

EXTENSION NOTES



Fisheries
and Oceans

Pêches
et Océans



PROTECTING FISH HABITAT FROM SEDIMENT

Fish and wildlife depend on shallow water close to shore. Changing shallow areas in creeks, rivers and streams, even slightly, can have devastating effects. That's why it's important to be cautious when working near water. Construction projects make soil unstable and vulnerable to erosion. When this happens, rain or wind can sweep loose soil particles into water bodies. These soil particles are called sediment and can be harmful to fish and wildlife habitat. Degrading fish habitat in any way violates the federal *Fisheries Act* and can result in fines and imprisonment.

This Extension Note explains how to reduce soil erosion when building or landscaping in and around water. The information applies to projects such as cottages, boathouses, docks, sheds and small landscaping jobs.

HOW DOES SEDIMENT HARM HABITAT?

Sediment can settle on the bottom of a stream, river or lake, covering areas where fish feed, hide from predators or lay eggs. It can also smother and kill fish eggs. Sediment suspended in the water can clog fish gills and also obscure vision, making it difficult for fish to find food and see predators.

FISHERIES ACT

The federal *Fisheries Act* provides for the protection of fish habitat. Under this Act, no one may carry out any work that harmfully alters, disrupts or destroys fish habitat, unless

If enough sediment enters a body of water, the aquatic environment can change permanently, harming fish, wildlife and people.

authorized by Fisheries and Oceans Canada. The Act also states that no one is permitted to deposit a deleterious (harmful) substance into water containing fish. Sediment is



Photo: Fisheries and Oceans Canada

considered a harmful substance under the *Fisheries Act*. Violations can result in substantial fines, imprisonment and a requirement to cover the costs of returning the site to its original state.

For further information on relevant legislation and permits and approvals contact your local conservation authority, Ontario Ministry of Natural Resources, Parks Canada or Fisheries and Oceans Canada.

BEFORE YOU BUILD

Plan ahead to ensure that your project does not harm the environment or violate the *Fisheries Act* or other laws. Before you build, determine exactly how you will reduce soil erosion and sedimentation. Base your plan on sound engineering practices used by experts in the construction industry.

- you don't have the knowledge and skills to plan and implement erosion control measures
- steep slopes, highly erodible soils or other factors make your site vulnerable to erosion
- you are working in or near water
- your project is large

Get an expert to help you assess the risk of erosion at your site and to develop a plan for erosion control when

PLANNING GUIDELINES

KNOW YOUR SITE

The risk of erosion depends on soil, ground contours, drainage patterns, vegetation and exposure to wind, rain and snow.

SOIL

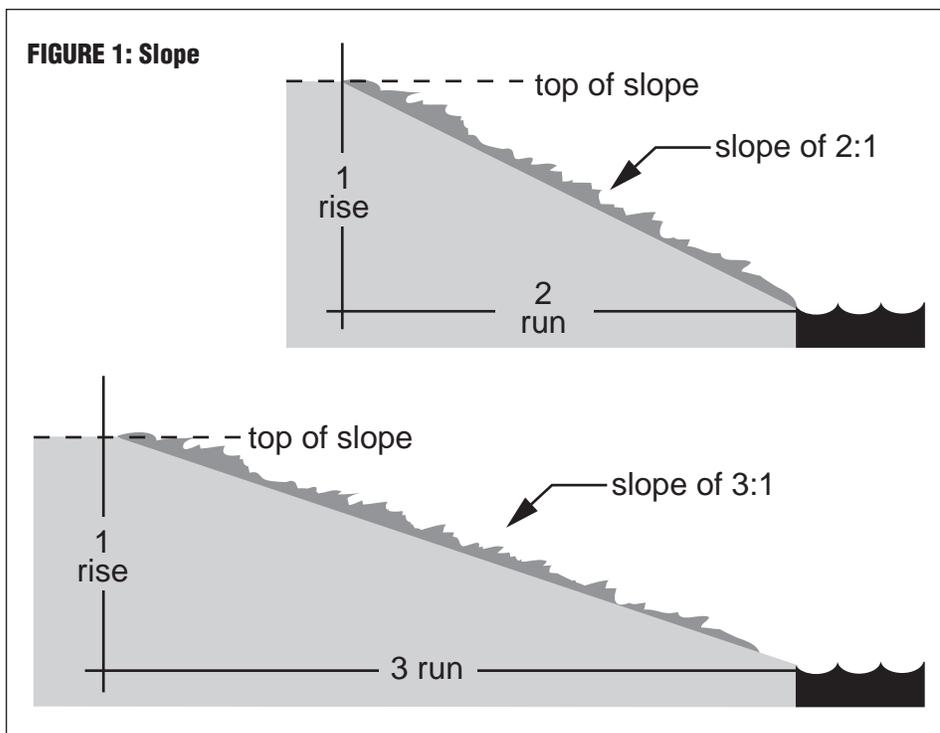
The higher the silt and fine-sand content of the soil, the more erodible it is. Pure clay soils are less erodible. The most stable soils contain coarse sand and gravel. If you are unsure about the composition of your soil, call your local conservation authority or your local office of the Ontario Ministry of Natural Resources.

