

ZONING PRACTICE

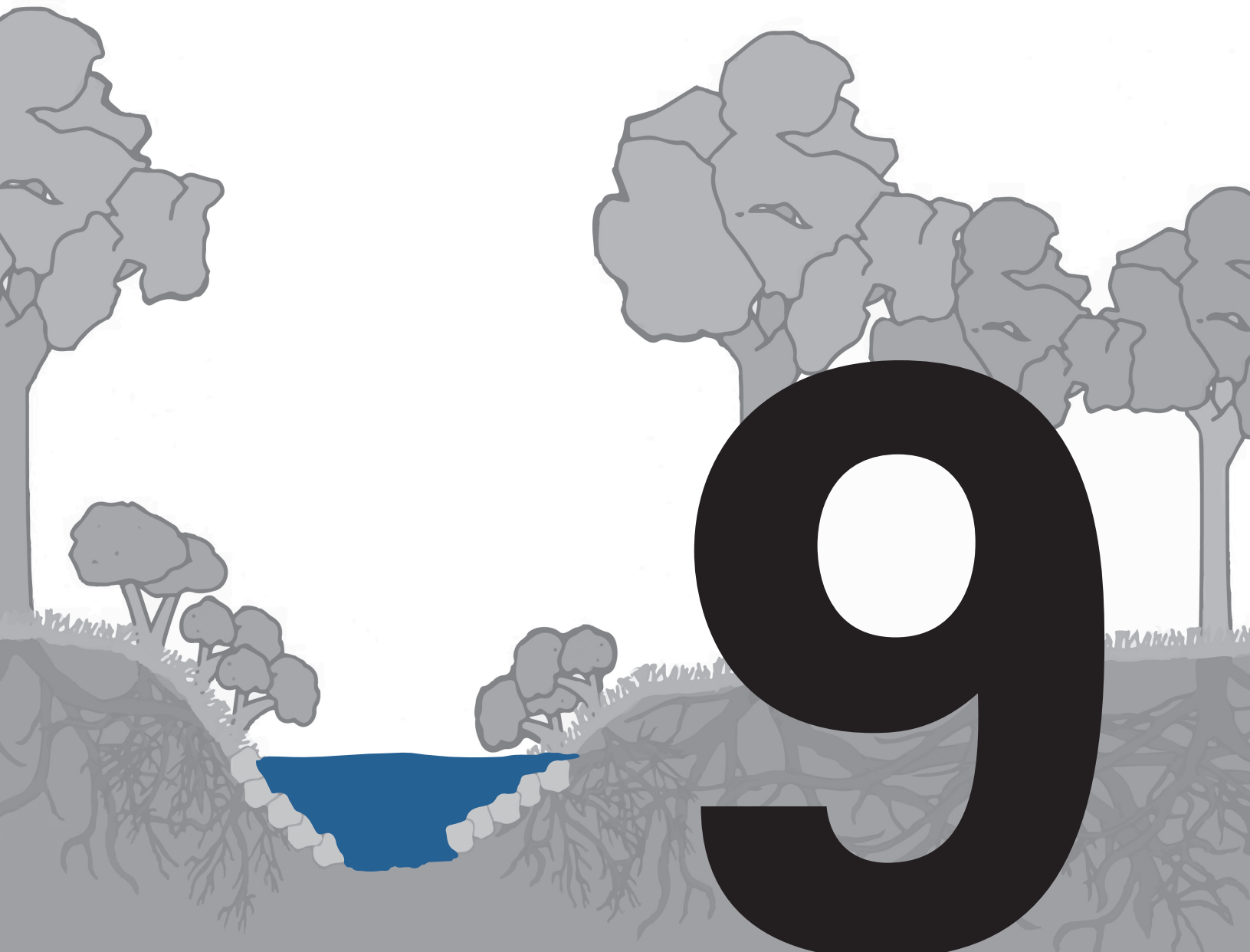
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PRACTICE RIPARIAN BUFFERS



Protecting Riparian Areas With Vegetated Buffers

By Suzanne S. Rhees, AICP

Lakes, streams, rivers, and wetlands are not uniform in character; they differ in function, water quality, and activities they support.

However, there is no question that all water bodies can benefit from a border of natural vegetation along their shorelines, known as a riparian or shoreland buffer. (The term “riparian” is used here in its broader sense, for land abutting any watercourse or waterbody.)

