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Riparian Buffers: The Lack of Buffer Protection Policies and Recommendations to Expand Protection

INTRODUCTION

Protecting riparian buffers is the best and most economical way to bar nonpoint source pollution from surface waters. Riparian buffers prevent sediment, nutrient, chemical, pathogen, and temperature pollution from affecting the hydrology and ecology of riverine and

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littoral systems. They also provide wildlife habitat, bank stability, and aesthetic and recreational benefits. Even though these benefits have a solid scientific basis, millions of miles of banks along our waterways are eroding or functioning poorly due to either the degradation or complete absence of riparian buffers. Recognizing this national issue, the federal government works cooperatively with state governments, encouraging them to establish, administer, and fund programs that target this challenge. Moreover, some states have enacted statutes or adopted regulations to protect our water and riparian resources. Regardless of state or federal action, miles of riverine and littoral banks lie unlawfully and unnaturally exposed, creating unreasonable and unnecessary damage to our aquatic ecosystems.

This Article will first review the benefits of buffers and why they should be restored or protected. Next, the Article will provide an overview of the numerous state and federal programs, statutes, and regulations that have been adopted to protect our riparian resources. The Article will then sift through the inadequacies of protective measures that fail to fully shield our riparian resources. Finally, the Article will make recommendations for changing the current nonpoint source pollution or buffer programs, statutes, and regulations to ensure all riparian buffers are protected.

I
THE SCIENTIFIC BENEFITS OF BUFFERS ARE MORE STABLE THAN THE POLITICS

Erosion is a national and international crisis. The United States is losing soil at 10 times the rate of soil replenishment, while China and India's losses are 30 to 40 times greater. Economic losses are estimated at 37 billion dollars per year from erosion.[1] Some soil is lost to the air, but much of it is lost to surface water runoff, which eventually runs into our nation's waterways.[2] Such soil erosion pollutes our waterways both physically and chemically.

Protecting and restoring riparian buffers prevents soil loss, thus preventing sediment pollution. These resources "buffer valuable

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1 J. William Futrell, *New Action for Soil Protection*, 39 ENVTL. L. REP. 10077, 10077 (2009).

2 Peter M. Lacy, *Our Sediment Boxes Runnuth Over: Public Lands Soil Law as the Missing Link to Holistic Natural Resource Protection*, 31 ENVTL. L. 433, 436 (2001).

aquatic resources from potential anthropogentic degradation."[3] The values of buffers are undeniable, but it is debatable what width a buffer should be in order to maintain the riverine ecosystem or the physical and chemical properties of the stream or lake.[4] Moreover, what science recommends is not necessarily what regulators and legislators are willing to require of private landowners.

Buffer functions and benefits do not increase linearly as the buffer gets wider; rather, a difference in vegetation determines its pollution prevention properties.[5] Depending on the slope of the riparian area, it may be necessary to require 9.1- to 61-meter buffers in order to achieve at least ninety percent sediment, nutrient, or heavy metal removal and erosion control. While, buffers of 15 to 30 meters width may be sufficient to protect a waterway from temperature increases and/or pollution.[6] Because buffers are also imperative to protect wildlife species within a riparian zone, even greater buffer widths may be required.[7] Given the complexity of aquatic systems and the multitude of studies about riparian functions, one can see why politicians and agency representatives have a difficult time deciding the best way to protect riparian buffers, thus leading to inadequate action or no action at all.

II
LEGISLATIVE FINDINGS ON THE BENEFITS OF BUFFERS

Legislative findings that support buffer protection laws may recognize the importance of buffer benefits, but they should be viewed in light of the actual protective measures, discussed in the subsequent section, for they sometimes do not fully protect what they declare is important. Legislative findings may be as simple as the findings in a Nebraska statute, which declares: "(1) Buffer strips help reduce the levels of sediment, crop nutrients, pesticides, and other chemicals introduced into surface water resources; and (2) Both wildlife and people benefit as a result of improved water quality."[8] Findings in a

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3 A.J. Castelle et al., *Wetland and Stream Buffer Size Requirements- A Review*, 23 J. ENVTL. QUAL. 878, 878 (1994).

4 *Id.* at 879.

5 *Id.*

6 *Id.* at 880.

7 *Id.* at 879; Joan Hagar, *Influence of Riparian Buffer Width on Bird Assemblages in Western Oregon*, 63 J. WILDLIFE MGMT. 484, 484–96 (1999).

8 Legislative Findings, NEB. REV. STAT. § 2-5102 (2015).

Maryland statue affirm how "fragile" these resources are: "the shoreline and adjacent lands, particularly the buffer areas, constitute a valuable, fragile, and sensitive part of this [the Chesapeake] estuarine system, where human activity can have a particularly immediate and adverse impact on water quality and natural habitats."[9] Perhaps the most drastic legislative finding is in Rhode Island statute that discusses buffer services and values, the benefits of different vegetative types, and even includes a table exhibiting the benefits of buffers at various widths. This example reads more like a journal article than a legislative finding. As discussed in the next section, the tone and range of findings highlights the wider range of riparian protection or lack thereof that laws and programs provide.

III
ERODED BUFFER PROTECTION POLICIES IN THE UNITED STATES

Regulatory incentives and mandates are the primary ways to preserve buffers. First, state and federal governments provide programs and economic incentives to restore riparian buffers on private lands. These incentives promote active management and can motivate landowners of ecologically sensitive lands to restore or protect such lands.[10] Furthermore, incentives can be a valuable tool in repairing relationships between government and landowners who already feel over-regulated.[11] Most programs are geared towards agricultural and forestry land uses. However, because land development throughout the United State is rapidly converting natural lands into impervious surfaces, regulatory authorities are also looking to restore riparian buffers in urban areas. Nevertheless, most programs are voluntary and underfunded. Second, state and federal regulations establish rules for different land uses around riparian buffers. The following sections review the federal and state programs and mandates, which highlight the successes and failures of those structures. Part VI then recommends what can be done to patch these failures.