GROUND CONTOURS

Respecting the natural contours of a site can reduce the risk of erosion and often the cost of construction. If possible, work on level ground rather than slopes. The steeper the slope, the greater the chance of soil erosion. If you must work on a slope, make sure the construction site is at a stable angle. Generally, the land should rise no more than 30 centimetres (1 foot) vertically for every 60 centimetres (2 feet) horizontally. This can also be expressed as run over rise of 2:1 (see Figure 1). If the kind of soil you have is easily eroded, the slope should be even

more shallow, for example a run over rise of 3:1 (also shown in Figure 1). If small channels form after a heavy rain, you will need a mitigation plan to prevent erosion.

When working around water, avoid using sand or other materials to fill in uneven ground or to change the angle of a slope. Fill materials are often unstable and vulnerable to erosion. If you must fill, use erosion-resistant materials such as coarse gravel or rock.



DRAINAGE

Gravity will carry water and sediments downhill. Determine where your slopes are and what paths the water will take as it flows toward water bodies. Plan your project to keep construction away from drainage areas and to reduce the amount of sediment carried away.

VEGETATION

Grasses, shrubs and other plants stabilize the soil and trap sediments. Map your vegetation and plan how best to preserve it. If you must disturb vegetation, restore it quickly by seeding or planting. Keep a buffer of undisturbed vegetation at least 15 metres (50 feet) wide (see Figure 2) between the construction area and a water body to slow down the water draining from the site and to trap sediments.

EXPOSURE

- Consider the degree to which the site is sheltered or exposed to wind, rain or other eroding forces.
- Disturb the smallest area possible. The less soil you disturb, the better, so keep your work area as small as possible.
- Work quickly. The faster you get the job done, the better. The longer the ground is exposed to wind and rain, the greater the risk of erosion.

CONSIDER THE TIMING

Whenever possible, undertake construction in the late spring or early summer. This will enable vegetation to re-establish quickly. During the spring freshet, avoid working in areas that are vulnerable to erosion. There are timing restrictions if the activity will potentially deposit sediment in water so fish spawning and egg incubation periods are not effected.

METHODS OF REDUCING EROSION

While it may be impossible to prevent sediment leaving disturbed lands (zero discharge of sediment), correct implementation and maintenance of the best management practices presented here should help to control sediment that may discharge from small construction projects.

