IV-H: Riparian Vegetation

A riparian buffer is defined as an area of trees, shrubs, and herbaceous plants located along the edge of a body of water such as a stream, lake, pond, or river. In stream systems, the presence or absence of vegetation in the riparian corridor is one of the primary factors influencing stability of streambanks. While the presence of buffers alone may not guarantee stream stability in all cases, the chance that a stream will experience streambank erosion is greatly increased when riparian vegetation is inadequate or absent.

1. ROLE OF RIPARIAN BUFFERS

For the purpose of this SCMP, the focus on riparian buffers is primarily on their role in providing multiple benefits associated with maintaining and protecting stream health. One of the many benefits of riparian buffers is the role the vegetation rooting system plays in providing streambank stabilization. Good buffer vegetation is characterized by a deep, dense network of plant roots which hold the streambanks together and provide resistance to erosion. Buffers can also provide an effective way to intercept and trap pollutants which would reach the watercourse if the buffer was not present.

In some studies, it has been reported that effective riparian buffers may reduce as much as 50% of nutrients entering the stream (Fischenich etal 2000). In some cases pollutants such as sediments may experience reductions up to 90% as the suspended soil particles are trapped in the buffer. The effectiveness of a riparian buffer in the removal of pollutants is influenced by the width of the buffer, as well as density and types of plants present.

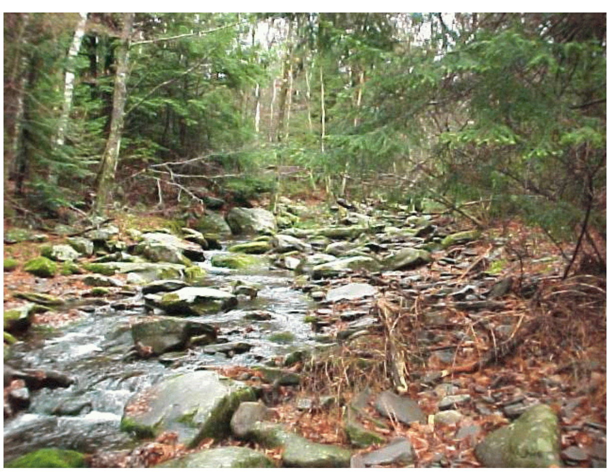

Figure IV-30: Riparian buffers provided stability, habitat and cooling benefits along the stream corridor

Riparian buffers also play an important role in creating or enhancing habitat for both terrestrial and aquatic organisms. Buffers can provide food and safe cover for terrestrial insects, mammals, and birds. Buffers also form migration routes which allow these species to move from one area of cover to another.

Buffers also provide critical benefits to aquatic organisms. Shading provided by vegetation helps lower water temperature which in turn benefits dissolved oxygen content. Leaf litter and large woody debris which enters the stream can also be a food source. In Catskill streams, leaf litter is a primary substrate for the microbes that macroinvertebrates (aquatic insects, crayfish, etc.) feed on. These are in turn the principle food source for trout and other fish.

2. BATAVIA KILL RIPARIAN CONDITIONS

Along the Batavia Kill, the current riparian condition varies from sections which are in excellent condition to stream reaches where there is little to no riparian buffer present. The Batavia Kill system is typical of many watersheds, in which good natural buffers exist in the upper, steeper headwaters and poorer conditions exist in the lower, flatter portions of the stream system. This is often due to higher pressure on the lower buffer areas from human activity.

Figure IV-31: This reach behind Alpine Village complex exhibits poor riparian conditions and is highly unstable

During the course of Phase I of the Batavia Kill Pilot Project, riparian buffer mapping and detailed assessment was not conducted. Currently, the GCSWCD will be completing riparian mapping in the summer of 2002. The Batavia Kill watershed does exhibit some general trends in riparian vegetation based on the location of the watershed. Steeper headwater reaches are typically well vegetated, with much less healthy buffers present lower in the watershed. In the following sections, The watershed has been divided into three general zones based on broad similarities in the riparian conditions. Vegetation is addressed in greater detail later in this document.

HEADWATERS (Big Hollow to Hensonville)

In the upper watershed, from the Big Hollow headwaters to Hensonville, buffer zones are generally present and in good shape with only limited sections of stream lacking a buffer. Above the last county bridge on Greene County Route 56, there is heavy forest cover on both sides of the stream with only limited areas of small fields where buffers are limited to a narrow band.

In the reach from the upper county bridge to Hensonville, a majority of the stream corridor is characterized by a fair to good buffer with the exception of areas where the stream is unstable. Poor riparian conditions are present in the reach at the Milton MacGlashen property as well as the restoration project site running upstream from Peck Road bridge to above the Leon MacGlashen farm.

Figure IV-32: Under conditions of extreme stream instability, riparian vegetation can be ineffective in providing streambank stability as shown in this eroded terrace in Big Hollow.

A short reach just above the C.D.Lane lake also exhibits poor riparian conditions. Between C.D.Lane park and Hensonville (bridge on Greene County Route 67), the riparian condition is good to excellent. While riparian buffers along some sections of this reach are narrower than generally recommended, and exhibit a lack of a mixed vegetative community of trees, shrubs, and grasses, the buffer appears to provide adequate stability, cover and habitat.

