Fisheries and Oceans | Pêches et Océans

MEMORANDUM **NOTE DE SERVICE**

To / À:
Ontario-Great Lakes Area Staff
Conservation Authority Staff
Parks Canada Agency Staff
Ontario Ministry of Natural Resources staff
Ontario Ministry of Transportation staff

Security Classification - Classification de sécurité
Unclassified/Non classifié
Our File - Notre référence
Your File - Votre référence
Date
April 10, 2007

From / De:
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Ontario Great Lakes Area

Subject / Objet: **Review of Water Crossing Projects under the *Fisheries Act*.**

The attached position statement is provided for greater consistency and clarity in the review and approval of water crossing projects under the *Fisheries Act*. This statement is being provided to Fisheries and Oceans Canada (DFO) Ontario-Great Lakes Area (OGLA) staff and partners who are involved in the review of water crossing projects under the *Fisheries Act*. This advice was provided by DFO-OGLA's Water Crossing Task Group and has been incorporated into the Environmental Guide for Fish and Fish Habitat Appendix 7a (which is a supporting document to the *MTO/DFO/OMNR Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings – both documents can be found at: www.ecoplans.com/ESP-EG_Fish_Guide.htm)*. If you have any questions please feel free to contact any member from the task group:

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Thanks

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April 10, 2007

DFO-OGLA Review of Water Crossing Projects under the *Fisheries Act.*

The following position statement is intended to provide greater consistency and clarity in Fisheries and Oceans - Ontario-Great Lakes Area review and approval of water crossing projects under the *Fisheries Act.* The advice outlined in this document is similar to the advice provided in the Environmental Guidelines for Fish and Fish Habitat (Appendix 7a) (which is a supporting document to the *MTO/DFO/OMNR Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings).* This advice applies to all water crossing types (e.g. bridges culverts, open and closed bottom structures) and all waterbodies (creeks, streams, rivers, bays, narrows, wetlands etc.) in Ontario. This advice is intended as guidance and should be used in conjunction with the DFOs Risk Management Framework and related Operational Statements (http://www.dfo-mpo.gc.ca/oceans-habitat).

Water crossings have the potential to impact fish habitat and fish passage. For each water crossing project whether it is a replacement or a new installation, we have outlined various habitat impacts that should be considered before a management decision is made on a file. In addition, when reviewing these same projects fish passage impacts need to be considered and any requirements for fish passage should be linked to the fisheries management objectives.

DFO-OGLA Position

Water Crossing Modifications - Extensions
An authorization for the harmful alteration, disruption or destruction of fish habitat will typically **not** be required in instances where existing water crossings requiring minor *water crossing extensions* will be extended with a similar design or better and all of the following criteria can be met:

- The extension does not require channel realignment.
- The extension does not result in an infill.
- The footprint of the project is not placed on important habitat or areas of groundwater upwelling.
- The extension does not impede fish passage (e.g. velocity barrier due to crossing length) as per fisheries management objectives
- The extension does not cause destabilization of the upstream or downstream channel.

Water Crossing Modifications – Liners
An authorization for the harmful alteration, disruption or destruction of fish habitat will **not** be required for *water crossing liners* if all of the following criteria can be met:

- The liner does not impede fish passage as per fisheries management objectives
- The design does not destabilize the upstream or downstream channel.

Water crossing replacements – like for like design:
An authorization for the harmful alteration, disruption or destruction of fish habitat will typically **not** be required for *water crossing replacements* when the project meets all of the following conditions:

- There are no fish passage concerns with the existing crossing (e.g. perched crossing, undersized water crossing, velocity barrier where fish movement is required) and
- The crossing will be replaced with a similar or better design (e.g. from crossing with no substrate in the barrel to crossing with substrate to provide roughness).

