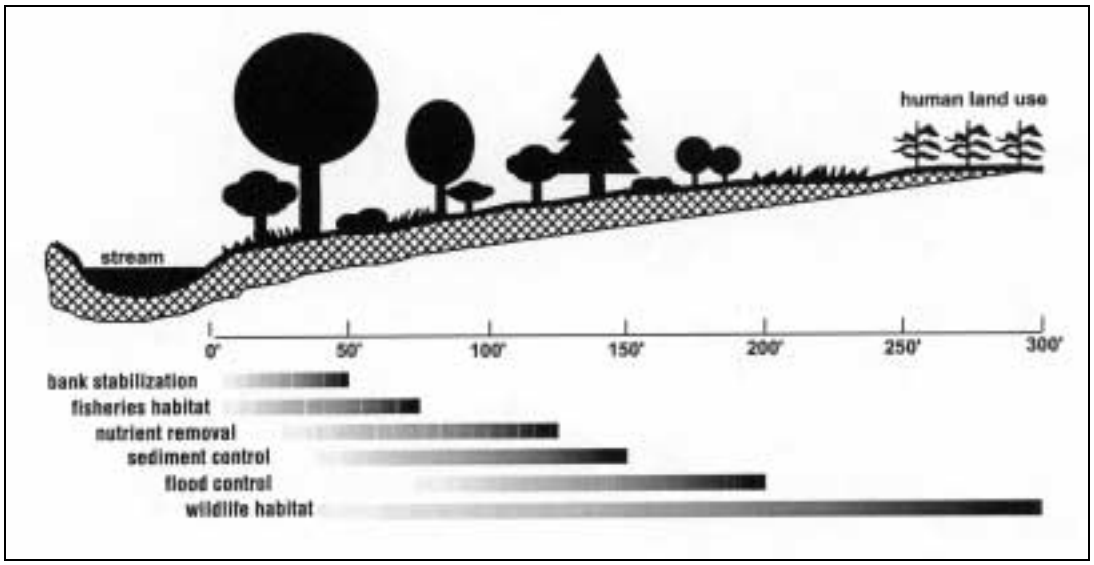
1.13 Riparian Areas

Riparian areas are ecosystems immediately adjacent to rivers, streams, ponds or lakes. Natural and restored riparian areas improve aquatic habitat by trapping sediment, contaminants and nutrients from stormwater runoff, and by shading the water body from temperature extremes. Vegetated riparian areas provide habitat for terrestrial wildlife, stabilize stream banks and serve as groundwater recharge areas.

In recent years, riparian areas in the Passaic River Basin have begun to become a popular target for open space acquisition, passive recreation facilities and stream bank stabilization/restoration projects. Riparian restoration efforts can include litter cleanup programs, implementing natural methods of stream bank stabilization instead of constructed methods, and restoring or allowing native plants to flourish by limiting mowing and livestock grazing near the water's edge. Local communities can also adopt riparian protection ordinances to limit activities within riparian areas.

A "riparian area" is not the same as a "floodplain". A floodplain is the area inundated by a flood of a certain frequency, such as the 100-year flood. A riparian area is the land along each side of a waterbody, and may or may not be in the floodplain. For example, if a stream has a low bank and floodplain on one side and a high bank on the other side with adjacent land above the designated flood level, trees along the high bank can still provide shade to the stream, and vegetation in the high overbank area can still filter surface flow before it reaches the stream, even though these areas are not in the floodplain.

A riparian buffer serves as the last line of defense between sources of pollutants and the waterbody, provides shade to the waterbody, habitat for wildlife and other functions, depending upon the width, slope and vegetation in the riparian area. Wider buffers are more effective than narrow buffers. If the slope of the adjacent land is steep, a wider buffer will be required to obtain similar benefits in comparison to a narrower buffer on flatter sloped land. There is no "one size fits all" for riparian buffers. However, a bare minimum of 35 feet from the top of bank on small streams and at least 50 feet on larger streams is needed to provide minimum benefits. The appropriate riparian buffer width in a given location depends upon site conditions, the intended purpose and the associated cost or implementability. Generally, a smaller buffer is required for bank stabilization and for providing shade to a waterbody, while increasingly larger buffers are required for benefits to fisheries habitat, nutrient removal, sediment control, flood control and wildlife habitat, as conceptually indicated below.



Source: Connecticut River Joint Commission, 1998

To Stabilize Eroding Banks

On smaller streams, good erosion control may require only covering the bank with shrubs and trees, and a 35' managed grass buffer. If there is active bank erosion, or on larger streams, going beyond the bank at least 50' is necessary.

To Filter Sediment and Attached Contaminants from Runoff

For slopes gentler than 15%, most sediment settling occurs within a 35' wide buffer of grass. Greater width is needed on steeper slopes, for shrubs and trees, or where sediment loads are particularly high. Wider buffers are needed on steeper slopes.

To Filter Dissolved Nutrients and Pesticides from Runoff

A width of up to 100' or more may be necessary on steeper slopes and less permeable soils to allow runoff to soak in sufficiently, and for vegetation and microbes to work on nutrients and pesticides. Most pollutants are removed within 100', although in clay soils, this may not happen within 500'.

To Protect Fisheries

The appropriate buffer width depends on the fish community. Cooler water holds more oxygen and reduces stress on fish and other aquatic creatures. A few degrees difference in temperature can have a major effect on their survival. For cold-water fisheries, the stream channel should be shaded completely. Unless there are problems with algae blooms, warm water fisheries do not require as wide a buffer or as much shade, but they still benefit from water cleaned by a buffer's filtering action. Studies show that, for at least up to 100', the wider the buffer, the healthier the aquatic food web. Forested areas provide woody debris and organic matter to the bacteria, fungi and other species that form the basis

of the aquatic food chain. Branches and tree trunks that fall into a stream can affect the stream channel shape, creating stepped pools, providing cover for fish and their food supply while reducing erosion by slowing flow.