A. Federal Programs

Recognizing that soil loss and nonpoint source pollution is a national issue, Congress has prescribed a few federal programs to help protect

9 Declaration of Public Policy, MD. CODE ANN., NAT. RES. § 8-1801 (LexisNexis 2015).

10 Stephanie Stern, *Encouraging Conservation on Private Lands: A Behavioral Analysis of Financial Incentives*, 48 ARIZ. L. REV. 541, 562 (2006).

11 *Id.*

our waterways and riparian resources. Most of these federal programs indirectly establish buffer protection policies that are mostly unenforceable, since the programs mandate plans and provisions for nonpoint source control without a policing component.[12]

The Clean Water Act ("CWA") is the preeminent federal program addressing water quality problems. Though the original Act focused on point source discharges, Congress amended the CWA in 1987 to focus national policy on programs that control nonpoint source pollution; thus buffer protection became part of the solution. In particular under § 305, reports by the states must identify water quality problems and propose plans to remedy impaired waters,[13] while § 319 authorizes and funds state nonpoint source programs; both of which usually encompass buffer restoration and/or protection as a part of the state's plans for nonpoint source control and remedy for impaired waters.[14]

Another federal effort to protect riparian zones is the Coastal Zone Management Act ("CZMA").[15] In order for states to be eligible for grants under CZMA or § 310 of the CWA, states must adopt a Coastal Nonpoint Source Pollution Program, which also commonly advocates riparian buffer protection because buffers provide low cost solutions to nonpoint source pollution.[16]

Other federal programs more directly protect stream banks and riparian zones. These federal programs mostly target agriculture and forestry land uses. In 1994 Congress amended the Conservation Reserve Program ("CRP") to focus on conserving water, soil, and wildlife resources. One of the regularly implemented practices of this program is to devote marginal lands to "appropriate vegetation, including trees in or near riparian areas."[17] This program pays farmers

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12 Douglas R. William, *When Voluntary, Incentive-Based Controls Fail: Structuring a Regulatory Response to Agricultural Nonpoint Source Pollution*, 9 WASH. U. J.L & POL'Y 021, 21 (2002), http://openscholarship.wustl.edu/law_journal_law_policy/vol9/iss1/3.

13 State Reports on Water Quality; Transmittal to Congress, 33 U.S.C. § 1315 (2015).

14 Nonpoint Source Management Programs, 33 U.S.C § 1329 (2015) (noting these programs must address and plan for nonpoint source pollution control which usually entails riparian protection or restoration in most plans conducted by states).

15 Coordination and Cooperation, 16 U.S.C. § 1456(d) (2015) (mandating that coastal states address nonpoint source pollution in order to receive federal assistance. This is addressed mostly by buffer protection in these applications).

16 Coastal Zone Management Act, Administrative Grants: Mandatory Adoption of State Management Program for Coastal Zone, 16 U.S.C. § 1455(d) (2015) (providing that these plans must address nonpoint source pollution and buffers are usually within their options).

17 Conservation Reserve Program, 16 U.S.C. § 3831 (2015).

annual rental payments to take land out of production and restore the land into functioning buffers for a period of five years.[18] In order to further and expand the goals of CRP, Congress established the Conservation Reserve Enhancement Program to leverage CRP funds, further water protections goals, and, most notably, extend the five-year limitation on contracts with landowners.[19] These additional incentives encourage more landowner participation. Moreover, landowners can use funds from similar federal programs, like the Environmental Quality Incentive Program and the Wildlife Incentive Program, to establish riparian buffers. Though the programs have different goals they all protect the environment and create fish and wildlife habitat. Despite these incentives, the boom of ethanol and escalating feedstock prices may prompt many landowners not to renew CRP contracts in order to maximize crop yields.[20]

Federal forest programs are the counterparts to the federal agricultural programs. Forest clearing can increase surface water yield by reducing evapotransperation[21] and plant uptake of water. This increase in surface water introduces greater and faster flows, previously unknown to a watercourse, which could create incision and higher rates of erosion. This type of stream degradation can have "deleterious impacts on fish by altering natural temperatures regimes and channel stability, aggravating bank erosion and sedimentation, and depleting winter cover and large woody debris."[22] The Forest Land Enhancement Program and the Watershed Forestry Assistance Program targets such "deleterious impacts" by protecting the functioning riparian and thus minimizing stream bank erosion and nonpoint source pollution.[23] These forest programs work with private nonindustrial forest landowners to provide technical assistance and small grants for best management

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18 Conservation Reserve Enhancement Program 16 U.S.C. § 3830 (1990). Repealed. (CREP used to be a separate statute but is now part of CRP 16 USC. § 3831 and now is a partnership with the states and uses state funds to increase payments in highly sensitive areas).

19 James M. McElfish, Jr. et al., *Inventing Nonpoint Controls: Methods, Metric, and Results*, 17 VILL. ENVTL. L.J. 87, 93 (2006).

20 DARYL RAY, AGRICULTURAL POLICY ANALYSIS CENTER, ETHANOL DEMAND AND THE CRP, (2006), http://www.agpolicy.org/weekpdf/322.pdf.

21 James Shanley & Beverly Wemple, *Water Quantity and Quality in the Mountain Environment*, 26 VT. L. REV. 717 (2002).

22 Stein v. Barton 740 F. Supp. 743, 749-50 (D. Alaska 1990).

23 Findings and Purposes, 16 U.S.C. § 6541 (2012); Watershed Forestry Assistance Program 16 U.S.C. § 2103b (2003) (repealed 2014); Forest Land Enhancement Program, 16 U.S.C. § 2103 (2003) (repealed 2014).

practices, including protecting and establishing riparian buffers, which protect water quality from improper harvest methods. Such programs are purely voluntary and, like the CRP, the latter of the two forestry programs only commits landowners to five-year contracts.

