



WIDE RIPARIAN ZONES

NEED TO BE PROTECTED & REGULATED

Riparian zones (the areas that line streams, rivers and other waterways) serve a variety of functions. Riparian zones provide an important buffer for streams helping to protect their integrity, quality and overall ecological health. When vegetated and protecting the waterway from development or other land uses the riparian zone is often referred to as a buffer or vegetated buffer. The riparian zone will include, but is not necessarily limited to or defined by a waterways floodplain, that part of a stream or river system that is ecologically designed to be inundated by high stream flows during or after a rain event.

According to the Army Corps of Engineers, riparian zones^[i]:

- ✓ stabilize streambanks ensuring they maintain integrity;
- ✓ provide erosion control;
- ✓ provide organic matter critical for aquatic organisms;
- ✓ serve as nutrient sinks for the surrounding watershed;
- ✓ provide shading and thereby provide water temperature control;
- ✓ reduce flood peaks; and
- ✓ serve as key recharge points for renewing groundwater supplies.

The Army Corps states, "that establishing or maintaining existing vegetated buffers to open waters is critical to overall protection of the nation's aquatic ecosystems".^[ii] The Army Corps recommends a minimum riparian buffer width of 300 ft. for avian populations and points out that the wider the buffer, the more protective of ecological functions they will be, which the Army Corps considers to be a mandated goal of the Clean Water Act.^[iii]

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Forested riparian zones protect ecological and human communities in a variety of ways. When floods pass through forested riparian areas it is reported that "low velocity zones" develop. When the water slows it allows for the "the retention of sediment and organic matter and refuges for organic organisms".^[iv]

Vegetated riparian zones are effective at protecting streambanks from scouring. By slowing high velocity waters and reducing high levels of water flow, vegetated riparian zones prevent the loss of vegetation and land. It is important to keep vegetation along the stream and in the riparian zone intact because the root systems of these plants hold the riparian soils and lands in place, contributing to the hydraulic roughness of the bank, which slows water velocities in the stream near the bank.^[v] Conversely, removing this vegetation measurably reduces the hydraulic roughness of the bank, which then increases flow velocities in the stream near the bank, which can cause erosion and the undermining of riparian vegetation. ^[vi] In fact, many degraded streams began their downward spiral when the stream structure and vegetated condition of the streambank and buffer was compromised.

New Jersey's Stormwater Regulations, adopted 2004, establish a 300 foot buffer along Category 1 waterways (State's designated high quality waterways) and their drainage areas throughout the state, identified as a special water resource protection area. The NJ Department of Environmental Protection established this buffer as necessary in order to prevent new point source discharges of stormwater and to preserve the existing values of the stream and its adjacent area. The 300 foot riparian areas are considered critical in reducing nonpoint source pollution by intercepting surface runoff and subsurface flows. The buffers are needed to allow the riparian area to function, which requires natural vegetative cover and other characteristics that are destroyed or diminished when the area is not adequately protected.^[vii]

In adopting the rule, USEPA, the Natural Resources Conservation Service and various scientific sources were referenced including: Azous, 1991; Hammer, 1992; Mitsch and Gosselink, 1986; Reinelt and Horner, 1990, Richeter et al., 1991; Stockdale, 1991 (further references listed at pp 80-83. attached hereto). NJDEP determined, based on the science, that vegetated natural riparian areas improve water quality by "processing, removing, transforming, and storing pollutants as sediment, nitrogen, phosphorus, and certain heavy metals (Washington State Department of Ecology, 1996)"^[viii]. NJDEP further cited references that verified that buffers trap phosphorus and process nitrate to nitrogen gas (denitrification), directly preventing these pollutants from entering the stream. TSS, sulfates, calcium, magnesium, and sediments are also removed and the buffer controls herbicides. NJDEP provides documentation that "riparian area vegetation and soils combine the physical process of filtering and the biological process of nutrient uptake and denitrification (Lawrence et al., Peterjohn and Correll, 1984)"^[ix] According to the rulemaking documents, riparian forests are particularly efficient as "a source of organic carbon for microbial processes like denitrification (James et al., Pinay and Decamps, 1988)"^[x]. USEPA was cited as concluding "riparian vegetation buffers ["buffers" is a verb] receiving waters from the effects of pollutants and they prevent the entry of pollutants into receiving waters (USEPA 2001)"^[xi]

NJDEP verified that recharge to streamside aquifers is improved when the riparian area is vegetated, supporting longer baseflow duration in the adjacent stream (Platts and Jenson, 1990)^[xii]. NJDEP also referenced findings that in-stream pollution is reduced during flood flows by riparian forests (Karr and Gorman, 1975; Kleiss et al., 1989)^[xiii], they capture and filter out instream pollution.

