



TRUSTED CARE OF LAND & WATER

THE ILM ENVIRONMENTS

GUIDE TO DREDGING



ILM Environment's **GUIDE TO DREDGING**



Dredging is an important part of keeping a lake, pond, or other body of **water clean and healthy.**

As lakes and ponds age, they accumulate sediment over time that affects their ecological health and appearance. Sediment often contains excess nutrients which feed unwanted plants and algae. Sediment also causes loss of water depth and can easily become suspended in the water, affecting water quality and clarity. Eventually, the aquatic ecosystem loses functionality and stops

supporting aquatic life. Lake management strategies, like proper aeration, nutrient deactivation and plant and algae control, are important to maintaining a healthy lake or pond. To keep water bodies in good ecological health, however, you will likely at some point need to dredge.

What Is Dredging?

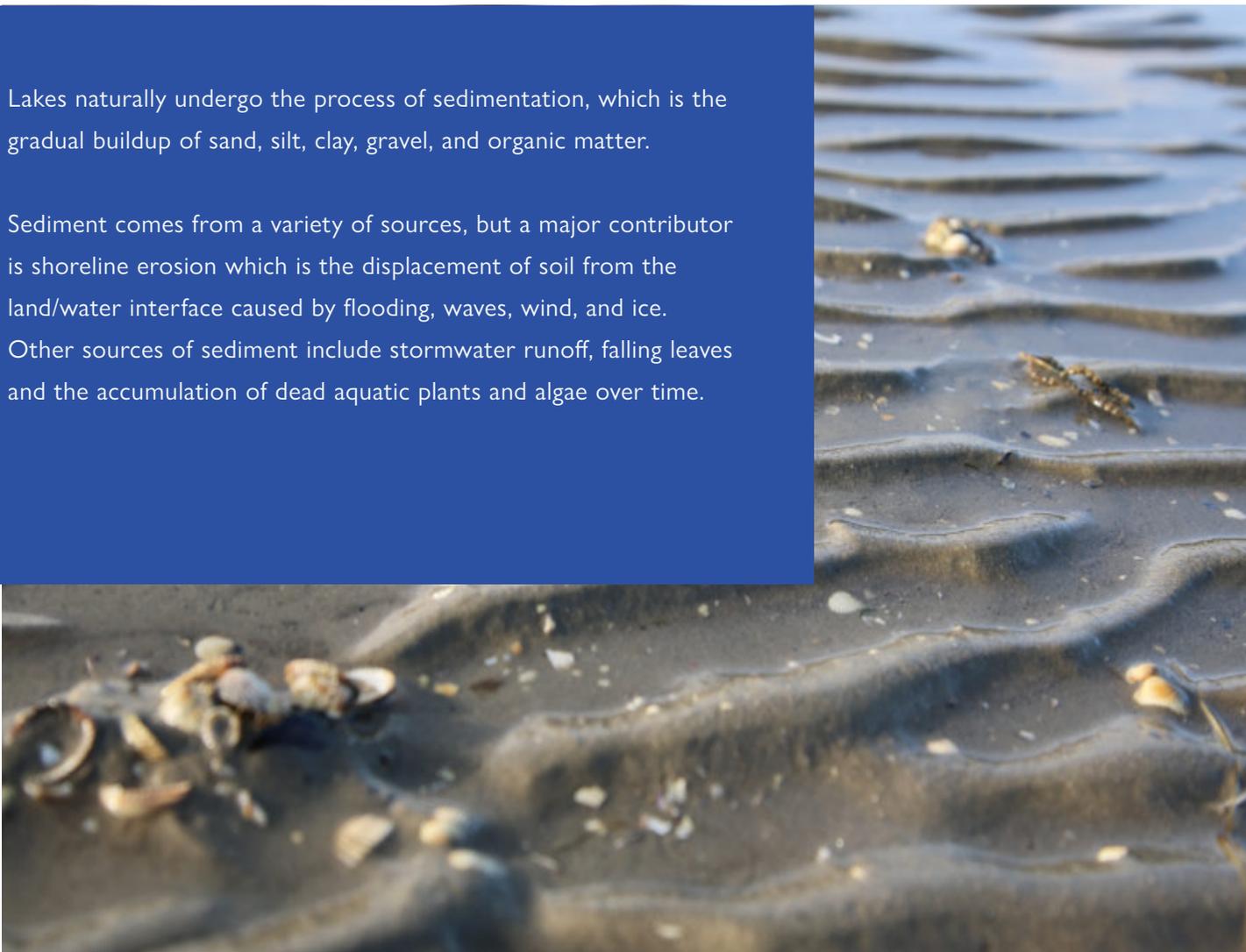
Dredging is the process of mechanically removing accumulated sediment from your lake or pond. The type of method used to dredge depends on several factors including sediment composition, site access and whether the sediment can be reused on site. Regardless of the dredging approach, restoring depth and removing accumulated excess nutrients is key to restoring your lakes ecological health.