The last type of federal programs that protect riparian zones are agricultural and forestry conservation easement programs, which are permanent measures and have a multitude of benefits. The Agricultural Conservation Easement Program[24] and Forest Legacy Program not only extinguish most of a landowner's development rights, but they also usually require all riparian zones be protected against most harvest methods.

All of the federal programs supra are beneficial but limited in scope. Fortunately many of the state programs dovetail with the federal programs and expand their effectiveness.

B. State Programs

In order to compliment and sometimes cooperate with the funding requirements of federal programs, states have enacted their own buffer programs. Many federal programs, like the CRP, require states to match federal funds and mandate that state boards oversee and report to the U.S. Department of Agriculture or the Natural Resources Conservation Service on the progress of the program and the resulting water quality benefits. For example, Kansas established the Water Quality Buffer Initiative Fund,[25] Vermont created the Seeding and Filter Strip Program,[26] and Iowa created the Conservation Buffer Strip Program.[27] Nebraska established the Buffer Strip Act, which is a voluntary program, much like other federal and state programs, which pays landowners to establish and protect riparian buffers.[28] These payments are based on the productivity of the soils, land value, and environmental

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24 Agricultural Conservation Easement Program established in the Agricultural Act of 2014 H.R.2643 (2014).

25 Conservation Structures and Practices, Grants; Riparian and Wetland Protection Programs; Return of Water Right, Cost-Share Grants; Water Quality Buffers, Grants, Valuation of Land, KAN. STAT. ANN. § 2-1915 (2013).

26 Vermont Seeding and Filter Strip Program, VT. STAT. ANN. tit. 6, § 4900 (2014) (formally called the Agricultural Buffer Program).

27 Conservation Buffer Strip Program, IOWA CODE § 466.4 (2015).

28 Rules and Regulations; Department; Powers and Duties, NEB. REV. STAT. § 2-5111 (2015).

benefit gained.[29] Many states have also established tax incentive programs that provide tax breaks to landowners who establish riparian buffers or who voluntarily forbear harvesting timber on certain portions of the land near waterways.[30] Some states, such as Maryland, have taken buffer protection more seriously and have established expansive structures to help protect riparian buffers.

1. Maryland

Maryland is one of the most progressive states in establishing water quality programs.[31] Much of Maryland's land mass is along the Chesapeake Bay and its tributaries. The Chesapeake Bay Program, a multistate program to help the Bay, has many water protection commitments from each state, including restoring 2,020 miles of stream buffers by 2010. The states met this goal in 2003, exceeding expectations, and have since extended the goal to 10,000 miles.[32] Coupled with this multistate program, Maryland's own Chesapeake and Atlantic Coastal Bays Critical Area Protection Program designates a minimum buffer of 200 feet along tidal lands and 100 feet along tributary streams.[33] Maryland also enacted the Buffer Incentives Program, which gives landowners payments for planting and maintaining forested buffers of at least 50 feet along streams and shorelines. Lastly, this exemplary state established the Forest Land Conservation and Management Program that gives forest landowners the benefit of an agricultural tax assessment if they follow a forest management plan approved by the Maryland Forest Service. Riparian buffer protection is an integral part of these plans, which prohibit unsafe and unwise harvests in riparian zones.

State and federal programs are an essential and intricate part of protecting riparian zones and preserving the values they provide. However, despite the successes of these programs our riparian zones

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29 *Id.*

30 Buffer Strips—Uniform Certified Document—Duties of Conservation Commission, OKLA. STAT. tit. 68, § 2817.2 (2015); The Criteria for Determining Streamside Management Zones upon Request from a Chief Appraiser or Taxing Unit, 4 TEX. ADMIN. CODE § 215.13 (2000); Riparian Forest Buffer Protection for Waterways Tax Credit, VA. CODE ANN. § 58.1-339.10 (2014).

31 James M. McElfish et al., *Inventing Nonpoint Controls: Methods, Metric, and Results*, 17 VILL. ENVTL. L.J. 87 (2006).

32 The Chesapeake Bay Program, *Planting Forest Buffers*, http://www.chesapeakebay.net/indicators/planting_forest_buffers.

33 Minimum Buffer, MD. CODE ANN., NAT. RES. § 8-1808.10 (LexisNexis 2015).

are still being degraded, devalued, and destroyed. Other tools such as mandates are also necessary to preserve our riparian resources.

C. Federal Statutes and Regulations

Federal regulations and statutes that require stream buffers can be divided into three categories: mining, working lands (agriculture, forestry, and grazing), and development regulations. The federal performance standards for surface and underground mining activities, set by the Department of Interior's Office of Surface Mining and Reclamation, require that "no land within 100 feet of a perennial stream or an intermittent stream shall be disturbed by surface (or underground) mining activities"[34] Federal mining permits also require buffers for an operator must show the protective measures against "disturbances and adverse impacts on fish and wildlife and related environmental values" that will be used during the active mining phase of operation. Such measures may include the establishment of buffer zones."[35]

Federal regulations that govern working lands pertain mostly to federal lands. The National Forest Timber Utilization Program mandates that the Secretary must maintain a 100-foot buffer on Class I streams and Class II streams that flow directly into Class I streams in the Tongass National Forest.[36] In other National Forests, land management plans must be developed and maintained for each forest unit. Plans must "ensure" that timber will be harvested from National Forest System lands "where protection is provided for streams, stream banks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment."[37] The most cost-effective method of protecting land from "detrimental changes" is to prohibit harvest in riparian buffers.