NJDEP warns however that streamside buffers have limits in terms of how much nonpoint source pollution they can process and that these areas need to be kept in optimum condition. NJDEP concludes that vegetated riparian areas need to be protected "to the maximum extent possible from changes that would degrade their existing pollution abatement functions" and says that degraded buffers need to be repaired to provide benefits, otherwise they can become a source of pollution themselves.^[xiv] Based on the science, NJDEP concludes that, a 300 foot riparian area is needed along high quality streams to ensure a buffer that can function to remove and prevent pollution of surface and ground waters.

Subsequent to providing this protection to all Category 1 streams, NJDEP established 300 foot buffers on all Highlands streams in its regulations governing the Highlands Preservation Area. Similarly, NJ's Coastal Wetlands Act of 1970 may require a wetlands buffer up to 300 feet. And NJ's Pinelands Commission reviews a 300 foot buffer on all Pinelands waters.

According to USDA Natural Resource Conservation Service Practice Standard "Riparian Herbaceous Cover, Code 390", dated May 2003, riparian areas are to be managed so that the functions of the buffer area are protected. Functions are defined to include habitat for aquatic and terrestrial organisms, and the improvement and protection of water quality in receiving waterways. Further, it is expressly stated that "The management plan shall consider habitat and wildlife objectives such as: habitat diversity, habitat linkages, daily and seasonal habitat ranges, limiting factors, and native plant communities". The Code goes on to state, "Riparian widths will vary depending on the requirements of wildlife species and associated environmental concerns."

Under the heading "Additional Criteria to Protect or Improve Water Quality", the Code states, "Concentrated flow erosion or mass soil movement shall be controlled in the up gradient area prior to establishment of the riparian herbaceous cover. The native or natural plant community should be managed and maintained to optimize functions of the riparian zone which control erosion and maintain water quality"^[xv]. While this standard is intended for agricultural uses, it is clear that the technical considerations that have informed this federal agricultural agency's practice standard have led to the conclusion that the riparian area provides water quality protection as well as ecological benefits and the riparian area should be kept intact, preserving its functions. The advice that erosive forces such as soil movement and concentrated flow should be kept outside of the riparian area supports NJDEP's establishment of a 300 foot riparian area to keep potentially degrading activities outside of the buffer.

In recommending buffers on lands where the pesticide terbufos is used (an organophosphate), the Environmental Protection Agency lists riparian buffer widths to mitigate risk factors for drinking water and ecological impacts: a 500 ft. vegetative buffer between treated area and surface water on neighboring lands and between a standpipe drain outlet and surface water on neighboring land; a 300 foot setback between the treated area and entry points to surface water bodies on highly erodible soils; and the restriction of loading, rinsing, and washing equipment within 300 ft. from surface water bodies or within 50 ft. from wells unless conducted on an impervious surface.^[xvi]

A White Paper submitted to the Washington Dept. of Fish and Wildlife, citing the US Fish and Wildlife Service, recommends a 150 ft. buffer beyond the 100 yr. floodplain (which in many instances will be more than 300 feet and could be more than 600 feet) on both sides of the stream to accommodate the channel migration zone for bull trout in Washington's streams. The buffer is required in order to include tall trees, filter sediments, provide microclimate and shallow groundwater thermal buffering to protect aquatic habitats, and to allow for stream meandering.^[xvii] It has been found that meander bends are five times less likely to be

significantly eroded from a major flood than nonvegetated bends.^[xviii] Erosion and sedimentation cause pollution to a waterway; the best defense is prevention through intact vegetation in the riparian area.

The Wisconsin shoreline zoning program (Wisconsin Administrative Code Ch NR115) uses a 1000' buffer from any lake and 300' from a stream or its floodplain. Nationally, public lands, in general, are required to have a 25' to 500' riparian management zone where forests are kept intact. The Maryland Chesapeake Bay Critical Area Program employs a buffer of 1000' from the mean high waterline of tidal waters or the landward edge of tidal wetlands or tributaries.^[xix]

Many species require wide buffers for habitat. In addition to water quality benefits, the natural resources of waterways are protected by wide widths, according to the literature.

