Stand By

Your Stream™

"Streamside Protection - Why Bother?"

An Outreach Program for Stream Management

You own a creek, perhaps by accident, perhaps because you love to fish or want to have fun with your kids. The truth is, you own much more. The adjacent streamside is not only an integral part of the stream but a unique habitat in itself.

Most streamsides, or ***riparian zones***, have historically been cleared for agriculture, reinforced for railways, cleared for development, and only occasionally been left alone. They have been viewed as barriers preventing access to the greater excitement of the stream. Yet, an intact and healthy streamside habitat serves many critically important functions. It deserves protection and good management.

> ***riparian zone****: the lands directly adjacent to a stream, creek or river which have a saturated groundwater table within 3 to 5 feet of the soil surface and / or which are periodically flooded aboveground.*

Riparian zones vary dramatically in appearance from the thin fringe of eastern hemlock and birch trees bordering small headwater creeks, to meadows and willow thickets along a farm stream, to mile-wide richly forested floodplains associated with large rivers. The critical features of all these streamside habitats are that the groundwater table is shallow enough to interact with the plant roots and that the plants are occasionally flooded aboveground when the stream is swollen by storms or snowmelt.

These conditions exert strong influences on the plants which live in the streamside. An amazing diversity of trees, shrubs and herbs have adapted to living in various portions of the riparian zone depending on the frequency and duration of flooding or soil saturation which they experience. The leaves, fruits, and root systems, provide the basis for many of the benefits which streamside habitats provide.

Wildlife Value

- Vegetated streamsides provide food, water, habitat and corridors for wildlife.
- Streamside vegetation provides a periodic source of organic litter and debris which are needed by stream inhabitants.
- Overhanging vegetation shades and cools the stream waters, making it more livable for aquatic organisms.

The highest diversity of wildlife in many northeastern landscapes, is associated with the streamside. Deer and other terrestrial animals include streamsides into their home ranges as a source of water or as a safe corridor by which to bypass exposed fields and urban developments. Birds depend on the wealth of fruits from the rich plant community as well as insects and aquatic organisms as their food source. Birds and other animals rely on the streamside for nesting and protection. Streamsides are also home for specialized species, such as water thrushes or star-nosed moles, river otters, and beavers which favor the combination of flowing water with adjacent vegetated land.

Riparian vegetation is also critically important to the organisms living within the stream itself. Every autumn, it provides a predictable and plentiful supply of leaf litter and debris as food for stream invertebrates and as fuel for the aquatic food web. Large fallen branches lodge within the stream, forming debris dams and hollowed-out pools for resting fish. Finally overhanging vegetation shades and cools the stream waters, making it livable for fish and other organisms.

But wildlife resources are only one dimension of the benefits that streamsides provide. These habitats perform other critical functions on which our society is dependent. These environmental services would be expensive to replace artificially.

Flood Control

- Plant foliage, stems and litter intercept storm waters, slow down water movement, and reduce the peak height and duration of floods downstream.

The first of these functions is natural flood control. Streams are dynamic systems. Water levels rise and drop daily with rainfall, seasonally with snowmelt and summer heat, and interannually with droughts and wet years. The streamside habitat is actually an extension of the stream itself and serves as the buffer area when stream ***discharge*** increases and the stream overflows its banks. The plants growing within the streamside are adapted to this periodic

flooding and the associated saturated ground conditions. When flooding occurs, the plant stems, leaves and litter intercept the floodwaters, slowing them down and reducing the height and duration of floods downstream. Without such interception, the stormwaters rush straight downstream, increasing the height and duration of peak flooding.

discharge: *the volume of water passing through a cross-section of a stream and its entire channel in a given amount of time.*

Filtering Mechanisms

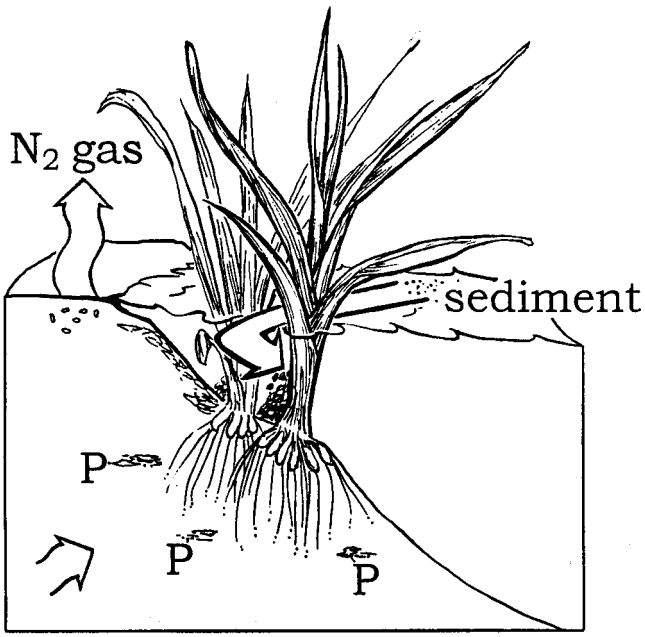

Figure 1

Sediment Trapping

- Plants and litter reduce the load of suspended sediments in storm waters and runoff by slowing down the water and allowing the particles to settle out.

Streamside plant communities also improve water quality by trapping suspended sediments among the plant stems and litter (Fig.1). The particles settle out of the slowed waters and are deposited in the riparian habitat. Most riparian plants, such as willows, sycamores, ashes and cottonwoods, must be adapted to deal with shifting substrates and can rapidly regrow root systems in the newly deposited sediment.

Erosion Control

- Plant roots hold the soil of the streambank in place and prevent erosion.

Plant root systems are a main factor preventing bank erosion and further movement of suspended sediment downstream. The roots form a fine, dense network throughout the soil, binding it together and resisting the erosive power of flowing water. Interestingly, the resultant resistance of the streambanks to erosion has direct feedbacks to the functioning of the larger stream network across the landscape. The sinuosity, or "wiggliness" of the stream channel is increased and this also helps to reduce the rapid flow of water downstream.

Groundwater Filtering

- The soil-root-microbe environment of the riparian zone filters out nutrients, metals and other contaminants from water as it moves subsurface.

Streamside habitats are also critical in the improvement of water quality as it flows subsurface. As groundwater moves from surrounding upland areas into the adjacent streams, it passes through the root zone of the streamside plant community. Stream water also moves in and out of the riparian substrate as it intercepts meander bends or overflows the banks.

There are a number of mechanisms acting to filter out contaminants from these invisible flowing waters. Phosphorus, metals and other contaminants are "stuck", or absorbed, onto tiny pieces of organic matter within the soil. Bacteria and other microbes transform and break down many contaminants. Denitrification, in particular, is a process by which microbes transform nitrate, a common component of fertilizers and manure wastes, into nitrogen gas. The gas is lost to the atmosphere and the nitrogen cleaned from the groundwater. Finally, microbes and plants temporarily store nitrogen, phosphorus and other contaminants in their living tissues.

Streamsides play a critical role in maintaining good health in our streams and in the adjoining terrestrial ecosystems. The interweaving network of streams and streamsides are the bloodstream which ties the landscape together. They are valuable habitats performing numerous functions which would be difficult to replace artificially. As such, they deserve protection and good management.

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