Where Is the Sediment Coming From?

Lakes naturally undergo the process of sedimentation, which is the gradual buildup of sand, silt, clay, gravel, and organic matter.

Sediment comes from a variety of sources, but a major contributor is shoreline erosion which is the displacement of soil from the land/water interface caused by flooding, waves, wind, and ice.

Other sources of sediment include stormwater runoff, falling leaves and the accumulation of dead aquatic plants and algae over time.



How to Stop or Slow Down Sediment Accumulation

To reduce or prevent sediment buildup in your lake or pond and mitigate its harmful effects, consider stabilizing the shoreline, planting native plant buffers, and possibly adding aeration.

Add Shoreline Stabilization

Shoreline erosion is a common issue in lakes and ponds caused by factors like wind, waves, ice, runoff, and loss of shoreline vegetation that hold the soil in place. Soil is pulled away from the shore and deposited in the water, contributing to decreased water clarity, poor water quality, and the buildup of sediment. Protecting your shoreline will not only help with the overall health of your lake or pond but can also prevent the need for dredging down the line.

Common shoreline stabilization methods include native plant installation and riprap. Native plants have exceptionally deep roots that hold the soil in place and prevent it from being washed away. Native plants can be very attractive and have the added benefit of filtering pollutants before they reach the water. They also provide food and habitat for native wildlife like bees and butterflies while deterring nuisance wildlife such as geese which will avoid areas with groundcover taller than turfgrass. When establishing a native shoreline, annual maintenance should be considered to ensure that aggressive, non-native plants do not reestablish and take over.

Riprap is another shoreline stabilization option where large rock is installed to absorb energy that causes erosion. Riprap does not create habitat like native plants, but it does offer long-lasting protection of shorelines, especially where wave action and ice are problematic. Riprap installation often requires permits, as adding material to waterways is regulated by governmental agencies.





Plant Shoreline Buffers

Shoreline buffers are vegetative strips comprised of a diversity of native plants that border lakes and ponds. These buffers can help filter sediment and other pollutants (such as fertilizers and pesticides) from runoff that flows from the land into waterways, thus protecting them from nearby land uses. Shoreline buffers should be a minimum of 20-30 feet wide, but any amount of buffer added along a shoreline will help to reduce sedimentation and improve water quality.



Add Aeration

When oxygen levels in a pond or lake are low, organic matter takes longer to decompose because the bacteria essential to this decomposition process require oxygen to thrive. An aeration system circulates and oxygenates the water, which will improve the ability of healthy bacteria to do their job and break down organic sediment.

There are two commonly used means of aeration: surface aerators, or fountains, and lakebed aeration systems, typically called diffusers. Fountains utilize in-water electric motors, typically affixed to a float, to move water at the surface. Even though water movement is located just below the surface, the cohesive nature of water and its strong hydrogen bond allows a fountain's impact to extend much further below the water's surface than the actual unit. Fountains are most effective in shallow water environments but can be useful in depths up to six to eight feet before diffusers become the preferred option.

Diffuser systems are comprised of an onshore compressor delivering compressed air to diffusers located at the bottom of a lake or pond. Unlike fountains, diffusers offer no visual appeal and maintain a water body's natural appearance. The process of diffusing compressed air through a porous material located at the bottom of a lake or pond creates a gentle updraft carrying with it water. Lake or pond bed aeration is most effective in deeper water. The deeper the water column the air must travel through to reach the surface, the greater the water movement. In water depths less than six to eight feet, diffuser systems start to lose their efficiencies and fountains become the better option.

