



# The Importance of Healthy Headwaters

A river begins at its headwaters, a network of small upstream tributaries. When most people think of headwaters, they think of mountain creeks.

But we should also include small streams that join a larger river in its lower reaches, desert springs and seeps, wet meadows, and even bayou-like channels originating in low-lying terrain.

In addition, headwater streams can be intermittent or perennial. Intermittent streams are those that contain flowing water only during wet periods, while perennial streams contain water year-round.

Headwater streams comprise the largest total number and most linear miles of streams in the United States. Because they occupy the entire range of climatic and geological conditions found in the US, headwater ecosystems collectively represent enormous diversity.

## **Why are headwaters important?**

Headwaters supply food and critical nutrients: The headwaters are a critical food source for the entire river. Because of their intimate connection to the surrounding landscape, headwater streams deliver nutrients and organic material-like fallen leaves-to downstream regions, sustaining aquatic life downstream.

The leaves that fall into a headwater stream are food for insects, which in turn are food for fish, which get eaten by birds-and so, the headwaters provide the base of the river's food web.

Headwaters influence downstream conditions: Headwaters influence downstream conditions in a number of ways. In addition to food, the headwaters provide other materials like water and sediments, essential to river health.

Natural sediment delivery to streams begins with the hill slopes above intermittent and headwater stream channels. Interconnected with wetlands and groundwater, headwaters help regulate natural river flow.

In the western United States, nearly all of the major waterways and 3/4 of the water supply for people originate in National Forests.

Headwaters support biodiversity: While headwaters are important for their downstream influences, they are also important in their own right as geologically and biologically distinctive and diverse ecosystems. Headwaters support rich and varied communities of plants and animals.

The biological diversity of certain groups such as amphibians is greater in headwater regions than anywhere else within a drainage basin.

Some of the most diverse breeding bird communities in North America are associated with headwater riparian zones in the Southwest. Many species of fish, including young salmon, live in headwater streams less than three feet wide.

## **Why are headwaters in trouble?**

Nearly every person living in the United States has a headwater stream within a mile or two of his/her home. It's no surprise, then, that human development has had a big impact on these delicate ecosystems.

Human activities -- including urbanization, dams and diversions, water withdrawals, point and non-point source pollution, deforestation, mining, and grazing -- harm the structure and flow of headwater streams, eliminate riparian and wetland habitats, and degrade water quality. And when headwater streams are damaged, the lower rivers suffer as well.

Dams and water withdrawals: Although often associated with larger rivers, dams and water withdrawals are widespread in headwater streams. Small hydroelectric dams dot the headwaters of the Northeastern rivers, a legacy of the mill dams and the first waterworks of European settlers.

(Continued on back)

In the arid regions of the West, because settlers concentrated near sources of irrigation water, the resulting development is often concentrated in headwater areas. Irrigation ditches take water out of the streams and into the fields, sometimes drying up the natural channel in the process.

In wet regions, natural drainage patterns are altered by the construction of drainage ditches and underground drainpipes. Many stream channels have been straightened in an attempt to quickly remove stormwater and prevent flooding. This alteration results in "flashier" floods and lower base flows.

Logging and grazing: Logging and over-grazing removes trees and natural vegetation from the land. Without native vegetation, the health of headwater streams is compromised.

Not only do the stream and its fish and wildlife lose important food sources, but the stream suffers more frequent and damaging floods, erosion, and poor water quality.

Mining: Acid pollution and degraded channels are the legacy of too many badly designed mining operations, often in headwater areas.

Sprawl: Urban and suburban sprawl occurs often in headwater areas. The associated impervious surfaces and often-inadequate stormwater collection systems damage headwater ecosystems.

Pollution: Chemical wastes from industry, municipalities, mining operations, livestock and farming activities easily pollute small headwater streams, especially when base flows are lowered by dams or diversions, and when the riparian zone is denuded, reducing its effectiveness as a filter.

### **What can be done about it?**

Human activities need not be devastating to headwater ecosystems. Thoughtful land-use planning and development can protect and even restore headwater streams as sustainable ecosystems that serve as oases of life and diversity within the neighborhoods and valleys where we work and live. A healthy network of headwater streams is a fundamental component of river management.

Protect intact headwater ecosystems: Science supports protection of headwaters of wild and little-disturbed rivers in as natural a state as possible, including the riparian zone of both perennial and intermittent streams.

Restore headwaters: Where preservation or restoration of natural headwater conditions is impractical because of human activities, we must seek a balance between human use and ecosystem needs to support and maintain important headwater functions. We can:

- Operate dams in a way that is least harmful to the ecosystem
- Minimize activities like logging, grazing, and mining-or manage them in a way that prevents excessive damage to the landscape and natural flows
- Protect riparian zones along both perennial and intermittent streams
- Minimize and monitor pollution discharges
- Refine land-use codes and construction site plans in developed areas to reduce impervious cover, preserve green space, and protect water quality

Because of their small size, headwater streams provide an excellent opportunity for local, community-based planning and conservation initiatives. Unlike the larger rivers that require conservation management by a wide range of people and agencies, headwater streams provide the unique opportunity for a community -- or even a single landowner -- to make a significant difference.

River-friendly planning: Effective protection of headwaters, even in developed areas, is feasible. Land-use codes and construction site planning techniques in urban and suburban areas should be refined to reduce impervious cover through cluster development, improve stormwater treatment using vegetated streams and natural wetlands, and conserve stream buffer systems as protected green space.

Information taken from American Rivers: <http://www.americanrivers.org/>

---

### **For more information:**

River Keepers  
325 7th Street South  
Fargo, ND 58103  
(701) 235-2895  
[info@riverkeepers.org](mailto:info@riverkeepers.org)  
[www.riverkeepers.org](http://www.riverkeepers.org)

July 2005