Water crossing replacements – upgrades:
An authorization for the harmful alteration, disruption or destruction of fish habitat will **not** be required where *water crossing upgrades* meet all of the following conditions:

- The water crossing design has been improved to alleviate fish passage concerns by:
    - Increasing the culvert diameter or bridge span width
    - Embedding the water crossing to ensure fish passage

- Create a low flow channel to assist fish passage during low flow periods as required;
- Incorporating plunge pools for energy dissipation (as appropriate), etc.
- Ensuring the stream dynamics are not destabilized by the crossing.

Water Crossing Removal or Decommissioning:
An authorization for the harmful alteration, disruption or destruction of fish habitat will **not** be required for *water crossing removal or decommissioning*. Mitigation measures and best management practices should be applied on a case by case basis including stabilization of approach slopes with rip-rap, erosion blankets, etc and restoring the site to pre-construction conditions or better, etc.

New Crossings – Indirect Fish Habitat
An authorization for the harmful alteration, disruption or destruction of fish habitat will **not** be required for new water crossing installations on indirect fish habitat.. In this case channel destabilization and sediment deposition on downstream fish habitat are the main concerns. The crossing size and erosion protection should be sufficient to prevent soil erosion at the crossing.

New Crossings – Low Sensitivity
An authorization for the harmful alteration, disruption or destruction of fish habitat will **not** be required for new water crossing installations on marginal fish habitat if the following criteria can be met:
- the water crossing spans the bankfull width (no infill on the stream channel);
- no channel realignment is required
- by ensuring that stream dynamics are not destabilized by the crossing.

New Crossings – Moderately Sensitive
An authorization for the harmful alteration, disruption or destruction of fish habitat will **not** be required for new water crossing installations on important fish habitat if the following criteria can be met:
- no channel realignment is required
- no infilling on moderately important fish habitat (e.g. pike spawning habitat, floodplain fish passage use)
- water crossing spans bankfull width including the placement of abutments, footings or armouring
- stream dynamics are not destabilized by the crossing.
- fish passage is maintained during operation and life of the water crossing as per fisheries management objectives.

New Crossings – Highly Sensitive/Critical Fish Habitat
An authorization for the harmful alteration, disruption or destruction of fish habitat will **not** be required for new water crossing installations on highly sensitive or critical fish habitat if the following criteria can be met:
- no channel realignment is required
- no infilling on highly sensitive or critical fish habitat (see definitions below)
- water crossing spans bankfull width including the placement of abutments, footings or armouring
- stream dynamics are not destabilized by the crossing
- fish passage is maintained during operation and life of the water crossing as per fisheries management objectives.

Note: If your project is in an area with Species at Risk – refer to SARA Section next page

Additional Considerations:
- Water crossing risk may be elevated due to lengthy in-water work periods since this could be considered a "harmful" disruption
- Permanent fill in the bankfull channel (refer to definitions below) that impacts fish passage may be unacceptable and should be assessed against fisheries management objectives

- Infilling moderately and highly sensitive fish habitat for abutments and approaches may require an Authorization.
- Cumulative effects should be considered where appropriate
- No fill/footprint should occur on important, highly sensitive (unique) or "critical" habitat.
- Avoid placing the crossing/fill footprint on groundwater upwellings that are used for spawning. Relocate the crossing to a more suitable area or redesign the crossing to an open-bottom structure of sufficient size to maintain spawning bed size material within the water crossing structure to mitigate the impacts.
- Changes in channel morphology may harmfully alter, disrupt, or destroy fish habitat (e.g. change in bankfull cross-section, loss of thalweg, loss of undercut banks, water depth, pools).

Species at Risk Act

- Ensure that any Letters of Advice (LOAs) and *Fisheries Act* Authorizations issued by DFO are in compliance with the *Species at Risk Act* (SARA):
    - For LOAs and *Fisheries Act* Authorizations: ensure compliance with Sections 32, 33 and 58 of SARA to ensure protection of Schedule 1 Species at Risk (mussels and fish) (Extirpated, Endangered, and Threatened species). For example closed bottom culverts may need to be redesigned to open bottom full spanning structures or the crossing may need to be relocated to another site.
    - For projects requiring a CEAA review: Ensure that all Schedule 1 SAR species (including Special Concern species) are protected under Section 79 of SARA. In addition, formal notification to other competent Ministers is required if there are potential impacts to non-aquatic SAR.
    - SARA permits may also be required for a water crossing project. Ensure that the appropriate SARA permits are obtained prior to any in-water works.
- Ensure that fish passage for Schedule 1 Species at Risk is maintained.

