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WG-1 Water Gardening Guidelines

The two most popular pond materials used today are the EPDM flexible liners or the plastic preformed pools.

- For larger water features, pool hardware (pumps and filtration systems) is a necessity.
- Aquatic plants help keep pond water clear and provide shade and protection for fish.

Size and Location

Before you start any water feature you must determine its size and location. There will be both budgetary and physical limitations on the size of pond you have in mind. If you want fish, a larger pond is best because there's greater temperature stability. A larger pond gives you the option to add more fish or aquatic plants. If you have a small yard or a limited budget, a smaller pond will be best.

Prime consideration in selecting a pond site should be given to the viewing area. A well-located pond can be enjoyed from your patio or deck without the need to establish a new viewing area. The pond should be located where it gets sun for part of the day. Five to seven hours per day is ideal for allowing aquatic plants to thrive and flower. If possible, avoid areas directly under trees because they can be the source of leaves and other debris (seeds and flower parts) that can foul the water. Tree roots can also damage pond liners.

Material Options for Water Ponds

Homeowners have the choice of flexible liners or preformed ponds (shells) to hold the water in place for their water feature. When it comes to flexible liners, EPDM rubber membrane is considered the best. The thicker grade (45mil) has a 20-year warranty, does not deteriorate with exposure to sunlight, and is safe for fish and aquatic plants. To determine the size of liner needed for a naturally shaped pond, draw an imaginary rectangle around it and measure length and width. To each of these measurements add twice the pond's maximum depth plus 2 feet to give the necessary surplus of material to extend beyond the edge of the excavated area.

Preformed ponds are available in a range of sizes and shapes with pre-molded shelves for plants. They can be made of plastic or fiberglass. While they appear easier to install, one must be very accurate when digging the hole and more creative with hiding the hardware. Plastic preformed ponds are less costly than the fiberglass ponds and flexible liners.

Any style of pool - formal, informal or something in between - can be built with any of these materials. However, some combinations make good sense: flexible liners are a good choice for informal pools because they can take any shape at all, while a perfectly round formal pool would be easier to create with a preformed shell. **Regardless of which kind of liner is used, we recommend placing a fabric liner under the pond liner to help prevent rocks from puncturing the liner.**

Pumps and Filters

As you design your pond, especially larger ponds, keep in mind the need for pumps and filters to maintain water clarity and aeration. Of prime importance is the pump which circulates water and powers filters, aerators and other water features (fountains, spitters, etc.). Pumps range from 75 gallons per hour (GPH) to several thousand GPH. The pump should be powerful enough to circulate the water of the entire pond at least once every two hours.

A filtration system is typically needed to maintain pond clarity. There are two types of filters: mechanical and biological. Mechanical filters rely on foam pads or brushes to capture debris and small particles suspended in the water; they must be cleaned periodically. Biological filters are the most important for the pond; they are used to keep the water quality in check by providing a habitat for beneficial bacteria which remove harmful ammonia and nitrites. These filters allow water to flow through various types of media including pads, brushes, and specially designed plastic forms; they have an extensive surface area that allows beneficial bacteria to colonize. As the

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water passes through the bacteria, ammonia is transformed into nitrites and nitrites into nitrates, providing healthy water for both plants and fish.

Pond Plants

Choose visually intriguing and functional plants by considering both the ornamental and practical value of each plant. A good combination will oxygenate the water, compete with algae to keep the water clear, and take up nitrogen to balance the pond's ecosystem. Before buying pond plants, develop a plan. The number of plants needed will be limited by the size of your pond or container. The general rule is that plants should cover no more than 2/3 of the water's surface. Good air circulation is needed to allow plants to flourish free of disease. Plan on rapid growth of the small plants you start out with; they will quickly require more space.

Be sure to include plants from each of the four categories of pond plants listed below:

- **Floating Plants** - float freely on the surface and their roots dangle in the water. They can be placed in all areas of the pond. They grow quickly and require periodic thinning. By shading the water with their leaves, they reduce the amount of light needed for algae to grow. Examples include **water hyacinth, water lettuce** and **azola**.
- **Surface Plants** - have their roots in soil and leaves on long stems that float on the water's surface. By blocking sunlight, they also inhibit the growth of algae. **Water lilies** are surface plants. Tropical or hardy, they are easily grown and make great plants for the average pond or container water garden. One thing to remember with water lilies is that they like calm water. Never place them near splashing or moving water. Other surface plants include **lotus, water hawthorne, variegated four-leaf water clover, floating heart, water poppy, moneywort** and **parrots feather**.
- **Submerged or Oxygenating Plants** - have leaves that remain underwater, rarely protruding above the surface. They may root in soil or float freely. These plants are important in maintaining the quality of the water in the pond. They produce oxygen for use by both plants and fish. By utilizing nitrogen produced from decaying plant material and fish waste products, they deprive algae of nutrients. Being fast growers, they will need thinning in smaller ponds. Submerged plants include **hornwort, cabomba, anacharis** and **jungle vall**.
- **Marginal or Bog Plants** - prefer their roots and lower parts submerged. They may be planted in the shallow areas of a pond or in very moist soil at the edge. In the pond, they compete with algae for available nitrogen. **Black taro**, with its large burgundy to black heart shaped leaves, contrasts well with the tall sword-like foliage of **sweet flag** or **variegated sweet flag**. Other interesting marginal plants include **zebra, corkscrew** and **horsetail rush, aquatic canna, purple or pink pickerel rush, variegated water celery, water calla, daylilies, cardinal flower, dwarf cattail, horsetail, blue moneywort** and **houltuynia**.

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