Fisheries and Oceans Canada
Pêches et Océans Canada

ONTARIO EDITION

THE DRAIN PRIMER

A GUIDE TO MAINTAINING AND CONSERVING AGRICULTURAL DRAINS AND FISH HABITAT

Drainage Superintendents Association of Ontario

OFA Ontario Federation of Agriculture

Canada

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THE DRAIN PRIMER

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WHAT'S THE SCOOP?
Getting the Info on Drain Maintenance

This primer is a guide to provide information for a variety of groups in Ontario. For farmers and municipalities, this primer will assist in finding ways to maintain the effectiveness of open drains while limiting the impact on the local environment. For the general public, the primer explains the necessity of open drains and the need to maintain them. For everyone, this document will demonstrate that the environment and agriculture can co-exist.

OPEN DRAIN MAINTENANCE – Why is it a normal business practice?

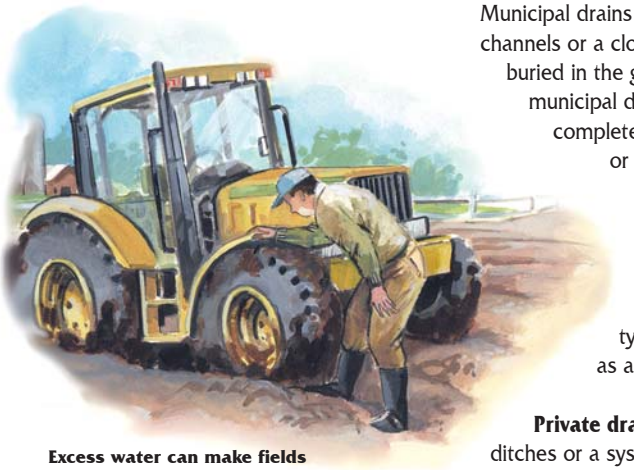
Agriculture, like so many other industries, faces not only the challenge of doing business in a worldwide market, but increasingly doing so in a manner that is protective of local resources, such as groundwater and habitat. A farmer's ability to produce high quality food for the rest of us depends on the natural environment – decent weather, productive land and workable soil. However, farmers sometimes have to modify the natural environment in order to grow their crops. One of these changes involves draining surface and subsurface water from their land.

Typically this has been done by constructing ditches, often referred to as open drains, which effectively remove excess water from the surrounding land. Improved drainage allows fields to be planted earlier in the spring, eliminates excess water that might hurt plant growth, and helps to dry up fields that normally would be too wet to support the weight of heavy tractors.

For more than a century and up to the present day, a network of open drains has been developed throughout Ontario with the majority being in the southwestern and eastern parts of the province.

TYPES OF DRAINS

A ditch is a ditch and a drain is a drain, right? So how can there be "types" of drains? Well, yes of course, a ditch is a ditch, but ditches or drains can be constructed in different ways that give them different legal status.



Excess water can make fields unworkable for farmers.

Municipal drains are created under the authority of the *Drainage Act* and have three key elements. Firstly, the drain is requested by the community through petition and involves a number of public meetings to address landowners' concerns and desires. If the need for drainage work is there, the municipality requests an engineer's report to identify the proposed solution to the drainage problem and how the costs will be shared. Secondly, after any appeals have been dealt with, the municipality passes a by-law adopting the engineer's report, giving the municipality the legal authority and responsibility to construct the drain. Finally, once the drain has been constructed, the maintenance becomes part of the municipality's infrastructure. The municipality, through its drainage superintendent, is now responsible for repairing and maintaining the drain.

Municipal drains are either open channels or a closed system of tiles buried in the ground. Open channel municipal drains can either be completely manmade ditches or they can be natural watercourses that have been modified through the *Drainage Act* process to improve drainage. This latter type is commonly known as a "creek drain."

Private drains are essentially ditches or a system of underground tiles that farmers construct on their own properties in order to drain their farmland.

Mutual Agreement Drains are private drains that have been constructed through an agreement between two or more property owners. To ensure that the mutual agreement drain continues to serve its original purpose should one or more of the benefiting properties change ownership, the agreement is registered on the property title through the Land Registry Office.

Award drains are drainage systems that have been constructed under legislation called the *Ditches and Watercourses Act*. This act was repealed in 1963, but some old award drains that were constructed prior to that date still exist. Each landowner along an award drain is responsible for maintaining their section of the drain. Maintenance of such drains is not the responsibility of the municipality.

No matter the type of drain, they all serve the same purpose - to remove excess water from agricultural lands.

Regardless of whether the open drain is natural or artificial, sediment gradually starts to build up in these watercourses. Plants and other vegetation, both in the water and along the drain's bank, begin to take root. Pools start to form and the watercourse will begin to wander back and forth from one bank to the other. As these various elements start to take shape, the open drain starts looking more like a natural stream. And of course, this natural stream now has the features that provide habitat attractive to fish and other aquatic life. However, the flow of the water through the drain also starts to become restricted, perhaps to the point where the drain is no longer capable of removing excess water from the neighbouring lands. Thus maintenance, repairs or improvements are required to restore the drain's function in order to maintain the productivity of the agricultural land.