1. VEGETATION

Plant vegetation to avoid erosion from

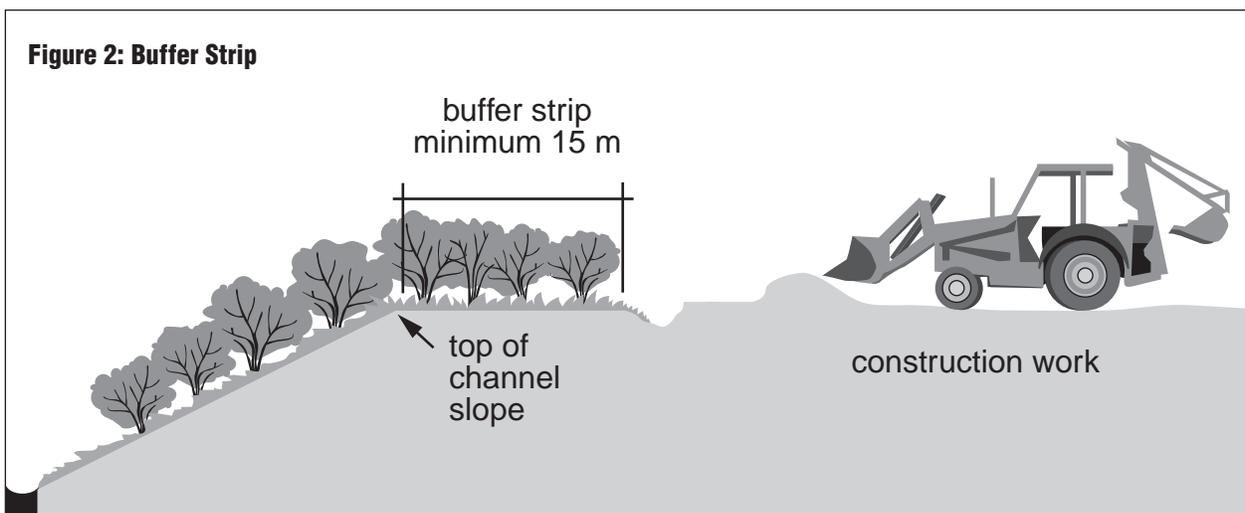
- exposed soil
- areas you have filled
- stockpiled fill material, especially when construction will last weeks or months
- shorelines

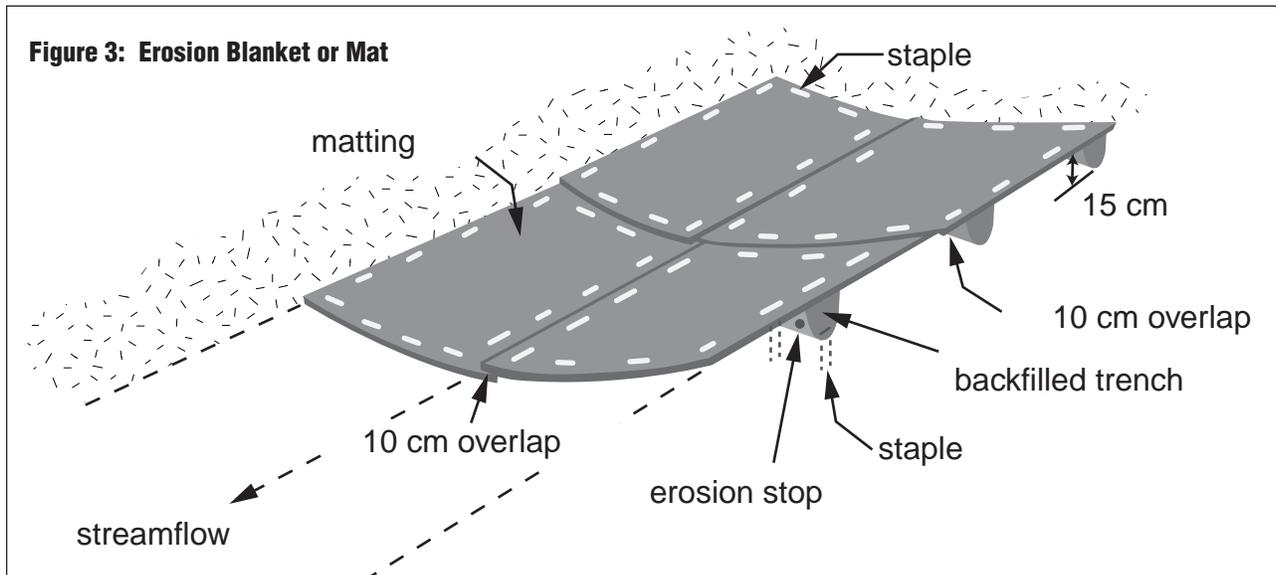
Scatter seed on disturbed soil. Use a mix of plant species that are suited for growth at the site. Grass and other plants take several months to germinate, and

