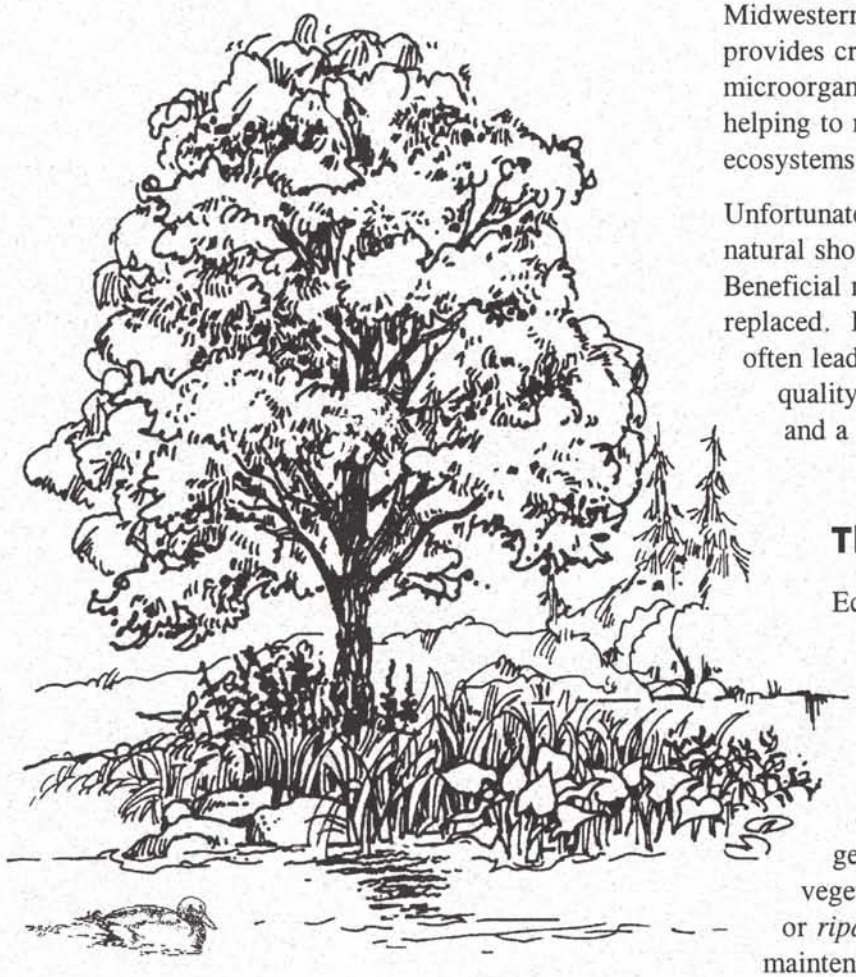
Lake Notes

Shoreline Buffer Strips

Picture an idyllic lake setting. The sun glimmering on clear, clean water. Children wading along the shore. A fisherman casting for elusive bass. Chances are this view also includes lushly vegetated shorelines blending into the surrounding landscape.



The interrelationship between a lake and its shoreline is important. The shoreline zone is the last line of defense against forces that may otherwise destroy a healthy lake. A naturally-vegetated shoreline filters runoff generated by surrounding land uses, removing harmful chemicals and nutrients. At the same time, shoreline vegetation protects lake edges from the onslaught of waves and ice generated by our harsh Midwestern climate. The shoreline zone also provides critical habitat for aquatic insects, microorganisms, fish, and other animals, thereby helping to maintain a balance in sensitive aquatic ecosystems.

Unfortunately, as lake landscapes are developed, natural shorelines often are damaged or destroyed. Beneficial natural vegetation is cut, mowed, or replaced. In urban and rural environments alike, this often leads to eroded shorelines, degraded water quality and aquatic habitat, impaired aesthetics, and a reduction in property values.

The Buffer Concept

Ecologists, water quality specialists, land planners, and lake managers all agree that a naturally-vegetated buffer strip along the periphery of a lake (or a stream or wetland) is critical to the health and quality of the waterbody. The concept of a buffer is fairly simple. A buffer generally should be comprised of the type of vegetation that naturally exists in a shoreline, or *riparian*, setting. Buffers require little maintenance, and use of fertilizers and pesticides is discouraged.

Buffer strip characteristics may vary depending on the lake setting. A buffer may include forest, prairie, or wetland vegetation. It may be twenty-five feet wide around a small urban pond, or hundreds of feet wide along a pristine rural lake. Intrusions into the buffer may be strictly controlled, or flexible to allow for user access.