Since there are large amounts of federal grazing lands, like forestry preserves, riparian zones are also indirectly protected by federal law

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34 Permanent Program Performance Standards-Surface Mining Activities- Hydrologic Balance: Stream Buffer Zones, 30 C.F.R. § 816.57 (2014). (79 FR 76227,76231, Dec 22 2014); Permanent Program Performance Standards-Underground Mining: Hydrologic Balance: Stream Buffer Zones, 30 C.F.R. § 817.57 (2014). (79 FR 76232, Dec 22 2014).

35 Surface Mining Permit Applications- Minimum Requirements for Reclamation and Operation Plan, 30 C.F.R. § 780.16(b) (1987). (52 FR 47359, Dec. 11, 1987).

36 National Forest Timber Utilization Program, 16 U.S.C. § 539d (2012).

37 National Forest System Land and Resource Management Plans, 16 U.S.C. § 1604(g)(3)(E)(iii) (2015).

that require "grazing standards."[38] State and regional guidelines set these standards and must at a minimum address maintaining and improving or restoring riparian—"wetland functions including energy dissipation, sediment capture, groundwater recharge and stream bank stability" and also at a minimum address "maintaining or promoting stream channel morphology and functions appropriate to landform."[39] Protecting riparian lands helps meet these minimum standards.

Lastly, to directly protect riparian zones, the U.S. Fish and Wildlife Service may designate an area as "critical habitat" under the Endangered Species Act. Critical habitat for the Snake River Sockeye Salmon, Snake River Fall Chinook, and the Snake River Spring Chinook Salmon now exists along a plethora of waterways in Oregon, Washington, and Idaho. Three hundred feet of riparian habitat along the waterways has been designated as "necessary habitat" for anadromous fish.[40] A critical habitat designation now requires federal agencies to consult wildlife agencies when proposing or permitting development or energy projects in the riparian habitats and may require modifications of the project to protect the habitat.[41] Again, as with federal programs, state regulations dovetail with these federal regulations to widen and lengthen their scope, protecting more miles of our riparian resources.

D. State Buffer Protection Statutes and Regulations

From this Article's review of buffer protection policies, it is evident that relatively few of the states that have protected buffers or riparian areas by statute. It is also evident that even fewer of those states have also authorized local municipalities to protect riparian lands. However it is evident that a pattern has evolved among different land uses and the buffer laws that regulate them and that one state has seemingly been a leader on this issue.

Foremost, states like Montana have protected riparian lands from the highly destructive land use of mining, where "no land within 100 feet of a perennial stream or intermittent stream or a stream reach with a biological community . . . may be disturbed by strip or underground

38 Standards and Guidelines for Grazing Administration, 43 C.F.R. § 4180.2(e) 4 (2015).

39 *Id.*

40 Critical Habitat for Snake River Sockeye Salmon, Snake River Fall Chinook Salmon, and Snake River Spring/Summer Chinook Salmon, 50 C.F.R. § 226.205 (2015).

41 U.S. FISH & WILDLIFE SERVICE, CRITICAL HABITAT: WHAT IS IT? (2015), http://www.fws.gov/endangered/esa-library/pdf/critical_habitat.pdf.

mining operations."[42] Forestry and agriculture rank together as the second most regulated riparian land use. Poor forestry practices have the potential to create large-scale water degradation from a single harvest operation; thus, buffers are required by some states for this land use.[43] These regulations can require specific harvest methods, prohibit harvest, or only allow for the removal of certain tree species in riparian zones.[44] Many states also regulate agricultural land use and often require a "vegetative buffer" around certain water bodies.[45] Some agricultural buffer laws go as far as to protect any existing natural buffers.[46]

Exactly what a "vegetative buffer" may consist of and which water bodies must be buffered can differ from state to state, resulting in varying quality of protection. For example, Oregon puts the burden of managing riparian areas on the landowners, by outlawing *any* conveyance of sediment into the waters of the state.[47] Essentially this law is a nonpoint source, erosion control, and riparian buffer protection law all in one. In order to be in compliance a landowner must have an adequate "vegetative buffer" or an equally effective pollution control practice, in the near-stream management area (25-foot buffer).[48] The definition of "waters of the state" is all-inclusive:

> "Water" or the "waters of the state" includes lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground

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42 Strip and Underground Mine Reclamation Act: Transportation Facilities, Use of Explosives, and Hydrology, Stream Channel Disturbances and Buffer Zones, MONT. ADMIN R. 17.24.651 (2014) http://www.mtrules.org /gateway/RuleNo.asp?RN=17.24.651.

43 Uses Within a Riparian Area, ALASKA ADMIN. CODE tit. 11, § 95.275 (2014); Tree Clearing and Timber Harvesting, MD. CODE REGS. 27.01.09.01 (2014); Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and maintenance of Existing Riparian Buffers, 15A N.C. ADMIN. CODE 2B.0233 (2015).

44 15A N.C. ADMIN. CODE 2B.0233 (2015).

45 *Id.*

46 Agricultural Activities MD. CODE REGS 27.01.09.01-6(B)(5) (noting that clearing of existing natural vegetation in the 25-foot buffer is not allowed).

47 Prevention and Control Measures, OR. ADMIN. R. 603-095-0340 (2015).

48 *Id.*

> waters), which are wholly or partially within or bordering the state or within its jurisdiction.[49]

Although this Oregon buffer law protects more surface waters than the Vermont buffer law, it fails to protect against all pollution, such as temperature pollution and does not guarantee a wildlife benefit. Only wide, natural riparian buffers can provide all of the ecological services aquatic systems depend upon.

