Management *of* Aquatic Plants

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Under ideal conditions, limited amounts of aquatic vegetation add to the aesthetic beauty of the pond and the ecosystem balance among the pond's aquatic life.

INTRODUCTION

If you build it, they will come. That can be said of ponds and aquatic plants. Just as grass and weeds will grow quickly on exposed soil, aquatic plants and algae will colonize new ponds in short order. While these plants and algae can grow abundantly and interfere with various pond uses, they also provide many benefits to the pond if their growth is limited.

The first step in assessing the importance of aquatic plants to your pond is to determine your intended primary use(s) for the pond. Ponds are frequently used in several ways to satisfy more than one objective. For example, having water available in the pond for fire protection may satisfy one objective without interfering or conflicting with other objectives such as swimming or fishing. Multiple-use ponds are fine as long as the uses are compatible. When conflicting or incompatible uses are desired, it is necessary to assign priorities to the owner's objectives. For example, the objective of providing an area for swimming may conflict directly with the objective of having water available for irrigation. Irrigation needs may lower the water level to a point where swimming is not possible at a time when swimming is most wanted. For this reason, you should list and prioritize specific objectives for your pond.

This publication is intended to help pond owners understand the importance and benefits of aquatic plants and algae. When plant and algae growth reach nuisance levels, pond owners have many options to restore balance to the pond ecosystem. Too often, pond owners reach for quick fixes like aquatic herbicides. If not used properly, herbicides may eliminate too much vegetation or beneficial plants along with the targeted weeds. Herbicides are just one method of controlling unwanted plants and algae. Nonchemical methods may provide longer and more permanent control and should be considered when developing a pond vegetation management strategy. Information in this publication will help pond owners properly identify aquatic plants, understand their benefits, and choose appropriate control strategies (where necessary) to minimize damage to the pond ecosystem.

If you build it, they will come.

THE ROLE OF AQUATIC PLANTS IN NATURAL POND ECOLOGY

Ponds are most healthy when there is a balanced ecosystem of insects, plants, fish, and animals otherwise known as a "food web." A balanced food web includes some planktonic algae and aquatic plants at the top, which serve as a food source for small zooplankton and aquatic insects. The zooplankton and insects in turn provide food for the smallest fish in the pond. These then become prey for larger fish, which finally may be taken by raccoons, bears, or fishermen.

Under ideal conditions, pond plants also provide oxygen to the water during the day as a result of photosynthesis. Some of this oxygen is then used to support the same plants during nighttime respiration. In the winter, water temperatures get much colder and ice may cover the top of the pond for an extended period of time. Most aquatic plants become dormant or produce seeds and die before winter, but a few plants are capable of remaining green and growing all winter long. These plants are usually able to get enough light through the ice to cause some photosynthesis and help support pond life during the harsh winter conditions.

The optimum amount of aquatic vegetation for a given pond is difficult to identify because it depends on the preferred use of the pond. Generally, aquatic vegetation should cover 20 to 40 percent of the pond area (bottom and top) to provide a healthy pond ecosystem. The smaller percentage is preferable for boating, irrigation, and swimming, while the larger percentages are best for ponds intended primarily for fishing recreation.

Benefits of Plants and Algae

A recent survey of Pennsylvania pond owners found that nearly two-thirds felt that aesthetic beauty was the main reason for building a pond on their property. Part of the picturesque view of a pond includes at least some aquatic vegetation and the beauty it can impart. The aesthetic beauty of water features with aquatic plants is one of the main reasons backyard ponds have become so popular in the last decade.

Besides their aesthetic beauty, plants and algae provide many benefits to the pond ecosystem. Both the roots and leaves of aquatic plants can reduce muddy water conditions. The roots of submerged and floating plants stabilize the bottom sediments while the dense leaves of submerged plants trap floating debris and sediment. The plants also remove nutrients from the water column, thereby reducing the availability of nutrients to cause nuisance algae blooms. The nutrients are stored in the plants until fall when much of the nutrient load falls to the pond sediments as the plants die. Around the edge of the pond, the roots of emergent plants also stabilize the pond banks and reduce erosion.