Buffer Strip Benefits

The benefits of buffer strips are well documented. They include:

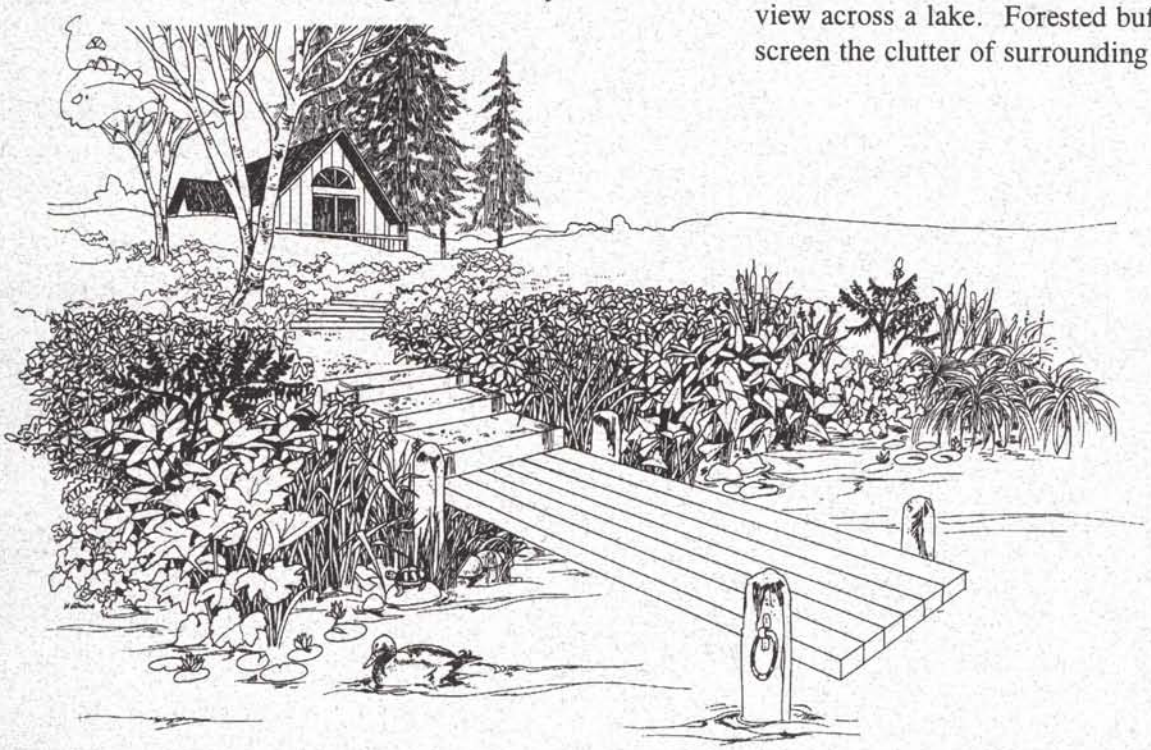
- **Runoff filtering:** As runoff from adjacent land filters through a buffer, pollutants and sediment are removed. Sediment and related pollutants are removed by filtration and settling in the dense network of plants and plant residue. Soluble pollutants, including plant nutrients, are taken up through plant roots or consumed by microorganisms in the soil. Native plants, particularly prairie vegetation, have much denser, deeper root structures than conventional turfgrass, which greatly improves the infiltration of surface runoff into the ground. Depending on the width and characteristics of the buffer, as much as 70 to 95 percent of incoming sediment, and 25 to 60 percent of incoming nutrients and other pollutants can be removed from the runoff. Buffer strips also can reduce the impacts from failing septic systems adjacent to the lake.

- **Shoreline stabilization:** Natural buffers that extend down to the water's edge can be very effective in preventing shoreline erosion. In contrast to conventional turfgrass (which is shallow-rooted and intolerant of flooding), natural riparian vegetation has dense, deep root systems that firmly anchor shoreline soils. These native plants also are able to withstand extended periods of inundation that are so common on lakes and reservoirs. Native vegetation performs this function so well that it is now being used, sometimes with other natural materials, to repair eroding shorelines. This approach, known as *bioengineering*, is a low-cost alternative to conventional engineering solutions such as riprap or seawalls.

- **Preservation of fish and wildlife habitat:** Many aquatic organisms, particularly insects, spend substantial portions of their life cycles in upland environments. Buffers provide a critical transition zone between upland and aquatic/wetland habitats. Depending on their widths, buffers also can shield sensitive species, particularly birds, from potentially disruptive activities occurring on adjacent land uses.

- **Screening noise:** Beyond protecting wildlife uses, buffers also can preserve the quality of lake recreational uses by filtering out the noise associated with certain types of adjacent land uses. Forested buffers, in particular, can effectively intercept noise from adjacent highways and industrial operations.

