**Estructura trófica en ríos: "Linking Trees to Streams"**

Extraido de: http://www.stroudcenter.org/lpn/more/trees2streams.htm

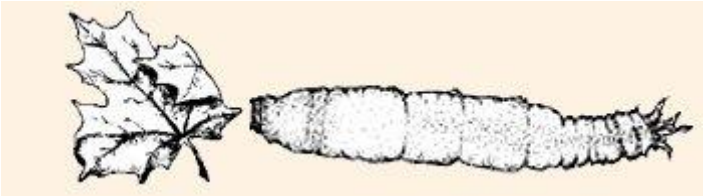
Historically, most small streams were forested. Leaf fall from the forest canopy was the dominant food resource for small streams. All ecosystems rely on a steady supply of energy. Solar energy drives photosynthesis that supplies carbon (chemical energy) for the rest of the system. In many headwater streams, however, sunlight cannot reach the water's surface due to shading of the forest canopy. Therefore, most headwater streams rely on autumn leaf fall to supply much of the carbon needed to support the stream throughout the year.

*. The leaves that fall into streams accumulate in packs behind branches, rocks and other obstructions in the stream, forming natural leaf packs*

Leaves, falling in or near the stream, leach out organic molecules creating a "watershed tea" that flows downstream providing nourishment along the way. On the leaf surface, there is a diverse assemblage of microbes (fungi and bacteria) and macroinvertebrates (insect larvae, crustaceans, etc.) which "process" leaves and facilitate the flow of energy through the system. Macroinvertebrates are often referred to as "canaries of the stream" because they function as living barometers that indicate changes in water quality.

Benthic freshwater macroinvertebrates can be defined as the following:

| | | |
|---|---|---|
| Benthic | = | inhabit bottom areas/substrates |
| Freshwater | = | streams, rivers, lakes, ponds |
| Macro | = | relatively "large" (> 0.2-0.5mm) |
| Invertebrate | = | animal without vertebrae |



Aquatic macroinvertebrates play important roles in the food webs of the stream ecosystem (Figure 1). Macroinvertebrates can be classified not only by traditional taxonomy but also by how they function in the ecosystem. This method of classification based on feeding adaptations and/or food preferences is known as functional feeding groups (Figure2).

**Figure 1.** *Food web in small streams*

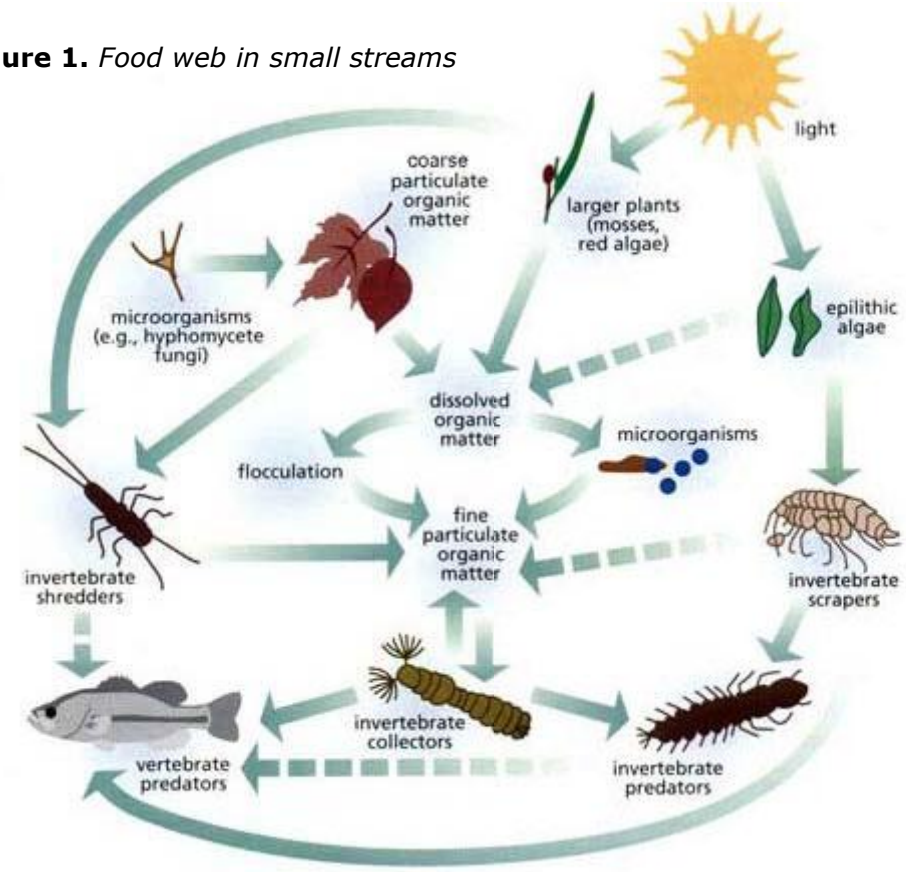



Image provided by, "Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FISRWG)."

