in developing the infrastructure needed to facilitate the implementation of an in-lieu fee program and 3rd party banking. In-lieu fee programs would allow proponents to offset for residual impacts not addressed by their offset projects.

Both in-lieu fee and third-party banking programs are best undertaken in an ecosystem (e.g., watershed based) context. DFO participates in some watershed-based planning initiatives (e.g., Fisheries Management Objectives). But DFO would need to strengthen its relationship with partner agencies to ensure that in-lieu fee and third-party banking programs could achieve their full potential.

4.3 Recommendations:

4.3.1 DFO should put the policies and procedures in place to effectively collaborate with government agencies with overlapping jurisdictions and responsibilities to facilitate the successful implementation of proponent-led habitat banking.
4.3.2 DFO should develop an in-lieu fee program as a way to offset for small impacts, residual impacts and as a bridge to third-party banking.
4.3.3 DFO should begin to develop third-party banking as a way of lowering the cost of habitat offsetting and improving the quality of offsetting projects.
4.3.4 DFO should seek to develop the in-lieu fee and third-party banking programs in an ecosystem context to help ensure that these programs are as effective as possible.

5.0 Monitoring

5.1 Background:

Pre-construction monitoring, monitoring during construction, and post-construction monitoring are often conditions of approval in authorization where habitat offsetting is being constructed. Monitoring can include biological data (e.g., fish, benthic invertebrate, vegetation), as well as a variety of physical parameters (e.g., length, width, height) focused on ensuring that what was designed, was built, and continues to perform, as intended. Effective monitoring provides a mechanism to evaluate the success of restoration and offsetting projects. Monitoring identifies when and where restoration and offsetting projects fail and provides opportunities to improve projects in the future. Improved monitoring is a key element of any strategy designed to slow or stop the continual loss of fish habitat.

5.2 Challenges:

At present, the monitoring requirements specified in authorizations administered by DFO are inconsistent. The monitoring requirements often vary from project to project in terms of the parameters, methods for measurement, the duration, and the frequency. The high degree of variability makes it difficult to collate and analyze the data to learn how to improve the design of offsetting projects. This variability also makes it difficult for consultants to advise their clients and for the clients to develop accurate project budgets. It can also lead to the perception that proponents are not being treated equally. DFO's Central and Arctic Region is currently working on developing standards for pre-construction, construction, and post-construction monitoring. This initiative creates opportunities to address the inconsistent approach to monitoring and perceived inequality in the treatment of proponents and their projects. DFO has also recently provided reviews and recommendations on compliance monitoring, functional monitoring, and effectiveness monitoring through the Canadian Science Advisory Secretariat (CSAS); the CSAS process reviews the science in technical documents, guidelines, and policy by subject-matter experts; similar to a peer-review process for scientific journals.

At present, DFO uses a variety of criteria to determine the success of offsetting projects. While productivity (e.g., biomass) and productive capacity may be the more scientific and appropriate metrics for determining the success of projects to offset the loss of fish habitat, the science is still not well understood. In addition, productivity data can be difficult and expensive to obtain, and is challenging to accurately assess in real-world conditions, outside of laboratory environments that can control for other contributing variables. For example, while the capture of fish or observation of fish use may be a defining success indicator, there are often other variables that affect fish presence, capture, and/or habitat use that cannot be controlled in real-world conditions which may lead to inaccurate conclusions about the success of a project. There are other biological data (e.g., benthic invertebrates) that inform productivity and are easier to collect, which may provide more reliable measure of success. Physical parameters (e.g., length, width, depth, flow), which focus on ensuring that structures designed to create

fish habitat are still in place years later and adhere to the original design, are also a reliable indicator of success. Based on the theory “if you build it, they will come”, these surrogates offer opportunities to ensure habitat is being created. Effective monitoring could provide a scientific basis for concluding that surrogates can be used to verify success in creating and restoring fish habitat. In the end, the criteria used to determine the success of offsetting projects should be based on the requirements outlined in the authorization.

As noted in the introduction, pre-construction monitoring can be an important part of accurately measuring losses of habitat. Unfortunately, pre-construction data receives less attention from proponents and regulators. There is often insufficient time to collect the quality and quantity of pre-construction data required to accurately measure habitat losses, particularly to measure the productivity of a certain species or its habitat. There is a requirement to educate all involved of the importance of accurate and sufficient pre-construction data.