Many states, in addition to regulating working lands and mining, also regulate residential and commercial development in riparian zones. New Jersey and New Hampshire have regulatory structures that protect state waters in different regions and in various ways. Within Coastal Management Zones in New Jersey, the state requires a 300-foot buffer to protect "Category One" streams from development, while requiring a 150-foot buffer to protect trout waters, waters containing endangered species, and water flowing through acidic soils.[50] Only a 50-foot buffer is required if the stream does not present these conditions.[51] New Jersey also allows for a "landscaped buffer" along the Hackensack River and its tributaries.[52] A landscaped buffer is better than none, but it may be a scenic or aesthetic buffer at best. New Jersey requires a 300-foot buffer along any open waters in the Highlands, a region in the Upper Delaware Watershed.[53] New Hampshire requires a 150-foot "natural woodland buffer," which allows buildings but not within 50 feet of the high-water mark. The first 50 feet is designated as a "waterfront buffer" and has many additional requirements and conditions depending on the lot size of the property.[54] This statute also allows for variances.[55] Vermont has only authorized and provided aid for municipalities to do what New Hampshire has established statewide.[56] Georgia requires a 25-foot buffer around state waters for all land disturbing activities[57] and a 50-foot buffer around trout waters

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49 Definitions for Water Pollution Control Laws, OR. REV. STAT. ANN. § 468B.005 (West 2015).

50 Riparian Zones, N.J. ADMIN. CODE 7:7-9.26 (2015).

51 *Id.*

52 Buffers, N.J. ADMIN. CODE 19:4-8.7 (2015).

53 Rules, Regulations, Standards, N.J. Stat. Ann. § 13:20-32 (West 2014).

54 Minimum Shoreland Protection Standards, N.H. REV. STAT. ANN. § 483-B:9 (2015).

55 *Id.*

56 Zoning; Permissible Types of Regulations, VT. STAT. ANN. tit. 24, § 4414 (2014); River Corridors and Buffers, VT. STAT. ANN. tit. 10 § 1427 (2015).

57 Best Management Practices Required for all Land-disturbing Activities; Minimum Standards for Rules, Regulations, Ordinances, and Resolutions, GA. CODE ANN. § 12-7-6 (2014).

with no variances allowed when it involves primary trout water.[58] Rhode Island on the other hand requires one hundred to two hundred foot buffers depending on the water-use classification.[59] Pennsylvania protects intermittent or perennial stream from all forms of earth disturbing activities with one hundred foot buffers when a project is located in an "exceptional value or high quality watershed."[60] Lastly, the North Carolina legislature has provided a number of statutes protecting riparian zones in many of the basins along intermittent and perennial streams but not ephemeral streams.

1. North Carolina

Like Maryland, North Carolina is a progressive state that has taken a preemptive approach to riparian buffer protection. In 1973, North Carolina first established the Sedimentation Pollution Control Act.[61] The Act restricts land-disturbing activities by permitting them within the proximity of a natural watercourse only if a buffer zone of sufficient width to confine visible siltation is established. Moreover, waters that are classified as trout waters must have an undisturbed buffer of 25-feet or be of a sufficient width to confine visible siltation, whichever is greater.[62] This Act only pertains to land disturbing activities greater than an acre.[63] Moreover, the Act mandates that erosion control plans be submitted for such soil disturbing activities. Buffers can be the main component of erosion control plans. The North Carolina legislature has further mandated that local governments adopt water supply watershed programs that will work in tandem with state agencies. If a local government fails to implement a program, the Environmental Management Commission ("EMC") will enforce minimum state requirements adopted by the EMC.[64]

Additional North Carolina statutes also show that buffer protection is an important part of the state's watershed and water protection programs. In order to address rapid growth, and a string of pollution problems that created fish kills, the North Carolina legislature created

58 Exemptions, GA. CODE ANN. § 12-7-17 (2014).

59 River Corridors and Buffers, R.I. CODE R. § 16-1-10:370 (LexisNexis 2014).

60 Riparian Buffer Requirements, 25 PA. CODE § 102.14 (2015).

61 Mandatory Standards for Land-Disturbing Activity, N.C. GEN. STAT. § 113A-57 (2014).

62 *Id.*

63 *Id.*

64 Water Supply Watershed Protection, N.C. GEN. STAT. § 143-214.5 (2015).

buffer regulations in specific basins that require 50-foot buffers along intermittent and perennial streams where development activities are to be conducted.[65] The 50-foot buffer includes two zones of 30 feet and 20 feet. Each zone permits different activities and requires different vegetative conditions. Easy to read charts simply have an "x" stipulating whether the activity in a zone is "allowable, exempt, or allowable with mitigation."[66] These buffer requirements are not required in all basins or in all coastal counties, aside from what is required by the Coastal Area Management Act, a state program required by the federal CZMA.

The legislature also required that the Goose Creek watershed, a watershed impaired by Charlotte development, have a water quality management plan with a mandate to establish a buffer width through the regulatory process.[67] Regrettably, this buffer mandate was established after Goose Creek became "highly impaired" water for its poor water quality conditions and low endangered species numbers. In order to reach the water quality goals of this stream, the Department of the Environment and Natural Recourses eventually established 200-foot buffers in this watershed, which is the largest buffer width mandate in North Carolina.[68] The Goose Creek regulation also has a long list of exempt, prohibited, and "allowable with mitigation" actions. Oversight of most of these buffer mandates can be delegated to local authorities if they have the power to regulate land use and complete an application, which the EMC then approves.[69] Local authorization can also be revoked.[70]

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65 Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and Maintenance of Existing Riparian Buffers, 15A N.C. ADMIN. CODE 2B.0233 (2015); Catawba River Basin: Protection and Maintenance of Existing Riparian Buffers, 15A N.C. ADMIN. CODE 2B.0243 (2015); Randleman Lake Water Supply Watershed: Protection and Maintenance of Existing Riparian Buffers, 15A N.C. ADMIN. CODE 2B.0250 (2015).