Best Management Practices

- Avoid building on meander bends, braided streams or alluvial fans or other areas that are inherently unstable
- Adhere to standard "best management practices" for in-water work, and for sediment and erosion control.
- Fish passage is most easily maintained when the water crossing design maintains natural stream processes within or under the crossing. This is referred to as 'stream simulation design', which is based on the premise that the simulated channel inside the crossing presents no more of a challenge to movement of organisms than the adjacent natural channel. Water crossing length typically should not be a concern if the water crossing is sized appropriately for fish passage.
- Construction should be completed in the dry, when there is no flow in the channel, or by use of a by-pass channel, dam and pump or other construction techniques, unless it is determined that working in the wet is appropriate.
- Follow the in-water work timing guidelines determined by OMNR.

Key Mitigation Measures:

- Water crossings should be backfilled with substrate material that is consistent with the existing substrate size and texture found within the watercourse and will remain in/under the crossing. (Note that the water crossing needs to be sized sufficiently to prevent it from being scoured out).
- Embed water crossings as appropriate to ensure fish passage and channel crossing stability.
- If fish passage is required during low flows, ensure that a low flow channel is maintained through the crossing, even for bridges.
- Fish passage should be maintained through the water crossing at high and/or low flows, as dictated by the fisheries management objectives.
- The natural stream gradient should be maintained upstream, downstream and through the water crossing.

- Water depth within the water crossing should be not less than 20 cm or the same depth as the natural channel especially during low flows.
- Fish passage will be maintained during operation and life of the water crossing as per fisheries management objectives;
- Work during low flow conditions and avoid work during large precipitation/runoff events.

Definitions

Sensitive fish species
Includes Species at Risk (as per Schedules 1 to 3 of *Species at Risk Act*) and other fishes that have specialized or limiting habitat requirements (e.g. brook trout, lake trout, lake sturgeon and muskellunge)

Indirect Fish Habitat
Areas that do not directly support fish and the main function of the watercourse is to convey flow, food and nutrients to downstream fish habitat.

Fish habitat – Low Sensitivity
Fish habitat areas with limited use by fish for feeding, growth, migration, and spawning. These habitat areas require less protection because they have a low productive capacity and contribute marginally to fish production. Changes to these areas will not result in a loss of productive capacity of fish habitat.

Fish habitat – Moderately Sensitive
Those habitat areas utilized by fish for feeding, growth and migration which, while important to the fish stock, are not considered critical. These can include spawning areas for species with non-stringent spawning requirements, such as yellow perch or gravel areas for smallmouth bass. Areas in this category usually contain a relatively large amount of similar habitat that is readily available to the stock (e.g. areas with aquatic vegetation in water bodies with an abundant supply of aquatic vegetation). Small scale changes to these areas will typically not result in a loss of productive capacity of fish habitat.