Types of Dredging

There are two types of dredging methods—hydraulic dredging and mechanical dredging. Experienced lake management professionals can help you determine which type of lake or pond dredging is right for you.

Mechanical Dredging

Mechanical dredging uses an excavator with a bucket to manually dig up sediment and transfer it to barges or trucks for disposal. Excavators are staged either on the shore or float in the water, depending on the area that needs to be dredged and the reach of the excavator. ILM Environments uses amphibious excavators that work from both land and water, offering flexibility at the job site. Mechanical dredging is useful when targeted areas of the lake have coarse material like gravel and sand. Material suspension, which refers to when certain amounts of dredge material are stirred up and suspended in the water, is more of a concern with mechanical dredging when removing finer sediments. As a result, hydraulic dredging is often recommended for removing fine, silty sediments.

Hydraulic Dredging

Hydraulic dredging uses a suction to remove sediment which is transported through a pipe and deposited on land, typically into a what is called a dewatering bag. The dewatering bag contains the sediment while allowing clean water to flow back into the lake or pond. A certain amount of skill and experience is required to achieve the optimal suction setting for different types of sediment balanced with the right flow for proper dewatering.

Since a significant amount of the volume of the material removed during hydraulic dredging is water, it must be separated from the sediment, clarified, and then returned to the lake as clean water. To speed up this “dewatering process,” polymers are often used as a coagulating agent. They bond suspended particles together into small aggregates, known as flocs, which then drop out of the water column much faster, leaving behind clear, sediment-free water.

Many professional dredgers use polymers on hydraulic dredging jobs to shorten the drying time, increase efficiency, reduce the area needed for dewatering, and improve the quality of returned water.

Which Dredging Method is Right for Me?

The type of dredging method employed depends on several factors. These include:

Type of dredge material:

- While dredging can remove a variety of bottom materials, the two methods are best suited to very different kinds of materials. Mechanical dredging is best suited for removing coarse material like gravel that can be contained in the excavator's bucket. Hydraulic dredging equipment, on the other hand, is best suited for removing fine silt, which can be easily sucked into pipes which transport water and silt as a slurry to dewatering bags on land.

Equipment:

- Mechanical dredging involves the use of an excavator or another type of heavy equipment, usually situated on a floating barge or at the water's edge, to dig out excess sediment. The sediment is then hauled away for disposal or reused. Available space on land for large machines and access for trucks for hauling are factors to consider with mechanical dredging. In contrast, hydraulic dredges float on water and are often much smaller in size than excavators. One consideration with hydraulic dredging includes having enough level space on land to place the dewatering bags that will contain the sediment until dry. In this case, the dewatering bags need to be left in place until the sediment fully dries out.

Material suspension:

Material suspension refers to the fact that during dredging, certain amounts of dredge material, which can contain contaminants, are stirred up and suspended in the water. This is more of a concern with mechanical dredging since the bucket physically digs up the lake's bottom. Hydraulic dredging, in contrast, uses suction with a shroud head to contain the suspended material and pump it away.

Time:

Mechanical dredging is usually faster than hydraulic dredging as it does not involve the piping, pumping and dewatering steps required by hydraulic dredging. Not to mention, if dewatering bags are used as part of a hydraulic dredge, the bags must remain onsite until the sediment dries out. Drying time depends on the type of material.

Regardless of the dredging technique employed, disposal of the dredge material is a big part of any dredging project. Having the ability to store and reuse the material onsite is always the most cost-effective option for dealing with dredge material. Hauling sediment away is more expensive and sometimes requires testing to ensure it does not contain contaminants. Local, state, or federal permits may be required for hauling, depending on the body of water, quality of the material, and requirements of the receiving site.

A professional lake management expert can help you determine which dredging method is right for your lake or pond.

Signs a Lake or Pond Needs to Be Dredged

Dredging has long-lasting benefits, and a well-maintained lake or pond may only need to be dredged every forty years or so. However, depending on the rate of accumulation of sediment, your lake may need to be dredged more often.

There are several signs that may indicate your may benefit from dredging:

01

Muck on the lake bottom

02

Bad Odors

03

Murkiness

04

Absence of wildlife such as fish and waterfowl

05

Dead Fish

06

Overgrowth of algae and/or weeds

07

Shallow Water

If you think it's time to dredge your lake or pond, contact a lake management expert for a consultation.

