

POND MANAGEMENT

INTRODUCTION

Ponds are small (under five acres), still bodies of freshwater that play an essential role in local ecosystems. They serve as habitats for fish, frogs, insects, birds, and countless microorganisms. Beyond their beauty and biodiversity, ponds support groundwater recharge, filter pollutants, and help manage stormwater. Ponds can be used for many purposes, however, these ecosystems are delicate and are easily disrupted by human activity and environmental changes.

Addressing these challenges requires a balance between environmental restoration and modern land-use needs, supported by regular monitoring and thoughtful management. Effective tools, strategies and Best Management Practices (BMPs) are available at the County, State and Federal level to support pond owners in being active stewards of this resource through appropriate pond management.



A pond overlooking agricultural land uses.



Keurner Farm Pond

APPLICABILITY

Ponds are maintained for different functions including:

- **Wildlife:** habitat for native fish, animals, insects, amphibians, microorganisms and plant species with little to no human disturbance.
- **Stormwater:** collect and filter excess stormwater runoff.
- **Recreation:** fishing, canoeing, and swimming.
- **Agriculture:** livestock water source, irrigation, field spraying, and fire protection.

It is imperative that landowners understand the use of their pond, as it will require specific monitoring and maintenance tailored for that purpose.

POTENTIAL PROBLEMS

The pond ecosystem thrives on the balance of nutrients, largely, the inflow and outflow of nitrogen, phosphorus, carbon, and oxygen. Aquatic organisms are made up of these compounds and contribute to the natural cycle of nutrients as they eat, breath, grow, and eventually, die. However, when nitrogen and phosphorus are present in excessive amounts it leads to a harmful imbalance called Eutrophication. Excess nutrient sources include:

- Natural erosion and sedimentation
- Human and animal waste from Water Treatment Plants and Septic Systems
- Fertilizer and manure runoff from farming and urban areas

Eutrophication is also activated by warm temperatures, calm water, and direct sunlight. The result of these conditions is rapid overgrowth of microscopic bacteria seen as floating “blooms,” or mats, on the surface of the water. Over time, as the bacteria begin to decay and sink to the bottom of the pond, the organic matter depletes oxygen levels in the water, clogs fish gills and eventually kills aquatic life. Signs of a eutrophic pond include green, brown, or red blooms, noxious or musty odor, and dead wildlife. Depending on the use of the pond, these bacterial blooms can be toxic to livestock, birds, animals, pets, and humans as well.



Pond located on Birmingham Hill Preserve



Pond on Kuerner Farm - Photo Credit Rick Prieur

TOOLS AND BEST MANAGEMENT PRACTICES

The following BMPs can improve and help avoid Eutrophication or aging of a pond:

1. **Consistent Water Quality Testing:** self-conducted pond testing kit to measure levels of nitrogen, phosphorus, pH, dissolved oxygen, temperature, and other data points to depict the pond's current condition.
2. **Pond Buffer:** plant native trees, shrubs, grasses and wildflowers along pond banks to help filter pollutants, provide shade (lowering water temperatures), reduce runoff, and prevent erosion. Tall vegetation will also deter geese from gathering near ponds and contributing to nutrient levels through their droppings.
3. **Maintain Plant and Algae Growth:** remove invasive plant species and maintain moderate levels of aquatic plants and algae to sustain habitat and food chain.
4. **Limit Fertilizer:** minimize use of fertilizer around pond area to decrease nutrient rich runoff.
5. **Aeration System:** install an electric-powered bubbler or fountain structure that continuously moves water and maintains oxygen levels.
6. **Fencing:** fence around the pond to keep livestock, horses, and pets out of water to minimize nutrient pollution from manure.

For more information on Pond Management, visit the Brandywine Conservancy website for additional toolkits.



1 Hoffman's Mill Road
P.O. Box 141
Chadds Ford, PA 19317

610.388.2700
conservancy@brandywine.org
www.brandywine.org/conservancy