Under the water surface, the dense stems, roots, and leaves of aquatic plants serve as excellent habitat for insects and invertebrates including snails, leeches, and crayfish. The plant structure traps organic material and promotes the growth of periphyton (attached algae) and attracts zooplankton (barely visible aquatic animals) that serve as important food sources for

Aquatic plants serve as important habitat for insects and other pond life.

these scavengers. Aquatic insects also perch on aquatic plants and filter the surrounding water for food.

The benefit of aquatic algae and plants to the pond fishery cannot be overestimated, especially since more than 50 percent of pond owners in Pennsylvania consider fishing recreation a major use of their ponds. A healthy and well-balanced fish population is more attainable if significant aquatic plant beds exist in the pond. Many pond fish use weed areas as nesting beds to provide cover for their young. Some feed directly on the plant leaves or the insects resting on the leaves. All fish use the cover provided by vegetation to stalk prey. Small fish hide from larger fish in underwater plants to prevent predation. As a result, the amount and type of vegetation will affect the fish population structures. Too much vegetation will allow many young fish to survive, making it difficult for larger fish to grow. Too little vegetation allows predator fish to easily capture smaller fish. In this case, fish may grow quickly until they consume all the smaller fish in the pond.

In addition to fish, other types of wildlife thrive in the pond environment. In fact, pond owners are often surprised at the number and diversity of wildlife that is attracted to a pond, especially if the pond is constructed in an area that is otherwise lacking water resources. Part of this attraction is the type of aquatic plants present in the pond. Various aquatic plants are a vital component in the diet of ducks and geese. They not only eat the plants themselves but also devour the insects that live on the plant surfaces. Emergent plants around the pond edge also serve as important nesting areas that provide dense cover for waterfowl. Various mammals also use aquatic plants. For example, muskrats prefer ponds with cattail beds for food and cover. Many pond owners are also surprised to see whitetail deer occasionally feeding on various pondweed species in and around the pond. Last but not least, amphibians and reptiles such as turtles, salamanders, and snakes rely on pond plants for food and shelter.

Healthy pond fish populations depend on aquatic vegetation for food, cover, and reproduction.

Overabundant Aquatic Plant Growth

Many of the same benefits provided to ponds by optimum levels of plant growth can be taken away by overabundant plant growth. Nuisance plant and algae growth can ruin the aesthetic appeal of the pond, degrade water quality, and even kill aquatic life. Unfortunately, nuisance plant growth is a common complaint among pond owners in Pennsylvania (Figure 1).

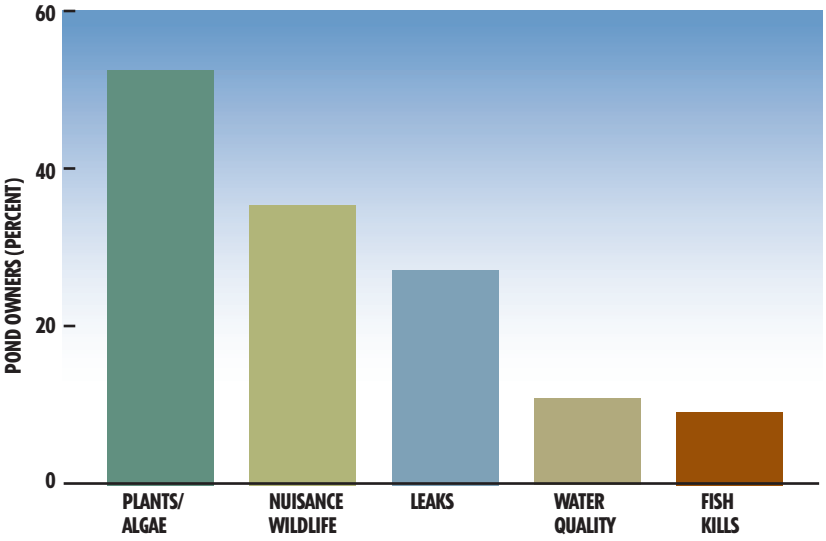

Figure 1. The prevalence of various pond problems based on a survey of Pennsylvania pond owners.