- **Preservation of aesthetic values:** Lakeside property owners often have varying opinions about what constitutes "appropriate" shoreline landscaping. However, most will agree that "natural" is better than "artificial." Even a narrow buffer can enhance the view across a lake. Forested buffers can effectively screen the clutter of surrounding urban developments.



How to Create Effective Buffer Strips

Buffer characteristics can vary widely depending on local circumstances. However, it is important to understand certain basic, minimum criteria.

- **Buffer width:** Any width of natural vegetation will provide some benefits; however, a 25 foot minimum width is most often recommended. Wider buffers (e.g., 50 to 100 feet) should be established for larger or more sensitive lakes. The U.S. Department of Agriculture recommends "filter strips" of 66 to 99 feet for water quality protection. A recent national survey of local and state guidance for stream buffers observed a range of 20 to 200 feet (with a median width of 100 feet).

- **Buffer intrusions:** While a continuous, uninterrupted buffer is preferable for protection of water quality and habitat, some flexibility may be needed to provide access to beaches, piers, and other lake uses. Access typically is provided via a mown footpath. Less intrusive pedestrian access could be provided via a stepping stone trail. Paving through a buffer is discouraged.

- **Buffer vegetation:** It is recommended that buffers be planted with native species that are indigenous to your particular locale. The Federal Land Survey, conducted in the mid-1800s, shows the general vegetation types that existed throughout the state prior to European settlement. It distinguishes between wetland, prairie, and woodland communities, and provides a good indication of the type of vegetation that is naturally acclimated to the soils, hydrology, and climate of an area.

Buffer vegetation also should reflect local needs and conditions. For example, a forested buffer is appropriate if noise screening is desired—but it may not be appropriate if local residents desire an unobstructed lake view. Similarly, some property owners will prefer a greater mix of showy wildflowers which may be less functional than other prairie plants but will enhance the beauty of the shoreline.

Buffer installation begins with the removal of existing, undesirable vegetation. The table on the back of this publication lists some common undesirable species. Recommended native vegetation, listed in the same table, can be planted as live plants or seeds. Planting should begin at or below the normal water elevation with wetland species and should proceed up the shoreline slope with water-tolerant and upland species. While buffer vegetation is being established, mowing and/or selected use of approved herbicides may be necessary to control the spread of aggressive, non-native plants.

- **Buffer maintenance:** Once the buffer is well established (typically within 1-3 years), maintenance will involve occasional mowing or controlled burns to control weeds and maintain native plant diversity. If certain noxious weeds need additional control, limited use of approved herbicides may be appropriate in localized areas. Use of fertilizer is not necessary and should be avoided in the buffer strip.

Plant Species Appropriate for Illinois Buffers and Shorelines

Appropriate vegetation is the key to effective buffer strips and shoreline stabilization. These plant species provide beneficial habitat, anchor shoreline soils, dissipate wave energy, and enhance the beauty of shoreline property. Some of the species listed here may not be appropriate in all areas. You should consult with one of the organizations listed below to verify which plants will do best under your local conditions.

Shrub/Brush Species

Buttonbush	*Cephalanthus occidentalis*
Red-Osier Dogwood	*Cornus stolonifera*
Common Witchhazel[S]	*Hamamelis virginiana*
Chokeberry[S]	*Prunus virginiana*
Peach-Leaved Willow	*Salix amygdaloides*
Pussy Willow	*Salix discolor*
Sandbar Willow	*Salix interior*
Black Willow	*Salix nigra*
Elderberry	*Sambucus canadensis*

Lower Bank and Nearshore

Sweet Flag	*Acorus calamus*
Water Plaintain	*Alisma subcordatum*
Bluejoint Grass	*Calamagrostis canadensis*
Creeping Spike Rush	*Eleocharis acicularis*
Blue Flag Iris	*Iris virginica*
Torrey's Rush	*Juncus torreyi*
Switch Grass	*Panicum virgatum*
Arrowhead	*Sagittaria latifolia*
Hardstem Bulrush	*Scirpus acutus*
Dark Green Rush	*Scirpus atrovirens*
River Bulrush	*Scirpus fluviatilis*
Prairie Cord Grass	*Spartina pectinata*
Blue Vervain	*Vebena hastata*
Common Cattail[+]	*Typha latifolia*

[+] *Cattails are invasive and can become a problem. However, they are very effective at dissipating wave energy and can become established under difficult situations. Other plantings should be chosen accordingly.*

UNDESIRABLE SPECIES!