strong root systems take even longer to develop. To protect the area until the seeds grow, cover the soil with an erosion blanket or a mulch such as straw or brush.

2. STRAW BALES

Straw bales can be installed as barriers to trap sediment and slow water flow. They should be in a trench, staked and backfilled. When straw bales are installed as a filter fence to trap sediment coming off a slope, they should be placed away from the top for increased holding capacity. When used as a barrier in a ditch or gully, they allow water to flow through, rather than over the barrier and no apron is required.



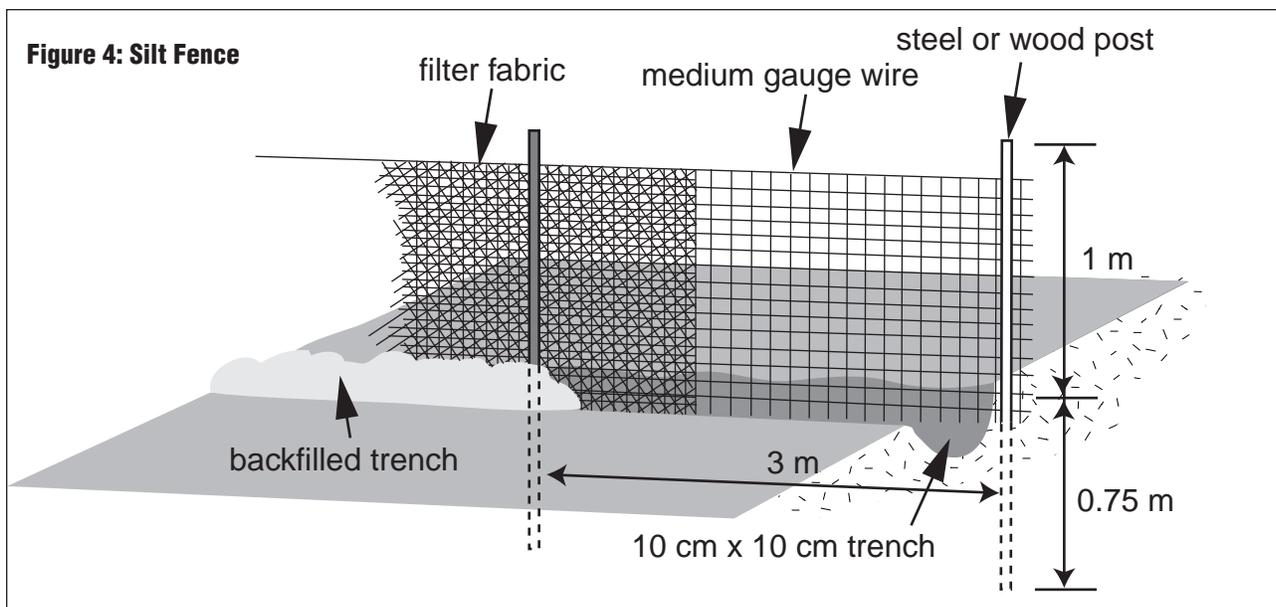


3. EROSION BLANKETS

An erosion blanket is usually made of natural fibres such as straw or coconut fibre. It acts as a protective barrier between the soil and the rain or the wind (see Figure 3). You can buy erosion-control blankets at building-supply stores.

