Stream Sedimentation

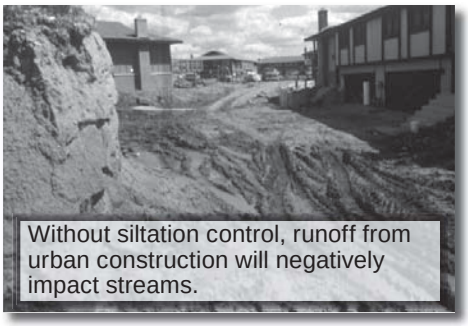
An Educational Series For Stream Teams To Learn and Collect

by Andy Turner, Stream Team Assistant

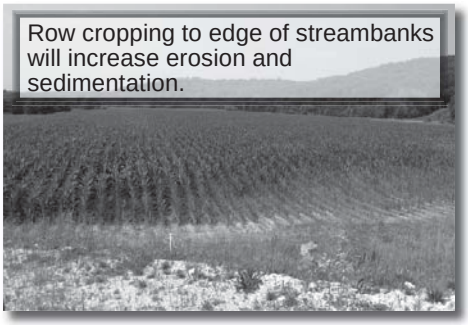
Sediment is the number one water quality pollutant nation-wide. The loss of sediment from our landscapes is influenced by many human activities, and small sediment particles make their way into streams from sheet and rill erosion in the watershed or erosion of stream channels.

Characteristics of a watershed define the sedimentation of a stream and can be considered natural if human activities are not contributing to the sedimentation. Natural inputs of sediment are controlled by climate, soils, native vegetation, and watershed slope. These natural inputs of sediment have helped define the conditions from which the current biotic community has evolved. A stream can be considered to be unnaturally or excessively impacted by sediment when human activities are contributing sediments. Human activity within a stream's watershed alters the natural sediment balance and can lead to detrimental effects on aquatic life. Some human activities shown to alter a stream's natural sediment regime include:

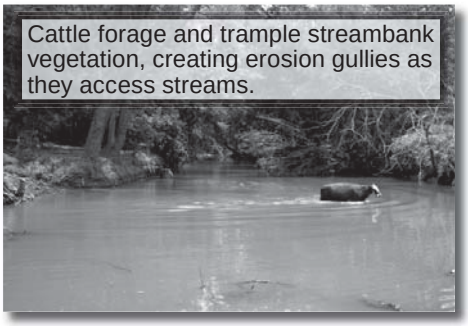
- Construction
- Urbanization
- Row cropping
- Overgrazing
- Livestock access to the stream
- Logging
- Riparian degradation
- Channelization
- Gravel mining



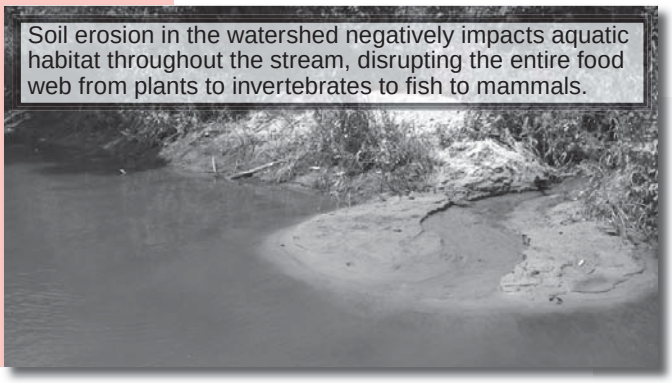
Without siltation control, runoff from urban construction will negatively impact streams.



Row cropping to edge of streambanks will increase erosion and sedimentation.



Cattle forage and trample streambank vegetation, creating erosion gullies as they access streams.



Soil erosion in the watershed negatively impacts aquatic habitat throughout the stream, disrupting the entire food web from plants to invertebrates to fish to mammals.

Affects on Biota

Excessive sedimentation can come in the form of both suspended and deposited sediments. Increased suspended sediments reduce water clarity and make it difficult for sight-feeding fish and invertebrate species to catch food. Suspended sediments also absorb the sunlight's energy, which inhibits plant photosynthesis and warms the water in the stream. Inputs of deposited sediments fill interstitial

(continued on back)

Stream Team Academy Fact Sheet Series:

Watch for more Stream Team Academy Fact Sheets coming your way soon. Plan to collect the entire educational series for future reference! Contact us at 1-800-781-1989 if you'd like a copy of previous Fact Sheets.

spaces and change the overall composition of the streambed. Interstitial spaces function to provide shelter and foraging habitat for aquatic invertebrates. When these spaces are filled and the streambed becomes dominated by sediments, aquatic invertebrates are unable to successfully feed and safely hide from predators. Large influxes of deposited sediment can also be great enough to bury invertebrates in silt and sand. Fish species are also affected by deposited sediment. Increased turbidity reduces feeding success and reproduction success is altered by the loss of nesting habitat and the smothering of eggs. Alterations in either the invertebrate or fish assemblages can lead to subsequent affects throughout the entire food web in a stream.

Excess sediment can reduce feeding and reproduction success for many fish species.

Effects of sedimentation are also not limited locally. These effects are carried downstream and large influxes of sedimentation can impair many miles of a stream system.

Limiting Excessive Sedimentation

In Missouri, all watersheds have been influenced by human activity. While we cannot expect to free a watershed of these influences, there are steps that can be taken to keep them to a minimum.

Actions that can minimize excessive stream sedimentation include: the establishment of a sufficient riparian zone, bank stabilization, and farming practices that limit erosion. A sufficient riparian zone is commonly considered to be 100-feet wide and consist of native woody vegetation. A reestablishment or protection of the riparian zone will function to buffer excessive sedimentation as it slows runoff and filters sediments before they reach the stream. Both overstory and understory vegetation are needed for a fully functioning riparian zone.

On lands being used for cattle grazing, riparian establishment is often achieved by fencing cattle from access to the riparian area and the stream. When cattle trample and forage on riparian vegetation, they reduce the buffering capability and the ability of the riparian zone to stabilize soil. Cattle also form erosion gullies as they access the stream to seek water and refuge from the heat during the summer. Bank stabilization techniques can be used to help slow erosion of streambanks as a result of riparian degradation and provides time for riparian re-establishment to be successful.

Many agricultural cropping methods also drastically increase erosion, the most common being standard tillage row-cropping. Switching to no-till methods and terracing crop fields not only provides the benefit of reducing excessive stream sedimentation but also limits the loss of fertile top soil from the growing fields.

As we undoubtedly play a part in every watershed, this role does not have to lead to excessive stream sedimentation. The measures referenced can neutralize our inputs of excessive sediments, allowing us to coexist with functioning streams and limit our degradation of Missouri's aquatic resources.

Keeping clean and healthy streams requires sound management practices throughout the watershed.

MISSOURI STREAM TEAM

Sources:

Leopold, L. B., M. B. Wolman and J. P. Miller 1964. Fluvial processes in geomorphology. San Francisco, W. H. Freeman, 522.

USEPA (U.S. Environmental Protection Agency). 2007. Wadeable Streams Assessment: A collabroative survey of the Nation's Streams Epa 841-B-06-002. Office of Water, U.S. Environmental Protection Agency, Washington DC. www.epa.gov/owow/streamsurvey

United State Department of the Interior: Bureau of Reclamation. 2006. Erosion and sediment manual. www.usbr.gov/pmts/sediment/kb/erosionandsedimentation/index.html