A healthy water feature can add architectural challenge and great aesthetic value to the golf course landscape.

Selecting an Aerator to Enhance Water Circulation

The proper type of water aeration can improve circulation and help lake quality, but it is far from a cure-all for ugly water features!

BY DARIN S. BEVARD

Water features are an important part of architecture on many golf courses. Well-placed lakes and ponds add to the strategy of golf and provide penalties for errant shots. More important, water features collect drainage water from golf course property and surrounding areas. Often, this water is the primary irrigation source on the golf course. Water features are an important aesthetic, environmental, and practical feature on golf courses. However, they can become an eyesore if algae blooms and other aquatic weeds transform them into a green mess. When this occurs, golfers become irritated and the perception of the golf course (and the superintendent in some instances) can suffer. A strategy to improve water quality as well as the appearance of the water feature needs to be developed.

Before going further, it should be noted that I am not a lake expert, and, in researching this article, I quickly realized that lake management is a lot like turf management. Many different factors contribute to the occurrence of aquatic weed problems and poor water

quality. Weather is a huge contributing factor, and there are exceptions to every rule. Additionally, the end user often dictates the treatment strategies that are implemented to address short-term problems that may or may not be the best long-term solution for the water feature. Rarely is one single factor the cause of water quality problems. This sounds an awful lot like managing turfgrass.

Moving water discourages the development of many common aquatic weed problems. During the summer months, sunlight warms the surface and upper layer of the water. Because warm water is less dense than cold water, a warm upper layer is formed and sits on top of a cold lower layer. Bacterial decomposition of organic matter can deplete the oxygen in the lower layer, creating a dead zone. This lack of oxygen may, in turn, lead to a phosphorous release that can fuel additional undesirable aquatic growth. Artificial circulation equipment increases oxygen levels and prevents stratification in the water column by providing a mixing effect. However, different types of aeration/water circulation devices offer advantages and disadvantages, depending upon the size of the water feature and other factors.

FLOATING FOUNTAINS

Floating fountains are very popular on golf courses, and are installed as much for their aesthetic appeal as for their benefits for a lake or pond. These fountains effectively increase oxygen levels and improve circulation in smaller bodies of water. Water features five to eight feet in depth that have surface area less than one acre may benefit from a floating fountain. Although larger bodies of water can benefit if fountains are used, the cost of electricity to power a fountain (or fountains) that provides adequate circulation may be prohibitive. Floating fountains can be attractive, but for larger bodies of water, other forms of aeration/circulation equipment may be more cost effective.

DIFFUSION AERATION

The bubblers used for diffusion aeration are located at the bottom

Diffusion aerators (subsurface bubblers) efficiently mix the water column and prevent stratification without the potential visual or noise distraction of a vertical water display.

Enhancing circulation with a fountain or other aerator cannot overcome other water quality problems, such as shallow pond depth or high nutrient load.

of the water feature. This allows the mixing of the water column as bubbles ascend to the surface. Diffusers that create smaller bubbles provide better mixing than those that create larger bubbles. Smaller bubbles provide greater surface area, which increases their impact as they rise through the water column. Diffusion aerators do not increase oxygen levels to the same extent as fountains or bubblers. However, they do an excellent job of preventing stratification of water features, allowing the water column to contain sufficient oxygen from top to bottom. The power source for diffusion equipment is located on land, which makes maintenance easier than floating fountains or surface aerators whose power sources are contained within the unit located in the water feature. Compared to other options, diffusion units require lower power inputs to treat the same surface area.

POND AERATORS

Pond aerators, sometimes called high oxygen transfer units, are very efficient for adding oxygen to water. On golf course water features where fish populations are a significant consideration, aerators may be extremely beneficial. These units generally propel water above the surface of the lake or pond, but not in the manner of a fountain. The aggressive circulation provided around these units increases oxygen content most effectively. Multiple units may be needed for larger bodies of water.

Keep in mind that increasing pond circulation and aeration may not cure a particular problem. Improved circulation helps with overall pond quality but may not be enough to combat algae and other pond weeds. Depth of water, as well as the continuing input of plant nutrients such as phosphorous and nitrogen, is a major contributing factor to the overall chance of maintaining a clean, healthy water feature.

When circulation is not adequate, biological applications of barley straw and other non-chemical techniques can help with water quality. In some instances, chemical treatment may be the only way to control a pond problem. Also, chemical treatment may be the only method that is quick enough to satisfy the aesthetic desires of the golf course clientele. Pond/water quality consultants can be an excellent resource for determining the best circulation units for a particular application as well as the best long-term approach to improve overall water quality.

So which unit is right for you? Many factors need to be considered. For example, in some instances on a golf course, a floating fountain or pond aerator may be annoying or distracting. A diffusion aerator may be more desirable in that situation. Conversely, if the interest is an aesthetic display, a fountain is the best choice. For larger water bodies, it may take a combination of different circulation equipment to achieve aesthetic and water quality goals. Considering all options with the input of a knowledgeable lake/pond consultant will provide the best opportunity for long-term success in managing the appearance and water quality of golf course water features.

DARIN S. BEVARD *is a senior agronomist in the Mid-Atlantic Region, where pond and lake management are becoming more challenging.* DON FULMER *from Lake Doctors also provided input for this article.*

While circulation may not be the only issue affecting water quality, without good circulation the odds of a pond being unhealthy and an aesthetic nightmare are high.