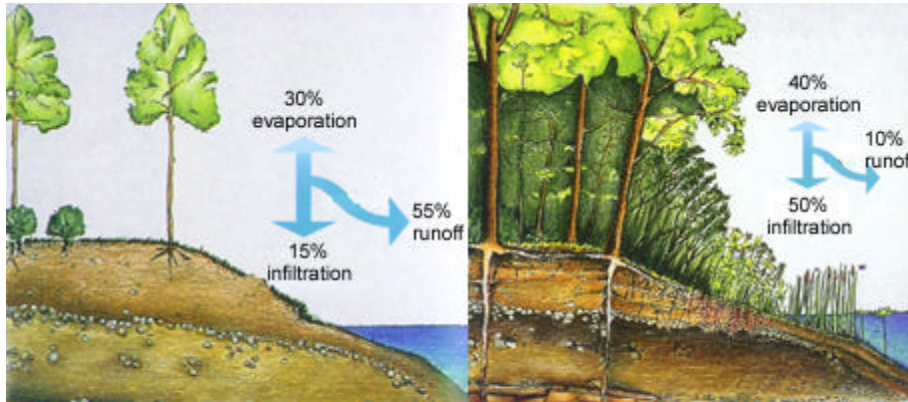


Aquascaping: the Latest Wave in Lakeshore Design

Minnesota lakeside homeowners are learning to see the beauty of landscaping for a natural shoreline.

By Margaret A. Haapoja



Water quickly runs off a shoreline cleared of natural vegetation, washing nutrients and pesticides into the water. A natural shoreline holds rainfall, which soaks into the soil; less water, soil and chemicals run into the lake or river. Shoreline and aquatic plants anchor shoreline areas, helping to protect them from erosion due to runoff and waves.

The flutelike notes of a red-winged blackbird float on the soft summer air. A breeze ruffles the lake's surface as a mallard hen leads a train of downy ducklings through the wild rice. Eileen Keen lounges on her front lawn, watching a monarch butterfly feast on milkweed flowers near the water's edge. Retired to the home where she grew up on the shores of Big Sandy Lake near McGregor, Keen says she's concerned about the changes she's seen in her lifetime. Her parents were area pioneers who began operating Wotring's Resort on the property in 1918. "We had nine cabins that stretched along the lakeshore," she says. "We could see across the lake, and there was not a house. Now you look out there at night, and there are all those lights."

Bob and Barb Greifzu live across the lake. After working in St. Paul for 32 years, the couple retired to Big Sandy in 1992 and soon fell into the familiar routine of mowing the lawn all the way down to the water--just as they had done at their suburban home. Then in May 1994 Bob, president of the Big Sandy Lake Association, attended a shoreland volunteer workshop presented by Itasca and Aitkin counties, the University of Minnesota Extension Service, and other agencies. There he learned about the far-reaching effects of shoreline development on lake waters, and he learned about steps shoreland owners could take to reduce or eliminate those impacts. "My eyes were opened, and a fire was lit under me," he says.

Spurred on by Bob Greifzu, members of the Big Sandy Lake Association looked at the

lake and decided to do something about the problems they saw. Development on Big Sandy had gone from 30 resorts and 300 residences in 1956, to four resorts and 1,150 homes in 1995. Each new home has led to removal of more vegetation along the lake's shoreline. Long-time lake residents have noticed erosion of the shoreland, an increase in algae blooms, and a decrease in water clarity.

With the help of Aitkin County extension educator Jean Pitt, Greifzu and the association obtained grants totaling about \$90,000 to conduct a demonstration and research project to test methods to reduce erosion and runoff. It has come to be called the Big Sandy Lake Shoreland Revegetation Project.

Collaborating on the project with Pitt are others from the University of Minnesota and dozens of agencies, organizations, and volunteers, including the Department of Natural Resources. Four private landowners, including Keen and the Greifzus, were chosen to participate in the revegetation project. A fifth private site, which is undeveloped, is being used to demonstrate how to landscape shoreline properties with minimal impact. Four nearby sites with similar terrain, exposure to wind and sunlight, and development serve as "control" sites, and four undeveloped sites with natural vegetation that is intact serve as "reference" sites. Several thousand plants, purchased from nurseries or grown at the University of Minnesota from seed collected from the Big Sandy area, were transplanted onto the four demonstration properties.