Landowners along Award Drains are responsible for maintaining their section of the ditch.

Municipal Drains are legally part of the local municipality's infrastructure.

Regardless of whether the drain is Private, such as the one above - or a Municipal, Mutual or Award Drain - all look alike and can easily be mistaken for each other.

Mutual Agreement Drains are registered on the property title to ensure that regardless of who owns the abutting properties, the original purpose of the drain is protected.

THERE'S NO PLACE LIKE HOME

Exactly what is fish habitat?

The *Fisheries Act* is federal legislation that protects Canada's fisheries resources. It defines fish habitat as those parts of the environment that fish rely upon, directly or indirectly, in order to go through the various stages of their life cycle. This life cycle depends on three basic elements – food, ability to reproduce, and cover. While these features can vary depending on the type of fish, typically all three basic elements are not always found in the same place. As such, migratory routes are also needed to allow fish to move from one place to another. In addition, fish need good water quality in order to survive, grow and reproduce.

How the two are connected – Why are drains important to fish habitat?

Open agricultural drains – the drains that look like artificially created ditches – may at first glance appear to offer little or no value as fish habitat. That might be true in some cases. However, just because fish are absent in the drain, does not mean the drain is not fish habitat. For example, pike may use seasonally flooded vegetation for spawning in a drain that may be dry most of the year. As well, one must keep in mind that all water flows somewhere and eventually it is going to find its way to a place where fish do exist.

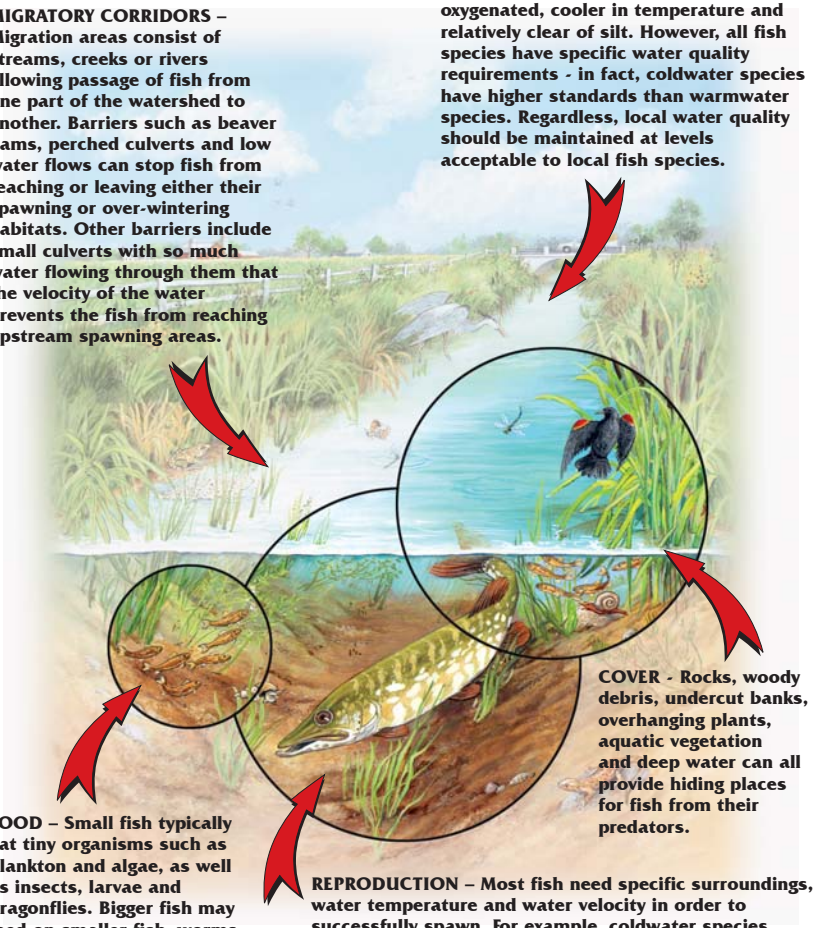
There are many open drains, especially well established ones that have been around a few years and that have not been cleaned out on a regular basis, which have developed the characteristics of providing good fish habitat. Trees, shrubs and other plants growing along the banks of the ditch not only produce food for fish (insects fall off the overhanging branches into the water) but also shade the water, providing cooler temperatures that are preferable for certain species of fish. Branches and other woody debris fall into the water providing cover for fish from predators. The meandering of the waterway from one side of the ditch to the other changes water flow, which depending on the species, can be favourable for spawning and other fish activities.

