



THREATS ADDRESSED

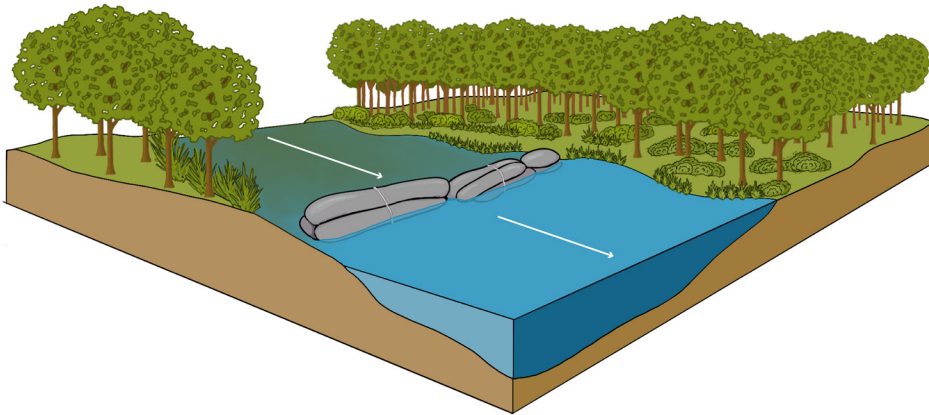
- Excess Nutrients
- Pollutant Inputs
- Algal Blooms
- Erosion
- Invasive/Nuisance Species

STRATEGY GOALS

- Protect
- Manage
- Rehabilitate

STRATEGY CO-BENEFITS

- Habitat Neutral
- Aesthetics Neutral
- Recreation Neutral



- Permittable in Massachusetts**
Local review through the Conservation Commission required. 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**
In small, private ponds. Local review and permitting may be required.
- Nature-based Solution**

DURATION OF BENEFITS

- Less than one month
- One season or year
- Multiple seasons or years

MAINTENANCE REQUIREMENTS

- Monthly
- Annually
- Infrequent

DESCRIPTION

Biochar, a carbon-rich material made from the partial combustion of biomass wastes, is an emerging material of interest as it can remediate pollutants and could be used to remove nutrients and other contaminants from ponds. Similar to activated charcoal, biochar has adsorbent properties that allow it to remove impurities from water. To make biochar, wood products are processed in a high heat, low oxygen environment to create highly porous carbon-rich properties with high affinity to absorb contaminants and nutrients. In a pond setting, biochar is placed inside permeable socks or bags which can be suspended in the water column or installed in racks or structures where water is most likely to flow through or pass over them. The biochar particles can attract and trap nutrients, metals, and other pollutants. The socks or bags need to be removed from the water and the biochar disposed of or repurposed to fully remove the pollutants. Other proprietary phosphorus filtration and inactivation technologies, such as EutroSORB, also work to filter and inactivate phosphorus similar to biochar, but are not approved for use in Massachusetts.

ADVANTAGES

- Biochar may be perceived as a “natural” material
- Biochar material can be repurposed as garden or lawn fertilizer
- Low maintenance

CONSTRAINTS

- Limited track record
- More appropriate for pond tributaries, therefore not applicable to kettle ponds
- Requires continual maintenance, upkeep, and repeated deployments
- Producing and sourcing biochar can be difficult, and expensive
- May reduce pond water fertility on a temporary basis



IMPLEMENTATION

POTENTIAL ACTORS



Towns: Towns may propose the use of biochar in town-managed ponds



Pond Groups: May propose the use of biochar in public or private ponds and provide a supportive role through education



Private Landowners: May propose the use of biochar in private ponds



Land Trusts: Land trusts may provide a supportive role through education

SITING REQUIREMENTS

- Ponds with tributaries
- Better in ponds with moving waters, if not, can be used in combination with aeration or circulation

INFORMATION NEEDS

- Nutrient loading analysis
- Quantity of product needed and frequency of application



Biochar flotation bags at Lake Hopatcong
photo by Lake Hopatcong Commission

IMPLEMENTATION EXAMPLES

The use of biochar in freshwater ponds and lakes on Cape Cod has been explored but has not been implemented. Biochar has been used in a [pilot project in a cranberry bog restoration in Marstons Mills](#).

[Biochar flotation bags](#) were installed in Lake Hopatcong, NJ to improve the lake's water quality by removing nutrients.

RESOURCES

- For more information on the use of biochar for the removal of nutrients in water, see a review paper in [Water Research](#)
- The Massachusetts' Department of Conservation and Recreation's [Lakes and Ponds Program](#) provides related resources.

COST ESTIMATE

Variable

Varies based on amount and price of product used



ADDITIONAL FINANCIAL CONSIDERATIONS

Assessment: Planning, design, and permitting

Implementation: Materials and installation

Maintenance: Monitoring and reapplication



POTENTIAL FUNDING SOURCES

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

Additional information regarding potential funding sources is available [here](#).