



**THREATS ADDRESSED**

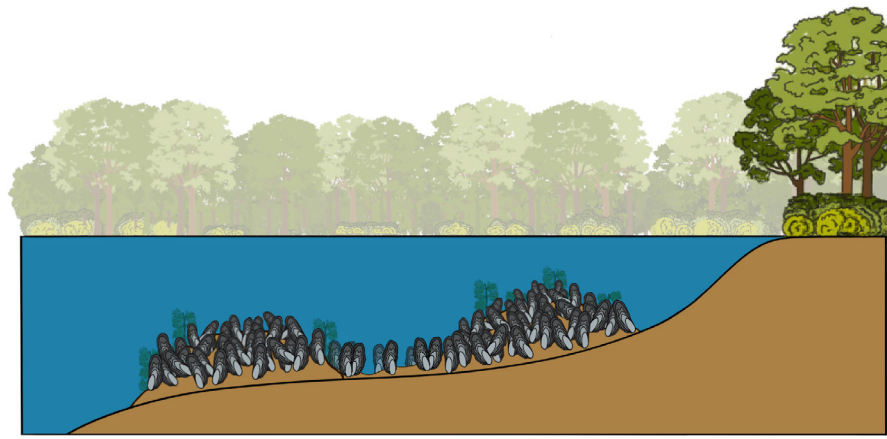
- Excess Nutrients
- Pollutant Inputs
- Algal Blooms
- Erosion
- Invasive/Nuisance Species

**STRATEGY GOALS**

- Protect
- Manage
- Rehabilitate

**STRATEGY CO-BENEFITS**

- Habitat Improve
- Aesthetics Improve
- Recreation Improve



- 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**
- Nature-based Solution**

**DURATION OF BENEFITS**

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

**MAINTENANCE REQUIREMENTS**

- Monthly
- Annually
- Infrequent

## DESCRIPTION

Freshwater aquaculture involves the reintroduction or enhancement of native freshwater mussel populations in ponds. Mussels serve as filter feeders, cleaning the water by removing small particles and potential contaminants, and consuming algae. Mussels can be raised in freshwater bodies to provide ecological remediation. The growing of mature mussels can sequester nutrients, while removing/harvesting mature mussels can remove nutrients from ponds. While aquaculture of shellfish (e.g., oysters) in marine environments is common and its nutrient management potential is documented, it is not common and benefits are not as well understood in fresh waterbodies. Freshwater mussels have a unique life cycle - mussel larvae (babies) undergo a metamorphosis as parasites on fish hosts. Some mussel species are “host specialists” using only one to a few fish hosts, while others are “generalists” and use many different fish species as hosts. To sustain a freshwater mussel population, suitable fish hosts must be present.

## ADVANTAGES

- Restores / enhances native populations of freshwater mussels
- Mussels filter water, improving water clarity
- Increases pond biodiversity

## CONSTRAINTS

- Benefits, environmental impacts, and unintended consequences uncertain
- Untested in freshwater ponds in Massachusetts, therefore permitting difficulties expected
- Of the 12 freshwater mussel species in Massachusetts, 6 are protected under the Massachusetts Endangered Species Act, presenting permitting challenges
- Studies have shown mussels’ positive impact on stream habitats, but less research in ponds and lakes
- Sourcing of mussels and ensuring fish hosts presence present challenges



## IMPLEMENTATION

### POTENTIAL ACTORS

- Towns:** Towns may investigate freshwater aquaculture in town-managed ponds
- Pond Groups:** May collaborate on freshwater aquaculture and provide a supportive role through education
- Private Landowners:** May collaborate on freshwater aquaculture
- Land Trusts:** Land trusts may collaborate on freshwater aquaculture and provide a supportive role through education

### SITING REQUIREMENTS

- Ponds that have, or have historically had, freshwater mussels
- Ponds with suitable habitat and fish host species for freshwater mussels

### INFORMATION NEEDS

- Mussel and fish surveys
- Mussel habitat assessment

### IMPLEMENTATION EXAMPLES

[New restoration efforts](#) in the Chesapeake Bay are boosting freshwater mussels for their ecosystem benefits.

In [Lake Trafford, Florida](#), the Florida Fish and Wildlife Conservation Commission and partners are experimenting with introducing freshwater mussels as natural filtration systems to improve the lake's water quality, benefiting hundreds of species in the area.



The [Indian Ponds Association](#), Barnstable is considering the merits and potential of repopulating several of the mussel species that lived in Association ponds prior to 2009 when the ponds experienced a major mussel die-off.

### RESOURCES

- The Massachusetts' Department of Conservation and Recreation's [Lakes and Ponds Program](#) provides related resources.
- Learn more about the freshwater mussels of Massachusetts [here](#).

## COST ESTIMATE

# Variable

Expected to be variable depending on scope of project



### ADDITIONAL FINANCIAL CONSIDERATIONS

**Assessment:** Planning, design, and permitting

**Implementation:** Mussels, materials, equipment and logistics

**Maintenance:** Monitoring, maintenance, replacement mussels, as needed, and mussel harvest considerations



### POTENTIAL FUNDING SOURCES

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

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