Some studies suggest that these older, open drains are important to fish production in that they contain larger numbers of fish, as well as a greater variety of species, when compared to the main watercourses into which they feed. The habitat provided by open agricultural drains has also played a significant role in setting a standard of environmental quality that people have come to expect. After all, a healthy fish community is a sign that the local human environment is also in good shape.

However, people also expect to eat and there often comes a time when open drains eventually need to be cleaned in order to enhance the effectiveness of farming operations. Therefore, drain maintenance must be managed carefully in order to protect habitat while ensuring the ability of the drain to function efficiently.

MIGRATORY CORRIDORS – Migration areas consist of streams, creeks or rivers allowing passage of fish from one part of the watershed to another. Barriers such as beaver dams, perched culverts and low water flows can stop fish from reaching or leaving either their spawning or over-wintering habitats. Other barriers include small culverts with so much water flowing through them that the velocity of the water prevents the fish from reaching upstream spawning areas.

WATER QUALITY – Typically, good water quality means the water is well oxygenated, cooler in temperature and relatively clear of silt. However, all fish species have specific water quality requirements - in fact, coldwater species have higher standards than warmwater species. Regardless, local water quality should be maintained at levels acceptable to local fish species.



COVER - Rocks, woody debris, undercut banks, overhanging plants, aquatic vegetation and deep water can all provide hiding places for fish from their predators.

FOOD – Small fish typically eat tiny organisms such as plankton and algae, as well as insects, larvae and dragonflies. Bigger fish may feed on smaller fish, worms, crayfish, insects or other invertebrates.

REPRODUCTION – Most fish need specific surroundings, water temperature and water velocity in order to successfully spawn. For example, coldwater species such as rainbow trout like gravel-bottomed shallows in streams with cooler temperatures and moderate water flows. Yet, the northern pike, a coolwater species, prefers spawning areas with slow moving water, such as wetlands or submerged, vegetated floodplains.

Why seek approval before doing maintenance on an open drain?

After time many agricultural ditches, whether they are private, municipal or mutual agreement drains, can start looking alike. If a property has changed ownership, the new landowner may not know whether the watercourse is a drain or a stream. Even if one does know, the next question is whether the watercourse is fish habitat. It can get confusing. One may believe that the ditch is poor habitat for fish and that they are perfectly within their rights to clean their ditch out. However, it is better to be safe than to be sorry. The law may require formal approvals before any drain maintenance work can be done.

Environmentally, drain maintenance can often change the characteristics that make an open ditch good fish habitat. The removal of plants, shrubs and other vegetation eliminates both food sources and cover for fish. Digging a deeper and wider channel may change both the speed of the flow and water temperature – two important factors contributing to good fish habitat. While the work is taking place, the disturbances that are occurring can create a barrier for those fish that might be attempting to migrate upstream. As well, digging stirs up sediment, which makes the watercourse that much less liveable for fish. Suspended sediments cloud the water, which can suffocate, cover and destroy spawning habitat as well as making it difficult for fish to breathe and feed.

Aside from the potential damage to fish habitat, landowners may also find themselves in violation of various provincial and federal laws should they proceed without approval. Some of the laws described below may apply to open drain maintenance.

The *Fisheries Act* (Federal)

The *Fisheries Act* applies to all fishing zones, territorial seas and inland waters of Canada and is binding on federal, provincial and territorial governments. It is administered by DFO. Through its *Policy for the Management of Fish Habitat,* DFO's goal is to increase the productive capacity of fish habitat. This is done through the conservation of existing habitat, restoration of damaged habitat, and development of new habitat. Under section 35 of the *Fisheries Act*, no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction of fish habitat, also referred to as a "HADD", unless authorized by the Minister of Fisheries and Oceans. When it comes to drain maintenance, it is this section of the *Fisheries Act* that most frequently applies. Unauthorized drain work that results in a HADD could result in a fine of up to $300,000 for a first offence and more for a second or third offence. The amount of the fine may also vary depending on the severity of the impact. While work on open drains is done to meet requirements under the *Drainage Act*, requirements under the *Fisheries Act* must also be addressed.

The *Species at Risk Act* (Federal)

A number of aquatic species have been identified under the federal *Species at Risk Act* (SARA) and must be considered prior to commencing work in

Changes or alterations to fish habitat may be necessary to improve drain function. When such changes are expected to result in a HADD, an authorization is required to avoid liability.

and around water. In addition to meeting the requirements of the *Fisheries Act*, all projects in and around water must be in compliance with the prohibitions of SARA. If your project is in an area where there are aquatic species at risk, or you are not sure, contact your local Conservation Authority or DFO office to ensure that you are in compliance with SARA. For more information on SARA and listed species, visit www.sararegistry.gc.ca.

The *Drainage Act* (Provincial)

Drainage legislation has been in existence in Ontario for over 150 years. The current statute, the *Drainage Act*, is administered by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) but it is administered locally by the municipality.