What To Do if You Think Your Lake Needs Dredging.

If you think it may be time to dredge your lake or pond, consider the following steps:

● Call a Trusted Lake Management Expert

Finding a lake management company or consultant with experience in dredging is the first step. Research local options, read client testimonials, and ask for references before choosing a contractor. You want to hire a team of experts who care about your lake and the health of the environment as much as you do.

● Conduct a Sediment Investigation

Once you have selected an experienced lake management team, they will likely recommend conducting a sediment survey to determine how much sediment buildup exists in your lake, where the sediment is, and the make-up of the sediment. Their investigation may include collecting data with sonar or sediment probing poles, building a topographical map of the water body, and calculating sediment volumes compared to lake depth. After the conclusion of their sediment investigation, the lake management professionals will recommend how much, if any, sediment removal is necessary.

● Choose a Lake Dredging Method

Your lake management experts will propose a dredging method that will work best for your lake or pond based on the data they collected from the sediment investigation. Access to the water as well as the type and amount of sediment at the bottom of the lake are factors in deciding whether hydraulic or mechanical dredging is right for your circumstances.

After securing the necessary permits, a skilled lake management team can then start the lake dredging process. All you have to do is look forward to a cleaner, healthier lake.

Do I Really Need a Permit for Dredging?

It depends. If your pond or lake is considered a “Waters of the United States” by the United States Army Corps of Engineers (USACE), then you will likely need a dredging permit. Small, man-made ponds which do not drain into other bodies of water often do not require permits. Getting a permit can range in complexity and timeframe from a two-week application to a six-month investigation process. It all depends on factors such as the type and method of dredging, where the lake or pond is located, the composition of the material to be dredged, and how the dredged material will be disposed of. Other considerations include whether any endangered species, archaeological zones, or historical sites will be affected by the dredging project.

In addition to the USACE, other regulators which may require a permit include:

- **US Environmental Protection Agency (USEPA)**
- **State Environmental Protection Agencies**
- **US Fish and Wildlife Service (USFWS)**
- **State Department of Natural Resources (DNR)**
- **Local issuing authorities (City, Town, County)**

This list is not exhaustive. Various states and local municipalities also have their own interpretations of dredging regulations and may require additional permits. A professional lake management company that provides dredging services will work with the authorities in your local and state government to verify whether your dredging project requires a permit.

What Do You Do with the Dredged Material?

How you manage the sediment removed from your lake or pond depends on the dredging method, the type of material removed, and whether you can repurpose the material onsite. If your project requires permitting, associated restrictions will also influence what you can do with the dredge material. Keep in mind that hauling fees to remove sediment from a project site can add significant costs to the project.

Mechanical dredging involves scooping up the dredge material mixed with water. If the material needs to be hauled away, it is typically placed in a water-tight truck bed to prevent the material from leaking out. Appropriate disposal sites will need to ensure that the slurry of dredge material remains contained while the water evaporates and/or seeps into the ground. If dredge material is contained at the project site to be used as fill for another project, it will need to be contained within silt fencing to prevent erosion of the dredge material. Once the dredge material dries out, the silt fencing can be removed.



Hydraulic dredging most often involves pumping a sediment slurry into a dewatering bag. Over time, clean water drains from the bag and returns to the lake or pond, leaving behind dry sediment. The bag is then cut open and the dried sediment is scooped into trucks and taken to a disposal site or a location where the material will be reused. Many dredging projects successfully incorporate the dredge material into an onsite project like creating a garden bed, building up a soccer field or other recreational area, and even using it to amend agricultural fields. In these cases, it is very important that the sediment be tested to make sure it is safe for human exposure. Reusing the material onsite is a significant cost savings for any dredging project.

ILM Environments

At ILM Environments, we offer a wide range of ecological services to help you maintain a healthy aquatic environment. We work closely with our clients to determine the best solutions to improve the ecological health of your lake or pond. Whatever you have questions or concerns about sedimentation, water quality, or lake maintenance, we have the ecological skills and expertise to help. Contact us to schedule a consultation.



Would you like to learn more or
talk to an ILM dredging specialist?

Call the number below or
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