



Ducks Unlimited
Canada



Best Management Practices
for Development around
Wetlands



The purpose of this document is to highlight the best management practices for developing around non-tidal wetlands. Of all the natural asset types (wetlands, rivers, lakes, forests, fields, etc.), no asset provides as many services and functions as a wetland and no asset is as hard to remediate or replace once it is damaged. Forming over hundreds of years, wetlands (bogs, fens, marshes, swamps and shallow water) help mediate the effects of climate change by storing carbon, reducing the effects of flooding during extreme weather events, preventing downstream erosion, mitigating the effects of drought as well as slowing wildfire. Wetlands purify water, help recharge groundwater aquifers, cool surrounding areas, provide unique habitat for a variety of flora and fauna, and often serve as corridors for wildlife.

The services and functions provided by wetlands can be degraded or lost by disturbance or encroachment upon wetlands and their buffer zones. As such, the best approach for developing around wetlands is to first consider the Wetland Mitigation Hierarchy. The Wetland Mitigation Hierarchy considers that intact, undisturbed ecosystems are more complex/resilient and better able to function at their full potential. The Wetland Mitigation Hierarchy states that impacts to wetlands should be avoided and, when unavoidable, impacts should be minimized. It is only as a last resort, when avoidance or minimization are not feasible, that offsetting wetland loss or other means of compensation be considered as an approach. It is also worth noting that there are many challenges in attempting to offset damage to a wetland, and that effective wetland restoration techniques have not yet been well established for application in Newfoundland and Labrador.

This document will focus on avoidance as a primary strategy, minimization and mitigation as a secondary consideration, and restoration/remediation (offsetting) as a last resort. These strategies will be examined through the following sections: Avoidance, Minimization, Wetland Crossings, Buffers, Timing, Landscape, Wetland Crossings, Trail and Park Design and Restoration.

Avoidance

Avoidance is always the best practice when working around wetlands. To properly avoid a wetland, the boundaries of the wetland must be clearly delineated. An effective way to discern if a project may infringe on wetland boundaries is to conduct an inventory of all wetlands within your municipality. This will help eliminate any question of whether a wetland may be affected by development or if alternative layout designs would facilitate avoidance. In instances where there is no other area in which a development can be built, knowing the boundaries of the wetland can determine the best course of action for minimizing impacts to the affected wetland.

Lack of a wetland inventory or a complete wetland inventory should not be a barrier to the application of best management practices. When a wetland inventory is not available, it is recommended to have a wetland delineation performed by a trained professional. Wetland delineations should be performed on any wetland that may be threatened by development. By delineation, the boundaries of the wetland can be known, and proper buffer zones can be established to protect the wetland from any loss of function/ degradation both during and after construction is complete. In the case where a wetland is threatened either by proximity to construction or by having to cross the wetland itself, a professional wetland delineation will allow planners to select the narrowest sections of wetland by which to cross and in a best-case scenario, find ways to avoid crossing altogether.

Questions to ask:

- + Can the proposed project be moved to an area where it is not near wetlands?
- + Can the size/scope of the project be altered to avoid infringement on the wetland?
- + Can project layout be designed in such a way to avoid crossing the wetland and permit establishment of buffer zones? (*30m is recommended*)
- + Are there already established crossings from which the new development could be accessed?
- + Has the developer exhausted all other possibilities before having to infringe upon the wetland?

Other things to avoid whenever possible, when considering planning for new developments:

- + Avoid fragmentation of linked wetland complexes/wildlife corridors whenever possible.
- + Avoid water withdrawal from wetlands.
- + Avoid infilling within wetlands.
- + Avoid removing trees/vegetation from within wetlands and buffer zones and along adjacent streams.
- + Avoid utility crossings within wetlands whenever possible.
- + Avoid placing stormwater catchments and similar infrastructure near wetlands.

When planning a development, small infringements upon the wetland may occur. While individually they may not seem severe, cumulatively these encroachments can reduce wetland functions and degradation of the affected wetland.

Changing the location of a proposed street may allow for adequate buffer zones to be maintained, or, in some instances, reducing the number of lots or providing larger lot sizes may produce the same result. Another consideration in subdivision/lot layout is that adequate room remains for construction vehicles etc. to operate without infringing on wetlands to complete the project. Accounting for potential add-ons by the homeowner is another consideration when deciding where to build a home. Enough room should be left for the construction of decks, sheds, patios, etc., without requiring infilling to increase lot size.