The *Drainage Act* provides a mechanism for landowners to solve their drainage problem by petitioning their local municipality. The process allows all landowners to provide input to the design and to voice objections to all aspects of the project. The Act also ensures that the drainage system is professionally designed and complies with other applicable laws. Costs are assessed to the landowners in the watershed of the drain.

Once constructed, municipal drains become part of the municipality's infrastructure, even when they are located on private land. The municipality is responsible for the maintenance, repair and overall management of the drainage system and can be held liable for damages if they don't fulfill these responsibilities.

The *Conservation Authorities Act* (Provincial)

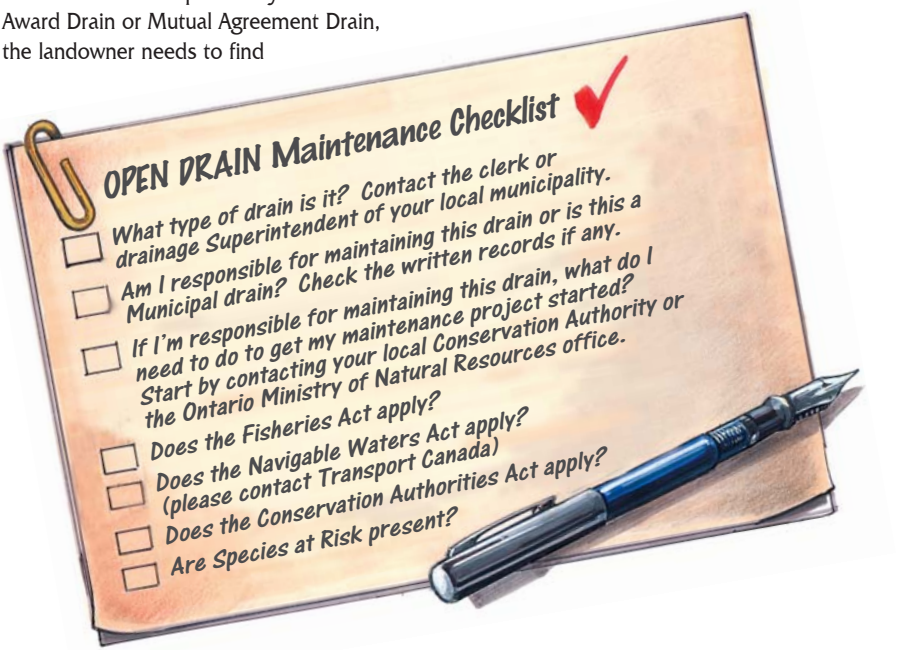
Conservation Authorities are responsible for conserving, restoring, developing and managing natural resources within their jurisdiction. Under the Province's *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation*, Conservation Authorities are able to regulate development in river or stream valleys, wetlands, shorelines and hazardous lands and associated allowances. In addition, they regulate the straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream, watercourse or for changing or interfering in any way with a wetland. Open drains are usually reviewed with special interest by Conservation Authorities.

HELP!! I NEED SOMEBODY!

Where do I start?

The first step a landowner should take before starting any kind of ditch maintenance is to determine the type of drain it is. The local drainage superintendent should be contacted in order to determine if the ditch is a municipal drain constructed under the *Drainage Act*. If it is, then the landowner should not undertake any maintenance on the drain since this is a municipal responsibility and liability. If it is not a municipal drain, the local municipality may also be able to tell the landowner if it is an Award Drain, Mutual Agreement Drain or a Private Drain. If it is a Private Drain, the maintenance of the ditch is the landowner's responsibility. If it is an Award Drain or Mutual Agreement Drain, the landowner needs to find the written records for that drain to determine who is responsible for performing maintenance.

If the landowner finds that they are responsible for maintaining the drain, the next step they should take before starting any kind of drain maintenance is to call the local Conservation Authority or the Ontario Ministry of Natural Resources (MNR) office. Both agencies can assist in providing information dealing with reviews and approvals for drain maintenance work that might impact fish habitat. Chances are that the Conservation Authority will also have the expertise to help the landowners develop a proper drainage maintenance plan.



SPEEDING UP THE PROCESS

Conservation Authorities, DFO, and other agencies have been working together to develop a Class Authorization System to streamline the process of reviewing fisheries concerns for maintenance proposals. This Class Authorization System is **only applicable to Municipal Drains,** the ones most frequently being maintained across Ontario. Without this system, all drain maintenance activities that might be harmful to fish habitat would be subject to individual review and may require a separate authorization under the *Fisheries Act*. Since there are many municipal drains being maintained across Ontario, this could be a very time consuming process, causing delays for landowners needing improved drainage, as well as for drainage superintendents trying to coordinate their work schedules. The Class Authorization System cuts through much of that red tape. It allows municipalities, through their drainage superintendents, to complete work, such as bottom clean outs, on less sensitive drains.