66 15A N.C. ADMIN. CODE 2B.0233 (2015); 15A N.C. ADMIN. CODE 2B.0243 (2015); 15A N.C. Admin. Code 2B.0250 (2015).

67 Site Specific Water Quality Management Plan for the Goose Creek Watershed (Yadkin Pee-Dee River Basin): Buffer types and Managing Activities within Riparian Buffers, 15A N.C. ADMIN. CODE 2B.0607 (2015).

68 Site Specific Water Quality Management Plan for Goose Creek Watershed (Yadkin Pee-Dee River Basin): Riparian Buffer Widths, 15A N.C. ADMIN. CODE 02B.0605 (2015) (providing that undisturbed riparian buffers are required within 200 feet of water bodies within the 100-Year Floodplain in this watershed).

69 Riparian Buffer Protection Program: Delegation of Riparian Buffer Protection Requirements to Local Governments, N.C. GEN. STAT. § 143-214.23 (2015).

70 *Id.* at § 143-214.23(c).

Because many of the North Carolina buffer regulations allow for the loss of a natural buffer when a variance is granted, the legislature created a program to make up for this loss of nonpoint source pollution protection. Variances are granted and thus mitigation can occur if a project developer cannot modify a project for land construction or other necessities. Mitigation can occur by (1) paying mitigation fees, which go to the Riparian Restoration Fund,[71] (2) donating real property to the state or a local conservation group that is a riparian buffer, (3) restoring or enhancing existing riparian buffers, (4) constructing a BMP that will reduce nonpoint pollution, or (5) participating in a private compensatory mitigation bank. Each of these options requires different ratios of mitigation and the mitigation option must be established in the same water basin. The Division of Mitigation Services is the authority in charge of mitigating buffer intrusions and wetland conversions.[72] Lastly, these mitigation funds can be combined the Clean Water Management Trust Fund, another water resource program, in order to protect and then restore large riparian buffers.[73]

IV
INHERENT OBSTACLES TO THE EFFECTIVENESS OF PROGRAMS, REGULATIONS, AND EDUCATION

Federal and state environmental laws are necessary in the fight for environmental protection. However, "legislation and regulation has proven to be in an incomplete solution."[74] There are inherent limitations in the nature of statutes and regulations and serious limitations in the effectiveness of the bureaucracies that enforce them.[75] Foremost, as we saw in the aftermath of the Deep Water Horizon oil spill, agencies can be captured by the very industry they are charged to regulate. State commissions or boards, authorized to promulgate rules to protect water quality can also be captured by an industry, especially

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71 Riparian Buffer Protection Program: Riparian Buffer Restoration Fund, N.C. GEN. STAT. § 1 43-214.21 (2015).

72 Division of Mitigation Services: Compensatory Mitigation, N.C. GEN. STAT, § 143-214.11 (2015) (formally known as the Ecosystem Enhancement Program).

73 Clean Water Management Trust Fund, NCST § 113A-251 (2015) (originally intended the fund to help retrofit municipal waste water treatment plants the program has expanded to riparian buffer and wetland protection).

74 Stern, *supra* note 10, at 542.

75 Michael D. Axline, *The Limits of Statutory Law and the Wisdom of the Common Law*, 38 ENVTL. L. REP. 10268, 10268 (2008).

when the board consists of individuals who have a direct financial interest in the regulated industry.[76] "Industry domination is a recurring problem in environmental protection."[77] Second, agencies are guided and directed by executive office preferences and initiatives, and thus a current administration, state or federal, is always "susceptible to essentially unreviewable political and administrative backsliding."[78] What may be important to one administration may not be important to the next and thus enforceability and interpretation is an issue.

Third, the amount of regulations and the sheer number of riparian miles make complete enforcement impossible. Many violations go unnoticed because agencies cannot afford the manpower to monitor each stream in every watershed.[79] Even more pressing, our current economic downturn will inevitably mean a reduction in state and federal agency budgets, directly affecting enforcement and investigative efforts. More than sixty percent of the land in the United States is held by private citizens,[80] which mean millions of stream miles will go unmonitored and unprotected unless additional measures, as recommended in Part VII, are taken.

Federal and state environmental programs are also necessary in the fight for environmental protection. However conservation incentive programs only incentivize landowners when government payments are greater than market prices for agricultural and forestry products.[81] Even when payments are greater, participation levels in these programs are in the moderate-to-low range.[82] Programs must be appropriately sized and well timed to effectively produce and protect riparian zones for an entire watershed.[83] Moreover, if these programs lose their annual funding source, they cease to be implemented. Again these programs, even though they achieve some success, do not dispense with the need for costly agency monitoring and enforcement.[84] In fact, the Maryland Technical Committee, the state committee that oversees many

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76 Peggy Hennessey, *Oregon Forest Practices Act: Unenforced or Unenforceable?*, 17 ENVTL. L. 717, 717 (1987).

77 *Id.* at 718.

78 Richard A. Duncan, *Ecosystem Restoration: The New Thing*, 87 MINN. L. REV. 1209, 1213 (2003).

79 Stern, *supra* note 10, at 542, 547.

80 *Id.* at 545.

81 *Id.* at 550.

82 *See* Robert Pitts, & James L. Wittenbach, *Tax Credits as a Means of Influencing Consumer Behavior*, 8 J. CONSUMER RESPONSE 335, 337 (1981).

83 Stern, *supra* note 10, at 543.

84 *Id.* at 556.

agricultural programs, has vented its frustration with incentive programs, stating that "most state and federal incentive programs are not performance-based, are varied, and piecemeal, and do not support societal goals of sustainable working lands and water quality protections."[85] Lastly, educational programs, which have not been considered in this paper due to their limited success, are also costly and take generations to implement behavior changes—if any changes happen at all.[86] The perpetual problem of riparian degradation needs a perpetual and sustainable solution beyond the current programs and mandates.