Minimization

Despite all best intentions, there are scenarios where some level of impacts on the wetland become unavoidable. In such cases, there are many minimization and mitigative techniques that can be employed to reduce those impacts and retain as much of the original wetland function as possible.

Buffers

The most effective way to reduce impacts is to establish buffer zones around all wetlands. A standard measure used in the Environmental Protection Guidelines for Forestry Operations in Newfoundland and Labrador is a 30-meter no-cut buffer. A minimum buffer would be 15 meters from the edge of the delineated wetland boundary.

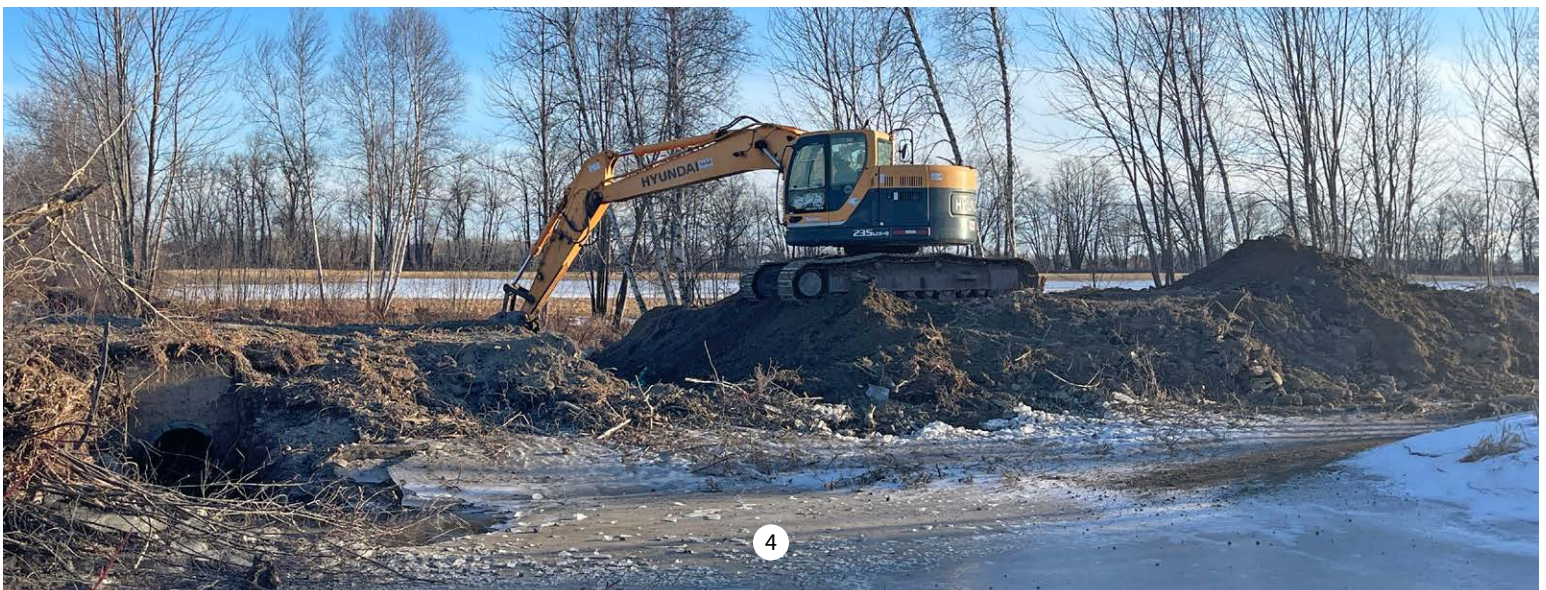
Timing

Timing of projects around wetlands is extremely sensitive. Wetlands are crucial habitat for waterfowl breeding, molting and staging areas and can be areas for fish migration, spawning and egg incubation. Furthermore, choosing the proper time of year during which to perform wetland crossings can limit the amount of damage to the ecosystem or increase that damage exponentially. Guidance should be sought from relevant federal agencies including the Department of Fisheries and Oceans and the Canadian Wildlife Service.