Drainage superintendents can save time on planning since they will know in advance what kind of work and timing is required for certain maintenance projects. The Class Authorization System also helps municipalities and drainage superintendents identify projects that might need a more in-depth examination.

The Class Authorization System is only applicable to Municipal Drains.

How does the Class Authorization System work?

While all open drains serve the same function of removing excess water from the land, not all drains are alike when it comes to the habitat they provide for fish. Open drains may differ in the type and sensitivity of the habitat they contain depending upon the drain's characteristics. For habitat management purposes, the Class Authorization System classifies municipal drains according to their flow characteristics, water temperatures, fish species present and time since the last full clean out.

Drainage superintendents, Conservation Authorities and other agencies are classifying all municipal drains in Ontario with the goal of incorporating this information into maps to help municipalities and their drainage superintendents identify the correct steps in maintaining a particular drain. As characteristics of the drains change, the new information is used to update the classification.

Call your local drainage superintendent, Conservation Authority or MNR to obtain assistance on how to maintain Creek Drains like the one above.

What if I want to do work on a private ditch, mutual agreement drain or a natural watercourse? What do I need to do to undertake this work?

Call your local Conservation Authority or MNR office before starting any work. They can provide information on a number of different options for drain maintenance that are not only endorsed by many agricultural organizations, but are also both environmentally-friendly and cost about the same as traditional methods. When considering these options, a number of different factors need to be examined before starting any open drain maintenance project.

You should also call your local municipal drainage superintendent to verify that this watercourse is not a municipal drain. If it is a municipal drain, the municipality should undertake the work.

MITIGATION MEASURES

Timing

Digging should be done so as to avoid local fish spawning or nursing periods. If done at the wrong time, suspended sediments from the maintenance work might prevent spawning, smother eggs, or kill young fish.

Option: Do the Project in the Summer

Summer may be a good time to do maintenance work when drains are dry or have little flow. This way the crane or backhoe operators can see exactly what needs to be cleaned out without the obstruction of clouded water. Doing the work when the ditch is relatively dry also

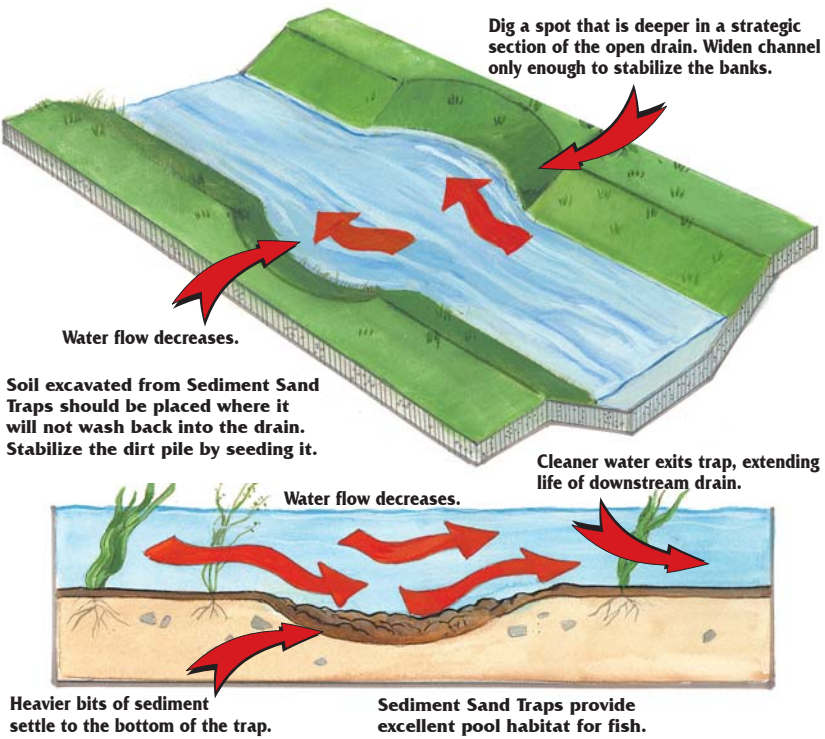
ensures that little, if any, sediment will float downstream where it might impact fish. As well, maintenance should be done as quickly as possible in order to limit the amount of disruption to fish migration and habitat

Sediment Controls

If work is undertaken while water is still flowing in the drain, controls need to be put in place to prevent the flow of sediment downstream. The following options are essentially designed for areas with sandy or sandy loam soils.

Option: Sediment Sand Traps

Sediment sand traps are created by strategically digging a spot that is deeper in the open drain. Excessive widening of the channel should be avoided, however the channel should be widened enough to stabilize the banks. This larger hole acts as a settling pond, slowing down water as it drops into the deeper spot. As the water flow decreases, heavier sediments and debris settle to the bottom of the trap, somewhat improving the quality of the water leaving the trap and moving downstream.