MIDDLE WATERSHED (Hensonville to Windham)

In the middle watershed, or that reach from Greene County Route 67 in Hensonville to the South Street bridge, the riparian condition is highly variable. Some sections are characterized by an effective buffer on both sides of the stream and other sections are highly deficient in riparian structure. In the stream reach from Greene County Route 67 to the State Route 296 bridge, instability of the stream system has exceeded the ability of the riparian buffer to prevent streambank erosion, and significant areas of mature buffer have been damaged or lost. Channel migration in this reach has resulted in over-widening of the stream and loss of riparian function.

In the remainder of this section of the Batavia Kill, a fairly good riparian buffer is present along much of the stream corridor, with the exception of isolated areas such as at the country club and GNH Lumber where no buffer exists. Through the hamlet, the buffer is again narrower than typically recommended, but it appears to provide good function and multiple benefits. With development concentrated in the immediate vicinity of the stream corridor, the role of vegetation in protecting streambanks from erosion is especially critical.

LOWER WATERSHED (South Street Bridge to Schoharie Creek)

In the section of the Batavia Kill running from the South Street Bridge in Windham to the Batavia Kill's confluence with the Schoharie Creek, the riparian buffers are poorer in quality and in many cases absent. While some short sections in this reach do have adequate buffers, visual observations of the riparian zone indicates that over 50% of the buffer is inadequate.

In this reach, agricultural operations, road construction, and other human activities as well as stream instability processes have significantly degraded the riparian zone and there are numerous areas where streambank erosion and lack of shade cover are impacting the stream. Ironically, in this section of the Batavia Kill stream system, the presence of loose, unconsolidated alluvial soils and "C" type streams makes the presence of vegetation critical to long-term stream stability.

Figure IV-33: In this field in Ashland behind Carrington Road, note the absence of riparian vegetation along the fields. The GCSWCD has measured migrations of this meander bend of over 40 feet in a single storm event.

The presence of a riparian buffer does not always ensure stability of the stream system. As seen in the photo below of a high terrace above Peck Road, if the geomorphic form of the stream becomes unstable and is undergoing adjustments, even a mature forest buffer can be lost or seriously damaged as the stream undergoes changes. In the flood event associated with Tropical Storm Floyd in 1999, the GCSWCD observed erosion of streambanks in areas with good buffers, with some banks moving as much as 50-75 feet in the flood event and the loss of hundreds of mature trees. Consequently, the planting of stream riparian buffers should only be undertaken when the streams geomorphic condition is basically stable and major changes in the stream channel are not actively underway.

3. INVASIVE SPECIES

Along the Batavia Kill and some of its tributaries, the stability of the riparian buffer is significantly influenced by the presence of Japanese knotweed (*Polygonum cuspidatum*), an invasive species. Also called false bamboo, Japanese knotweed is a herbaceous perennial with an aggressive growth habit and very poor performance in stabilization of streambanks.

Knotweed can grow to an average of 8' in height and it is characterized by a stout round hollow stem and broad leaves (Japanese Knotweed Manual, 1998). It grows in very dense clumps. The plant is generally associated with areas of disturbance, where it quickly colonizes open ground and disturbed soils.The plant's primary method of reproduction is rhizomes, which can regenerate a plant population from small fragments that are easily transported through the stream system by flood flows. The aggressive growth habit of knotweed allows it to out compete native vegetation for nutrients and sunlight. Clumps of knotweed are so dense that little or no sunlight penetrates its leaf cover. This slows the native plant growth under its canopy and in most cases quickly out competes native materials, resulting in a monoculture vegetative community.

Figure IV-34: Japanese Knotweed has distinctive broad leaves, large hollow stems and small white flowers in the fall

Although knotweed clumps can form an intense rooting network, the rooting mat is compact and shallow. It is thus ineffective in providing streambank stabilization. Knotweed on streambanks that it provides minimal surface protection during flood events. Typically, stream side vegetation assists in reducing flood velocities and shear stress by providing "roughness" to the streambank. However, Knotweed generally becomes very brittle during its dormancy, and its stalks typically break off near the ground in the late fall. This leaves minimal plant exposure through fall, winter, and spring.

Compounding the problems of poor rooting depth and aggressive growth, Japanese Knotweed is also very difficult to eradicate. Various methods from mechanical removal to herbicides have been used to control Knotweed with limited success. Eradication generally requires multiple year treatments with herbicides, as well as mechanical treatments such as excavation or mowing. During Phase II of the Project, the GCSWCD and NYCDEP will be working with Hudsonia to investigate the Knotweed situation and to use field trials to test different management techniques. Hudsonia is a non-advocacy, nonprofit, scientific research and education institute (Hudsonia 2001).

IV-35: The aggressive growth habit of Knotweed forms dense clumps which overshadow more beneficial species of riparian vegetation.

Observations made by the GCSWCD throughout the stream corridor show that knotweed colonies generally have not become established in areas where mature forest buffers are present. The lack of sufficient light, and the stability of the streambanks in these areas have not been conducive to the formation of knotweed colonies. In areas where a forest cover is present , it appears that the shade provided by the "over-story" can be effective in reducing the formation of dense Knotweed populations. During the course of the GCSWCD assessment of the Batavia Kill corridor, it was noted that knotweed may have originated in the watershed in the area of the Sugar Maples resort in Maplecrest. The resort is the site of dense populations of the plant, and it is assumed that the Knotweed may have been used as an ornamental at some time in the past. Currently, no significant colonies are located upstream of the Sugar Maples Resort. A small colony was noted near C.D. Lane Park.