It is generally agreed that cumulative effects are not well understood. There is also general agreement that cumulative effects are a significant contributor to the overall loss of fish habitat. Conversely, cumulative benefits from multiple projects are also not well understood, and a standardized method of evaluating the benefits and losses associated with development, offsetting, and restoration projects has not been developed. Therefore, there is a need for improved guidance on how to assess and/or predict cumulative impacts (i.e., losses) and cumulative benefits associated with develop, offsetting, and restoration projects. The BC Ministry of Forest, Lands, Natural Resource Operations and Rural Development (FLNRORD) has a promising pilot project to assess long term monitoring and cumulative effects documentation called SBOT (Stewardship Baseline Objectives Tool). While currently developed for BC’s South Coast Region, the SBOT’s framework has the potential to be adopted on a national scale.

Despite careful planning, design, and construction, some offsetting projects fail to produce the required habitat. When this happens, proponents and regulators struggle to determine and implement response measures. While contingency measures are a required component of the authorization to carry out the project, in practice, they remain challenging to implement and more detailed contingency planning is needed to effectively implement these agreed-upon measures.

While it is part of their responsibilities, DFO is not effectively tracking all offsetting projects. As a result, they are not aware when monitoring reports are not submitted, nor are they aware when projects fail to meet their targets. DFO could be more aggressive when it comes to enforcement on failed offsetting projects. Failure to audit and to do the proper follow-up contributes to the continual loss of habitat.

5.3 Recommendations:

5.3.1 Standardized monitoring protocols (e.g., parameters, method of measurement, duration, and frequency) for offsetting projects should be developed so that we can learn and improve future offsetting projects.
5.3.2 Monitoring provides a way to verify that surrogates can be used and to develop science-based thresholds for success.
5.3.3 Project proponents and regulators must adjust their timelines to allow for the collection of valuable pre-construction data.
5.3.4 Develop better methods for data collection and analysis that will facilitate more accurate assessment and prediction of cumulative effects.
5.3.5 Develop more detailed contingency plans in the issuing of project authorizations to expedite the replacement of missing habitat.
5.3.6 More robust auditing and enforcement of restoration and offsetting projects should be developed to confirm that these projects are achieving their intended success metrics.

6.0 Fisheries and Oceans Canada

6.1 Background:

DFO administers the *Fisheries Act* and the *Species at Risk Act*, as it relates to the protection of aquatic species at risk. DFO establishes the legal requirements and process to maintain compliance with legislation. Fisheries and Oceans Canada has the responsibility and opportunity to positively impact the restoration of aquatic habitat in Canada. This section presents recommendations as to how DFO could reduce the loss of aquatic habitat.

Along with amendments to the *Fisheries Act*, DFO experienced significant financial cuts under previous governments. This reduction in funding resulted in the scaling back, postponement, or cancellation of programs, projects, and initiatives. This also resulted in the loss of many key staff with a wealth of institutional knowledge and project experience. As a result, this greatly hindered DFO's ability to fulfill its legislative mandate during this time period.

Under the current government, DFO received increased funding which has afforded the opportunity to enhance services, reinstate and develop programs, and hire staff. It is hoped that this increased funding will provide DFO the opportunity to implement the recommendations put forward in this report.

6.2 Challenges:

DFO collects substantial amounts of money for impacts to fish and fish habitat in the form of fines and letters of credit. However, DFO does not always direct this money to the implementation of habitat restoration and offsetting projects. The money is sometimes used to fund research and other activities. While these activities may be worthy, the diversion of funds away from restoration means impacts are not being offset and, as such, is contributing to the

loss of fish habitat. If DFO is unable to implement habitat offsetting projects, it could purchase credits from approved habitat banks (see Section 4 for more information on habitat banking) or use these funds to retain agencies and organizations with a proven track record in restoring fish habitat to complete the required offsetting projects.

Historically, DFO has encouraged project proponents to offset for impacts to fish and fish habitat as close to the site of impact as possible. This policy has led to many offsetting projects being implemented in urban areas where there is a limit to how much habitat can be restored. This policy has also forced many project proponents in the Arctic to search for restoration opportunities and implement offsetting projects where they are not really needed; these areas are pristine and sensitive to activity and, perhaps, should not be further disturbed. Many other jurisdictions have encouraged proponents to implement offsetting in locations where it is needed, and which can create more habitat for the money spent.

For projects with small impacts, DFO sometimes requires no offsetting or, if it does, requires a correspondingly small offsetting project which often has a limited chance of success. Other jurisdictions (e.g. many US states) use in-lieu fee programs to deal with small impacts. Proponents of projects with small impacts are allowed to pay a fee and the money generated by many small projects is pooled to facilitate the development of large-scale offsetting projects with a better chance of successfully restoring lost habitat.