The sediment sand trap technique can be low cost when compared to other conventional methods. Farmers and municipalities need only worry about cleaning the trap out, which is a lot cheaper than paying for a full-scale clean out. Less of the drain is disturbed and clean out is quicker. Sand traps should be placed in spots easily accessible so as to avoid having to drive over planted crops in order to get maintenance equipment to the site.

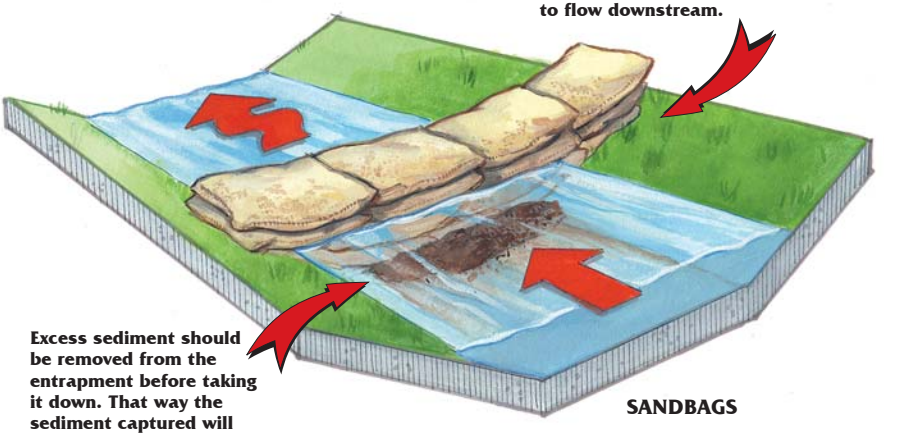
Option: Silt Fences /Straw Bales/Sandbags

Silt fences (those little black curtains we see between construction sites and watercourses), straw bales, and sandbags are inexpensive ways to prevent the flow of sediments downstream. Silt fences or straw bales need to be staked into place downstream of the maintenance site. These two options act as filters removing sediment from water. More than one set of curtains or bales may be required.

Sandbags act much like sand traps. By sandbagging the water back, one creates a settling pond where heavier sediment can drop out, allowing relatively cleaner water to flow downstream.

Any of these light-weight channel flow controls are only good for handling relatively low flows in small drainage areas for short periods of time. These options only work when they are properly maintained. Care also needs to be taken when removing these controls. Excess sediment should be removed from the entrapment before taking down a sediment control structure. That way, the sediment captured will not be released back into the stream.

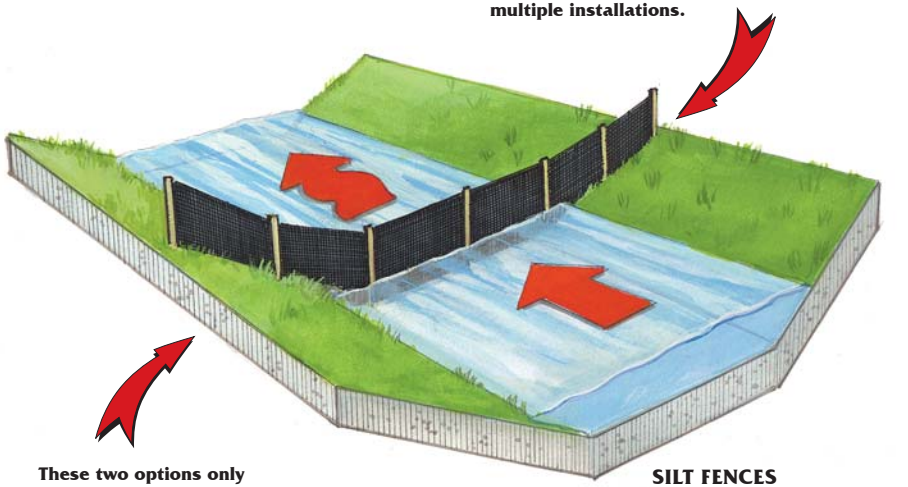
By sandbagging the water back, a settling pond is created. Heavier sediment drops to the bottom, allowing relatively cleaner water to flow downstream.



Excess sediment should be removed from the entrapment before taking it down. That way the sediment captured will not be released back into the stream.

