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Waterfront Buffer Zones

Riparian buffers are vegetated zones of land adjacent to water sources. Preservation and reestablishment of these zones can have many environmental benefits. The most important function of these zones is to act as a filter for water flowing into the water source, and studies show that they greatly reduce water pollution. The vegetation and soil absorb runoff water that is often laden with pollutants, sediments and nutrients that are harmful to the water supply, especially if the buffer zone is over 30 feet wide.¹ The absorption of runoff water has other benefits: it recharges the ground water supply, and can regulate water flow in rivers and therefore reduce and prevent flooding. Having vegetation immediately adjacent to a water source also helps control erosion, as the roots of the plants help hold soil in place. Zones of land adjacent to water sources are often flourishing wildlife habitats, with many species depending on them for survival.² Buffer zones could also theoretically reduce the amount of public spending on storm water management and pollution removal.³

Many levels of government in the U.S. have mandated the creation/maintenance buffer zones in which construction and other environmental disturbances are prohibited. The difficulty in legislating the creation or preservation of these zones lies in balancing the interests of landowners with the interests of those seeking to improve water-quality.

¹ Belt, G.H., J. O’Laughlin, and T. Merrill, “Design of forest riparian buffer strips for the protection of water quality: analysis of scientific literature” *Idaho Forest, Wildlife, and Range Policy Group Report No. 8*, University of Idaho, Moscow, ID, 1992; Johnson, A.W., and D.M. Ryba, “Literature review of recommended buffer widths to maintain various functions of stream riparian areas” Water and Land Resources Division, King County Department of Natural Resources, Seattle, WA, 1992; Castelle, A.J., A.W. Johnson, and C. Conolly, “Wetland and stream buffer size requirements – a review” *Journal of Environmental Quality* (1994) 23:878-882; Fennessy, M.S., and J.K. Cronk, “The effectiveness and restoration potential of riparian ecotones for the management of nonpoint source pollution, particularly nitrates” *Critical Reviews in Environmental Science and Technology* (1997) 27:285-317; Christensen, D. “Protection of riparian ecosystems: a review of the best available science” Jefferson County Natural Resources Division, Port Townsend, WA, 2000; For more information see: Canfield, Timothy J., Mayer, Paul M. McCutchen, Marshall D. Reynolds, Steven K. Jr., “Riparian Buffer Width, Vegetative Cover and Nitrogen Removal Effectiveness: Review of Current Science and Regulations” U.S. Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, Ada, Oklahoma, 2005, Retrieved April 9, 2008 from www.epa.gov/nrmrl/pubs/600R05118/600R05118.pdf.

² Hawes, Ellen, Smith, Markelle, “Riparian Buffer Zones: Functions and Recommended Width” Yale School of Forestry and Environmental Studies, Prepared for the Eightmile River Wild and Scenic Study Committee, April, 2005, retrieved March 31, 2008 from http://64.233.169.104/search?q=cache:5OqTzrid3tsJ:www.eightmileriver.org/resources/digital_library/appendicies/09c3_Riparian%2520Buffer%2520Science_YALE.pdf+riparian+buffers,+new+england&hl=en&ct=clnk&cd=6&gl=us&client=safari.

³ Presler, Henrietta H., “Successful Implementation of Riparian Buffer Zones,” *Stormwater*, December 2005, retrieved March 31, 2008 from http://www.gradingandexcavation.com/sw_0611_successful.html.

