VEGETATION MANAGEMENT

# Biocontrol


STRATEGY SCALE

**THREATS ADDRESSED**

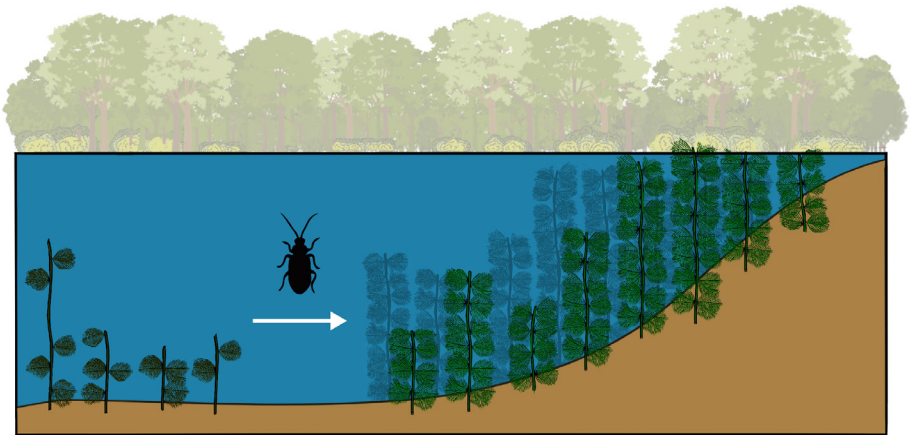
- ✕ Excess Nutrients
- ✕ Pollutant Inputs
- ✕ Algal Blooms
- ✕ Erosion
- ✓ Invasive/Nuisance Species

**STRATEGY GOALS**

| Protect | Manage | Rehabilitate |
|---|---|---|
| ○ | ✓ | ✓ |

**STRATEGY CO-BENEFITS**

| Habitat | Aesthetics | Recreation |
|---|---|---|
| ⊖ Neutral | ⊖ Neutral | ⊖ Neutral |



- ⊖ **Permittable in Massachusetts**
  *Limited. Insects are permitted. Fish and pathogens are not. 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**
  *In small, private ponds. Local review and permitting may be required.*
- ✓ **Nature-based Solution**
  *If native species used.*

**DURATION OF BENEFITS**

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

**MAINTENANCE REQUIREMENTS**

| Monthly | Annually | Infrequent |
|---|---|---|
| ○ | ✓ | ○ |

## DESCRIPTION

Biocontrol involves the introduction of herbivorous fish (e.g., grass carp, tilapia), insects (e.g., milfoil moth, milfoil weevil, root boring weevil, leaf beetles, loosestrife beetle), or pathogens (e.g., fungi, bacteria, viruses) to a pond to consume aquatic plants and reduce excess levels of nuisance or invasive aquatic species. Biocontrol harnesses biological interactions to produce desired conditions. In Massachusetts, some insect biocontrol agents are permitted, while fish and pathogens are not permitted. Effectiveness and potential impacts of plant pathogens are not well understood.

## ADVANTAGES

- Use of herbivorous biocontrol agents is low maintenance and unobtrusive
- Can involve species native to region, or even targeted lake
- Expected to have no negative effect on non-target species
- Plant biomass is reduced slowly, minimizing risk of oxygen loss
- Duration of benefits extended with self-sustaining population

## CONSTRAINTS

- There is a fundamental biological limitation to this approach as control agents do not eliminate their targets, so oscillating cycles are common, making this technique generally unreliable
- Any introduction of organisms may have imperceptible impacts on water quality, the aquatic community structure and food web
- Often involves introduction of non-native species and generally not self-sustaining
- Biocontrol agents may adversely affect non-target species
- May eliminate all plant biomass, funneling energy into algae
- Logistical difficulties with producing and distributing biocontrol agents

# Biocontrol



## IMPLEMENTATION

### POTENTIAL ACTORS

- **Towns:** Towns may propose the use of biocontrols in town-managed ponds
- **Pond Groups:** May propose or support the use of biocontrols in public or private ponds and provide a supportive role through education
- **Private Landowners:** May propose or support the use of biocontrols
- **Land Trusts:** May provide a supportive role through education

### SITING REQUIREMENTS

- Ponds with target nuisance or invasive aquatic species present and susceptible to available biocontrol species
- Ponds with no surface connections and little concern for unintended consequences
- Permitting issues affect use in MA, especially for fish and pathogens

### INFORMATION NEEDS

- Macrophyte survey (species composition and abundance)
- A full biological survey and study should be conducted to determine what type of manipulation is best suited to achieve the desired goals while minimizing possible adverse impacts

Purple Loosestrife

### IMPLEMENTATION EXAMPLES

In the 2000's, the State and partners initiated a *Purple Loosestrife Biocontrol Project*. The Galerucella beetle was introduced to control purple loosestrife, an invasive wetland plant species that invades areas and excludes native species from growing. On Cape Cod, Great Pond in Eastham was included in the project. The beetles consumed the loosestrife and kept it from spreading into other ponds in the area.

### 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 biocontrol agent used, magnitude of application, monitoring requirements, and mitigative measures

### ADDITIONAL FINANCIAL CONSIDERATIONS

**Assessment:** Planning, design, and permitting, including full biological survey

**Implementation:** Biocontrol agent, logistics

**Maintenance:** Monitoring, mitigation, and reapplication, as needed

### POTENTIAL FUNDING SOURCES

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

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