SEDIMENT MANAGEMENT

Dredging

STRATEGY SCALE

THREATS ADDRESSED

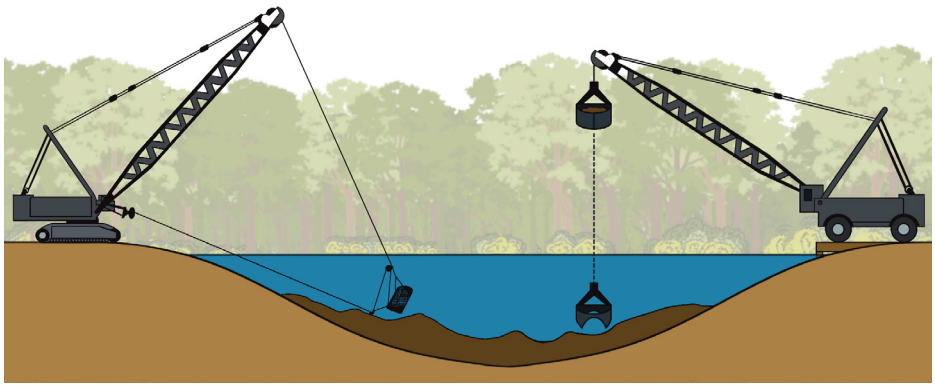
- ✓ Excess Nutrients
- ✓ Pollutant Inputs
- ✓ Algal Blooms
- ✗ Erosion
- ✓ Invasive/Nuisance Species

STRATEGY GOALS

Protect	Manage	Rehabilitate
○	○	●

STRATEGY CO-BENEFITS

Habitat	Aesthetics	Recreation
✗ *Detrimental*	− *Neutral*	− *Neutral*



- ✓ **Permittable in Massachusetts**
  Local planning process. List of potential permits available here.
- ✓ **Implemented on Cape Cod**
  See examples of pond projects implemented on Cape Cod here.
- ✓ **Listed in 208 Plan Technologies Matrix**
  Learn more about the nutrient management strategies in the Tech Matrix here.
- ✗ **Can be Performed at Homeowner Scale**
- ✗ **Nature-based Solution**

DURATION OF BENEFITS

Less than one month	One season or year	Multiple seasons or years
○	○	●

MAINTENANCE REQUIREMENTS

Monthly	Annually	Infrequent
○	○	●

DESCRIPTION

Ponds store and accumulate nutrients and pollutants within their sediments and these can be released into the water column. Accumulation of sediment itself can also be a problem. Dredging physically removes sediment where pollutants are stored, with possible re-use or disposal of dredged sediment. Dredging may also be used to remove aquatic invasive or nuisance plant species. Sediment is removed by wet or dry excavation or by using hydraulic dredging. Dredged sediment is deposited in a containment area for dewatering/disposal. Other in pond sediment management strategies permitted as "dredging" include reverse sediment layering, which uses hydraulic jetting to extract glacial sand from under the nutrient rich anaerobic organic sediment layer and place it on top of these sediments, and sediment capping, which is a containment technology that isolates contaminated sediments from the surrounding aquatic environment using clean layers of geological material and/or synthetic liners. These strategies are used to reduce the sediment-water interaction to reduce sediment-bound nutrients and other contaminants in sediment from becoming mobilized. Another use of sediment capping is to prevent the growth of rooted macrophytes.

ADVANTAGES

- Over the long term, dredging may "reset" or "rebalance" pond system
- Can remove large quantities of sediment and dramatically change pond hydraulics over a short period of time
- Can remove significant mass of phosphorus resulting in diminished internal phosphorus recycling
- Increases pond depth and retention time which may improve pollutant removal, sediment deposition, and flood control
- Can improve spawning habitat for fish species

CONSTRAINTS

- Over the short term, dredging may disrupt the aquatic ecosystem through physical removal of both native and invasive plants and animals; cause silting and increase in short-term turbidity, which can stress and can kill aquatic life; and change pond bathymetry
- Dredging activity can mobilize otherwise stable pollutants
- May temporarily impact recreational and other uses during dredging operations
- Off-site reuse or disposal of dredged sediment dependent on chemical testing of sediment

Dredging

IMPLEMENTATION

POTENTIAL ACTORS

Towns: Towns may propose dredging in town-managed ponds

Pond Groups: May propose or support dredging of public or private ponds and provide a supportive role through education

Private Landowners: May propose or support dredging of ponds

Land Trusts: May support dredging of ponds and provide a supportive role through education

SITING REQUIREMENTS

- Ponds with excessive sediment and/or significant sediment nutrient loading present
- Hydraulic / suction dredging may be better suited for large lakes or large-scale dredging as it can utilize a pipeline to reduce or eliminate truck trips
- Generally more suitable for shallow lakes (< 10 ft)
- Access/boat launch for large equipment

INFORMATION NEEDS

- Sediment characterization, quantity, grain size, and quality analyses
- Site specific information, based on hydraulics and other characteristics
- Depending on purpose of dredging (i.e., removal of nutrient/pollutant laden sediments or rehabilitation of pond to increase attenuation), additional data may be needed

IMPLEMENTATION EXAMPLES


Lake Elizabeth, Barnstable

There are very few examples of dredging in Cape Cod ponds. Reverse sediment layering was attempted on *Lake Elizabeth* in Barnstable. The project pumped glacial sand from below the sediment layer in the pond but was stopped when a concrete-like layer of "river till" beneath was encountered, and therefore there was not enough sand to pump to complete the re-layering process. Cranberry farmers were hired to distribute sand over the thick sediments.

RESOURCES

- The Massachusetts' Department of Conservation and Recreation's *Lakes and Ponds Program* provides related resources.

COST ESTIMATE

$$$$

Relative to other in-pond strategies

Varies depending on scope of project, type of dredging, volume of material to be removed, whether sediment needs to be treated, and distance sediment needs to be transported

ADDITIONAL FINANCIAL CONSIDERATIONS

Assessment: Planning, design, and permitting, including sediment characterization studies

Implementation: Dredging equipment and sediment disposal

Maintenance: Monitoring and mitigation

POTENTIAL FUNDING SOURCES

- **Community Preservation Act**
- **Capital Budget**
- **Grants**
- **Private Funding**

Additional information regarding potential funding sources is available ***here***.