To Protect Wildlife Habitat

Buffer width depends upon desired species: 300' is a generally accepted minimum. Much larger streamside forest buffer widths are needed for wildlife habitat purposes than for water quality purposes. The larger the buffer zone, the more valuable it is. Larger animals and interior forest species generally require more room. Some use so much habitat that it would be nearly impossible to protect the size buffers they require. A narrow width may be acceptable for a travel corridor to connect larger areas of habitat. Continuity is important – even small patches of trees are better than none at all when it comes to migrating birds.

To Protect Against Flood Damage

Smaller streams may require only a narrow width of trees or shrubs; a larger stream or river may require a buffer that covers a substantial portion of its floodplain. Large trees in the floodplain can slow down the velocity of the floodwater in the overbank area, and can result in higher flood depths in the forested riparian buffer, thus resulting in a greater volume of water stored in the floodplain during a flood, and a reduction in the peak flow downstream due to the attenuation effect of the overbank flood storage. Protection of the floodplain in the riparian buffer also helps protect the existing floodplain storage and prevents construction of structures that could be damaged by flooding in that portion of the flood prone area. In addition, a forested riparian buffer slows the velocity of surface runoff passing through it, and allows more water to infiltrate the soil (also carrying nutrients that can be taken up by the root system and stored in the biomass of the trees, rather than being discharger to the stream). This action reduces the surface flow to the stream, and provides more groundwater to help maintain stream base flow.

In Urban Areas

The purposes of a buffer will influence the kind of vegetation to plant or encourage. In urban and residential areas, trees and shrubs do a better job at capturing pollutants from parking lots and lawn runoff and providing visual screening and wildlife habitat. While grass can provide surface flow filtering, it cannot provide shade to cool the water. Tree roots penetrate much deeper into the soil where much of the nitrogen moves in subsurface water flow. Trees are not easily smothered by sediment, have greater root mass to resist erosion, and provide better cover for birds and other wildlife. Native vegetation is preferred to non-native plants.

> The quality of life in a stream is inversely proportional to the amount of impervious cover within its watershed. When a watershed reaches 10% to 15% impervious cover the quality of aquatic life in a stream is severely impacted and above 25% it can no longer support aquatic life. Heavy metals, common in runoff from urbanized areas, accumulate in fish tissues, threatening fish health as well as those who eat them. However, streams flowing through urbanized areas with intact streamside forests have healthier aquatic life than those that do not. Microbes in forest soil can convert some pollutants into less toxic forms. Natural vegetation should be maintained where it remains. Where native vegetation is gone but soil remains, mowing and cutting practices can be changed to allow gradual natural succession of native plants. Where riparian areas have been paved, communities can reverse the riverbank treatment by removing pavement and restoring vegetation. Where stormwater is conveyed to the stream in a conduit, it may be appropriate to construct a vegetated stormwater detention basin away from the stream, to provide the benefits of a vegetated buffer.[1]

Riparian Areas in the Passaic River Basin

A GIS analysis was completed to determine the character of riparian areas along major rivers and streams in the Passaic River Basin (down to third order streams). The land use within a 100-foot buffer along major rivers and streams was determined based upon the data for 1995 detailed land use. Then a further analysis was undertaken to identify the river and stream reaches where at least four (4) acres of contiguous natural areas (forest or wetlands) exist along the river or stream within the 100-foot buffer. This analysis has resulted in identification of numerous riparian areas where natural land use conditions continue to exist. Many of these natural riparian areas are in protected lands, but many of them are adjacent to existing development and may be lost in the near future if appropriate planning and protective measures are not employed.

WMA 3

As expected, there are extensive reaches of natural land within 100 feet of the rivers and streams in the Newark Watershed lands of WMA 3. However, there are also several such reaches along the lower Pequannock River, between the Newark Watershed lands and the confluence with the Ramapo River, interspersed with reaches of natural land not meeting the screening criteria, and with urban areas. In the Wanaque River Basin, there are significant reaches of natural areas along the lower Wanaque River (below Wanaque Reservoir) and part of Meadow Brook. Upstream of the Wanaque Reservoir and beyond the limits of the protected lands, there are significant reaches of natural riparian lands along West Brook, and short reaches along Belcher Creek downstream of Pinecliff Lake.

---

[1] Adapted from information developed by the Connecticut River Joint Commission of NH & VT with technical assistance provided by USDA Natural Resources Conservation Service, EPA, US Fish and Wildlife Service and other agencies, September 2000.
http://www.crjc.org/riparianbuffers.htm

Development has encroached upon much of the riparian area of the Ramapo and Pompton Rivers. However, there are some smaller reaches of natural areas along each of these waterways. There are long reaches of natural area meeting the screening criteria along Beaver Brook, a tributary to the Pompton River in Lincoln Park and Montville. There are shorter reaches along portions of the Pompton River, particularly on the east side in Wayne, on the Ramapo River and Darlington Brook in Mahwah, and on Pond Brook in Oakland. Some of these latter locations deserve high priority for preservation since they are the closest to existing development.

Efforts should be made to preserve existing natural riparian lands, including those within protected areas, so that these areas can be permanently preserved even if there is a future change in use of the surrounding government owned land.

P:\310500 NJDWSC WMA346\Reports\WMA 3\1.13 Riparian Areas rev 021124.doc