In New Jersey, the Toms River Corridor Task Force Regional Protection Plan recommends an expanded riparian buffer (beyond the 300 foot Pinelands wetland transition buffer required when threatened and endangered species are present). The recommendation is based on the finding that wildlife species that rely on both wetland and upland habitats need a greater area adjacent to wetlands and streams that includes uplands as well. The inclusion of both habitat types provides a "connector" that allows species to move from one type of habitat to another. A 600 foot riparian buffer is recommended along the Toms River and Ridgeway Branch of the Toms River (mostly in Jackson Township), based on the species present in the area, including reptiles and amphibians. Evidence is presented by the Task Force that the pine snake may need even more. ^[xx]

The State of Vermont reports on various buffer widths and their functions in its buffer guidance document.^[xxi] They cite the following literature and widths of 300' or greater needed to protect numerous wildlife species:

- For general protection: 50'-300' (Roman and Good 1985)
- For nutrient removal: 150'-300'(Clark 1997)
- For waterfowl nesting: 300' (Foster et al 1984)
- For beaver, mink: 300'-330' (Roderick and Miller 1991)
- For dabbling ducks: 300'-330' (Roderick and Miller 1991)
- For furbearers: 330' (Dibello 1991)
- For beaver feeding: 330' (Hall 1970)
- For mink den sites: 330' (Mequist 1981, Linn and Birks 1981)
- For mink habitat: 600' (Mequist 1981, Linn and Birks 1981)
- For sm. Mammals: 330' (Golet et al 1993)
- For reptiles, amphib.: 330' (Golet et al 1993)
- For pileated woodpcker: 450' (Roderick and Miller 1991)
- For breeding birds: 575' (Hooper, unpub. Mauscr.)

A study of riparian areas and bird use in central Pennsylvania resulted in a recommendation of a 410-foot buffer of natural vegetation in order to support the full compliment of birds in the area.^[xxii] While smaller widths will provide habitat for some of the birds present, studies focused on Delaware and Maryland found that riparian forests which are less ten 328 feet wide are dominated by short distance migrants but forest buffers wider than 328 feet have more neotropical migrant species, and the numbers of bird species present continued to increase in forests wider than 656 feet. ^[xxiii]

A White Paper submitted to the Washington Dept. of Fish and Wildlife reports that literature on forest stream buffers suggest that 300 to 600 ft. buffers are needed for bird populations to limit the effects of nest predation from invading birds.^[xxiv] Scientists have recommended 600-foot buffers in order to accommodate important bird species such as herons and bald eagles.^[xxv] And certain birds and amphibians are documented to need 600' or more as shown below:^[xxvi]

- For songbirds: 660' (Scheuler)
- For breeding birds: 660' (Stauffer and Best 1980)
- For travel corridors: 660' (Forman 1983) (For all wildlife except black bears)
- For bald eagle, heron: 600' (Roderick and Miller 1991)
- For cavity nesting ducks: 600' (Roderick and Miller 1991)
- For wood duck: 600' (Grice and Rogers 1965)
- For blue-winged teal: 840' (Duebberland Lokemeon 1976)
- For red shouldered hawk: 330' (AppD-4, State of Vermont 2001)
- For wood turtle: 330' (AppD-4, State of Vermont 2001) (distance from nest to water)
- For wood turtle: 100' to 1 mile (AppD-4, State of Vermont 2001) (feeding habitat distance from water)
- For spotted turtle: 100' to ½ mile (AppD-4, State of Vermont 2001) (feeding habitat distance from water)

Conclusion

It is clear that streams and the flood hazard areas and riparian zones along streams need a wide area in order to provide stabilization to streambanks and bottoms, prevent erosion and sedimentation, absorb and retard flood flows and to protect water quality. The riparian area itself needs buffering in order to maintain optimum function. Across the Delaware River Watershed, waterways have been impacted and flooding has increased due to compromised riparian zones and flood hazard areas. In order to make up for the lost functions of these areas, the Watershed States need to pass regulations that protect and enhance the quality of our waterways by providing on both sides of the waterway a minimum 300 foot buffer zone and preferably a 600 foot or greater buffer zone, depending on site specific needs of species.

^[i] Army Corps of Engineers WRAP, "Technical and Scientific Considerations for Upland and Riparian Buffers Strips in the Section 404 Permit Process", ERDC-WRAP-01-6, May 2002, citing DeBano and Schmidt 1990; O'Laughlin and Belt 1995".

