The Shoreland Stewardship Series

Number 3

Protecting Our Living Shores

Something amazing happens when land meets the water. The life force virtually blossoms into a level of diversity that is unparalleled on any parcel of upland. Shorelands can include uplands, wetlands and water, supporting plants and animals from all three areas, including many only found in shorelands. **In Wisconsin, 80% of endangered or threatened species spend all or part of their lives in shoreland areas.** You don't have to be an animal-lover or botanist to realize the significance of this biological panorama. By understanding how fish, waterfowl and other wildlife depend on shorelands, we can begin to work to protect Wisconsin's living shores.

Life in the Water

". . . I have become satisfied that the destruction of trees bordering on these streams and the changed conditions of the banks produced thereby, has resulted in the destruction of the natural harbours or hiding places of the trout . . ."

– J. F. Van Cleef, American Fisheries Society, 1885

As early as 1885, people were beginning to understand that fish and other aquatic life do not always adapt to changes on the land around their home. Replacing naturally vegetated shorelands with managed landscapes such as lawns, golf courses and cropland can harm water quality when runoff carries soil, pesticides and fertilizers into lakes and rivers.

One of the easiest ways to detect a change in water quality is to watch for a change in water clarity. When you notice a change, so will the fish. Many species of fish rely on sight to find their food, and if the water is dirty, it becomes difficult for some fish to find food.

As water quality decreases, insects and many other delicacies also begin to disappear. Among the first to go are caddisflies and mayflies, the favorite food of trout.

Rain water and snow melt can become nutrient-laden while flowing across lawns and gardens, picking up excess applied fertilizers. The nutrients can cause excessive aquatic weed growth that reduces the oxygen supply in lakes and rivers. This change favors populations of carp, catfish, suckers and other rough fish that are more tolerant of low-oxygen conditions. Oxygen levels can be lowered further as rough fish remove the oxygen-producing plants found on the beds of lakes and rivers and as people clear shoreland vegetation that shades the water.

Cooler water holds more oxygen and reduces stress on fish and other aquatic creatures. A few degrees difference in temperature can have a major effect on their survival. It's important to keep even tiny brooks – not big enough to hold fish – cooler because the cool water, rich in oxygen, eventually reaches fish downstream. ■

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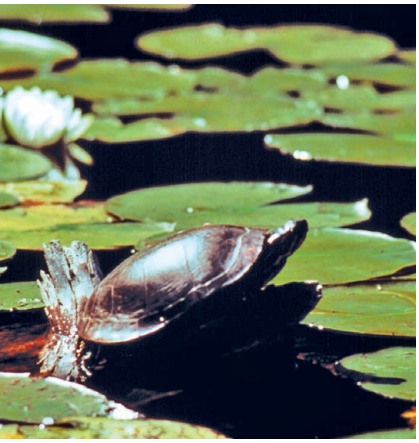


Insects, the favorite food of many fish, are abundant in waters kept cool by waterfront vegetation. Leaves, twigs, and other organic matter from shoreland vegetation that fall into the water provide both lunch and breeding grounds for aquatic insects. These insects in turn feed fish and many others up the food chain. Besides providing insects with the food and cover they need, trees supply woody cover for lakes and rivers, such as fallen logs and branches. In Wisconsin lakes, over 15 different fish species at a time may inhabit a single downed tree. Birds and turtles can also be found using woody cover along the shore as resting places and basking spots.

The rich diversity of emergent, floating and submerged plants located just offshore provide important habitat for many aquatic animals. Some fish, like bluegills, graze directly on the leaves and stems of these aquatic plants, while other fish feed off the bugs and other critters found living on or beneath the plants. These shallow plant beds are important spawning areas for a number of fish including bass, bluegills and northern pike.

Besides helping fish, aquatic plants offer food, shelter and nesting materials for waterfowl, shorebirds and aquatic mammals such as mink and muskrats. Beds of aquatic plants hide young ducklings from predators and provide protection from wave action. Loons also depend on these plants to build their mounded nests.

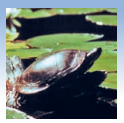
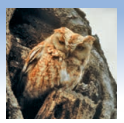
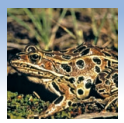
As our shorelands become more developed, these important aquatic plants and the habitat they provide are vanishing. In Minnesota, researchers found that developed shorelands had on average 66% less floating and emergent plants than undeveloped shorelands. Researchers in Wisconsin recorded even more dramatic losses of plant species for developed shorelands – 83% to 92% fewer species than undeveloped shorelands. As the aquatic plants disappear, the fish and other animals that rely on them may not be too far behind.