Buffer Width

Scientists disagree over the optimal width for riparian buffer zones, but it seems clear that different water sources have different needs. Three factors influence ideal buffer widths: slope, soil type, and vegetation mix. A buffer with a steep slope needs to be wider because the water will rush over it faster, giving it less time to be absorbed. The type and density of soil also affects the speed of absorption. The type of vegetation in the buffer is perhaps most important-- buffers with a wide variety of vegetation types (trees, grasses, bushes, etc.) will absorb more nutrients than buffers with just one type of vegetation.⁴

It is impossible to generalize ideal buffer zone widths due to the individual needs of specific streams, but the following are some guidelines from various scientific studies. Most studies find that buffers between 30 and 150 feet are highly effective.⁵ Several studies found that narrower buffer zones of around 15 feet still reduced subsurface nitrate flows by up to 80%, but were less effective in reducing surface nitrogen and other pollutants.⁶ Another review of the scientific literature found that most studies demonstrate significant nutrient removal in buffers more than 90 feet wide, but that “these buffers are much wider than what land managers can typically expect farmers to remove from active production”.⁷

H. 549 in the Vermont House during the 2007-2008 Legislative Session sought to establish a minimum statewide riparian buffer zone. The bill would require the establishment of a 50 foot buffer zone along the lakes and streams of the state.⁸ The bill would allow for some exceptions, and local governments would be free to create wider buffers for specific water sources.

Other States' Laws

Georgia

Georgia's Conservation and Natural Resources Act of 2007 mandates that “a natural vegetative buffer area shall be maintained for a distance of 100 feet on both sides of the stream as measured from the stream banks.” The act requires local governments to map the areas surrounding rivers

⁴ Hawes and Smith, “Riparian Buffer Zones: Functions and Recommended Width.”

⁵ Belt et al., “Design of forest riparian buffer strips for the protection of water quality: analysis of scientific literature”; Johnson and Ryba “Literature review of recommended buffer widths to maintain various functions of stream riparian areas”; Castelle et al., “Wetland and stream buffer size requirements – a review”; Fennessy and Cronk, “The effectiveness and restoration potential of riparian ecotones for the management of nonpoint source pollution, particularly nitrates”; Christensen “Protection of riparian ecosystems: a review of the best available science”; See Canfield et al., “Riparian Buffer Width, Vegetative Cover and Nitrogen Removal Effectiveness: Review of Current Science and Regulations”

⁶ Muscutt, A.D., G.L. Harris, S.W. Bailey, and D.B. Davies “Buffer zones to improve water quality. A review of their potential use in UK agriculture” *Agriculture, Ecosystems, and Environment*, (1993) 45:59-77; Parkyn, S., “Review of riparian buffer zone effectiveness” Ministry of Agriculture and Forestry Technical Paper No. 2004/05, Wellington, New Zealand ; See Canfield et al., “Riparian Buffer Width, Vegetative Cover and Nitrogen Removal Effectiveness: Review of Current Science and Regulations”

⁷ Hickey, M.B., Doran, B., “A review of the efficiency of buffer strips for the maintenance and enhancement of riparian ecosystems” *Water Quality Research Journal of Canada*, (2004) Vol. 39, No. 3. Pgs. 311-317.

⁸ See bill as amended <http://www.leg.state.vt.us/WorkGroups/FishWild/229633.pdf>, accessed May 20, 2008.

and streams and create zoning laws in accordance with the act. There is a significant exception to the act, which is that it cannot prohibit the building of a single-family home on a property of at least two acres.⁹

Maine

In 1971 the Maine state legislature implemented the Shoreland Zoning Act. The law as currently on the books requires municipalities to adopt shoreland zoning maps and ordinances in order to protect the state's water resources. The law considers shorelands to be all areas 250 feet from the high water lines of great ponds, rivers, saltwater bodies, and coastal wetlands, and 75 feet from a stream. The municipalities are required to have zoning ordinances for all land that this law considers shoreland. The state publishes guidelines for municipalities, but does not necessarily require that they abide by the guidelines. There are also additional state laws that designate specific waterways as "significant river segments" that deserve additional protection.¹⁰

Massachusetts

The Massachusetts Legislature adopted the Rivers Protection Act in 1996. The law creates a protected area extending 200 feet on both sides of most rivers and streams in the Commonwealth. The designated area is only 25 feet in certain urban areas. The state defines a river as "any natural flowing body of water that empties into any ocean, lake, or other river and that flows throughout the year." Structures existing before the implementation of the act are exempted.¹¹

Virginia

In 2000, the Virginia General Assembly created the "Riparian Buffer Tax Credit" for landowners who preserve riparian forest buffers along land on which they harvest timber. The credit requires that the preserved buffer be between 35 and 300 feet wide and that it remain for 15 years.¹² The credit may only be claimed in the first year of this fifteen year period, after which the land is again eligible for the credit.¹³ Additionally, the tract of land (timber harvesting area and buffers together) must be at least ten acres in size.¹⁴

The credit is worth 25% of the value of the timber retained as a buffer, up to a maximum value of \$17,500, and must be claimed in the year in which timber on the adjacent land was harvested.

