

Erosion Control for Construction within the Protected Shoreland

Erosion is the process by which soil is carried from an area by water or wind. When water deposits eroded soil into a waterbody as sediment, it fills in that waterbody. It also contributes significant amounts of harmful nutrients to the water. These nutrients often contribute to excessive algae and aquatic weed growth in waterbodies, resulting in dramatic reductions in water clarity and quality. Erosion from construction sites is a leading cause of water quality problems in New Hampshire's waterbodies (Figure 1). Protecting water quality is important to safe water for drinking, recreation, and businesses. New Hampshire's natural resources provide the foundation for many of the activities that drive New Hampshire's economy. Residents, businesses, and visitors enjoy New Hampshire's clean lakes, streams, wetlands, and seacoast because of their natural beauty and recreational opportunities.



Figure 1 - Erosion at construction sites causes water quality problems in New Hampshire's waterbodies.

Vegetation shields soil surfaces from the impact of rain, reduces the speed of runoff, maintains the soil's capacity to absorb water, and holds soil particles in place. Soils become vulnerable to erosion when construction activity removes or disturbs the vegetative cover. When vegetation and natural ground cover is removed or disturbed in proximity to water, erosion accelerates, overloading waterbodies with nutrients and sediments. By limiting and phasing vegetation removal during construction, soil erosion can be significantly reduced.

The New Hampshire Shoreland Water Quality Protection Act (SWQPA, RSA 483-B) was established to protect New Hampshire's lakes, ponds, rivers, and estuaries. The SWQPA requires that all excavation, earth moving, and filling activities within the protected shoreland have appropriate erosion and sedimentation controls in accordance with Alteration of Terrain regulations (RSA 485-A:17 and Env-Wq 1500). The goal of this fact sheet is to explain various methods to limit erosion during construction within the protected shoreland.

EROSION IS A SERIOUS PROBLEM

Problems caused by sediments and nutrients include:

- **Lower Property Values:** Property values may decline when a lake, pond or stream fills with sediment, making the water shallower. Shallow areas encourage weed growth and create boating hazards.
- **Poor Fishing:** Sediments and nutrients reduce fish populations by clouding the water, covering spawning beds, increasing unwanted aquatic plant growth, and decreasing the quantity of oxygen in the water critical for fish survival.
- **Growth of Weeds and Algae:** Sediments carry nutrients that feed algae and aquatic weeds including exotic species such as milfoil.
- **Loss of Tourism:** Shallow, mucky lakes, ponds, and streams are not attractive to tourists or local residents, resulting in economic loss.
- **Local Tax Impacts:** Cleaning up sediment in streets, sewers and ditches adds extra costs to local government budgets.

PREVENTING EROSION IS SIMPLE

Erosion control is important to protect the quality of New Hampshire's public waters. The easiest and most cost-effective way to prevent erosion is to preserve existing vegetation. Placing temporary orange construction fences around existing trees, shrubs, and low-growing vegetation will prevent accidental damage to plants during construction. At a minimum, fences should be placed outside the tree canopy dripline to minimize damages to roots from grading and excavation. It will also avoid soil compaction around roots that can be caused by the weight of soil stockpiles and vehicle traffic.

If vegetation needs to be removed, leaving stumps in place will help prevent erosion. Under the SWQPA, stump removal requires a permit. Within 50 feet of the reference line, stumps that are removed are to be replaced with pervious surfaces, new trees, or other woody vegetation.

When it is not possible to preserve vegetation, alternative erosion control measures must be used. The materials needed are easy to find and are relatively inexpensive:

- **Silt Fences and Hay Bales:** These are used to trap sediments on the down slope side of the lot.
- **Hay Mulch, Straw Mulch, and Erosion Control Matting:** These materials are used to temporarily cover disturbed soil, prevent erosion, and promote seed growth.
- **Temporary Diversions:** These are temporary channels used to divert clean water from upslope areas around the construction site.
- **Revegetation:** Within three days of final grading or temporary work suspension, all exposed soils must be stabilized by seeding and mulching during the growing season. If not within the growing season, soils must be stabilized by mulching with tack or netting, or with another approved method of temporary stabilization. Do not underestimate the success of frost seeding and mulching as an alternative to leaving a slope bare until the spring planting season.