V
INADEQUATE LANGUAGE OF THE BUFFER STATUTES, REGULATIONS, AND PROGRAMS

The language in many buffer protection statutes and regulations is inadequate to fully protect riparian resources. For example, many states' agricultural buffer regulations allow for any type of riparian buffer: grass, sod, shrub, or natural.[87] A grass or sod buffer does not provide much wildlife habitat, stream bank stabilization, aesthetic qualities, or water temperature benefits. Many state statutes allow for grazing, fertilizing, tilling, or cutting a buffer, which again compromises the values of a natural buffer.[88] Furthermore, many of the agricultural programs are too limited in scope and only provide five years of riparian protection.

Forestry buffer regulations and statutes also contain inadequate language. Some states allow for harvesting in riparian buffer zones that still cause damage to the wildlife habitat. Harvesting may remove snags, old growth trees, or woody debris that are essential to aquatic and terrestrial wildlife in riparian zones, especially amphibians.[89] Many states do prohibit harvests in riparian zones but do not provide wide

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85 THOMAS W. SIMPSON ET AL., THE SCIENTIFIC & TECHNICAL ADVISORY COMM. CHESAPEAKE BAY PROGRAM, INNOVATION IN AGRICULTURAL CONSERVATION FOR THE CHESAPEAKE BAY: EVALUATING PROGRESS AND ADDRESSING FUTURE CHALLENGES 18–19 (2004), http://www.chesapeakebay.net/content/publications/cbp_13325.pdf.

86 Stern, *supra* note 10, at 550.

87 Accepted Agricultural Practice Rules, VT. ADMIN. CODE. 2-3-401 (2015).

88 *Id.*

89 Hagar, *supra* note 7, at 484; Dustin Perkins & Malcolm L. Hunter Jr., *Effects of Riparian Timber Management on Amphibians in Maine*, 70 J. WILDLIFE MGMT. 657, 657, 657 (2006).

enough "no harvest zones" to establish proper wildlife sanctuaries or corridors.[90]

As important as buffer widths are in forested areas, they may be even more important in developed areas. The buffers required by some states in development zones can be too small to provide many ecological benefits, especially when they are allowed to be landscaped[91] or allow for tree removal under the guise of "tree maintenance."[92]

A common feature amongst buffer laws of all land uses is that they only provide protection for certain stream types.[93] Some provide protection only for trout waters, waters with "exceptional value," "high quality" waters, or perennial streams. Only a few aggressive jurisdictions protect intermittent streams and even less jurisdictions protect ephemeral streams. Some federal statutes only protect "Class I" streams or "Class II" streams that lead into "Class I" streams.[94] These stream type requirements leave millions of miles of our surface waters and riparian zones unprotected. Much of the construction activity in our watersheds affects the biological and physical function of unprotected streams.[95] All streams, whether "high quality" or "low quality," ephemeral or perennial, need protection for they are hydrologically, chemically, and ecologically connected and important to the rest of the aquatic ecosystems. The farther up in a watershed a stream lies, the more important that stream is to the quality and ecology of that watershed.

As a final point, many of the regulatory systems and agency regulations construct a vortex of bureaucracy, which confuses property owners and allows for a multitude of variances and/or exceptions that compromise the integrity of a waterway, which may already be degraded. These exceptions have triggers like, "to the extent practicable," or "unreasonable," or "under an acre," or "whenever

90 Castelle et al., *supra* note 3, at 878.

91 Riparian Zones, N.J. ADMIN. CODE 7:7E-3.26 (repealed July 6, 2015).

92 *Id.*; Protected Stream Information, IOWA ADMIN. CODE 567-72.32 (455B) (2015).

93 C. Mark Hersh, *The Clean Water Acts Antidegradation Policy and Its Role in Watershed Protection in Washington State*, 15 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 217, 247 (2009) (noting that the Shoreline Management Act only applies to streams with flows of greater than 20 cubic feet per second); Best Management Practices; Minimum Requirements for Rules, Regulations, Ordinances, or Resolutions, GA. CODE ANN. § 12-7-6.

94 National Forest Timber Utilization Program, 16 U.S.C. § 539d (2015).

95 Hersh, *supra* note 93, at 247.

feasible."[96] A regulatory system must have some flexibility, but the exceptions and variances seem pervasive and excessive. Many variances allow for other Best Management Practices ("BPPs") and can even allow a buffer to be completely removed if a payment or form of mitigation is provided.[97] Mitigation projects and BMPs do not fully restore the original environmental benefits of the natural riparian buffer, thus there is a net loss in riparian function and stream health. BMPs can provide for a few or one nonpoint source control benefits but rarely can provide for every ecological, chemical, or physical benefit that natural wide buffers can provide.

VI
RECOMMENDATIONS

The current federal, state, and local regulatory and incentive structures are not enough to protect our riparian resources. Additional measures are needed to tighten and supplement the current protection policies. Below are eight such recommendations.

First, state and federal incentive programs need to be more permanent and/or more competitive with agricultural commodity prices. In order to encourage more voluntary efforts from landowners, the monetary incentive to retire farm and forestlands from production should be more attractive.[98] These incentive programs should also extend contracts to at least twenty years and should focus more on perpetual buffer programs, like conservation easements. These perpetual protection programs are more sustainable in the long run but more expensive in the short run but in theory should not be necessary after total riparian protection is in place.