SANDBAGS

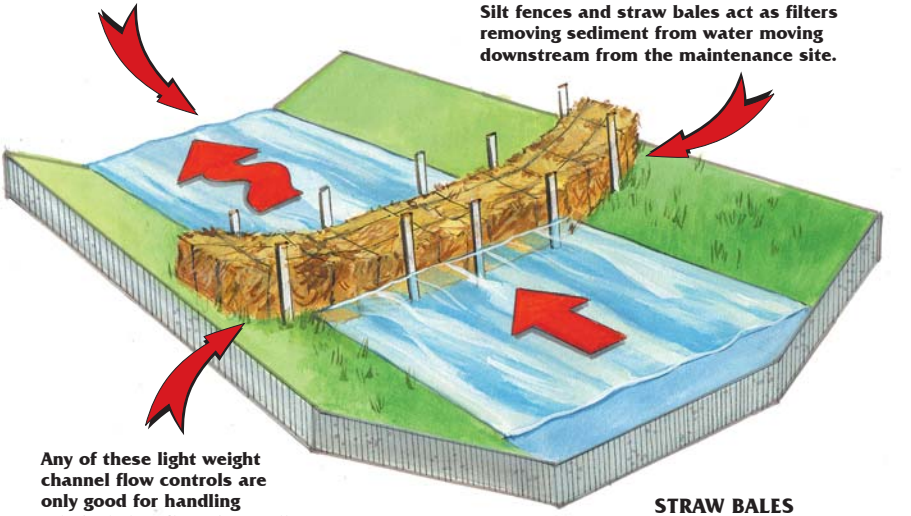
Silt fences or straw bales need to be staked into place downstream of the maintenance site and may require multiple installations.



These two options only work when they are properly maintained.

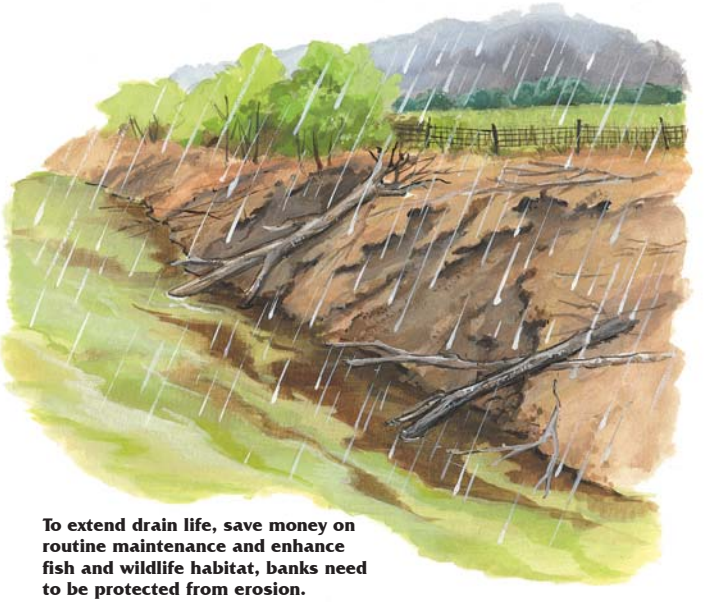
SILT FENCES

Silt fences and straw bales act as filters removing sediment from water moving downstream from the maintenance site.



Any of these light weight channel flow controls are only good for handling relatively low flows in small drainage areas for short periods of time.

STRAW BALES



To extend drain life, save money on routine maintenance and enhance fish and wildlife habitat, banks need to be protected from erosion.

Erosion Control and Bank Stabilization

Eroding drain banks can be costly to farmers, municipalities and the environment. The more soil collapses into a drain, the more that drain's flow is disrupted. The extra soil entering the system is unlikely to be carried very far in the water, resulting in an accumulation of sediment, which in turn fills the drain. Eroding banks may lead to trees and other vegetation falling into the watercourse, further diverting and slowing water flow and leading to more erosion. Eventually, the ability of the open ditch to drain surrounding land is hampered and further maintenance is required sooner than was originally planned. To extend the life of the drain, save money, and help the environment, a number of techniques can be used.

Option: Leave the Banks Alone

Bank erosion is best prevented by not disturbing the banks at all. Stable banks usually have grass, shrubs and trees growing along them. Vegetation adjacent to the bank helps slow down runoff from the fields, which in turn helps to minimize erosion of the bank. As well, the root systems of vegetation along the banks hold the sides together and stabilize the slopes. Environmentally, the stalks and leaves from the different types of plants slow down runoff and act as a filter by trapping sediment, pesticides and other pollutants – improving the quality of water entering the drain.

Option: Plant Bigger Buffers

Other means to prevent erosion, extend the life of the drain and improve habitat is to plant shrubs and trees and to increase the size of the vegetated buffer between the field and drain.

Conservation cropping, such as the soy beans planted to the left of the drain above, can help stabilize the bank, reduce future drain maintenance, and improve habitat for a wide variety of species.

Bigger buffers can help remove more of the sediment carried by field runoff into the open ditch, and thus minimize the need for drain maintenance. This option might involve taking productive land out of operation. The alternative may be to look at planting such crops as hay or alfalfa as buffers along the drain. Once these crops are planted, the land can go a number of years without the need for being plowed up, crops can be harvested annually, and the root systems remain undisturbed.

Option: Work from One Side of Drain

If vegetation needs to be removed from a ditch, it would be best to remove it from one side only. That way, one side of the ditch is better protected from erosion, less movement of equipment is needed, clean-out is quicker, and there is less disruption. Where applicable, it is best to leave the south side of the drainage bank alone as that will ensure shade, cover and food sources for fish.

