

# Pond and Lake Management Part II: Preventing Shoreline Erosion & Removing Sediments

Fact Sheet FS1077



## **Cooperative Extension**

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### **The Need for Pond and Lake Management**

Waterbodies such as lakes and ponds are valuable resources. Lakes and ponds can be natural or man-made, and management depends on the desired use. For example, not all lakes are suitable for swimming, and different management practices will be applied to areas where swimming is encouraged and areas where it is not. Human actions, as well as natural phenomena, contribute to unwanted pond and lake conditions. Excessive plant growth, algal blooms, oxygen depletion, sediment build-up, bank erosion, and pests are the most common issues faced in the management of a lake or pond. In many cases there is a “quick fix” remedy that can eliminate the symptoms of a problem at least temporarily. However, the issue will return if the root cause of the problem is not addressed. A sound pond or lake management plan addresses not only management of the symptoms, but also remediation of the causes of common pond and lake issues. This fact sheet is the second in a series that addresses common lake and pond problems.

### **Reducing Erosion and Removing Sediments**

Shoreline erosion and sedimentation are physical problems that are usually the result of increased stormwater flows. Shoreline erosion results from water and ice hitting the bank from below, as well as runoff pouring off the land from above. In addition to simply filling in the lake or pond, these

sediments can serve as a source of nutrients that can be released under low oxygen conditions resulting in algal blooms. Aquascaping and vegetated riparian buffers, discussed in more detail in Pond and Lake Management Part I, can help stabilize shorelines. Rooted plants hold soil particles in place so they are less likely to be eroded away by either wind or water. In larger lakes where erosion is the result of wave action, revetments can be used to stabilize banks and armor the bank against wave forces. The most common revetment is riprap. Loose rocks are placed on top of a filter blanket so that soil particles underneath will not wash away. Roottrap is also used to stabilize banks. It is similar to riprap; however, a layer of topsoil is provided, and vegetation is planted. The roots of the plants stabilize the structure by holding the rocks in place.

Sediments cause turbidity, fill up basins, and also may carry nutrients, heavy metals, or other toxins attached to the soil particles into the pond or lake. The sediments that build up in a pond or lake are the result of erosion of not only the local lake banks, but also areas upstream. Reducing the source of sedimentation by protecting stream banks from erosion can be used as a preventative measure against sediment build up. A great amount of sediment comes from the erosion of exposed land at construction sites or plowed agricultural fields. New construction sites around lakes should have the highest priority for erosion control including, but not limited to, the use of silt fences, diversions, detention basins, and replanting as soon as possible. Crop rotation, conservation tillage, contour stripping, and the use of vegetative buffer strips can be used to control erosion in agricultural areas in close proximity to a waterbody.

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Sediments settle from flowing waters as the flow velocities decrease. Diverting turbid water to a detention basin where it can slow and deposit its sediments before it enters the pond or lake will prevent the sediment from entering the pond or lake. The sediments suspended in the water can also be removed with trash screens or skimmers at storm water culverts, road ditches, or detention pond outlets. Proper cleaning and maintenance of these structures is necessary to prevent blocking and backup that could lead to flooding or other upstream problems.

The removal of the sediments and muck on the pond or lake bottom is referred to as dredging. In addition to simply deepening the lake, dredging can remove nuisance macrophyte plants, limit nutrient cycling, and remove contaminated sediments. If dredging seems to be a viable option, permits to dredge should be sought. Before dredging, the source of the sediments should be identified and efforts to reduce the source input should be made. Sometimes sediment buildup is a natural process, such as the sedimentation due to leaf litter from overhanging branches and decaying plant and algal matter. In small scale applications the muck can be simply scooped out with a metal bucket. Seines or slushers can also be used. When sediment is removed in this way, it contains less water and the dewatering time is much shorter. Small scale pumping systems can also be used to remove loose sediments. In more large scale applications, backhoes, front end loaders, or commercial dredging equipment is necessary. New Jersey Department of Environmental Protection (NJDEP) general wetland permits and stream encroachment permits are required to dredge. A lake lowering permit may also be required. These permits must include a dewatering plan and an approved dredge spoil disposal plan. Additional regulatory information can be found at:  
[http://www.nj.gov/dep/landuse/njsa\\_njac.html](http://www.nj.gov/dep/landuse/njsa_njac.html).

## Additional Resources:

Lake Management Short Course. January 17-18, 1997. Cook College, Rutgers University. New Brunswick.

McComas, Steve. 1993. Lake Smarts. Terrene Institute. Washington D.C.

Holdren, C.W. Jones & J. Taggart. 2001. Managing Lakes and Reservoirs. N. Am. Lake Manage. Soc. and Terrene Inst., in coop. with Off. Water Assess. USEPA, Madison, WI.

Butler Sr., B. R. & Terlizzi, D. 1999. FS-766 Integrated Pond Management for Maryland.  
<http://www.agnr.umd.edu/MCE/Publications/Publication.cfm?ID=86>

Ohio Pond Management Bulletin 374-99. Ohio State University Extension.  
[http://ohioline.osu.edu/b374/b374\\_4.html](http://ohioline.osu.edu/b374/b374_4.html).

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