Second, the state riparian laws for different land uses should be combined into one statute that provides a minimal set of variances, no matter the land use. A minimal set of variances would be sufficient to

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96 Performance Standards, ME. REV. STAT. tit. 38, § 490-D (2015); Stream Channel Disturbances and Buffer Zones, MONT. ADMIN.R.17.24.651 (2015); Minimum Shoreland Protection Standards, N.H. REV. STAT. ANN. § 483-B:9 (2015); Rules, Regulations, Standards, N.J. STAT. ANN. § 13:20-32 (West 2015).

97 Water Supply Watershed Protection, N.C. GEN. STAT. § 143-214.5 (2014); Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and Maintenance of Existing Riparian Buffers, 15A N.C. ADMIN. CODE 2B.0233 (2015); Catawba River Basin: Protection and Maintenance of Existing Riparian Buffers, 15A N.C. ADMIN. CODE 2B.0243 (2015); Randleman Lake Water Supply Watershed: Protection and Maintenance of Existing Riparian Buffers, 15A N.C. ADMIN. CODE 2B.0250 (2015).

98 Stern, *supra* note 10, at 581.

allow for each land user type to be able to adapt to the regulation with the slight additional allowance. Regardless a riparian buffer should be a set width of natural vegetation no matter what land use is adjacent to it. The values of a natural riparian buffer cannot be replaced by a buffer in another stream section nor by a BMP. Some of the nonpoint source pollution can be mitigated, but the overall environmental benefits of a particular section of buffer cannot be substituted for enhancement in another section. Limiting the amount of variances and exceptions, along with the combination of the statutes, will duly protect more stream miles and reduce agency resources needed to administer separate and confusing policies.

Third, the prescribed narrow widths of buffers in most laws needs to be increased. Scientific data overwhelming supports the need for wide buffers in order to protect our public water and wildlife resources. However, wider buffers, along with strict variance regimes, could potentially render a parcel of land undevelopable but not unusable or diminish all of its economic use.[99] Moreover, a landowner may be losing some revenue from harvestable forestland or the right to have a manicured lawn near the lake or stream—likely not enough to establish a takings claim. Buffer regulations and local ordinances that are aimed at protecting a public resource and are based on the "best available" science are fortified against constitutional scrutiny.[100]

Fourth, and perhaps most importantly, all surface waters should be afforded the protection of buffer laws. This would fully protect and provide the environmental benefits of riparian zones in the entire watershed and prohibit the current degradation that is taking place along our unprotected headwater and ephemeral streams. Regardless of whether streams are fed by groundwater or surface water, these streams are integral parts of the watershed that ultimately feed our larger perennial streams and rivers. If the water quality and environmental benefits of ephemeral and headwater streams and their respective riparian zones are lost, the quality of our perennial streams is already compromised, and buffers placed on those perennial streams will be of minimal value for the water quality and ecology will already be compromised.

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99 Lucas v. S.C. Coastal Council, 505 U.S. 1003 (1992).

100 Casey Schach, *Stream Buffer Ordinances: Are Municipalities on the Brink of Protecting the Health of Streams or Opening the Floodgates of Takings Litigation?*, 40 URB. LAW. 73, 73 (2008); Judicial Decisions 56 PLANNING & ENVTL. LAW, *Growth Management Through Government Consolidation* (2004).

Fifth, changes should be made to the state statutes that authorize local governments to establish buffer ordinances. These authorizations, which usually establish that local municipalities "may" regulate land use within a river corridor and buffer,[101] should be amended to require that municipalities "must" regulate land uses within buffers. Many states have authorized local municipalities to protect water quality or establish river protection corridors, but local politics that sometimes resist national or state goals can prevent municipalities from doing so.

Sixth, affirmative language should also be present in the management plans and standard requirements for our federal lands. Standards and management plans should include mandates that riparian areas "*must* be protected" from harvests and grazing rather than "*ensuring*" that bank stabilization and riparian habitat will be protected. The current flexibility of these plans and standards unnecessarily compromises our riparian resources.

Seventh, citizen suit provisions should be inserted into all buffer requirements. This would ensure that individuals, citizen groups, and environmental nonprofits could also monitor a regulated buffer, in addition to agency staff. This measure would help offset agency monitoring, combat dwindling agency budgets, and inefficiencies enforcement when dealing with miles and miles of riparian buffers. Citizen suits have proven to be effective on other water quality protection battles, such as Clean Water Act enforcement, and should be implemented for buffers.

Lastly, and equally important, the courts must flex the common law, or the legislatures must tweak the laws governing riparian rights. Riparian rights look to what is a "reasonable use" under those rights. Riparian removal or degradation of riparian land causes stream bank erosion and instability and thus pollution and should be unlawful and/or as a matter of law, "unreasonable." These actions are unreasonable because they create harm to downstream riparian owners and the general public who owns the public water resource. Redefining or flexing the definition of "reasonable use" would allow downstream landowners and the public the opportunity to protect the riparian rights they deserve.

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101 Zoning Bylaws, VT. STAT. ANN. tit. 24 § 4411(2015).

CONCLUSION

This review of federal and state statutes, regulations, and programs emphasizes that legislatures are to some degree answering the call to protect surface waters. However the response is no more than a slight step towards what is needed. The current measures do not go far enough to fully protect our riparian zones, the values and functions they provide, and the public water resources they protect. Specifically, most of the laws and regulations are for existing natural riparian buffers and usually exempt prior uses within the riparian zone. It is also evident that legislators currently do not have the political will to require a landowner to repair his riparian buffer. Continual man-caused degradations to our riparian resources along our shorelines and stream banks, and the loss of ecological functions associated with these resources, highlights the need for revamping our current laws and supplying the additional tools recommended in this paper. As the fight for riparian protection continues, we can only hope the strength of science will supply legislatures with the political will and foresight to protect our riparian resources. If not, then a common law solution may be our last and only hope.