According to Carrol Henderson, DNR Nongame Wildlife Program supervisor, a multitude of benefits accrue from lakeshore planting. "The concept of putting in a buffer zone and re-establishing native plants both on shore and in the water is kind of a package deal," he says. "All of a sudden a whole bunch of headaches go away at the same time. You're spending less time mowing and less money on chemicals and fertilizer, and you've got more time to go fishing or canoeing on the lake. The ultimate goal is to get the vegetation back where it used to be so that the vegetation does the work for you: purifies the water, provides fish habitat, and breaks up the wave action."

The Big Sandy project aims to demonstrate that a naturalized shoreline minimizes erosion, protects water quality, enhances wildlife habitat, improves aesthetics, and reduces maintenance. Although plantings will require years to mature and spread, participants have already learned a great deal about shoreline revegetation. Meanwhile, lake associations across the state are fielding questions from lakeshore owners interested in naturalizing their properties.

"If you're interested in doing this kind of work, we're interested in coming up with ways to support you," says Pitt, "but you're probably still going to be a pioneer because there's a lot we don't know. You have to consider it an adventure in gardening."

Here's a look at the most frequently asked questions and the responses of various experts.

How Do You Plan a Naturalized Landscape?

Terry Ebinger, DNR aquatic plant management specialist, encourages lakeshore owners to contact their local DNR office, especially when they want to replace plants in the water. "We'll help them locate transplants. We'll help them locate sites for re-establishment," he says. "In fact, sometimes we'll even assist them in putting the plants in. We make it as easy on people as we possibly can."

Seek out other landowners who have restored shoreline on your lake. Also look for people who have not disturbed the natural state of their lake lot. Attend a lake association meeting or contact the DNR for a list of people who have naturalized their shorelines. Visit Big Sandy near McGregor to see native plantings. (Call the Aitkin County extension office for directions.)

How Can I Have a Beach and Dock as Well as Native Plantings?

Henderson suggests that people who own 100 feet of lakeshore frontage try naturalizing 75 feet of shore and using the remaining 25 feet for lake access, such as a boat dock or swimming area.

When you remove vegetation from the water to make way for recreation, landscape designer Kathryn McFadden recommends clearing a path through aquatic plants at an angle so that plants remaining will help break the waves coming into the shoreline. To reduce erosion, she avoids designing trails to run straight downhill to the shore. Instead, she runs trails so they angle across the slope to the shoreline. That might require locating the dock at the edge of the property.

How Can I Plant Some Native Species and Retain My Scenic View?

With the proper landscaping, you can plant trees and shrubs without spoiling your view of the lake, says Susan Galatowitsch, assistant professor of horticulture at the University of Minnesota. She calls the process a matter of "editing" your shoreline by removing as little vegetation as you can. By planting or leaving in place particular plant material, you can often screen undesirable views and frame attractive ones. According to McFadden, shrubs or trees on a 7 percent slope, for example, can grow as high as 8 to 10 feet without blocking a view of the lake from a deck.

How Do I Decide Which Plants are Best Suited to My Site?

"Find places on your lake or neighboring lakes where the shoreline hasn't been developed and see what grows there. Cruise the shoreline and take pictures," says Henderson. "If you don't know what the plants are, take close-ups and show them to someone from the DNR who can identify them for you."

Once you have decided on the exact site you wish to plant, you need to determine the average water level. (Call the DNR or conservation district to find out.) Some plants tolerate dry and wet seasons, but many will die if they are too wet or too dry.

Next, identify the shoreline zones--aquatic, wet meadow, and upland forest. Aquatic plants generally grow in less than 7 feet of water. The wet meadow fringe runs along the water's edge and forms a transition between aquatic vegetation and the upland forest.

Try to select natives that grow in your immediate area. "A person's first priority should be to try to get Minnesota plants," says Henderson. "The closer you can get--let's say 50 to 75 miles from where you are--that's even better."

Choose perennial plants that offer aesthetically pleasing color and texture, tolerate various soil conditions, and grow vigorous rhizomes that will help stabilize your shoreline. By choosing a variety of perennials, you can have flowers blooming from spring through fall.