For example, heavy machinery should not be permitted on the wetland as it leads to severe damage to the wetland vegetation, compaction and alteration of wetland hydrology. However, if heavy machinery must operate on a wetland, this should only be done during the winter when the wetland is frozen and only on brush mats. When the wetland is frozen, the effects of compaction/disturbance to plants and soil are minimized and sedimentation that could occur from the machinery is reduced. When the wetland is not frozen, no machinery should be allowed on the wetland.

Any work that must be done around streams, tributaries, wetlands, etc., should be done during low-flow periods to reduce sedimentation/siltation, as well as detrimental effects to wildlife that inhabit the wetlands during those times.

Work around wetlands should also be avoided before predicted major storm events. This will reduce siltation/sedimentation potential that can threaten aquatic species.





Landscape

When planning developments, all efforts should be made to maintain the natural topography/grade of the land and to maintain the natural hydrology of the area. This also includes attempts to decrease the number of impervious surfaces added while creating new developments.

Wetland Crossings

Wetland crossings have potential for causing long lasting damage to wetlands and their hydrology and it is always best to avoid wetland crossings whenever possible. When wetland crossings are unavoidable there are steps that can be taken to minimize the damage to the wetland and maintain its ecological condition and function. *The following are steps to be taken to minimize the effects of wetland crossings on wetlands:*

- + Have the wetland professionally delineated so that the boundaries and narrowest sections are clearly identifiable.
- + Situate crossing at the narrowest section of the wetland, or in scenarios where there is an existing crossing, or previously disturbed areas utilize these rather than affecting an undisturbed section of wetland.
- + Design crossings at a right angle to the wetland whenever possible.
- + Select areas with gentle approaches whenever possible.
- + Ensure approaches are as stable as possible.
- + Ensure proper erosion and sediment controls are in place prior to the commencement of crossing construction.
- + Avoid having heavy machinery on wetland unless it is winter.
- + Utilize fabricated wetland mats and/or timber corduroy to limit the effects of compaction.
- + Pre-cast spanning structures can aid in minimizing disturbance and help limit damage to the wetland until permanent culvert/bridge work can be completed.
- + Avoid disturbance to wetland soils and other vegetation as much as possible.
- + Maintain as much of the surrounding tree canopy as possible.

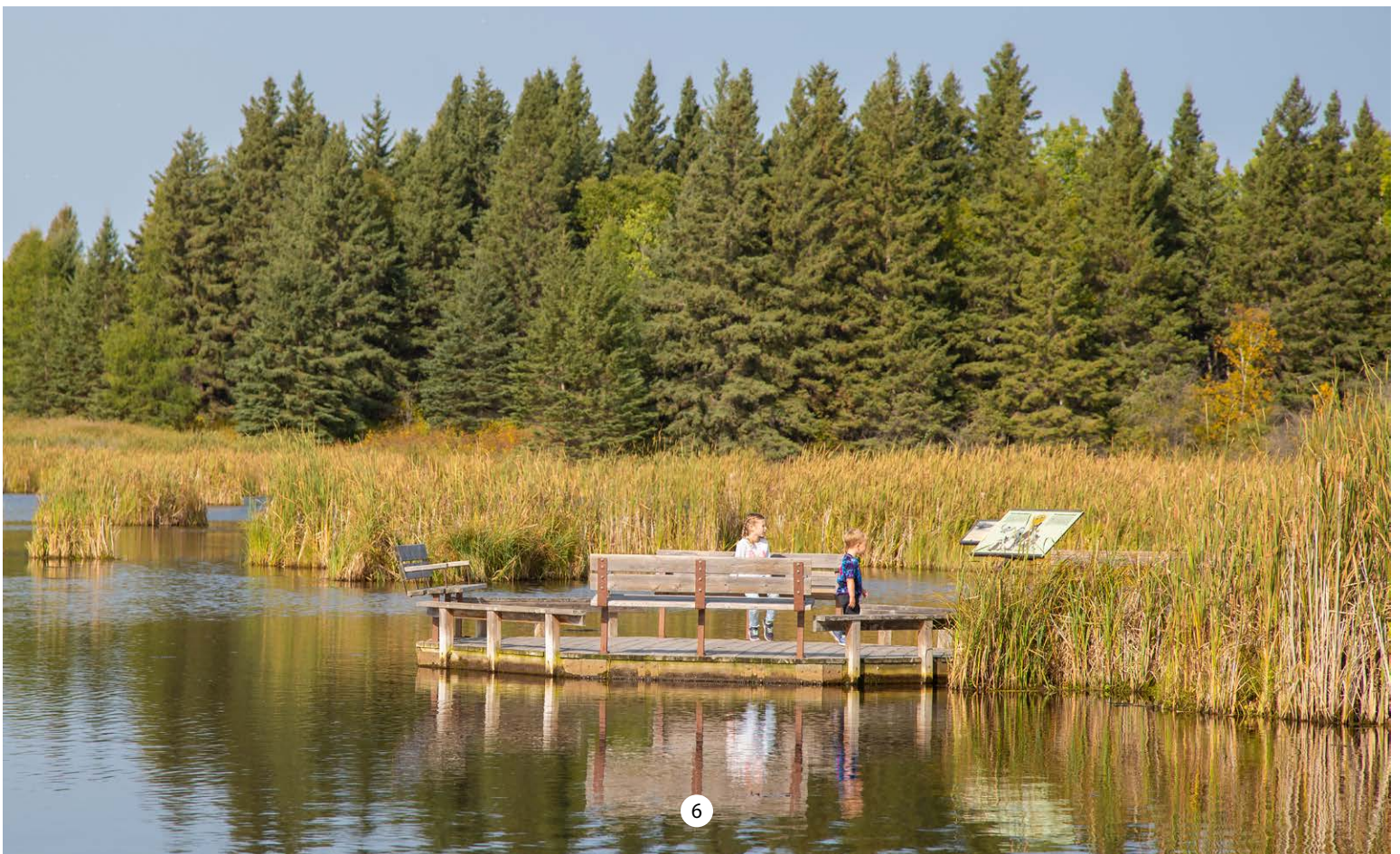
Reducing compaction and avoiding sedimentation are two of the key things to avoid in relation to any on-wetland work. Another way to reduce compaction is using low ground pressure tracked vehicles or vehicles with wide tires at low pressure.

