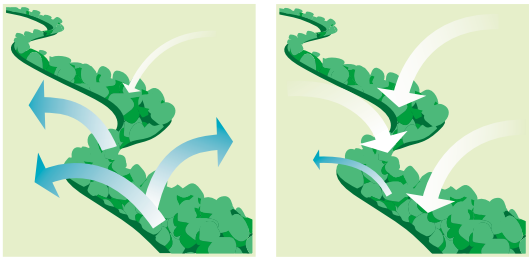
Source and Sink Functions



Sources provide organisms, energy or materials to the surrounding landscape. Areas that function as sinks absorb organisms, energy, or materials from the surrounding landscape. Influent and effluent reaches, discussed in Section 1.B of Chapter 1, are classic examples of sources and sinks. The influent or "losing" reach is a source of water to the aquifer, and the effluent or "gaining" reach is a sink for ground water.

Stream corridors or features within them can act as a source or a sink of environmental materials. Some stream corridors act as both, depending on the time of year or location in the corridor. Streambanks most often act as a source, for example, of sediment to the stream. At times, however, they can function as sinks while flooding deposits new sediments there. At the landscape scale, corridors are connectors to various other patches of habitats in the landscape and as such they are sources and conduits of genetic material throughout the landscape.

Stream corridors can also act as a sink for storage of surface water, ground water, nutrients, energy, and sediment allowing for materials to be temporarily fixed in the corridor. Dissolved substances, such as nitrogen, phosphorus, and other nutrients, entering a vegetated stream corridor are restricted from entering the channel by friction, root absorption, clay, and soil organic matter. Although these functions of source and sink are conceptually understood, they lack a suitable body of research and practical application guidelines.

Forman (1995) offers three source and sink functions resulting from floodplain vegetation:

- Decreased downstream flooding through floodwater moderation and/or uptake
- Containment of sediments and other materials during flood stage
- Source of soil organic matter and water-borne organic matter

Biotic and genetic source/sink relationships can be complex. Interior forest birds are vulnerable to nest parasitism by cowbirds when they try to nest in too small a forest patch. For these species, small forest patches can be considered sinks that reduce their population numbers and genetic diversity by causing failed reproduction. Large forest patches with sufficient interior habitat, in comparison, support successful reproduction and serve as sources of more individuals and new genetic combinations.

Dynamic Equilibrium

The first two chapters of this document have emphasized that, although stream corridors display consistent patterns in their structure, processes, and functions, these patterns change naturally and constantly, even in the absence of human disturbance. Despite frequent change, streams and their corridors exhibit a dynamic form of stability. In constantly changing ecosystems like stream corridors, stability is the ability of a system to persist within a range of conditions. This phenomenon is referred to as *dynamic equilibrium*.

The maintenance of dynamic equilibrium requires that a series of self-correcting mechanisms be active in the stream corridor ecosystem. These mech-

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