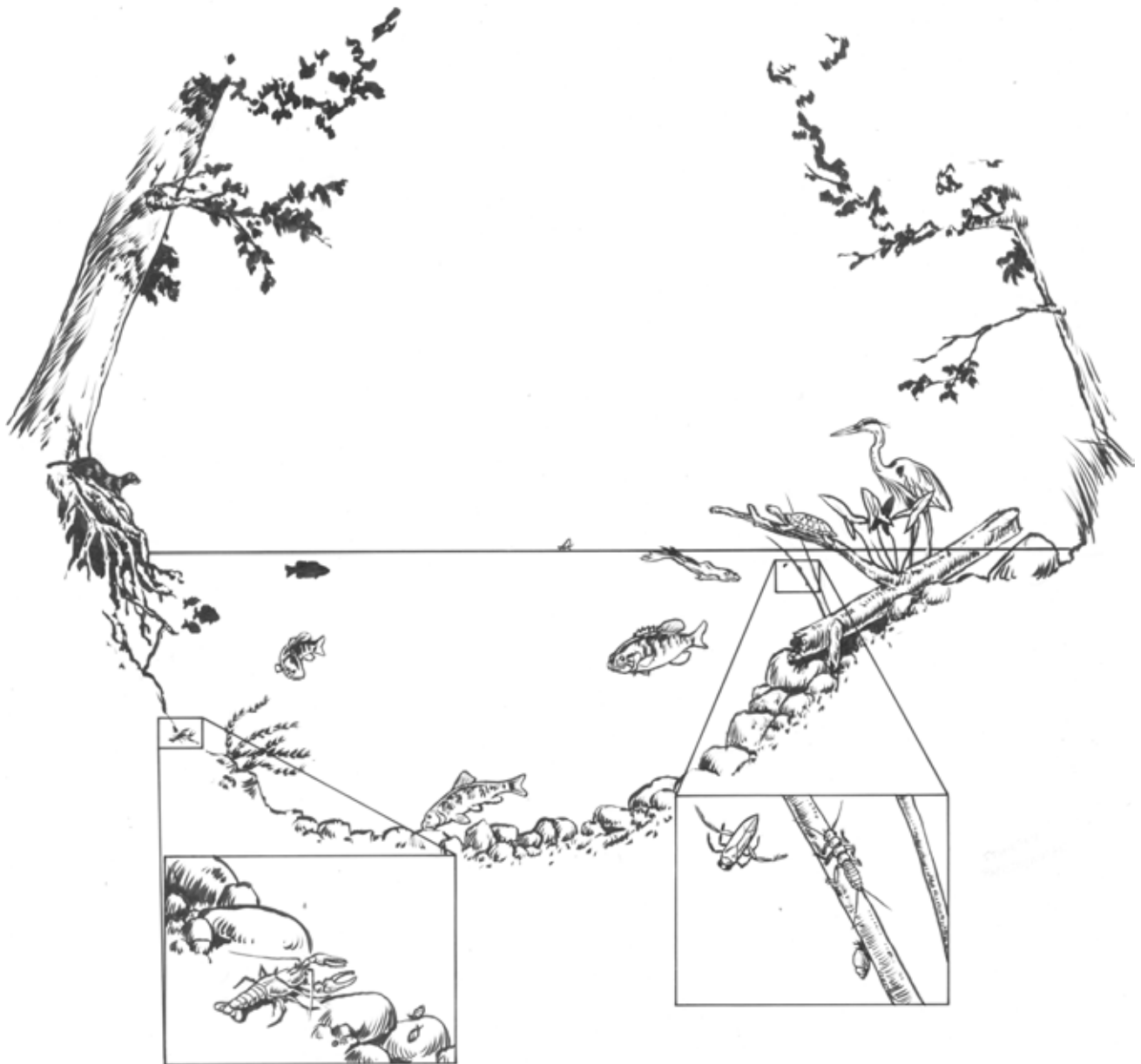


Aquatic Habitat Module

The quality of the fisheries and the diversity of aquatic life depend upon the watershed conditions of the stream channel, banks, riparian zone, and flood plain. Healthy aquatic habitats are an important component in all ecosystems. In addition, aquatic habitat health can affect human health and recreation.