Many states and local jurisdictions require or encourage such buffers along watercourses and waterbodies to improve water quality and provide habitat. This article explores a selection of state programs, model codes, and local ordinances in an attempt to identify effective regulatory approaches to protecting riparian areas with vegetated buffers.

The following sections focus primarily on the more comprehensive statewide programs and the local ordinances that fall within their purview, but also highlight a number of innovative ordinances that local governments have adopted on their own.

BENEFITS AND LIMITATIONS OF VEGETATED BUFFERS

A stream, lake, or wetland in a natural wooded setting may be bordered by riparian forest or steep, wooded bluffs or ravines. In a prairie setting, a natural buffer may consist of deep-rooted tallgrass prairie plants, a broad expanse of wet meadows, or other wetland ecosystems. As land is cleared for development or agricultural uses, streams erode downward, stream-banks become less stable, runoff increases, and flooding becomes more severe. Water quality is degraded by sediment and pollutants, such as phosphorus and nitrogen, and both aquatic and upland habitat suffer.

Buffers in a variety of settings have been extensively evaluated for their effectiveness in improving water quality in lakes, streams, and wetlands. Among other benefits, buffers can:

- reduce flood risk by slowing peak flows and infiltrating surface runoff;

- capture sediment and nutrients from adjacent lands;
- capture and remove certain pollutants from runoff, including phosphorus that is attached to sediment or organic matter and nitrate;
- improve stream or ditch bank stability;
- provide an infiltration area for surface water runoff;
- provide habitat for pollinators and game birds; and
- shade and cool the stream, protecting against rapid fluctuation in temperature that can reduce fish spawning and survival.

These multiple benefits make riparian buffers one of the most cost-effective and broadly applicable strategies for water quality and habitat improvement. The buffer is essentially the first line of shoreline defense. While these benefits will vary depending on topography, soils, land-use practices, and activities occurring upstream of the buffer, in most situations, the wider the buffer, the greater the benefits. (See the March 2016 issue of *Zoning Practice* for a table showing a range of riparian buffer widths for a variety of functions.)

Buffers also have their limitations.

They are ineffective against tile drainage, in which subsurface flows are intercepted and discharged directly into streams and ditches. Buffers that are too narrow or lack deep-rooted vegetation are less effective at capturing runoff and pollutants, while intensive clearing of land outside the buffer can also increase runoff beyond the buffer's handling capacity.

BUFFERS IN A STATE REGULATORY CONTEXT

The place of riparian buffers within a regulatory system varies widely from one state to another. Some states, especially those with economies that depend on clean water for recreation and tourism, have created shoreland management

programs that enable, but sometimes also constrict, local regulations. These state programs, including those of Maine, New Hampshire, Washington, Minnesota, and Wisconsin, usually set minimum standards, giving local authorities the ability to be more restrictive—although a few of them set maximum standards that limit local authority.

Meanwhile, Georgia imposes buffer requirements as erosion and sedimentation controls to protect water quality. Pennsylvania applies buffer requirements to a defined set of streams determined to have the highest resource values. While not discussed here, many coastal states require buffers or setbacks from tidal waters for flood and storm surge protection. In the majority of states, however, vegetated buffers are simply a recommended best management practice, one which local governments may choose to require.

BUFFERS AS PART OF A SHORELAND MANAGEMENT PROGRAM

Most state programs are implemented through local zoning ordinances that must meet defined standards and that require state approval, although a few states, such as New Hampshire, manage shoreland activities through a centralized permit program. In addition to vegetated buffer requirements, these ordinances typically classify different types of water bodies; enumerate land-use districts and use restrictions; establish setbacks, height limits, and bulk restrictions for buildings; and include standards for planned unit developments, resorts, and other specific water-related uses as well as for features of riparian properties, such as beaches, stairways, boat landings, and stream-bank reinforcement.

Other state requirements are applied through mandatory erosion and sedimentation controls. The Georgia Erosion and Sedimentation Control Act defines a 25-foot buffer

adjacent to creeks, streams, rivers, saltwater marshes, and most lakes and ponds, and a 50-foot buffer on trout streams, within which land disturbance and vegetation trimming are restricted (although some activities are allowed under a variance process administered by the state's Department of Natural Resources (§12-7-6)).