**Figure 2.** *Functional Feeding Groups*

| Feeding Strategy | Food Category |
|---|---|
| I. Shredders | dead leaves/live macrophytes |
| II. Collectors | fine organic particles (live/dead) |
| filter feeders | particles in water column |
| miners | buried particles |
| browsers | bottom surface deposits |
| III. Scrapers | live benthic algae (diatoms) |
| IV. Piercers | live filamentous algae |
| V. Predators | other invertebrates + small fish |

Leaf fall from the forest canopy in small streams are used by shredders (Figure 3). Shredders get nutrition primarily from the fungi and bacteria that colonize the leaf surface. Craneflies, stoneflies, caddisflies and aquatic sow bugs are important members of this group. Small fragments of leaves and feces from shredders are captured by another group of macroinvertebrates called collectors. Netspinning caddisflies and blackflies are examples of this group.

*Leaves accumulate in leaf packs in streams. The animals adapted to feeding on leaves are called "shredders."*

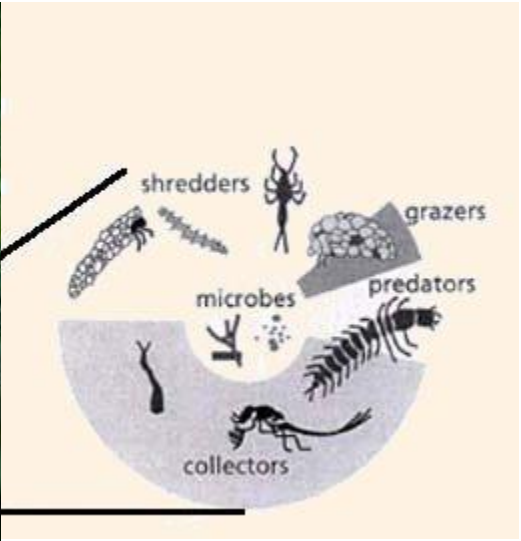



**Figure 3.** *Shredders and collectors form the major proportion of stream macroinvertebrates.*

As the stream widens, exposing more of the water's surface to sunlight, in-stream photosynthesis plays a more important role. Leaf litter reaching the stream decreases and algae, due to the increased sunlight, becomes more abundant. As the food base shifts so does the type of invertebrates. Grazers/Scrapers who utilize the abundant algal resource increase while shredders decrease (Figure 4). Snails, limpets, certain mayflies and case-building caddisflies are adapted to feeding on the algae growing on rock surfaces.

*More sunlight reaches this mid-sized stream.*

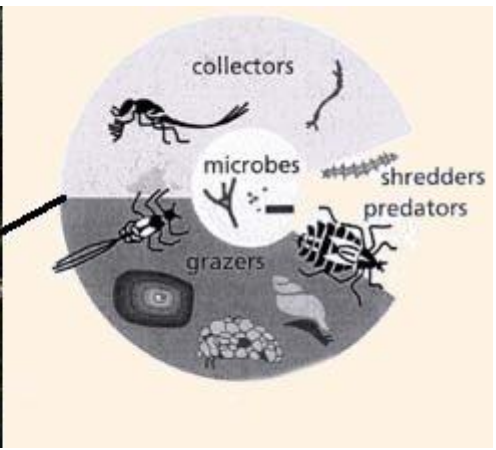



**Figure 4.** *Collectors gather or filter plant fragments, feces, and plankton. Grazers, also known as Scrapers browse on algae.*

Further downstream the river channel widens and deepens. Trees shade only the edge of the river and sunlight, although abundant, does not penetrate to the river's bottom due to turbidity. The food base is dominated by phytoplankton and fine, suspended organic particles generated