Introduction

All life forms in and around the stream are dependent upon specific habitats for their existence. Each habitat determines the amount and types of food, shelter, and spawning areas available for fish and wildlife.

In a stream, the aquatic life is a function of the types of food, shelter, and conditions of the riparian corridor, stream channel, and overall watershed conditions. Land use conditions in a watershed determine runoff water quality and quantity. The riparian corridor conditions either buffer a stream or leave it unprotected (see Introduction on Riparian Corridors). In turn, human activities that take place directly in the stream channel (improper gravel or sand dredging, inappropriate ATV use in stream beds, channelization, dam construction, and water diversions or withdrawals of water flow) can degrade a stream's aquatic wildlife. Many of Missouri's rare and endangered species have their life cycles tied to stream beds or riparian corridors. For example, the wood frog and assortments of birds, fish, fungi, insects, mammals, and reptiles that are rare or endangered are dependent directly or indirectly on streams. Forty Missouri endangered species are aquatic. (Check the Missouri Department of Conservation booklet on *Rare and Endangered Species*.)

Four primary factors determine a stream's habitat quality: pools and riffles, stream flow, structures, and stability of the stream bottom. Each of these factors reflects the land use conditions of a stream's channel, riparian corridor, flood plain, and watershed.

Pools and riffles are the dominant habitat in a stream's ecosystem. The deep, slower moving waters of a pool provide cover and quiet resting areas for fish. Riffles are shallow and fast moving as water flows over rocks. The riffles put oxygen in the water, which is used by invertebrates that live among the rocks in a riffle. These invertebrates provide a food source for fish. Water quality in a stream can be determined by analyzing the types of macro invertebrates that live in a riffle.

As a stream gradient drops, pools and riffles work together to provide habitat and balance to a stream's equilibrium. Pools can fill up with sediment, a process known as channel filling. Riffles are destroyed by improper use of heavy equipment and ATVs in a stream bed. When a pool is exposed to excessive sedimentation two events take place, sunlight is absorbed by the suspended darker sediment particles raising the water temperature. This results in a decrease in the water's ability to hold oxygen. Additionally, photosynthesis is reduced as sunlight is blocked from aquatic plants therefore reducing the production of dissolved oxygen. A decrease of oxygen has a negative impact on sensitive macro invertebrates that are a food source for fish.

Stream flow is the speed and amount of water traveling in a stream channel. Stream flow is affected by precipitation, topography, and geology. Missouri receives approximately 20-40 inches of precipitation in a year. Due to the karst geology of the Ozarks, water is funneled underground in sinkholes and losing streams, reappearing as springs. As precipitation decreases in the dry summer months, aquatic life is stressed as stream flow decreases and temperatures increase with standing waters. Slower waters decrease the opportunity to add oxygen to a stream. Human activities such as

channelization, dredging, damming, discharging effluents, and withdrawing water in larger rivers increase or decrease stream flow.

Structures such as root wads, logs, boulders, and vegetation in a stream are important, they provide shelter for all forms of aquatic life. These structures provide cover for fish, attachment areas for insects, and homes for reptiles, amphibians, and mammals. A stream without of these structures will be void of a diversity of aquatic life. Dredging, channeling, and improper gravel or sand removal in streams disturb these structures and threaten aquatic wildlife.

The stability of a stream bed affects aquatic wildlife. A stable stream bottom does not shift excessively with changes in the stream flow. A stable stream bottom provides habitats for insects, crayfish, and essential spawning grounds for fish. The stability of a stream channel is reflected by human activities within the stream channel, riparian corridor, flood plain, and watershed. These factors are interdependent as a stream seeks equilibrium. The quality of aquatic life is determined by land use management in a watershed.