THRESHOLDS FOR REQUIRING BUFFERS

At a minimum, most of the programs and ordinances surveyed here apply to perennial streams, lakes, and coastal shorelines. Some programs rely on delineations such as the “blue lines”—the perennial streams on U.S. Geological Survey maps—or on more detailed soil survey maps. Other states and local governments have surveyed and evaluated their water resources in order to identify those in need of protection.

Minnesota's shoreland management program establishes different thresholds for incorporated and unincorporated areas. Outside municipal boundaries, shoreland includes all water basins (i.e., lakes and wetlands) 25 acres or larger and streams with a drainage area of at least two square miles. Within incorporated areas, the same requirements apply to streams and water basins as small as 10 acres.

In Maine, the shoreland zone applies to lakes (known as great ponds), rivers that drain at least 25 square miles, and all tidal waters and saltwater marshes.

New Hampshire's Shoreland Water Quality Protection Act applies to all tidal waters, all lakes and ponds larger than 10 acres, all fourth order (medium) and higher streams and rivers, and other designated rivers.

In Pennsylvania, statewide standards apply only to streams defined as “exceptional value” and “high quality,” determined based on their water quality, biological communities, or location on protected lands (§102.14). State regulations largely prohibit land disturbance within 150 feet of these streams for projects requiring a state permit and involving disturbance of more than one acre. However, model ordinances promoted by a number of conservation organizations and counties in the state call for application of buffers to all perennial streams as shown on soil survey maps.

Absent state-derived authority, several city ordinances, including those of Boulder, Colorado, and Salt Lake City, designate specific stream corridors and wetlands, often based on detailed inventories and studies.



A vegetated buffer along the shore of Little Rock Lake in Benton County, Minnesota.

CLASSIFICATION OF WATER BODIES

Some statewide regulations and local ordinances group lakes, streams, and wetlands into classes based on their size, depth, hydrologic regimen, location in the landscape, and the land uses that surround them. For example, Minnesota's statewide shoreland program classifies three types of lakes, each with different setback and lot size requirements:

- *Natural Environment Lakes* are generally smaller, shallow lakes with a low level of development; many support waterfowl populations and may have some winter kill of fish. These are afforded the highest level of protection.
- *Recreational Development Lakes* are deeper lakes with a moderate level of development, defined as between three and 25 dwellings per mile of shoreline.
- *General Development Lakes* are large, deep lakes with more than 25 dwellings per mile of shoreline; some are bordered by commercial recreation and urban development.

Rivers and streams are classified into six categories, including remote, agricultural, forested, transitional, urban, and tributary streams.

Each lake and river classification is assigned different lot sizes, lot widths, structure setbacks, and other dimensional standards. The less developed the setting, the higher the level of protection.

Maine's shoreland program requires establishment of districts or zones within shoreland areas based on the adjacent water body and other resource characteristics. For example, Resource Protection Districts must include all riverine or tidal 100-year floodplains, lands adjacent to high-quality freshwater wetlands, salt marshes and salt meadows, and areas with two or more acres of steep slopes (over 20 percent).

Other land-use districts are defined based on their suitability for residential, recreational, or commercial development or the presence of intensive water-dependent uses, such as working harbors.

Many local ordinances classify rivers and streams based on size and significance, with the most protective standards for perennial streams. For example, Montgomery County, Pennsylvania's model ordinance classifies and recommends different standards for perennial streams (shown as solid lines on soil survey maps), intermittent streams, other streams with drainage areas of less than 75 acres, and wetlands and water bodies.

Although these classifications provide the greatest protection for larger streams, research indicates that smaller headwater streams in the upper reaches of a watershed have the greatest area of land-water interaction and are often the most sensitive to sedimentation and pollution. Where feasible, a narrower buffer may provide some measure of protection for these streams.

WIDTH OF THE BUFFER ZONE

Many state regulations and local ordinances require establishment of a shoreland zone within which the buffer zone forms the inner protective ring. In Maine, the shoreland zone extends 250 feet from the normal high-water line of water basins, known as great ponds, and tidal areas and 75 feet from streams.