Box Elder*	*Acer negundo*
Garlic Mustard*	*Alliaria officianalis*
Japanese Honeysuckle*	*Lonicera japonica*
Tartarian Honeysuckle*	*Lonicera tatarica*
Purple Loosestrife*	*Lythrum salicaria*
Reed Canary Grass*	*Phalaris arundinacea*
Common Buckthorn*	*Rhamnus athartica*
Glossy Buckthorn*	*Rhamnus frangula*
Multiflora Rose*	*Rosa multiflora*

Banks and Slopes

Sideflowering Aster[S]	*Aster laterifolius*
Big Bluestem	*Andropogon gerardi*
Gray Sedge[S]	*Carex amphibola*
Common Wood Sedge[S]	*Carex blanda*
Pennsylvania Sedge[S]	*Carex pennsylvanica*
Brown Fox Sedge	*Carex vulpinoidea*
Canada Wild Rye	*Elymus riparius*
Streambank Rye	*Elymus villosus*
Silky Wild Rye	*Elymus virginicus*
Fowl Meadow Grass	*Glyceria striata*
Torrey's Rush	*Juncus torreyi*
Evening Primrose	*Oenothera biennis*
Switch Grass	*Panicum virgatum*
Indian Grass	*Sorghastrum nutans*
Prairie Cord Grass	*Spartina pectinata*
Blue Vervain	*Verbena hastata*

* not native, [S] shade tolerant

Wildflowers (non-stabilizing)

Columbine	*Aquilegia canadensis*
Jack-in-the-Pulpit[S]	*Arisaema triphyllum*
Green Dragon[S]	*Arisaema dracontium*
Swamp Milkweed	*Asclepias incarnata*
Turtlehead[S]	*Chelone glabra*
Shooting Star[S]	*Dodecatheon meadia*
Joe-Pye Weed	*Eupatorium maculatum*
Spotted Jewelweed[S]	*Impatiens capensis*
Cardinal Flower[S]	*Lobelia cardinalis*
Virginia Bluebells[S]	*Mertensia virginica*
Blue Phlox	*Phlox divaricata*
May Apple[S]	*Podophyllum peltatum*
Solomon's Seal[S]	*Polyganatum canaliculatum*
Swamp Buttercup[S]	*Rannuculus septentrionalis*
Bloodroot[S]	*Sanguinaria canadensis*
False Solomon's Seal[S]	*Smilacina racemosa*
Spiderwort	*Tradescantia ohiensis*
White Trillium[S]	*Trillium grandiflorum*
Prairie Trillium[S]	*Trillium recurvatum*
Big Merrybells[S]	*Uvularia grandiflora*
Culver's Root	*Veronicastrum virginicum*
Golden Alexanders	*Zizia aurea*

Cover Crops

Annual Ryegrass*	*Lolium multiflorium*
Perrenial Ryegrass*	*Lolium perenne*
Smartweed	*Polygonum punctatum*
Yellow Coneflower	*Ratabida pinnata*
Blackeyed Susan	*Rudbeckia hirta*

Organizations to Contact for Further Assistance

Chicago Botanic Garden
Plant Information Center
(847) 835-0972

Illinois EPA-Lakes Unit
Springfield, Illinois
(217) 782-3362

Illinois State Water Survey
Peoria, Illinois
(309) 671-3196

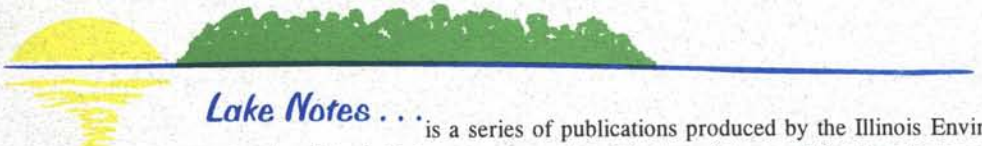
Lincoln Memorial Garden
Springfield, Illinois
(217) 529-1111

Local Soil & Water Conservation Districts, and USDA-Natural Resource Conservation Service offices

Missouri Botanical Garden
Horticulture Answer Service
(314) 577-5143

Northeastern Illinois Planning Commission
Natural Resources Department
Chicago, Illinois
(312) 454-0400

U.S. Fish & Wildlife Service
Chicago Field Office
Barrington, Illinois
(847) 381-2253



Lake Notes . . . is a series of publications produced by the Illinois Environmental Protection Agency about issues confronting Illinois' lake resources. The objective of these publications is to provide lake and watershed residents with a greater understanding of environmental cause-and-effect relationships, and actions we all can take to protect our lakes.

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This *Lake Notes* publication was prepared by Dennis Dreher and Michael Murphy of the Northeastern Illinois Planning Commission, Chicago, Illinois.

For more information about other publications in this series and to request copies, please contact: Illinois Environmental Protection Agency, DWPC-Lake and Watershed Unit, P.O. Box 19276, Springfield, Illinois, 62794-9276; 217/782-3362.

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