Before selecting plants, answer the following questions, because all these factors affect how well a plant will do on a particular site:

- 1.** What is my property's soil type? A soil-testing kit from your county extension office will help you determine texture, pH, percent of organic matter, and moisture content. Each plant has specific requirements.
- 2.** What direction does my property face? Some plants thrive in the sun on a south-facing shore while others prefer a shady northern exposure.
- 3.** From which direction are the prevailing winds? Plant or preserve aquatic vegetation at the proper angle to shield the shore from these winds.
- 4.** How big are the waves that break on my shore? Aquatic vegetation might not thrive on the wind-swept shore of a large lake. But on a relatively calm site with waves no higher than 2 feet, aquatic plants can help stabilize the shore. Bulrush, a perennial with vigorous rhizomes that grow bigger each year, withstands winds better than wild rice, an annual with a small root system.
- 5.** How steep is the slope of my yard? It is especially important to choose vegetation with roots that bind the soil and stabilize steep banks.

Big Sandy project participants selected non-aggressive perennial plants which are not

likely to spread too far or too fast, from regional flora. (Research found 507 species in the area.) They chose greenhouse-propagated specimens rather than those collected in the wild, and they made sure all plants were hardy and appropriate to the site conditions.

Which Plant Species Will Attract Wildlife, and Which Will Deter Nuisance Animals?

Riparian zones--areas of vegetation adjacent to rivers or other waters--are among the most prolific wildlife habitats. Plants here provide food and cover for animals of all kinds.

Books such as Henderson's *Landscaping for Wildlife* and *Lakescaping for Wildlife and Water Quality* can help you find plants preferred by wildlife. For example, Henderson says, 66 species of wildlife use smartweed, 40 species use pondweed, 23 go for wild rice, and 17 for cattails. Henderson refers to elderberry as a summer fruit, or an "ice cream plant," because birds eat the berries as soon as they're ripe. On the other hand, American high-bush cranberry is an excellent example of a winter fruit, or "spinach plant," because its fruit is bitter when it first appears but hangs on throughout the winter months, becoming sweeter after a couple of hard frosts. (See "[Native Species for Aquascaping](#)" below for more plants to attract wildlife.)

Bob Greifzu cites one of the biggest benefits of planting a buffer zone between his lawn and the lake: no more geese on the mowed grass. Because the geese suspect predators are hiding in the tall grass along shore, they avoid the Greifzus' yard.

How Can I Establish Aquatic Plants?

Here are some special considerations for planting in the water:

1. Before planting, wash the roots of aquatic plants with a garden hose to remove all soil and seeds of exotic plants such as purple loosestrife. Keep the roots in water until you are ready to plant.
2. Leave the tops on aquatic plants. "These aquatic plants are sort of like snorkelers," says Galatowitsch. "They need to take air in through their stalks, and the air goes down through chambers and aerates the root zone. If you cut off the stalks when you transplant them, water will go down through those channels and suffocate the plants."
3. Anchor or stake each plant to secure it to the lake bottom. Carolyn Dindorf, limnologist with Hennepin County, has experimented with coconut fiber mats when she plants aquatic species. "We cut slits in the coconut fiber, insert the plants, and anchor the fiber to the lake bottom with either rocks or wood stakes," she says. "The fiber mats last a couple years before they decompose, and by then the plants should be well-

established. We've also used metal staples on upland sites, and we've experimented with coconut fiber logs as wave breaks."

4. Install a structure to break waves. Such structures are critical when establishing aquatic vegetation, according to Dawn Magnusen, community program assistant with Aitkin County extension service. Big Sandy project participants use simple PVC frames glued around 2-by-8-foot panels of marine plywood. They install them in 18 inches of lake bottom as soon as the ice goes out, and remove them right before freeze up. Magnusen expects they'll need to use the structures for three or four years until the plants are well-established. You can pick up a fact sheet on how to build a wave break structure from your county extension office.

Where Can I Obtain These Native Plants?

Nurseries specializing in native plants offer many species suitable for wet meadows and uplands, but aquatic plants are harder to find. Because you might need to order by mail, allow plenty of lead time. For a list of native plant sources, consult your county extension office.

Locating plant sources sometimes takes extra energy and creativity. For example, individuals may harvest some submergent plants from local wetlands and lakes with permission from the property owner. Check with the DNR for permits required for digging wild vegetation in Minnesota. The permits require that you guarantee such plants are weed-free to ensure you're not transporting exotic species such as purple loosestrife or Eurasian watermilfoil from one lake to another.

Aquascaping is not a panacea for the problems of every lakeshore landscape, warns Galatowitsch, and patience is essential during the awkward, messy stage while the plants are getting established.