In Minnesota and Wisconsin, the shoreland zone is 1,000 feet around water basins and 300 feet or the width of the floodplain, if greater, along streams. In Minnesota, the actual buffer, known as the Shore Impact Zone, is limited to one-half the building setback from the ordinary high water mark, a distance ranging from 25 to 100 feet, depending on the shoreland classification of the water body and whether the property is sewered. In agricultural areas, a riparian buffer of 50 feet is required. Wisconsin's riparian buffer zone extends 35 feet inland from the ordinary high water mark, but structure setbacks and impervious coverage limitations apply within 300 feet.

Many Georgia communities have adopted higher standards than the statewide 25-foot or 50-foot minimums. For example, the city of Alpharetta requires a 100-foot buffer on all perennial streams, with an additional 50-foot setback beyond the buffer in which all impervious coverage is prohibited. For non-perennial streams, a 50-foot buffer and a 25-foot setback are required. For erosion and sedimentation control during construction, the city requires that buffers remain undisturbed on all perennial streams equal to the width of the 100-year floodplain, where that has been mapped, or in other locations, five times the width of the stream at top of bank.

All these examples specify a fixed width for the buffer and, where applicable, the shoreland zone. In contrast, many model ordinances recommend a variable width based upon a more detailed evaluation of site characteristics, clearly a more complex approach. Another common method, developed originally for the Chesapeake Bay, is to establish up to three concentric buffer zones with progressively more flexible requirements farther away from the water (Hawes and Smith 2005).

New Hampshire's shoreland protection program establishes the following zones:

- *A Waterfront Buffer* extending 50 feet landward from a defined reference line, within which existing natural ground cover must remain intact except for a foot path to the

water; limited clearing of trees is allowed according to a grid and point system, and no primary structures are allowed.

- *A Natural Woodland Buffer* extending 50 feet to 150 feet from the reference line, in which structures are allowed but at least 25 percent of the area must be maintained in an unaltered wooded state.
- *The Protected Shoreland* zone encompasses the entire area extending 250 feet from the reference line. Some land uses are restricted, setback requirements for all new septic systems are determined by soil characteristics, and impervious cover is limited to maximum of 30 percent of the lot area.

VEGETATION MANAGEMENT WITHIN THE BUFFER

Protection of natural vegetation management is a primary reason for the riparian buffer and a primary activity within it. In most state and local regulations the level of management varies with the sensitivity of the water resource. Most ordinances allow routine maintenance such as pruning, limited clearing for purposes such as removal of invasive plants, diseased or downed trees, and other safety hazards, and some level of access to the shoreline.

In Minnesota, intensive vegetative clearing (sometimes known as clear-cutting) is prohibited within the Shore Impact Zone (one-half of the width of the structure setback). However, limited exceptions are allowed for typical lake-front activities such as beaches, docks, boat-houses, stairways, and paths. Land within the 50-foot agricultural buffer must be maintained in permanent vegetation or under an approved Natural Resources Conservation Service (NRCS) conservation plan.

Crow Wing County, a lake-rich region in north-central Minnesota, applies higher standards to vegetation management (Land Use Ordinance Article 11). It allows limited clearing in the shore impact zone only on the more developed classes of lakes (General Development and Recreational Development) in order to provide views of the lake from the principal dwelling and for recreational improvements. A permit is required to remove woody vegetation within the shore impact zone of a Natural Environment lake, a distance of 75 feet. The county has also developed a "rapid assessment model"—a process for analyzing existing shoreland vegetation and developing a vegetation restoration plan if needed. The model uses a point system based on the degree of erosion

along the shoreline, the presence of naturally vegetated cover within the shore impact zone, and the structure setback to determine the width of a required "no-mow buffer."

Maine's shoreland zoning law prohibits removing vegetation within a 75-foot buffer area around a great pond that is zoned for resource protection, except to remove safety hazards. In all other shoreland areas, no more than 40 percent of the total volume of trees over four inches in diameter in the buffer area may be harvested in any 10-year period. Vegetation less than three feet tall, including groundcover, cannot be removed from shoreland buffers, although pruning the lower third of the branches of a tree is allowed. Beyond the immediate buffer area, a point system is used to establish the number of trees that may be removed. Timber harvesting is regulated separately, and agricultural activities are exempt from regulation.

Wisconsin's shoreland regulations limit clearing within a 35-foot buffer measured from the shoreline, although a 35-foot-wide viewing corridor is allowed for each 100 feet of shoreline. Accessory structures such as boathouses and staircases are also allowed.