Place erosion blankets

- in high-risk places such as steep slopes or areas with highly erodible soil
- while vegetation is establishing in areas you have seeded



4. SILT FENCES

Install silt fences as a temporary last-defence measure at the base of slopes or in areas that have a high risk of erosion. Silt fences (also known as filter fences) are woven structures that slow the flow of water and trap sediment (see Figure 4). When used to control sediment from steep slopes, silt fences should be placed away from the top of a slope for increased holding capacity. Sediment collects in the pond that often forms at their

base. Silt fences should only be used to intercept shallow overland water flow. You can buy silt fences at building-supply stores. They are inexpensive and come in rolls with wooden stakes attached.

Examine silt fences regularly, especially after a rainstorm, and remove any sediment that has collected. Remove silt fences when vegetation has been re-established and the soil is stable.

5. INTERCEPTION DITCHES

Create interception ditches or diversion ditches to block flowing water and divert it away from water bodies (see Figure 5). Redirect water to an area with vegetation. This will filter out the sediment. Keep in mind that you may not divert water onto the property of other landowners without their written permission.

6. BERMS

A berm is a low mound of soil. Create berms to direct flowing water away from water bodies. Berms can be used in combination with diversion ditches to divert runoff from slopes that are vulnerable to erosion (see Figure 5). Interception ditches and berms also reduce water velocities in ditches which reduce erosion.

7. BARRIER DAMS

Barrier dams are also referred to as sediment traps. A barrier dam slows water flow, causing sediment to collect in pools formed above the dam. Use barrier dams as a temporary measure to control soil erosion in ditches or gullies. To create a barrier dam, pile erosion-resistant material such as rocks, logs or sandbags inside the ditch. Straw bales can also be used to construct a temporary barrier, however, they must be installed properly and regularly maintained (see Figure 6). Water entering the ditch will slow down in the pool formed above the dam, and sediment will collect there. The dam should reach just below the top of the ditch (see Figure 7). To reduce the possibility of the dam causing bank erosion, build a spillway on the dam at the lowest point in the ditch. Lay erosion-resistant materials along the sides of the ditch in the area of the dam. Install geotextiles in the dam. These special landscaping fabrics hold back sediment but allow water to pass through, reducing pressure on the dam and allowing drainage. Geotextiles are available in landscaping stores. Barrier dams should be used only in small catchment areas and should never be built in natural streams. Remove the dam when the area has been stabilized with an erosion blanket or other device.