The science of habitat restoration is advancing rapidly and has shown that the development of effective offsetting projects generally requires a team with expertise in fisheries, engineering, fluvial geomorphology, and botany. DFO currently lacks the expertise it needs to work effectively with proponents to ensure that the best possible offsetting projects are implemented. To its credit, DFO has been retaining consultants to review and provide advice on some larger and more complex offsetting projects. There is an opportunity for DFO to hire individuals with the required expertise. Training offers another avenue to expand the expertise available within DFO. Fisheries and Oceans Canada could avail itself of training offered through existing institutions or have custom training developed to improve expertise in areas where DFO lack sufficient in-house expertise.

DFO has published and made available a wide variety of information regarding the design and implementation of effective offsetting projects. This material includes both previous and current offsetting guidance documents that are available on DFO's website. Through CSAS, DFO has also published material that reviews and evaluates offsetting activities, as well as mitigation and restoration activities. This information is used by both DFO staff and project proponents. Because the science of habitat restoration continues to advance rapidly, some of the information available on DFO's website is out of date or no longer relevant. In an effort to provide better information, DFO has had a number of guidance documents prepared; however, these documents have not yet been published and made available.

To streamline project review, DFO has organized its regional offices to specialize in specific project review (e.g., all mining projects are handled by the Edmonton Office). This has led to some improvements in technical expertise and project awareness, as well as improving consistency in project reviews and outcomes, which was a chief criticism of the previous organizational structure. Unfortunately, this new structure has also created some new challenges. Under the new structure, the office doing the review is sometimes located thousands of kilometers away from the project. As a result, the DFO reviewer cannot visit the site and sometimes lacks knowledge of local conditions and, thus, is not well equipped to provide an effective review and direction on the project. In addition, projects that are being undertaken in close proximity to one another, but are in different sectors of the economy, are reviewed by different offices; this can lead to inconsistencies in review and approval decision-making, as well as requiring different offsetting requirements. This can lead to the perception of unequal treatment by proponents. While no organizational structure will lead to perfectly consistent results, there are opportunities to improve project reviews and consistency that account for a region and/or project's unique challenges.

Project review timelines sometimes take a considerable amount of time. Project proponents desire an effective consultation process within a specific time frame. However, lengthy and unpredictable stakeholder consultation timelines create uncertainty during the application review process and can result in significant economic hardship on project proponents. Stakeholders desire sufficient time to participate effectively in the consultation process and short timelines can leave stakeholders believing that their concerns were not heard or addressed. Timelines for stakeholder consultations should be negotiated and then kept.

Section 35(1) of the *Fisheries Act* prohibits works, undertakings, or activities that result in the "harmful alteration, disruption or destruction of fish habitat". However, the definition of fish habitat is broad and creates some challenges for DFO and project proponents. Agricultural drainages and stormwater ponds are two areas where the definition of fish habitat and the protection provisions in the *Fisheries Act* create issues. The agriculture sector needs to continue to reduce the need for maintenance in agriculture drainages, while stormwater management practices need to improve (e.g., not allow in-line ponds). At the same time, DFO could focus more effort on protecting higher quality fish habitat, particularly species at risk and critical habitats.

Many levels of government (e.g., federal, provincial, Indigenous, regional, municipal) participate in the management of fish and fish habitat. In addition, some government agencies have delegated authority to others. This has resulted in some degree of duplication of effort and inconsistency among regulatory agencies and governing bodies. Memoranda of understanding, agreements and/or arrangements have been shown to reduce duplication of effort and inconsistencies; these same agreements had also shown to generate synergies and improve collaboration. These synergies should help protect fish and fish habitat.

Canada is not alone in working to protect fish and fish habitat. Many countries, including our neighbours to the south, are actively involved in fisheries management. Canada could be more effective if the regulations of the *Fisheries Act* were aligned with the aquatic conservation regulations of other countries. There are also opportunities to integrate policies and regulations with countries who share borders, as well as collaborate on the regulation of international waters.

The amended *Fisheries Act* still focuses on the protection of specific species (generally those of economic value or listed as aquatic species at risk) and their locally important habitat. This approach fails to recognize the interconnectedness of the ecosystem. An approach based on ecosystems and the protection of all species and all habitats may be more successful.