Georgia's Environmental Protection Division provides explicit guidance on the appropriate type of vegetation for shoreland stabilization. To be ecologically functional and effective, vegetation must consist of native species adapted to Georgia's riparian forests and stream edges. Vegetation should be "multitrophic"—made up of multiple layers such as low-growing grasses, forbs (non-woody flowering plants other than grass), and other plants; an intermediate small trees and shrub layer; and tree canopy cover. While buffers may be trimmed to create lines of sight to the shoreline, an entire trophic layer should not be removed. The guidance also includes standards for nonstructural and bioengineering techniques for streambank stabilization, such as the use of live stakes, brush layering, and toe protection (Georgia Department of Natural Resources 2007).

Similar regionally specific guidance can be found in many publications by the NRCS, state cooperative extension service programs, and local conservation districts.

MANAGEMENT OF LAND DISTURBANCE AND RUNOFF WITHIN THE BUFFER

Other land-disturbing or potentially harmful activities such as placement of fill, storage

of materials, and septic systems are typically prohibited or restricted within buffer areas. Roads and stream crossings, stormwater or drainage ditch outfalls, and utility structures may also be regulated to manage erosion and reduce runoff.

Where some state regulations and local ordinances primarily restrict clearing, others include site-specific mitigation requirements. For example, Georgia requires mitigation as part of a streambank buffer variance approval. The state's Department of Natural Resources' buffer mitigation guidance states: "A buffer extending out from a stream serves three main functions: hydrologic, water quality, and aquatic/buffer habitat protection" (Georgia Department of Natural Resources 2010). And there are separate mitigation requirements for each function.

Applicants must address hydrologic functions by meeting minimum stormwater management standards that reduce downstream bank and channel erosion and capture runoff from the first 1.2 inches of rainfall to ensure an 80 percent reduction in total suspended solids (TSS). They must address water quality functions by implementing on-site best management practices that address common post-construction pollutants other than TSS. And applicants must address aquatic habitat functions by meeting the requirements of a U.S. Army Corps of Engineers Section 404 Permit, or, if that permit is not required, by purchasing mitigation credits.

STRUCTURE SETBACKS AND IMPERVIOUS COVERAGE

Most buffer regulations do not allow primary structures within the buffer zone closest to the water, although small accessory structures such as gazebos, decks, and boathouses may be allowed. Greater setbacks for primary structures are often required.

For example, Wisconsin requires a setback of 75 feet from the shoreline, although an average of existing setbacks with a minimum of 35 feet may be used in developed areas. New Hampshire requires a minimum of 50 feet, except in certain urban areas, and Maine requires from 75 to 100 feet.

Impervious coverage is also regulated within the broader shoreland zone. Most of the regulations surveyed specify a maximum of 15 to 20 percent impervious coverage, except in highly developed areas or in conjunction with an approved stormwater management plan.

BLUFFS AND STEEP SLOPES

The steeper the slopes around a stream or water body, the greater the potential for erosion and, in extreme cases, slope failure. A number of state regulations apply to steep slopes, typically defined as greater than 20 to 25 percent, within the defined shoreland area. Maine's shoreland management standards specify that in areas with slopes of 20 percent or more, the setback for roads and other impervious surfaces must be increased 10 feet for every five percent increase in slope above 20 percent. Wisconsin's shoreland standards prohibit construction on slopes steeper than 20 percent over a 50-foot horizontal distance. Minnesota defines "bluffs" in shoreland areas as slopes rising at least 25 feet from the shoreline with a grade of 30 percent or more over the lowest 25 feet. Buildings must be set back at least 30 feet from the top of a bluff, and no structures other than staircases and landings are allowed on the face of the bluff or within 20 feet of the top.

A simpler approach is to specify that slopes over 25 percent do not count toward the required width of a buffer (Wenger and Fowler 2000).

WETLAND BUFFERS

Wetlands are a distinct class of water bodies with many different water regimens, depending on whether they are flooded or saturated year-round, seasonally, or periodically. They provide many benefits, from flood control to groundwater recharge to wildlife habitat, and these benefits can only be sustained when wetlands are surrounded by protective upland buffers. According to McElfish et al., "Relying on regulations and conservation measures that deal only with the wetland is like trying to operate a municipal swimming pool without any attention to the pipes, the deck, the lifeguard stations, and the condition of areas draining into the water" (2008).