⁹ Georgia Code, "§ 12-2-8" 2007, Retrieved April 7, 2008 from the George State Code: <http://www.lexis-nexis.com/hottopics/gacode/default.asp> (search needed).

¹⁰ Maine Revised Statutes, "Statute 435." 2008, Retrieved April 2, 2008, from the Maine State Legislature Website: <http://janus.state.me.us/legis/statutes/38/title38sec435.html>.

¹¹ Massachusetts Department of Environmental Protection. "Massachusetts Rivers Protection Act." Retrieved April 2, 2008 from <http://www.mass.gov/dep/water/laws/rpa01.htm>.

¹² Virginia Department of Forestry. "Riparian Buffer Tax Credit: Introduction." Retrieved April 2, 2008 from <http://www.dof.virginia.gov/rfb/rbtc-index.shtml>.

¹³ Virginia General Assembly Legislative Information System. "§ 58.1-339.10. Riparian forest buffer protection for waterways tax credit." Retrieved April 2, 2008 from <http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+58.1-339.10>.

¹⁴ Virginia Department of Forestry. "Riparian Buffer Tax Credit: How to Apply." Retrieved April 2, 2008 from <http://www.dof.virginia.gov/rfb/rbtc-apply.shtml>.

If the value of the credit exceeds the amount of tax due that year, the remainder of the credit may be applied to future tax liabilities, for up to five years, until the tax credit has been expended.¹⁵

The law gives the State Forester responsibility for determining many of the technical requirements that determine eligibility for the credit.¹⁶ Currently, the amount of buffer area eligible for the credit is equal to the amount of adjacent land area on which timber is harvested (e.g., five acres of buffer are eligible for credit if five acres of timber have been harvested adjacent to that area).¹⁷ An application, including a \$100 to \$175 fee, buffer stewardship plan, proof of land ownership, proof of value of buffer timber, and a map of the buffer must be submitted for each tract of land on which a credit is sought.¹⁸ Individuals, Corporations, and Partnerships are eligible for the credit; Estates and Trusts are not.¹⁹

The credit is not available to landowners who do not harvest timber, nor to those, such as farmers, who use their land for other income-generating activities.

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Disclaimer: This report has been compiled by undergraduate students at the University of Vermont under the supervision of Professor Anthony Gierzynski. The material contained in the report does not reflect the official policy of the University of Vermont.

¹⁵ Virginia General Assembly Legislative Information System. “§ 58.1-339.10. Riparian forest buffer protection for waterways tax credit.” Retrieved April 2, 2008 from <http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+58.1-339.10>.

¹⁶ Virginia General Assembly Legislative Information System. “§ 58.1-339.10. Riparian forest buffer protection for waterways tax credit.”

¹⁷ Virginia Department of Forestry. “Riparian Buffer Tax Credit: Frequently Asked Questions.” Retrieved April 2, 2008 from <http://www.dof.virginia.gov/rfb/rbtc-faq.shtml>.

¹⁸ Virginia Department of Forestry. “Riparian Buffer Tax Credit: How to Apply.” Retrieved April 2, 2008 from <http://www.dof.virginia.gov/rfb/rbtc-apply.shtml>.

¹⁹ Virginia Department of Forestry. “Riparian Buffer Tax Credit: How to Qualify.” Retrieved April 2, 2008 from <http://www.dof.virginia.gov/rfb/rbtc-qualify.shtml>.