Every wetland crossing will be a little different than the last. Ensuring the right culvert/crossing type is essential to maintaining the hydrology and connectivity of wetland complexes and in the prevention of erosion, sedimentation, and other detrimental effects to the wetland.

Trail/Park Design

One of the best ways to promote education and stewardship of wetlands is through the creation of walking trails that highlight the natural beauty and diversity of these habitats. The goal is to provide access to wetlands without creating negative impacts in the process. Ideally, any path design should not infringe on wetland or cause any degradation to the natural resource while still allowing for the enjoyment of recreation. ***To maintain wetland values, the following steps should be considered:***

- + The area surrounding the wetland should be evaluated for suitability as a recreation site (can paths be placed outside of wetland and vegetated transition zones, can steep slopes be avoided, can pathways be constructed in such a way to be unobtrusive to wetland in general)
- + Are there existing pathways or disturbed areas that can be used to facilitate walkways?
- + Wetland crossings should be designed and constructed in such a way as to minimize altering the wetland as much as possible (*eg. use of boardwalks or bridges*).
- + Consider the importance of the site to wildlife that use the area and avoid building pathways/infrastructure in sensitive wildlife areas.
- + Use lookoffs/view portals to allow visitors to view the wetland in well-chosen locations.
- + Use selective thinning to increase view portals if necessary.
- + Restrict the width of pathways to what is necessary to maintain as much of the natural character of the area as possible.
- + Use pervious surfaces to construct pathways and encourage natural drainage regimes (*eg. geotextile with gravel, woodchips, bark mulch, etc.*)
- + Try to locate and allow for the passage of temporary streams across pathways by creating small crossings (boardwalk) to maintain hydrology.
- + Try to maintain as much of the surrounding tree canopy as possible during trail construction.



All trail construction should follow the same general principles laid out earlier in this document. Once trails have been completed, maintenance staff should be aware of areas that evidence destabilization, erosion, or sedimentation, and respond promptly to prevent effects to the wetland. It is also advisable to limit mowing near wetland edges and to be on the lookout for invasive species which should be eradicated as soon as they become present.

Restoration

When development activities result in wetland impacts, it is imperative that any damages incurred during the process be remediated as soon as possible. Though crossings may temporarily disturb/alter wetlands, if the affected areas are returned to close to pre-construction states those damages will in time be mostly negated. Restoration may include returning stream beds to original condition, replanting of slopes near crossings with local flora, or planting of local trees to increase canopy cover in some cases. The goal in restoration is to have the project site returned to as close to its natural state as it was found.

References

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