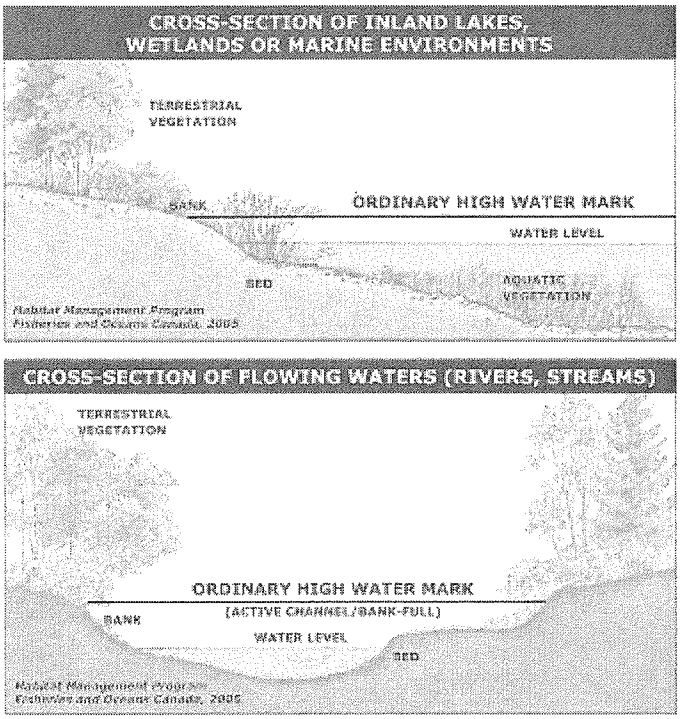
Fish habitat – Highly Sensitive/Critical
Those habitat areas which are needed to maintain the overall productive capacity of the fishery. These can include spawning areas for fish species with stringent spawning requirements, such as cobble areas for walleye and lake trout, ground water upwelling areas for brook trout; highly productive nursery and feeding areas such as wetlands; areas with Species at Risk, essential refuges areas such as winter refugium for brook trout in small streams; habitats that cannot be replaced or compensated for, such as ground water upwellings, and migration routes which provide access to spawning areas for fish species with stringent spawning requirements (e.g. brook trout). These include habitat types that are relatively rare or sensitive to disturbance (e.g. areas with aquatic vegetation in water bodies with a limited supply of aquatic vegetation). Alterations in these areas will result in a loss of productive capacity of fish habitat.

Critical Habitat: includes habitat for Species at Risk as defined under the Act. "Critical habitat means 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". Critical habitat can also apply to other species if the habitats are limiting or sensitive to disturbance.

Bankfull (Ordinary High Water Mark)

In alluvial streams, bankfull stage (i.e., elevation on the bank) is associated with the flow that just fills the channel to the top of its banks and at a point where the water begins to overflow onto a floodplain (Rosgen 1996). In DFO's Operational Statements (http://www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/on/index_e.htm) we have also defined this level as the ordinary high water mark (refer to figure below). These are the flows during bankfull stage that are typically considered to be channel forming (i.e., this is when the most 'work' is performed on the

channel with respect to erosion, deposition and sediment transport). In streams flowing through channels that are affected by bedrock, roots and woody material, large glacial deposits etc., an equivalent to the bankfull stage (that is, the trim line depth) is identified as the upper limit of a regularly scoured zone and a distinct change in vegetation. In natural streams bankfull flow typically occurs with a return frequency of about 1:2 years. However, urban streams may exhibit bankfull flows more frequently.



Stream Simulation is a design process to create natural stream processes within a water crossing. It is based on the principal that if a fish can migrate through the natural channel, they can also migrate through a human-made channel that simulates the stream channel. As a result, sediment transport, fish passage, flood and debris conveyance within the water crossing are intended to function as they would in a natural channel. Taking this approach eliminates the need to consider such parameters as target species, timing of migration, and fish-passage hydrology because it simply mimics what already exists. As a result, fish passage is typically addressed.

Water crossings designed for stream simulation are sized wider than the channel width and the bed inside the water crossing is sloped at a similar or greater gradient than the adjacent stream reach. These culverts are lined at the bottom with boulder/cobble mix that resists erosion and is unlikely to change grade unless specifically designed to do so. This fill material is placed to mimic a stream channel and allowed to adjust in minor ways to changing conditions. Stream simulation design culverts are usually the preferred alternative for steep channels and long water crossings. (Washington Department of Fish and Wildlife. 2003. Design of Road Culverts for Fish Passage.)

Fisheries Management Objective – the fish species or community that OMNR is managing for below and above the water crossing. Sometimes a water crossing that is a barrier to upstream fish migration enables a fisheries management objective to be met such as maintaining a viable brook trout population upstream of the crossing by blocking upstream migration of species such as Pacific salmon or rainbow trout. Don't forget to comment OMNR.