Some state shoreland programs and local ordinances address wetlands that are hydrologically connected to lakes, streams, or tidal waters, but do not apply to isolated wetlands. For example, under Wisconsin's shoreland program, communities must adopt Shoreland-Wetland Zoning Districts that apply to all wetlands of five acres or more within the designated shoreland zone (Administrative Code NR §117.05). Uses within the overlay may include farming or forestry, but must not include "filling, flooding, draining, dredging, ditching, tiling or excavating." In other cases,

local ordinances apply specifically to wetlands independent of their shoreland status.

As with other types of buffers, greater width increases effectiveness. While much of the sediment and nutrients are removed within the first 15 to 30 feet of the buffer, a width of 30 to 100 feet is recommended for more consistent removal of pollutants. The narrower the buffer, the more likely it is to become saturated with sediment and nutrients over time, reducing its effectiveness (McElfish et al. 2008).

According to a detailed study of wetland and stream buffers by Boulder, Colorado, the optimal width for a wetland buffer will depend on its desired function and local condition. Research points to recommended widths that range from 50 feet to reduce sediment loading to as much as 300 feet for wildlife habitat. For practical purposes, however, it often makes more sense to establish a "zoned" system: an inner buffer with a fixed or average width and a second or third zone outside it with progressively less restrictive requirements.

Boulder's current overlay district standards are based on an evaluation and classification of wetlands and other water bodies as "high-functioning" or "low-functioning," with different standards for each (§9-3-9). A 50-foot buffer divided into 25-foot inner and outer zones is required for high-functioning water bodies, while low-functioning water bodies (constructed stormwater ponds, for example) require only a 25-foot outer buffer zone. Vegetation removal and most land-disturbing activities are strictly limited within the inner zone.

Plymouth, Minnesota, a large community in the Twin Cities metropolitan area, uses a similar approach. After inventorying all its wetlands, the city adopted an ordinance that classifies them by resource value, from "low" to "exceptional," and establishes variable buffers around them (§21670). Buffers range from an average of 25 feet and a minimum of 10 feet for the lowest quality to an average of 75 feet and a minimum of 50 feet for the highest quality wetlands. Structures must be set back at least 15 feet from the outer edge of all buffer strips.

Plymouth's ordinance specifies that vegetation within the buffer strip, where acceptable in quality, must be retained. Acceptable vegetation includes either a continuous, dense layer of perennial grasses or an overstory of trees or shrubs with at least 80 percent canopy closure; both must have been unbroken or uncultivated for at least five years. Invasive plant species such as reed canary grass or purple

SUMMARY OF STATE PROGRAMS

State	Water features included	Min. width of protective zone	Minimum width of riparian buffer	Restrictions on clearing vegetation	Structure setback from water's edge or buffer	Impervious coverage limitations
Georgia	Watercourses, tidal waters	25'; 50' from trout streams (same as buffer)	25'; 50' for trout streams	Yes	Generally equal to buffer width	Limited by vegetative requirements
Maine	Great ponds, saltwater bodies, rivers, tidal and freshwater wetlands, streams	75' from streams; 250' from all other water features	75'	Grid and point system restricts clearing	75–100'	20% of lot area in most districts
Minnesota	3 lake classes; 6 stream classes	1,000' from lakes; 300' (or width of floodplain) from streams	One-half building setback; 50' for agricultural uses	No "intensive clearing" in shore impact zone	50–200'	25% of lot area
New Hampshire	Water bodies > 10 acres; designated rivers, tidal waters	250' from reference line	50' for inner waterfront buffer	Grid and point system used to manage clearing	50'	20–30%
Wisconsin	Lakes, ponds, flowages, rivers, streams	1,000' from lakes; 300' (or width of floodplain) from streams	35' from ordinary high water mark	Limited clearing; 35' viewing corridor per 100' of shoreline	75' or average existing setback; min. 35'	15–30%

loosestrife are unacceptable. Buffers that lack acceptable vegetation must be planted with an approved mix of native perennial grasses and flowering plants or shrubs, with specific requirements for installation and maintenance. The edges of the buffer strip are marked with a monument at each lot line. The developer is responsible for maintenance of the buffer strip for five years after installation.