Life on Land

As roads and houses creep into shoreland areas, human activities and structures can degrade the surrounding wildlife habitat, affecting the behavior, reproduction and survival of animals. Although researchers have estimated that animal habitat can be affected up to 1,500 feet away from human activities and structures, it may not be realistic to provide such a wide berth. But preserving and restoring shoreland vegetation can help limit the impact of these disturbances, which might include subtle changes in vegetation and animal travel patterns. In other words, how you manage your shoreline will determine how attractive it is to birds, frogs, turtles and other wildlife.

Every spring and fall, migrating songbirds and waterfowl use the Wisconsin and Mississippi rivers as travel corridors, just as European settlers did when they migrated into the state. Migrating birds depend on shoreland corridors for food, cover and nesting areas. Many studies have confirmed that the key to preserving the diversity and abundance of birds is to preserve plant diversity. Most woodland birds, for instance, require several layers of vegetation, from groundcovers to shrubs to trees. Grassland and wetland birds need a diversity of native grasses, wildflowers and shrubs. Simply put, more plants mean more foraging and nesting sites, thus more birds.

The structure of the habitat is important, as well. For example, some birds prefer trees with a certain diameter (24 to 30 inches at breast height for wood ducks) for nesting, while birds such as kingfishers use shrub cover along the water to conceal their brood. Cavity trees are used by many kinds of birds for nesting, including wood ducks, hooded mergansers and owls. Osprey, kingfishers, flycatchers and other birds can often be found perching in dead trees, or snags, along the water watching for food. Bats roost under the loose bark of dying trees when they are not out catching

insects. A single bat can eat as many as 1,200 bugs during an evening – among them many mosquitoes.

Amphibians and reptiles such as salamanders, frogs and turtles are common along natural shorelands. They often require water or damp areas to reproduce, and may move into upland areas for portions of the year. Salamanders and frogs need unbroken shoreland corridors because they are often unable to safely cross even small areas of unsuitable habitat, such as roads and parking lots. To a salamander, whose life revolves around water, a cement curb or retaining wall might as well be the Great Wall of China.

Since so many different types of animals rely on shorelands, it is difficult to select a single width that can preserve shoreland habitat for all wildlife. Recommendations vary depending on the animal and its needs. Some animals are more sensitive to human activities, and as a result, require more room. General recommendations to preserve wildlife habitat vary from 30 feet to over 300 feet wide, with some recommendations exceeding 1,500 feet.

Muskrats do fine with approximately 30 feet of natural shorelands but kingfishers, turtles and frogs prefer 100 feet to over 300 feet. Some animals, such as herons, scarlet tanagers and the American redstart may need over 400 feet to 600 feet of natural shorelands to successfully reproduce and grow.

It is often unrealistic to have widths of 600 feet or more of shorelands preserved for wildlife. However, narrower corridors of shorelands surrounding our lakes and rivers will still provide habitat for some wildlife. When shoreland development completely rings a lake or follows the twists and turns of a river, it is important to restore wildlife travel corridors to and from the water. These travel corridors can provide access to larger tracts of land when the habitat needs of some animals cannot be met at the water's edge. ■

Shoreland Plants that Please

Columbine

To enhance the wildlife habitat along a shoreland or anywhere, restore a diverse mix of native grasses, wildflowers, shrubs and trees. There are many plants to choose from, but several of the easiest to find at local nurseries and greenhouses are listed here. Even if you are unable to restore your shoreland all at once, finding places for these and other native plants is a good starting point to help wildlife.

Grasses

Switch Grass—
Panicum virgatum
Switch grass has delicate, airy seedheads that follow any breeze. It can reach a height of 3 to 6 feet depending on the soil moisture available. In the fall, the grass turns a burnished

gold, providing color throughout the winter. It prefers full sun and can handle dry to moist soil conditions. In their caterpillar stage, many butterflies, such as the tawny-edged skipper and the Northern pearly eye, rely on switch grass and other grasses for food. Switch grass also provides important nesting habitat for many grassland birds.

Blue Joint Grass—
Calamagrostis canadensis
Blue joint grass grows in clumps with finely-textured leaves. It can grow 2 to 4 feet tall, and prefers full sun. It is often found in wet areas, but can tolerate occasional dry conditions. Blue joint grass is a cool-season grass that greens up earlier in the spring than most grasses. It is sometimes confused with reed canary grass, an invasive exotic plant, which should never be planted in shorelands.

Tussock Sedge—
Carex stricta
Tussock sedge is commonly found in sedge meadows with its slender arching leaves. It grows 2 to 3 feet tall and prefers full sun with moist soils. It favors areas with standing water, but will withstand occasionally drying conditions. Many different species of sedges capture nutrients from runoff to feed their growth, helping to protect water quality.