"It's a fair amount of work, and it may draw some odd looks from your neighbors," Galatowitsch says. "But don't give up. It's well worth the wait. People who do decide to naturalize are people who love their lake as much as they love their own property."

For more information about aquascaping, including fact sheets, titles of publications and videos, and sources of seed and plants, call your county extension office. Landscaping for Wildlife and Lakescaping for Wildlife and Water Quality are available from Minnesota's Bookstore, 651-297-3000 or 800-657-3757.

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Native Species for Aquascaping

Aquatic Plants

Plant in less than 7 feet of water in full sun. Plant beds provide habitat for waterfowl, furbearers, fish, frogs, turtles, and aquatic invertebrates. Some species, such as bulrushes, act as filters to clean the lake.

<i>Scirpus validus</i>	Soft-stem bulrush	4-6 feet tall, light-green erect stems, yellow-brown scale flowers in spring.
<i>Scirpus acutus</i>	Hard-stem bulrush	Same as soft-stem except dark-green stems.
<i>Sagittaria latifolia</i>	Arrowhead	2-3 feet tall, arrowhead-shaped leaves, showy white flowers.
<i>Brasenia schreberi</i>	Water-shield	Floating oval leaves, rose-purple flowers.
<i>Typha latifolia</i>	Cattail	Desirable species because it doesn't spread as much as other cattails.
<i>Pontederia cordata</i>	Pickeralweed	2-4 feet tall, purple flowers June-August. Thrives in mucky bottom.

Wet Meadow Plants

These plants at the water's edge trap sediments and assimilate nutrients running off the land. Many wildlife species, including butterflies and dragonflies, reside here.

<i>Onoclea sensibilis</i>	Sensitive fern	1-3 feet tall, opposite pairs of light-green leaflets with wavy edges.
<i>Caltha palustris</i>	Marsh-marigold	1-2 feet tall; glossy, round leaves; thick, hollow stems; daisylike yellow flowers bloom in early spring.
<i>Iris versicolor</i>	Blue flag (wild iris)	2-3 feet tall, swordlike leaves, blue flowers bloom in late spring.
<i>Scirpus cyperinus</i>	Woolgrass	5-6 feet tall, slender leaves and stems, flower looks like tufts of wool--clusters of brown spikelets at ends of drooping stems.
<i>Carex lacustris</i>	Lake sedge	1-3 feet tall; coarse, long, wide bluish-green leaves with open reddish featherlike fibers at the ends.

<i>Asclepias incarnata</i>	Swamp-milkweed	3-4 feet tall, tapering leaves, clusters of pink to rose-purple flowers June-August.
<i>Impatiens capensis</i>	Spotted touch-me-not	12-18 inches tall, succulent stems, orange flowers June-September, reseeds itself annually.
<i>Eupatorium maculatum</i>	Joe-pye weed	2-4 feet tall, whorl of toothed leaves, purplish pink plumes, July-September.
<i>Rudbeckia hirta</i>	Black-eyed Susan	1-3 feet tall, large single yellow flowers with brown center, blooms in summer.
<i>Cornus stolonifera</i>	Red osier dogwood	8 feet tall, bright maroon leaves in fall and red stems that provide winter color.

Upland Forest Plants

Upland forest zone begins above the wet meadow and provides habitat for many wildlife species, especially if you leave any snags or dead standing trees.

<i>Aquilegia canadensis</i>	Columbine	1-3 feet tall, long-spurred red and yellow flowers, blooms May-June.
<i>Aronia melanocarpa</i>	Black chokeberry	5-8 feet tall, oval lace-edged leaves, black or deep purple fruit.
<i>Cornus alternifolia</i>	Pagoda-dogwood	15-30 feet tall with horizontal, platformlike stories or branches; oval, shiny, dark green leaves turn maroon in fall; white flowers with blue-black fruit.

Aquascaping Do's

Maintain a natural shoreline or restore an altered one.

Include a three-story, native plant buffer zone at least 15 to 25 feet wide.

Add native trees to help stem runoff, reduce erosion, frame or edit views, and provide habitat for wildlife.

Plant native grasses and wildflowers instead of high-maintenance lawns.

Cultivate aquatic plants to stabilize shoreline and make a home for more aquatic wildlife.

Clear no more than 25 percent of shoreline for boat docks or beaches.