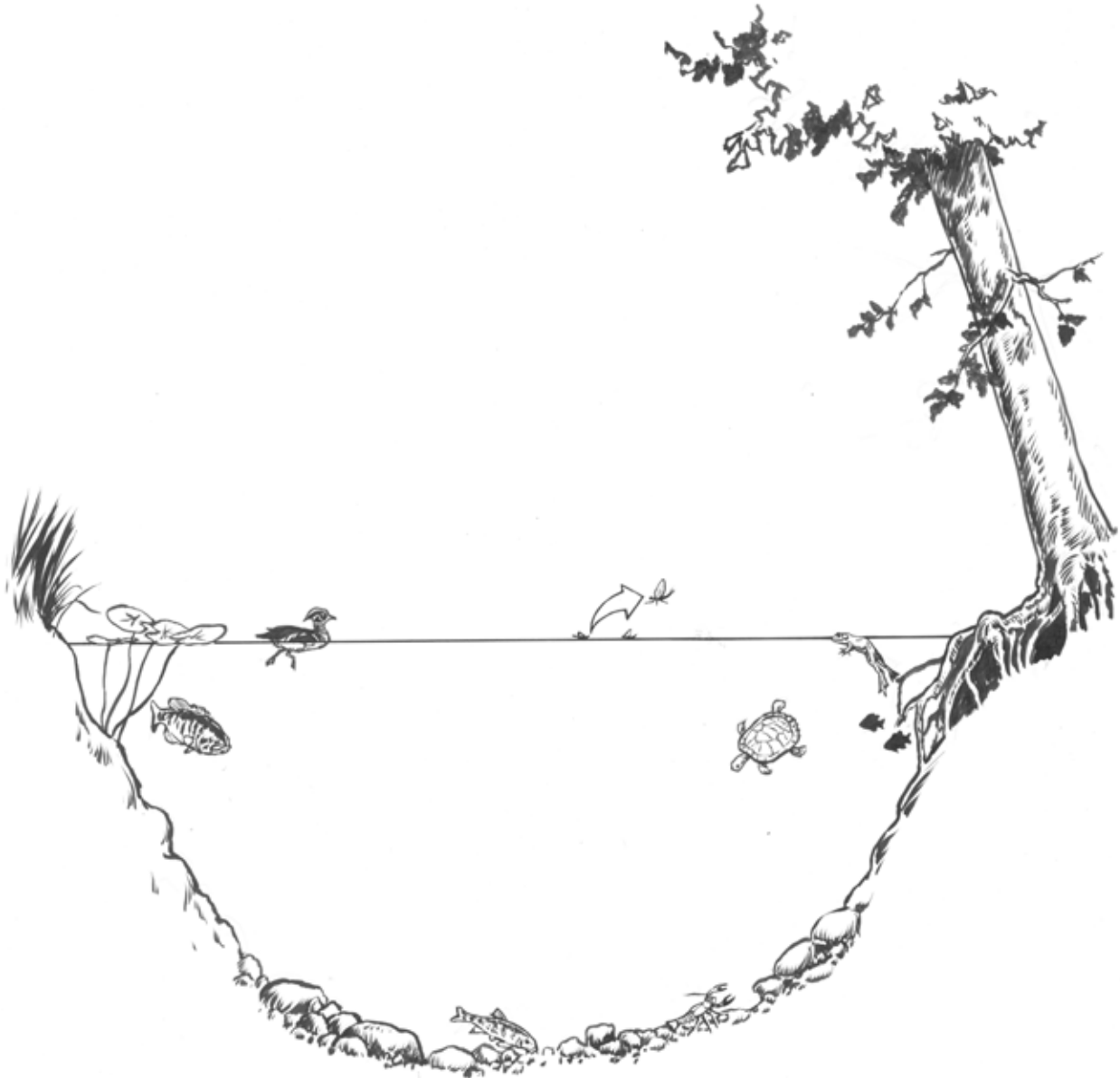


Stream Channel Module

The stream channel is the path where water concentrates to flow downstream in a natural meandering pattern throughout the watershed. The stream channel is the area between the banks that holds water during normal flows. Stream channels include gravel or sand bars. Some streams may not retain water all year. The stability of a stream is the function of water, sediment, energy, and vegetation which can be affected both positively and negatively by human activity.



Introduction

The stream channel is where water concentrates to flow downstream. Stream channels are characterized by an elevation drop as they flow downstream. This is known as stream gradient.

Most Missouri streams flow in a meandering pattern because this is the natural way for water to flow through flood plains with low to moderate gradients. Streams flowing across the Osage Plains developed meanders throughout their flood plains before the Ozark uplift began millions of years ago. As the land moved up, the rivers cut down producing entrenched meanders. These entrenched meanders are prevalent in the Ozark Scenic Rivers which have curved paths and high bluffs.

Stream channels and the forces that form them are important. Understanding the interaction of stream gradient, stream flow, stream beds, bank materials, and vegetation helps explain pool and riffle formation, stream bank erosion, and a large number of stream problems. The study of all these factors is known as Fluvial Geomorphology.

Stable streams are characterized by a balance in sediment, water, energy, and vegetation (primary components). When the gradient of a channel is altered, the stream energy becomes unbalanced, often causing drastic changes upstream and/or downstream. For example, gravel dredging not only changes gradient, but also loosens the bed material, making it easier for the stream to pick up particles and deposit them in downstream pools. As a result, headcutting occurs upstream as the water erodes the stream bed in an upstream motion.

Channelization, the straightening of a stream channel, has the effect of increasing the gradient and energy since a straightened channel will make the same elevation drop over a shorter distance. Faster flowing water increases erosion which cuts into the stream bottom; thus, eliminating habitat for many aquatic organisms.

Another channel alteration is the construction of a hydroelectric dam or impoundment. Aside from an impoundment smothering a stream to the point where it cannot function as a stream, a dam or impoundment affects downstream discharges which can harm aquatic ecosystems. For example, when the water is released from the dam, the change in elevation increases the energy of the water and cuts deeper into the bottom and banks until the excess energy is dissipated. Finally, increased or decreased stream flow will alter channel characteristics through erosion or deposition of materials, thus increasing or decreasing channel dimensions. Stream flow may also change due to flooding. Changes in the watershed (increased buildings, parking lots, roofs, etc.) will increase runoff.

A stream channel is efficient in its natural, balanced state. This balance is a function of the water, sediment, energy, and vegetation conditions. A change in any of these factors can cause a dramatic "domino effect" affecting a stretch of a stream for miles and even the entire watershed.