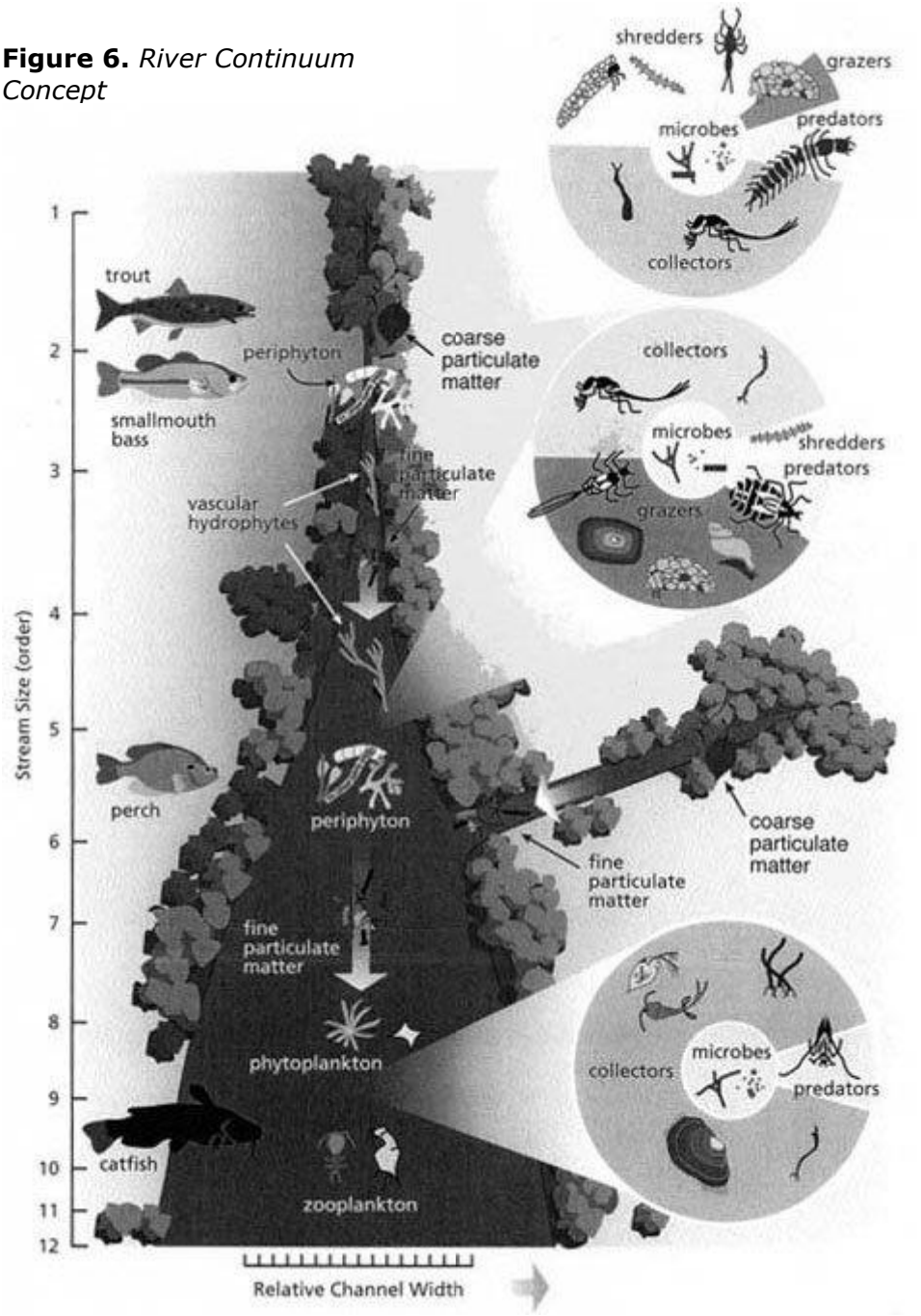
further upstream and from the river's floodplain. Filtering collectors (Figure 5) such as mussels and clams are adapted to filtering these fine particles from the water column. To complete food web ecology, a diverse group of predators are found throughout the entire stream length feeding on all other feeding groups.


*Large river*

**Figure 5.** *Filtering collectors such as mussels are found in greater abundance in larger streams.*

Physical conditions vary greatly in small headwater streams compared to large rivers. In general width, depth, temperature, and discharge increase further downstream. The **River Continuum Concept** (Figure 6) seeks to correlate this continuum of physical changes with biological changes throughout a river system and provides a conceptual model to compare with stream systems throughout the world.

**Figure 6.** *River Continuum Concept*

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