

**EROSION ON  
SHOREFRONT  
PROPERTY**  
IDENTIFYING THE CAUSES OF CHRONIC  
EROSION PROBLEMS

POND AND LAKEFRONT PROPERTY  
STREAMBANK PROPERTY  
SHELTERED COASTAL PROPERTY

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## IDENTIFYING THE CAUSES

Your property is washing away! Each year you watch the gradual deterioration of your shoreline. The same forces of nature which you admired so much when you purchased your land are now relentlessly altering it. What can you do?

This fact sheet is designed to guide you in correcting basic erosion problems on your **shorefront property**. It is limited to shore frontage on lakes, ponds, brooks, small streams and sheltered tidal waters.

This publication does not address shorelines on large streams, rivers or the open ocean. The forces at work in these areas are extremely complex. Professional engineering expertise should be sought in these areas.

Also, the practices recommended in this fact sheet are basic and designed to be conservative. They are well known, widely used, easy to install and have withstood the tests of time. However they may be over-designed for your specific site. You may save money by hiring a professional engineer to design the erosion control structures for your property. Site specific engineering may suggest new innovative technologies or refine these basic designs to save you money.

## IDENTIFYING THE PROBLEM

As the owner of eroding shorefront property, your first job is to be a detective. You must carefully examine your property and determine what forces are at work. They will be different depending on whether you have property on a lake, a stream, or in a sheltered ocean cove.

A series of questions are listed below. Go through the list carefully and try to determine what needs to be dealt with. After each question there is a list of possible solutions. Refer to available fact sheets for explanations on how to implement each solution.

*1. Is wave action a factor?*

Wave action usually occurs on lakes, ponds and sheltered ocean coves or tidal regions. The waves can be caused by wind, tidal currents, and in some cases by boat traffic. Waves generally undercut the toe of the slope causing it to slump.

- REINFORCE THE TOE OF THE SLOPE WITH RIPRAP AND VEGETATE
- REINFORCE THE TOE OF THE SLOPE WITH GABIONS AND VEGETATE
- LIMIT BOAT SPEEDS

### *2. Is concentrated stormwater runoff a factor?*

During rainstorms, does a lot of rainwater runoff from roofs, driveways and lawns, concentrate in a low spot and then channelize down a slope? Is a gully forming on the slope because of it? Sometimes you can resolve erosion problems by installing gutters and downspouts and directing runoff to another stable area. Alternately, you can reinforce the slope with stone at the point where the water is channelizing.

- INSTALL GUTTERS AT THE ROOF EDGE
- DIVERT RAIN WATER AWAY FROM THE SLOPE TO A STABLE AREA (FLAT AND WELL VEGETATED)
- TRANSPORT WATER DOWN THE SLOPE IN A REINFORCED CHANNEL

*Note: Depending on the complexity of the water drainage problem, a professional engineer may be needed to solve these problems. If a lot of water from off site is crossing your property, you should probably seek professional assistance.*

### 3. Are the slopes too steep?

Naturally occurring stable banks are usually about 2H:1 V (two feet horizontal for every one foot of vertical rise). This angle varies with different soils. Soils do not permanently stand on a vertical face but form an angled slope that varies with the soil and groundwater conditions. Banks will erode until they reach their natural angle of repose.

#### Slopes less than 2:1

- REGRADE AND REVEGETATE

#### Slopes greater than 2:1

- INSTALL A COMBINATION OF VEGETATION AND RIPRAP PROTECTION
- INSTALL A COMBINATION OF VEGETATION AND GABIONS

### *4. Is seepage in the slope causing bank failure?*

This is common when a coarse layer of sand overlays a less permeable soil such as clay. **Water tends to** move rapidly and freely in the sand. Once it reaches the less permeable clay layer, it tends to flow along the clay's surface and exits the slope face.

*Note: This problem is beyond the scope of this fact sheet. A registered professional engineer should be consulted. In a limited number of cases, planting water-loving vegetation at the seep line (shrub willows) may help stabilize the slope. Refer to fascine rolls in "VEGETATIVE STREAMBANK STABILIZATION FACT SHEET".*

5. *Are there problems with the vegetation holding the slope?*

Thick, healthy vegetation contributes greatly to slope stability by holding the soil together with its root structure. Carefully examine the **quality of the vegetation on the slope**.

Is it mostly bare soil covered with pine needles or leaves (usually the case where tree growth is dominant)?

Has slash been disposed of on the banks (which kills vegetation by smothering it)?

Is the bank overly shaded for shrub growth?

- REMOVE ALL SLASH
- SELECT THE APPROPRIATE VEGETATION, PLANT IT, PROTECT IT, AND FOSTER ITS GROWTH
- INSTALL A COMBINATION OF VEGETATION AND RIPRAP PROTECTION
- INSTALL A COMBINATION OF VEGETATION AND GABIONS

6. *Is most of the damage caused during spring runoff or big rainstorms?*

This is frequently the case on brooks and streams. Water velocities are often too high for bare soil or vegetation to withstand.

- PLANT BANKS WITH SPECIAL STREAMBANK STABILIZATION PLANTS
- INSTALL A COMBINATION OF VEGETATION AND RIPRAP PROTECTION
- INSTALL A COMBINATION OF VEGETATION AND GABIONS

*Note: If much of the water crossing your land is from off-site, you should hire a registered professional engineer to design bank reinforcement*

7. *Is foot traffic or vehicular traffic a problem?*

Are pedestrians threatening bank stability by trampling vegetation to get to the water? Are cars parking too close to the water, compacting the soil so that no vegetation can grow? Are ATVs tearing up the place?

- PROVIDE STABLE FOOT PATHS WITH CLEARLY DEFINED BORDERS
- PROVIDE AN ACCEPTABLE, CLEARLY MARKED PARKING AREA AWAY FROM THE ERODING SLOPES
- PHYSICALLY LIMIT ACCESS TO ERODING AREAS AND SLOPES BY INSTALLING BARRIERS AND PLANTING PRICKLY VEGETATION

8. *Is ice damage a problem?*

Winter ice build-up along shorelines can cause tremendous damage with freezing and thawing cycles, as well as the spring thaw.

- INSTALL A COMBINATION OF VEGETATION AND RIPRAP PROTECTION
- INSTALL A COMBINATION OF VEGETATION AND GABIONS

9. *Are fluctuating water levels a problem*

If the water level varies greatly over the course

of the year, vegetation may have difficulty getting established.

- PLANT VEGETATION THAT CAN ADJUST TO FLUCTUATING WATER LEVELS
- INSTALL A COMBINATION OF VEGETATION AND RIPRAP PROTECTION
- INSTALL A COMBINATION OF VEGETATION AND GABIONS

*Note: If whole sections of the slopes are collapsing during the drawdown period, the rate of drawdown may be too rapid.*

*10. !s a combination of these causing the erosion?*

This is the rule rather than the exception! Usually your property is subject to a combination of forces. A great deal of your success depends on identifying them. Take the time to examine your shorefront carefully and determine what combinations of factors are causing the total erosion problem.