Figure 5: Interception Ditches and Berms

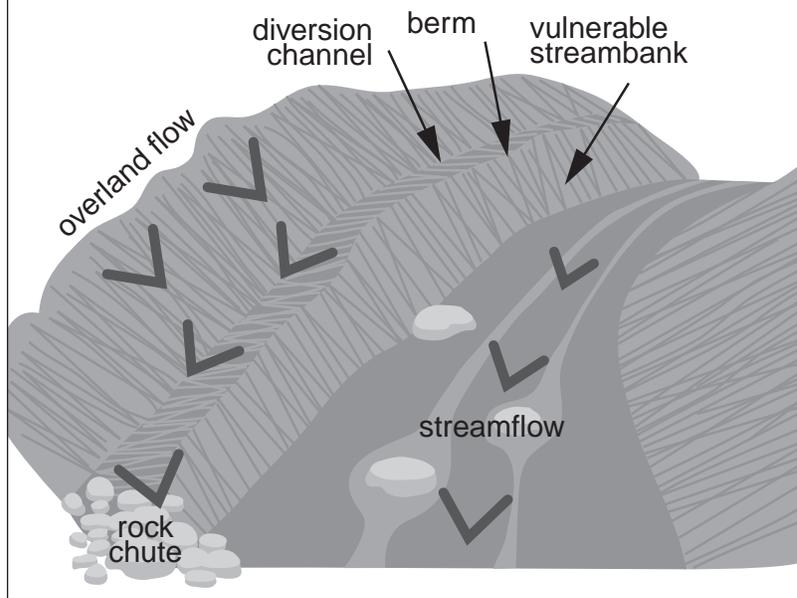


Figure 6: Straw Barrier Dam

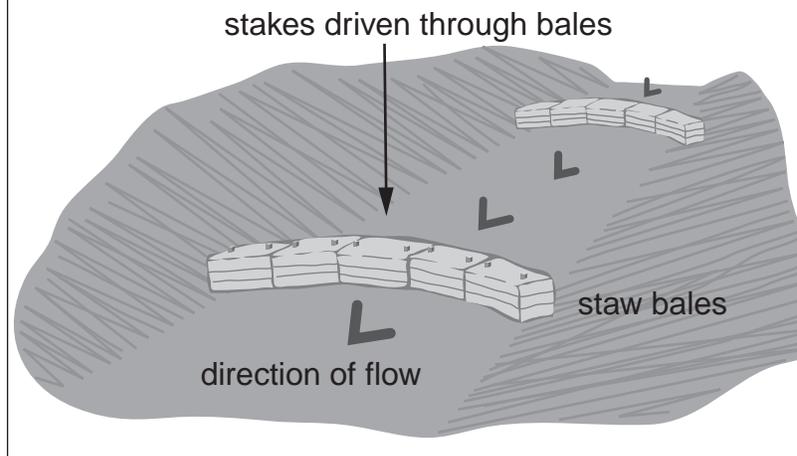
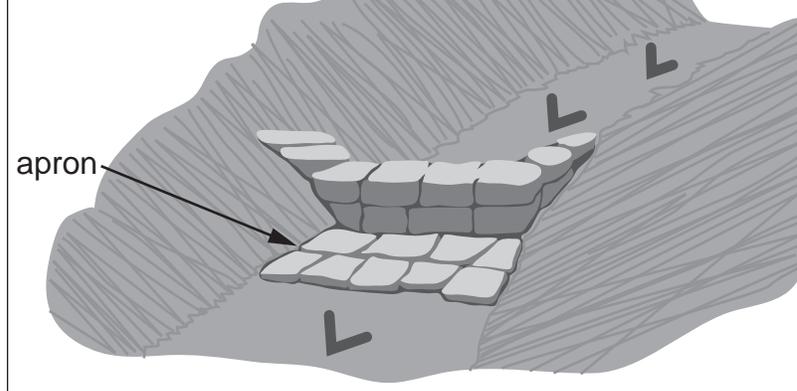


Figure 7: Stone Barrier Dams



THINGS TO WATCH FOR

Inspect the construction site regularly for signs of soil erosion, especially after a rainstorm. Look for gullies and small channels in the soil, which indicate soil erosion. Repair and clean erosion-control devices when necessary.

FOR MORE INFORMATION

For more information about soil erosion and how to use erosion-control devices, contact your conservation authority or your local office of the Ontario Ministry of Natural Resources or office or building-supply store.

FURTHER READING

- Ontario Ministry of the Environment and Energy. 1995. *Guidelines for Evaluating Construction Activities on Water Resources*.
- Ontario Ministry of Natural Resources. 1990. *Environmental Guidelines for Access Roads and Water Crossings*.
- *Working Around Water*, a series of fact sheets produced by Fisheries and Oceans Canada

- Kerr, S.J., 1995. *Silt, Turbidity and Suspended Sediments in the Aquatic Environment* — An Annotated Bibliography and literature review, OMNR 277p.

The following Extension Notes are good sources of information on fish habitat

- *Protecting Fish Habitat*
- *Improving Fish Habitat*
- *Preserving and Restoring Natural Shorelines*
- *Preserving Water Quality*
- *Buffers Protect the Environment*

For more information contact:

LandOwner Resource Centre

P.O. Box 599, 5524 Dickinson Street
Manotick, Ontario K4M 1A5
Tel 613 692 2390 or 1 800 387 5304
Fax 613 692 2806

Product Ordering: 1-888-571-INFO (4636)

E-mail: info@lrconline.com

Internet: <http://www.lirconline.com>

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