^[ii] Army Corps of Engineers WRAP, "Technical and Scientific Considerations for Upland and Riparian Buffers Strips in the Section 404 Permit Process", ERDC-WRAP-01-6, May 2002 citing the Federal Register 67(10), p. 2065.

^[iii] Army Corps of Engineers WRAP, "Technical and Scientific Considerations for Upland and Riparian Buffers Strips in the Section 404 Permit Process", ERDC-WRAP-01-6, May 2002.

^[iv] Water, Science, and Technology Board, Board of Environmental Studies and Technology, "Riparian Areas: Functions and Strategies for Management", 2002, citing Swanson, et al.

^[v] Water, Science, and Technology Board, Board of Environmental Studies and Technology, "Riparian Areas: Functions and Strategies for Management", 2002, citing Swanson, et al

^[vi] Water, Science, and Technology Board, Board of Environmental Studies and Technology, "Riparian Areas: Functions and Strategies for Management", 2002, citing Swanson, et al

^[vii] NJAC 7:8 NJDEP Agency Proposal Document at NJAC 7:8-5.5(h).

- [viii] NJAC 7:8 NJDEP Agency Proposal Document at NJAC 7:8-5.5(h), page 76.
- [ix] NJAC 7:8 NJDEP Agency Proposal Document at NJAC 7:8-5.5(h), page 76.
- [x] NJAC 7:8 NJDEP Agency Proposal Document at NJAC 7:8-5.5(h), page 77.
- [xi] NJAC 7:8 NJDEP Agency Proposal Document at NJAC 7:8-5.5(h), page 76.
- [xii] NJAC 7:8 NJDEP Agency Proposal Document at NJAC 7:8-5.5(h), page 77.
- [xiii] NJAC 7:8 NJDEP Agency Proposal Document at NJAC 7:8-5.5(h), page 77.
- [xiv] NJAC 7:8 NJDEP Agency Proposal Document at NJAC 7:8-5.5(h), page 77.
- [xv] USDA Natural Resource Conservation Service Practice Standard "Riparian Herbaceous Cover, Code 390", May 2003.
- [xvi] USEPA, "Pesticide Tolerance Reassessment and Reregistration, Terbufos IRED Facts", EPA 738-F-01-015, October 2001.
- [xvii] Bolton and Shellberg, Univ. of Washington, submitted to Washington Dept. of Fish and Wildlife, "Ecological Issues in Floodplains and Riparian Corridors", July 2001.
- [xviii] Center for Watershed Protection, "Impacts of Impervious Cover on Aquatic Systems", Watershed Protection Research Monograph No. 1, March 2003.
- [xix] Water, Science, and Technology Board, Board of Environmental Studies and Technology, "Riparian Areas: Functions and Strategies for Management", 2002, citing Swanson, et al.
- [xx] A Regional Natural Resource Protection Plan for the Toms River Corridor, Jackson and Manchester Townships, Ocean County, NJ, Toms River Corridor Task Force, February 2004, pp 34-36.
- [xxi] State of Vermont, Department of Environmental Conservation, Dept. of Fish and Wildlife, "Riparian Buffer Procedure", App.D-4, Draft 2001.
- [xxii] Julia Klapproth & James E. Johnson, "Understanding the Science Behind Riparian Forest Buffers: Effects on Plant and Animal Communities" Virginia Cooperative Extension, Virginia State University, Publication No 420-152, October 2000.
- [xxiii] Julia Klapproth & James E. Johnson, "Understanding the Science Behind Riparian Forest Buffers: Effects on Plant and Animal Communities" Virginia Cooperative Extension, Virginia State University, Publication No 420-152, October 2000.
- [xxiv] Bolton and Shellberg, Univ. of Washington, submitted to Washington Dept. of Fish and Wildlife, "Ecological Issues in Floodplains and Riparian Corridors", July 2001.
- [xxv] Julia Klapproth & James E. Johnson, "Understanding the Science Behind Riparian Forest Buffers: Effects on Plant and Animal Communities" Virginia Cooperative Extension, Virginia State University, Publication No 420-152, October 2000.
- [xxvi] State of Vermont, Department of Environmental Conservation, Dept. of Fish and Wildlife, "Riparian Buffer Procedure", App.D-4, Draft 2001.