One way to help shift toward an ecosystem approach would be to focus on watersheds or catchments. As demonstrated in several jurisdictions, an approach based on watersheds can improve the overall effectiveness of the management of aquatic resources and fisheries. For example, BC and DFO have developed the Watershed-based Fish and Sustainability Planning (WFSP) process to develop a watershed plan, in collaboration with partners, to identify and prioritize restoration requirements and coordinate their implementation. This approach brings a sense of ownership to those that utilize the resources within a particular watershed, which encourages accountability for the maintenance and sustainability of those resources. An approach based on watersheds would facilitate the coordination of government efforts as well as facilitate the involvement of local stakeholders and landowners.

6.3 Recommendations:

6.3.1 All money collected for impacts to fish and fish habitat should be allocated by DFO to restoring fish and fish habitat.
6.3.2 DFO should reconsider its policy of encouraging proponents to implement offset projects as close to the site of impact as possible.
6.3.3 DFO needs to bolster its expertise as it relates to current habitat restoration science by hiring, retaining consultants and/or training.
6.3.4 Updated guidance material on habitat restoration should be developed and made available to DFO staff and project proponents, while outdated materials should be removed from online sources.
6.3.5 DFO needs to work to ensure a consistent approach to project review and approval across offices and sectors.
6.3.6 DFO should negotiate a schedule for consultations between stakeholders and project proponents and then work to ensure both parties abide by the schedule.
6.3.7 Clearer definitions of fish habitat should be developed.
6.3.8 DFO should work to reduce duplication of effort and inconsistency and create synergies with other agencies involved in managing fish and fish habitat.
6.3.9 Canada's *Fisheries Act* and its associated regulations should be integrated and harmonized with the relevant legislation and regulations of other countries.

6.3.10 Implement the *Fisheries Act* at the ecosystem level.
6.3.11 Administration of the *Fisheries Act* should consider a watershed and catchment management approach.

Summary

Throughout the course of information gathering from the members of the working group, as well as the external stakeholder and rights holder engagement, a number of topics were repeatedly brought forward by contributors. Each conversation provided a unique perspective on the challenges and recommendations that were articulated. Many of these issues and recommendations were applicable to multiple categories. This provided the opportunity for Aquatic Habitat Canada to summarize the efforts of this project into the following key recommendations for facilitating and improving aquatic habitat restoration in Canada.

Summary Recommendations*:

1. Implement agreements between federal, provincial, territorial, and traditional landowners and rights holders.
2. Develop and publish Fisheries Management Objectives in consultation with federal, provincial, territorial, and traditional landowners and rights holders.
3. Adopt an ecosystem approach to habitat restoration, habitat offsetting, and habitat banking.
4. Adopt a strategic and adaptive management approach to both development and restoration.
5. Assign value to ecosystems and their components, and count ecosystem services in economic and market prices.
6. Introduce economic instruments, such as market price, in-lieu fee program, and third-party banking to bring market forces to bear.
7. Develop and publish standardized monitoring requirements with science-based thresholds.
8. Improve DFO's expertise and guidance materials regarding restoration, offsetting, and banking design.
9. Prepare and publish standards and codes of practice, policy and guidance documents, and other supporting documents and tools at the same time as new legislation comes into force.

(* Not listed in order of importance.)

Appendix

Prior to proceeding with a proposed alteration to a watercourse (i.e. channel realignment), a permit must be obtained as these works are regulated under Ontario Regulation 166/06. The following outlines submission requirements in support of a permit to be obtained at the detailed design stage. Submissions in at other planning stages should demonstrate that the following objectives can be met.

OBJECTIVES

1. Preserve and enhance the physical and ecological function of the watercourse and the natural system.
2. Ensure no adverse impacts on the watercourse upstream or downstream of the proposed alteration.
3. Ensure no increase in upstream and downstream flooding.
4. Ensure no decrease in riparian/floodplain storage.
5. Preserve and/or restore natural vegetation such as trees and shrubs to the maximum possible extent.
6. Implement adequate erosion and sediment control (in-stream and off-stream) during and after construction.
7. Protect sensitive species during and after construction, including critical life processes.
8. Ensure no net loss of the productive capacity of the watercourse for fisheries.

SUMISSION REQUIREMENTS

The following is a list of the detailed documentation, calculations and plans that the proponent must provide in support of the permit application. It is recommended that a pre-application meeting take place between the proponent and TRCA staff to identify pertinent issues and study requirements. The level of detail required for the submission may be adjusted at this point to reflect the level of project complexity. This meeting may provide an opportunity for TRCA staff to provide the proponent with available data for the study area. Channel modification plans must be prepared by a professional engineer with final documents stamped and signed.

