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Pond Basics

Outdoor ponds and water features have become very popular in recent years. Technology has grown leaps and bounds since the days of the heart-shaped concrete ponds of my youth. There are many ways to maintain outdoor ponds, and different techniques work for different situations so no short paper could cover everything. But we will touch on some of the absolutes in this article, as well as discuss equipment and husbandry.

Construction

There are three main methods of keeping water from soaking into the ground. Concrete, Vinyl liners, and preformed plastic. Most people prefer a Vinyl Liner. The material is actually EPMD or Polypropylene. It allows you to dig a pond to any shape or size you wish, and does not dissolve and crack like untreated concrete. Concrete also raises the pH while it slowly dissolves into the water. It can be coated and be rendered safe, but this is a much more expensive alternative to a liner. Keep in mind that the big hole you dug is going to look much smaller once the liner is added and filled up with water!

Depth

In western North Carolina, any pond that is going to be stocked with fish should be dug to a depth of at least 30 inches, with 36 inches being ideal. Fish can survive surface freezing, but need to go deep enough to get some ground warmth while they go dormant in the winter months. A deep pond can also take the heat of the summer sun much better.

Placement

You want to dig your pond in an area where it will receive some full sun, especially if you are hoping to grow aquatic plants. Consider avoiding any area with any overhanging tree limbs, because leaf removal will be a real chore.

Water Flow

Once you have dug a hole, installed a liner, and filled it with water, you will need water movement. An appropriately sized water pump will serve this purpose. If the water sits and becomes stagnant, you will not encourage the type of life you want, and will attract mosquitoes!

Filtration

If you plan on keeping and feeding fish, a filter of some sort will be needed. There are many on the market, and you usually get what you pay for. Most guides suggest a 5 to 10 times turnover rate per hour, in other words a 500 to 1,000 gallon per hour filter unit for a 100 gallon pond. Whatever model you choose, keeping the mechanical filter (usually a foam insert) rinsed regularly will result in a clean pond and a long life for the pump.

UV Sterilization

These filter additions create UV light which kills any waterborne parasites or algae that flow through the unit. Nothing clears up green water like these. While not necessary for every pond, they make an enormous difference in water clarity. If you are having a hard time seeing your fish, consider one of these units.

Fishes - Goldfish and Koi

Varieties of goldfish are the most popular choices for outdoor water features. They come in many shapes and sizes, and most can winter over in our area. The shorter bodied varieties are generally more delicate, and are much more apt to be caught by predators. They also do poorly in water over 80 degrees or in outdoor winter conditions. If you keep these fancy goldfish outdoors in the summer, have an unheated tank to move them indoors during the winter months. Koi and Comets are more hardy, but keep in mind they reach a very large size. Koi can reach over three feet in length, so plan on a minimum of 200 gallons of water per fish. The larger the pond, the easier it is to care for fishes.

Catfish

Sometimes you will see channel catfish offered for sale as pond fish. They can make interesting pond inhabitants, but do easily reach four feet in length and are quite predatory. They are not a safe addition for most ponds.

Mosquitofish and guppies

Gambusia affinis, the common *Mosquitofish* and feeder guppies are sometimes sold to keep mosquito larvae at bay. They are good at this job, but are prone to nip fins of other fishes. They will also die when the winter temperatures drop.

Plants

There are aquatic plants suitable for ponds that range from inexpensive Hyacinths to tropical species costing several hundred dollars. Aquatic plants of any type are beneficial to the pond ecosystem. They pull nutrients from fish waste out of the water, and can provide food, shade and shelter. Many are winter hardy and will come back year after year. The growth of plants will also reduce algae, as they compete for the same nutrients. Keep in mind that in a heavily stocked pond, your fish may eat and tear up plants faster than they can grow.

Uninvited Guests and Pests

Ponds are a great source of not only drinking water, but food for the local wildlife. There are only a few animals that will actively fish healthy fish out of your pond. Raccoons, Herons, Bullfrogs, Water Snakes and Cats are usually the biggest culprits. Ridding a pond of these can be a lot of work, but *Haveahart* live traps can be set for small mammals and snakes and frogs can usually be netted out. If you can catch them, release them far enough away that they don't come back. If possible, refrain from killing them; they are part of the ecosystem and simply doing their job. Smaller frogs, toads, garter snakes, dragonflies and water striders will not bother any but perhaps the tiniest of fish. They add an interesting slice of nature to your pond –and you don't even have to pay for them!

Water Chemistry

Like fishes in an aquarium, fishes in a pond have to have proper water conditions. Test kits for pH, Ammonia, Nitrite, and Nitrate are very helpful for determining the health of a pond. When nitrogen levels get high, often simply running a hose into the water and letting the pond overflow for a short time is all that is needed. Just be sure and use a dechlorinator if you are on treated city water.

Springtime

Every spring, it is a good idea to do some spring cleaning. I usually drain nearly $\frac{3}{4}$'s of the pond, dredge any decomposing leaves out, test all equipment, and clean and hose down filter media thoroughly. After this, it is time to restart all pumps, filters, and UV. It is also a good time to replace the bulb in the UV if it has run for a year or more. When the water reaches about 50 degrees, you can begin to lightly feed the fish again. Spring is a fun time for a pond, tree frogs and other amphibians will take up residence for mating season and the trees at night can be a chorus of sounds! Spring is also the best time to repot and divide any plants that need it.

Summer

Summer is when the real growth takes place, for both fish and plants. Early summer is also the best time to add fish to your pond. If you have everything operating optimally, summer is the time of year to get enjoyment out of all of your work. The fish will often spawn, tadpoles will appear, and visiting birds are at their peak. The maintenance during this time of year is mostly routine filter rinsing and thinning out excessive plant growth.

Fall

Hardy water lilies and Lotus can be left in the pond over winter, but Irises and other non-hardy varieties will need to have their bulbs or tubers protected. Simply pull all leaves and long roots, wrap in wet newspaper, and store in a plastic bag (not air-tight) in a cool place such as a garage until spring time. Water Hyacinth and Water Lettuce can be composted, as they are inexpensive and hard to winter over indoors. Fish can be fed and treated as usual as long as temperatures permit.

Wintertime

When cold weather comes, your fish will start to slow down. When the temperatures drop below 50 degrees it is time to stop feeding, when temps reach 35 or so you can shutdown equipment. You do not want your pump and pipes to have water in them during freezing temperatures. During winter, your fish will go dormant on the bottom of the pond, where the ground keeps them warm. If you run your filtration or pumps all winter, the bottom will be much colder; this is hard on the fish. Gas exchange in the pond is stifled when the top of the water freezes over. It is best to either use a deicer, or drain some of the water out so there is a layer of ice insulating the water below. I have never seen it get cold enough in western NC for a second layer of ice to form. Besides this, there is really nothing you need to do to your pond throughout the winter months.

- Chip Bridges