Wildflowers

Columbine—
Aquilegia canadensis
Columbine has brilliant red and yellow flowers, providing a splash of color in early summer and drawing hummingbirds like a magnet. Its flower stalks can reach 1 to 3 feet tall, preferring medium to dry soils. Columbine is common along woodland edges and in forests.

New England Aster—
Aster novae-angliae
New England aster provides rich magenta to deep purple blossoms every fall, growing 1 to 4 feet tall. It prefers full sun or partial shade, and will grow in medium to wet soils. In their caterpillar stage and as adults, butterflies use asters for food. The seeds also provide food for many songbirds in the fall and winter.

Marsh Milkweed—
Asclepias incarnata
Marsh milkweed has pink to magenta flowers and grows 1 to 4 feet tall. It prefers full sun and wet soils, tolerating an occasional flooding. Marsh milkweed is used by the monarch butterfly in all its life stages. Birds also use milkweeds when building their nests. Song sparrows line their nests with the fuzzy white "floss" from seed pods and Baltimore orioles use it in the construction of their hanging nests.

Shrubs

Red Osier Dogwood—
Cornus stolonifera
Red osier dogwood, a native deciduous shrub, provides excellent shoreland protection. It favors wet soils and can grow in sun or partial shade. The striking red stems are especially attractive in winter against snow. Grouse, turkey, bluebirds thrushes, and other birds favor its distinctive white fruits.

Red Osier Dogwood

Highbush Cranberry—
Viburnum opulus L. subsp. ***trilobum***
Highbush cranberry has showy white flowers that are followed by scarlet fruits that persist into winter, offering food to wildlife. Its leaves turn a deep red to purple in the fall. This very hardy deciduous shrub tolerates wet conditions, and grows in sun to part shade. Grouse, pheasant and small birds use the plant for cover, and bluebirds, cedar waxwings, cardinals and others eat the fruit. Avoid the potentially invasive improved or horticultural varieties of the highbush cranberry.

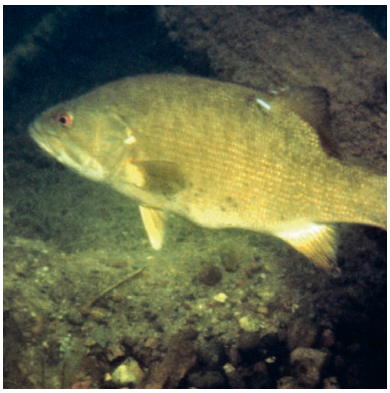
Trees

Swamp White Oak—
Quercus bicolor
The swamp white oak can reach heights of 60 to 70 feet. It is common in wet soils along streams and swamps, and is tolerant of occasional flooding. Its acorns provide an important winter food source for many animals, including turkey and white-tailed deer.

Tamarack—
Larix laricina
Tamarack is a deciduous conifer, which means it produces new needles every spring. In the fall the needles turn a bright golden color before the tree sheds them. Tamarack can grow to heights of 90 feet, prefer sunny sites and do not tolerate shade. Tamarack is common in the wet, peaty soils of bogs and swamps, but can also be found in drier upland sites. Sharp-tail grouse, pine siskin and other birds will eat tamarack seeds from the cones. Snowshoe hares will also eat the bark and branches of tamarack. ■

In-Depth Study: Smallmouth Bass

Smallmouth benefit from woody cover, also known as "fish sticks"



Smallmouth bass are commonly found in medium to large streams and in large, clearwater lakes throughout Wisconsin. Although considered a "warm water" fish, smallmouth bass actually prefer cool water. Unlike largemouth bass, which are found in the shallow, weedy areas of lakes and river backwaters, the smallmouth bass prefers moderately swift-flowing water in the rocky portions of streams, and deeper water in lakes over rocky bars and ledges.

In early summer when water temperature reaches about 62º F, the male smallmouth construct spawning nests in the shallow waters it normally shuns. Nests are built at depths of 1 foot to nearly 20 feet of water on rock, gravel and sandy surfaces. Shoreland development can limit the availability of nesting sites for smallmouth bass when soil from construction sites and eroding shores covers these preferred spawning areas. Nests are constructed next to large rocks or woody cover, such as fallen logs (also known as "fish sticks"), to provide protection from predators. A study conducted in northern Wisconsin and Upper Michigan suggests that the woody cover smallmouth bass and many other fish depend on is decreasing as residential development along shorelines increases. Another study of northern Wisconsin shorelands found that the average tree cover of 57% on undeveloped sites was reduced to 38% on developed sites.