1. Design Brief/Report

A design brief is required, either separately or as part of another reporting requirement (e.g Storm Water management Design Brief, Fisheries Act documentation).Typical components that comprise a Design Brief report are provided below. Calculations and field data, if applicable, should be included in appendices. Previous correspondence should be noted and if possible, meeting minutes attached. For re-submissions, provide a table that outlines previous comments and how they have been satisfied and where in the report and/or plans the issues have been addressed. This will facilitate a faster review.

a. ***Introduction***

i. Background Information (e.g. proponent, location)
ii. Project Description (including rationale for proposed modification)

b. *Existing Conditions*

i. Fluvial Geomorphology
- Channel Morphology
- Substrate Characterization
- Hydrology and Sediment Regime (including baseflow)
- Channel Stability
- Upstream and Downstream Conditions
- Historical Channel Condition and Change

ii. Terrestrial Resources
- Vegetation Assessment (ELC mapping and location of species of concern)
- A tree inventory will be required where the project is in or adjacent to a wooded area, or where there are a number of mature trees present

iii. Fisheries (*see Fisheries Act submission requirements if applicable*)
- Aquatic Habitat Assessment
- Fisheries Community Inventory

c. *Proposed Watercourse Alteration*

i. Geomorphic Basis for Design
ii. Proposed Channel Morphology (plan form, cross-section, bed profile)
iii. Proposed Substrate (provide calculations to support size)
iv. Bank Stabilization
v. Erosion Protection (if applicable)
vi. Connection to Existing Channel
vii. Hydraulic Analysis
- Flood Elevations (existing vs. proposed - 2 year to Regional)
- Riparian Storage (existing vs. proposed - to Regional Flood elevation)
- Baseflow Estimates
- Velocity Calculations

d. *Environmental Preservation and Mitigation*

i. Terrestrial Resources
- Preservation and Removal of Vegetation (including timing)
- Restoration Plan
- Access Routes
- Working and Staging Areas

ii. Fisheries (*see also Fisheries Act submission requirements if applicable*)
- Timing Windows
- Fish Passage (assess expected velocities and potential for various species to pass)
- Substrate
- Morphologic Diversity
- Riparian Cover Restoration Plan
- Fish Rescue Plan
- Compensation Measures (if applicable)
- Monitoring Plan

e. ***Erosion and Sediment Control during Construction***
(see also Erosion and Sediment Control Guideline for Urban Construction 2006)

i. Construction Timing and Phasing Plans
ii. In-Stream Construction Practices
- By-Pass or Diversion Method(s)
- Dewatering

iii. Erosion Control
- Topsoil and Materials Stockpile Locations and Stabilization
- Stabilization of Disturbed Areas (following construction)

iv. Sediment Control
- Perimeter Controls
- Settling Controls
- Filtration Controls

iv. In-Stream Controls
v. Inspection and Maintenance Requirements

2. Figures

The following is a list of figures and their associated requirements for an alteration to a watercourse permit submission:

Figure	**Description/Requirements**
Context Plan	Site location
	Location of the watercourse (and any required re-alignment)
	Regional Flood and Fill Lines
Design Drawings	Layout/configuration of the channel in plan and profile (including existing alignment and profile) and typical cross sections
	Identification of low flow channel and bankfull channel
	Details on in-water works, if required, including 'working in the dry', dewatering of work area, fish rescue plan and fisheries timing window
	Details of Compensation Features and fisheries mitigation, if required
	Details on erosion protection works in support of all proposed treatment types
Tree Removal/ Preservation Plan	Identification of vegetation type within work area, location of trees to be removed and preserved, and protection measures for remaining stand
Landscape/ Restoration Plans	Detailed plan identifying species (including scientific names) and quantities for trees, shrubs and seed mixes, and location size and condition of plant material (See also TRCA Post-Construction Restoration Guidelines) Details on erosion control and/or bioengineering treatment type
Hydraulic Analysis Plan	Location plan of all model cross-sections used in the analysis (i.e., if new sections are required over and above the existing conditions model) Existing and proposed Regional and 100 year floodlines

Erosion and Sediment Control Plans	Location of control techniques, i.e. silt fences
	Detail drawings for control techniques
	Notes on maintenance of control techniques
	Notes on construction procedure and/or phasing including timing
	Construction access

Note: *All design briefs, drawings and supported hydraulic calculations are to be submitted, stamped and signed by a professional engineer. All geomorphic analyses and channel realignment designs are to be completed by a professional engineer or professional geoscientist qualified to practise fluvial geomorphology.*