Option: Remove Vegetation at Intervals

Depending on various circumstances, another option may be to remove vegetation at certain intervals. If an open drain has gone several years without maintenance – trees, shrubs and other brush may have grown to the point where removal of vegetation is required to allow a crane or backhoe access for proper drain clean out.

Mature or young trees should be left on either bank. These trees help stabilize the ditch, provide cover and insect food for fish, and shade the banks and the water. The shade from the trees also helps prevent the growth of vegetation that may create blockages to drain flow.

Rather than clearing out all the vegetation, one can remove for example, 20 metres of vegetation on one side of the bank, skip 20 metres, and then continue so on down the one side of the drain. Then to ensure total bottom clean out, do the same on the opposite bank. Later, when one needs to maintain the drain, vegetation removal and drain maintenance can be done from the spots that were originally left untouched. While this option may be a bit more costly and time-consuming, the landowner is always guaranteed that there will be mature vegetation along the drain to help stabilize it.

Option: Brushing

Brushing involves using large mowers to cut the vegetation along the bank. The trimming of the plants and shrubs should improve water flow and thus cause the drain to naturally deepen on its own, as faster water tends to scour a watercourse. As well, runoff from the surrounding land is less impeded by mature vegetation when entering the drain. Brushing can also be a helpful step in providing access spots for maintenance equipment to the drain bottom. Regardless of the reason for using the technique, the key to brushing is that it leaves the root system untouched. Thus the drain's banks are stabilized, the mulch from the mowing protects the surface from wind and rain erosion, and reseeding the slope is unnecessary. Care must be taken to make sure that the mulch from the brushing that ends up in the waterway is removed so that the drain does not get clogged downstream.

Gentle bank slopes help reduce erosion by reducing runoff speed.

Brushing leaves the root systems intact, stabilizing the banks from erosion. Debris from the brushing protects the banks from wind and rain erosion.

Option: Reseeding

As soon as the drain maintenance is done, one should consider leveling the spoils, or excavated material, created from clear-out and reseed the work area while the soil is still moist in order to reestablish vegetation and stabilize the bank. If immediate revegetation is not an option (maybe the growing season has passed) then using filter cloth, various mulches or erosion blankets made of natural material might help in protecting the banks from erosion.

Option: Sloping

When maintaining a drain, it is preferable to have gentle slopes on the banks rather than steep ones. The steeper the grade, the quicker the water enters the drain, the more unstable banks become, and the more likely erosion will take place.

Straw blankets, such as the one seen above, help protect the exposed area from wind and rain erosion, and incorporate natural materials to help vegetation get reestablished.

Natural channel design features can be incorporated into drains where appropriate. Natural channels are efficient at moving both water and sediment, as well as providing long-term stability for the drain and enhancing fish habitat.

WHERE CAN I GET MORE INFORMATION?

DFO has developed fact sheets, Operational Statements – DFO's guidelines for works around water that pose a low risk to fish habitat – and guides which help people become better informed on ways to avoid negatively impacting fish and fish habitat. For additional information, please visit the DFO Web Site at www.dfo-mpo.gc.ca/oceans-habitat/. Once there, click on "Operational Statements" or click on "Infocentre", then "Documents", for other publications. These documents are a good source of information for anyone working in or around water. By listing some common activities and mitigation techniques to help with project planning, impacts to aquatic communities can be avoided. Specific to drains, two posters have been developed. One outlines the Class Authorization System and the other illustrates the review process under the *Fisheries Act* for the development of an engineer's report. A fact sheet has also been developed: *Working Around Water? What You Should Know About Fish Habitat and A Class Authorization System for the Maintenance of Agricultural Municipal Drains in Ontario.*

The following documents are also available through DFO Ontario offices (listed on page 23):

- *Maintenance of Municipal Drains – A Fisheries Act Class Authorization Process for Municipal Drain Maintenance and Repair Activities under the Drainage Act, and*
- *Streamlining the Fisheries Act Review and Authorization Process During the Development of the Engineer's Report for Drainage Projects Authorized by Sections 4 and/or 78 of the Drainage Act.*

FARMING AND FISH CAN CO-EXIST

It is hoped that this guide has demonstrated that the needs of farmers and the local environment can co-exist in a mutually beneficial manner. Farmers are stewards of the land; after all, they live on it, make their living from it and are in contact with it daily. This document is designed simply to show that there are a number of cost-effective options that incorporate the natural environment, such as vegetation and its root systems, which will help minimize drain maintenance costs while protecting the environment at the same time. Thanks to farming organizations, concerned individuals, community groups, Conservation Authorities, drainage superintendents and many other partners, documents such as this primer and other Best Management Practices have been developed to ensure that farming and a healthy environment endure for the benefit of future generations of Canadians.

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