Once hatched, the smallmouth's diet consists of tiny crustaceans such as water fleas. As it matures, the smallmouth's diet expands to include other fish, crayfish and various insect larvae and adults. Since bass depend on sight to find food, good water clarity is essential. Water clarity lessens when soil washes into lakes and rivers, and with excessive algae blooms. But natural shorelands can help protect water clarity by catching sediment and attached nutrients before the soil reaches the water. In Wisconsin, phosphorus is the key nutrient responsible for algae and weed growth in over 80% of the lakes. Testing soil to find correct fertilizer amounts for lawns and gardens can help reduce excess nutrients in runoff. Using low- or no-phosphorus fertilizer (the middle number on the fertilizer bag refers to phosphorus content) will help keep this nutrient out of our waters.

Smallmouth bass are just one of many creatures found along our living shores. You can help to ensure that fish, turtles, loons and other wildlife thrive along Wisconsin's shorelands by protecting natural shorelands and working to restore them. ■

Know Local, State & Federal Regulations: It's the Law

Local, state and federal authorities protect wildlife habitat along shorelands in several ways. Local ordinances often establish minimum setbacks for structures, septic systems and wells. Many communities regulate removal of vegetation along shoreland. Permits may also be needed for land-disturbance activities, such as grading or filling, to ensure that proper soil erosion control plans are implemented.

The State of Wisconsin regulates activities occurring below the ordinary high water mark of lakes and rivers. The ordinary high water mark is the point on the bank or shore where the water leaves a distinct mark and is often located above "normal" water levels. If you are thinking of removing (or planting) any plants in the water or in a wetland, contact your local DNR aquatic plant specialist for advice and to determine if a permit is required. Both the state and the United States Army Corps of Engineers can be involved in any wetland projects. Be certain to get all required permits before starting any work in shorelands, floodplains or wetlands.

Managing for Wildlife

One of the easiest ways to maintain the quality of wildlife habitat is to minimize habitat alteration during and after construction. For example, the design of structures, trails and roads can blend into the natural landscape to minimize impacts. Shorelands should also be protected during construction. On developed properties, wildlife habitat can be easily enhanced with the reintroduction of native plants and restoration of shorelands.

If you're ready to enhance habitat, the first step is take a moment to look around your property. There may already be many natural features that are valuable to wildlife such as:

- Large, dead standing or cavity trees (nesting and roosting sites for wood ducks, hooded mergansers, owls, hawks, osprey and eagles, or dens for other animals)
- Large, dying trees (woodpeckers search for insects and bats roost under loose bark)
- Seasonal pools and ephemeral wetlands (used by amphibians for breeding)
- Berry "tangles" (cover for many species of wildlife)
- Logs and branches in the water (basking areas for turtles and cover for fish)
- Lakeshore and streambank burrows (homes of weasels, otters and muskrats)
- Sandy soils with good sun exposure (used by turtles for nesting areas)
- Rock piles (cover for snakes and small mammals)
- Large trees overhanging the water (feeding perches for flycatchers, kingfishers, osprey and other birds)
- Fallen logs on the land (preferred habitat for some salamanders)
- High, sandy banks (nesting sites for kingfishers, bank swallows and rough-winged swallows)

By protecting these natural features, you can provide a strong foundation for wildlife habitat on your property. Unlike native plants, which can be reintroduced to your property, it is often very difficult to replicate the habitat provided by the natural features listed above once they are lost. ■

Additional Resources

Landscaping for Wildlife and Lakescaping for Wildlife and Water Quality – Minnesota Dept. of Natural Resources, 1-800-657-3757.

Life on the Edge: Owning Waterfront Property – Wisconsin Lakes Partnership, (715) 346-2116.

The Water's Edge: Helping fish and wildlife on your waterfront property – UWEX Publication GWQ040 available from county UW-Extension offices or Cooperative Extension Publications 877-947-7827, and DNR publication WT-FH-428 available from local DNR service centers.

Rain Gardens, a Household Way to Improve Water Quality in Your Community – UWEX Publication GWQ034 available from county UW-Extension offices or Cooperative Extension Publications 877-947-7827, and DNR publication WT-731 available from local DNR service centers.

Through the Looking Glass: A Field Guide to Aquatic Plants – available from UW-Extension Lakes 715/346-2116

Restore Your Shore website – www.dnr.state.mn.us/restoreyourshore

Wisconsin Native Plant Nurseries – dnr.wi.gov/files/pdf/pubs/er/er0698.pdf

Shoreland Stewardship Series:
This is the third fact sheet in the shoreland stewardship series. The entire series is available from county UW-Extension offices or Cooperative Extension Publications 877-947-7827 and online at learningstore.uwex.edu, and it is available from DNR Service Centers.

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