BUFFERS IN URBAN SETTINGS

Most of the examples described above are applied in rural or suburban settings. In an urban setting, where most land is already developed, greater flexibility in buffer width and allowed uses may be needed. Some state programs provide blanket exemptions for more intensely developed areas. For example, New Hampshire authorizes localities to exempt urbanized areas where "vegetative buffers have been depleted, impervious surfaces are in excess of 50 percent, and residential uses are of at least 10 dwelling units per acre" from state requirements (§483-B:12). Maine's shoreland program includes a Commercial Fisheries and Maritime Activity District, where the impervious coverage limit is 70 percent (Land Rules §1000.15.B.(4)).

Salt Lake City's Riparian Corridor Overlay District applies to the major streams that cross the city and their associated wetlands (§21A.34.130). The ordinance establishes a "no disturbance" corridor of 100 feet on undeveloped parcels of an acre or more in size.

On developed land, the ordinance establishes a three-zone approach: a 25-foot no disturbance zone, a "structure limit" area extending back another 25 feet, and a transition area in the remaining 50 feet, where most uses allowed by the underlying district are permitted. Expansions of existing structures in the first two zones is allowed without a variance if the setback from the streambank is maintained, although streambank restoration may be required as a condition.

STATE LAWS AFFECT LOCAL REGULATIONS

State laws provide a foundation for local regulation but can also limit its scope. Minnesota's shoreland rules require local governments to adopt and enforce shoreland ordinances. However, the requirement applies only to selected water bodies, and studies have shown that only about one-third of the watercourses in the state's agricultural counties were protected (Rundquist and Cox 2014; Minnesota Board of Water and Soil Resources 2014).

A new law adopted in 2015 will require an average 50-foot, minimum 30-foot buffer of perennial vegetation along all natural watercourses and a 16.5 foot buffer along public ditches managed by drainage authorities (Minnesota Statutes §103H.48). The law is not linked to local zoning and will be implemented not by local governments but by each county's soil and water conservation district. It will increase the number of water bodies protected by buffers,

but its relationship to existing shoreland zoning is not always clear. The law states that the more restrictive requirements apply, but "more restrictive" is not always immediately obvious. Moreover, the requirement for "perennial vegetation" could be satisfied by perennial turf grass, and not the deep-rooted native species that effectively stabilize streambanks.

The situation is quite different in Wisconsin, where environmental and lake associations charge that the state is rolling back decades of shoreland protection. Changes to state law in 2015 prohibit local ordinance provisions that are more restrictive than the state's rules (§59.692(1d)(a)). Counties that adopted higher standards for certain classes of water bodies must now roll these back. Among the provisions of the law, local ordinances may not require the establishment of a vegetative buffer on previously developed land or require expansion of an existing buffer, and nonconforming structures must be allowed to rebuild or remodel if the building footprint is not increased. Furthermore, the Department of Natural Resources may not issue an opinion on whether a variance should be granted unless requested by a county board of appeals (BOA), and may not appeal a BOA decision.

RECOMMENDATIONS

Given the diversity of water features and the variety of approaches to establishing and managing riparian buffers, a few best practices can

be applied in most circumstances, with or without the framework of a state program.

Inventory and classify water features based on their level of development and need for protection or restoration. Watercourses such as trout streams and unique wetland types such as fens may need higher levels of protection.

Consider a multizone system that establishes a gradation of regulation, with greater flexibility in the outer zone(s). Steep slopes, floodplains, or native plant communities may require a wider buffer.

Establish standards to manage vegetation to encourage the multilevel structure of a buffer, including ground-level grasses and flowering plants, the understory, and the tree canopy.

Provide access for lakeshore residents who need some level of visual and physical access to the water's edge. Incorporate reasonable exceptions for view corridors, paths, stairways, and docks or boathouses.

Encourage compatible uses of buffers such as haying and limited grazing in agricultural areas. Allow for alternate methods to achieve the goals of reduced erosion and improved water quality, including the many best management practices promoted by the NRCS and state cooperative extension services.

Consider the goals of public access and recreation. A completely vegetated buffer in urban areas, especially downtown riverfronts, may not be feasible. Stormwater management practices can improve water quality in there.

Allow some flexibility in exchange for higher standards. Many ordinances allow expansion of existing buildings or impervious surface in protected zones but require restoration of vegetation or a stormwater management plan to mitigate the effects of the expansion.

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HOW DOES YOUR COMMUNITY PROTECT RIPARIAN AREAS?

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