Using these materials and techniques is easy when careful planning is done. Only a few control measures are needed at most construction sites (Figure 2). Other control measures include, but are not limited to:

- Locating erodible materials away from any roads or waterways.
- Using a temporary construction entrance/ exit to limit the tracking of mud by construction equipment onto streets.

Additional information is available in the online version of the New Hampshire Stormwater Manual.

INSTALLING AND MAINTAINING EROSION CONTROL MEASURES

Erosion control measures are only effective if they are well installed or properly executed. Using the recommendations below will increase the efficiency of these measures. These recommendations do not supersede any guidance from best management practices manuals for New Hampshire, or the New Hampshire Stormwater Manual. Where administrative rules or permit conditions specify that work will be done in accordance with specifications in one of these manuals, the manual must be followed.

Silt Fences and Hay Bales:

- Install before any other work is done.
- Install on down slope side(s) of site, with ends flared up slopes.
- Place parallel to the contour of the land to allow water to pond behind the fence.
- Entrench the fence fabric or hay bale four inches deep.
- Stake using two stakes per hay bale or one stake every three feet of silt fence.
- Leave no gap between hay bales or sections of silt fence.
- Inspect and repair once a week and after each storm event.
- Remove sediments when deposits reach half the fence or bale height.
- Maintain until lawn is established or soil is stable.



Figure 2 - Hay bales and biodegradable erosion control matting minimize erosion on this slope.

Hay Mulch, Straw Mulch, and Erosion Control Matting:

- Mulch or install erosion control matting as soon as possible.
- Place a sufficient amount on exposed soils so that soil surface is not visible.
- On small areas, hold mulch by wetting or matting with stakes.
- *Required* for seeding outside normal seeding season.
- Inspect periodically and after each storm. Spread additional mulch when more than 10% of the soil surface is exposed.

Temporary Diversion of Runoff:

- Install diversion upslope of disturbed areas where runoff is coming onto property.
- Divert runoff into vegetated areas.
- Stabilize the channel with erosion control matting prior to use.
- Do not use to intercept streams or dam wetland areas.

Replanting:

- Replant with native species (Figure 3), as listed in Appendix D of the Shoreland Protection rules (Env-Wq 1400).
- Within 25 feet of the reference line of public waters, select species that do not require fertilizers (state law prohibits fertilizer in this area). Twenty-five feet beyond the reference line, low phosphate, slow release nitrogen fertilizer may be used.
- Use in combination with other control measures until soil is no longer exposed.



Figure 3 - Maleberry, a native species.

Seeding:

- Loosen soil to a depth of two inches where compacted.
- Seed uniformly with an appropriate seed mix for the site. Roll lightly.
- Do not fertilize within 25 feet of the reference line of public waters. Twenty-five feet beyond the reference line, low phosphate, slow release nitrogen fertilizer may be used. If site is fertilized in winter and seeded in spring, the fertilizer will have leached into the ground before seeds germinate.
- Mulch with hay or straw and anchor when necessary due to wind or slope.
- Water as needed.

Preplanning Soil Pile Location:

- Locate soil piles away from steep slopes, down-slope street, driveway, waterbodies, wetland, ditch, or drainages.
- Protect from erosion. Use anchored tarps, temporary seed, and/or sediment barriers.

Temporary Gravel Construction Entrance/ Exit:

- Use to limit the tracking of mud by construction equipment onto streets.
- Install a single access entrance/ exit.
- Consider using geotextiles under the gravel. This will limit the deposit of gravel into underlying soil and facilitate maintenance.
- Cover with 2-3 inch of stone aggregate.
- Maintain the gravel capacity throughout construction.
- Sweep or scrape up any soil tracked onto the road by the end of each work day or after a storm.

FOR MORE INFORMATION

For more information, please refer the New Hampshire Stormwater Manual, Volume 3, available at www.des.nh.gov. You may also contact the Shoreland Program by phone at (603) 271-2147, via email at shoreland@des.nh.gov, or by mail at 29 Hazen Drive; P.O. Box 95 Concord, NH 03302-0095.