Streams

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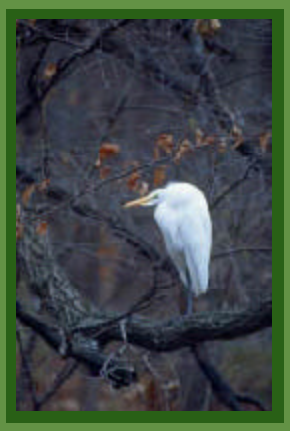
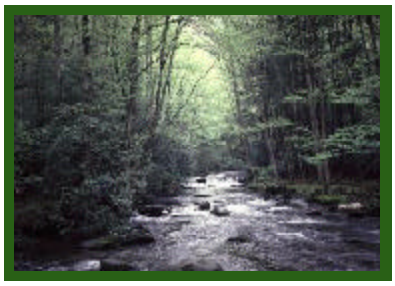


USFWS Photo

Of the 3.2 million miles of streams in the lower 48 states, only 2% remain free-flowing and relatively undeveloped. The other 98% have been fragmented by dams and water diversion projects. Only 42 "free-flowing rivers" (125 miles total) exist in the U.S.

Catherine Pringle,
University of Georgia

America's diverse landscape is supported by a mosaic of waterways linked together and fed by streams. Streams play a key role in maintaining water quality, wildlife habitat and biodiversity. Even the smallest streams and those with only seasonal flows play a critical role. Yet there has been an increasing effort in recent years to eliminate protection for these types of streams. Most recently, the Bush Administration issued a directive to federal regulators in January of 2003 that directed them not to extend Clean Water Act protections to so-called "isolated" waters. Some regulatory personnel have interpreted this to include the upper reaches of streams that do not flow year-round or sections upstream of areas where the stream flows underground. For streams that they consider "isolated," regulators are failing to enforce Clean Water Act protections against discharges of pollutants, dredging, filling, channelization, or oil spills.



USDA Photo

Streams are dynamic waters, with wide variations in size, source, function and natural cycles. Streams can flow year-round, fluctuate through the seasons or be completely dry except for a few months when precipitation levels are high. Each stream is a critical component of its watershed and the surrounding ecological community and provides numerous benefits for people and wildlife.

Benefits of Streams:

- Streams provide essential habitat for fish, reptiles and amphibians and play an important role in the life cycles of many insects, mammals and birds.
- Streams filter pollutants that have been washed off developed land, preventing the degradation of downstream rivers and lakes.
- Small streams help process leaf litter and other organic debris on the forest floor, breaking it down into fine particles that will eventually become an important food source for downstream ecosystems.
- Streams distribute nutrients, helping to establish the basic water chemistry for rivers and lakes downstream.
- Headwater streams are important in the retention of sediments. Loss of headwater streams allows excessive sediment to move downstream, reducing water quality, disturbing fish spawning and inhibiting the productivity of underwater plants.
- Headwater streams also slow runoff during times of heavy rain or snowmelt, minimizing downstream erosion and flooding, and allowing for groundwater recharge.
- Streams provide many high quality recreational opportunities for boaters, anglers and other outdoor enthusiasts.

"Smaller streams are much more endangered as they are often the easiest targets of human development." SCIENCE April 2001

"According to the EPA, about 60% of all river-miles or 2.15 million miles in the lower 48 states are intermittent streams…"

EPA Photo

Most Streams Don't Flow All of the Time....

Ephemeral Stream: An ephemeral stream has flowing water only during and for a short duration after precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Intermittent Streams: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Hydrology of Streams: How Streams Work

Hydrology is the scientific study of the properties, distribution, and effects of water on the earth's surface. Stream hydrology explains how streams connect and interact with other bodies of water, what role they play in maintaining water quality, and how they fit into the ecosystems around them. It tells us how nutrients are filtered, how sediments are transported and ultimately, how habitat for fish and other wildlife is created. Maintaining the natural hydrology of small streams is critical to maintaining healthy rivers and lakes downstream and to the upkeep of America's clean water supply.

Meandering...

As a natural stream flows from its source, it wends and twists through the landscape. It widens or narrows in places, becomes deeper or shallower and intersects a variety of habitats. Streams constantly reshape themselves and shift their channel within the floodplain. Channelization, bank armoring, culverting, and other alterations to streams for agricultural or development purposes prevent the stream from functioning in this way. Inevitably, this will lead to increased erosion and degradation of the aquatic system and destruction of its natural functions, including its habitats.

Natural Filters and Distributors

Small streams make up approximately 85% of the total drainage network and collect most of the water and dissolved nutrients from the surrounding land. Small streams, particularly headwater streams, are the transport medium for sediment in rivers, lakes, ponds and coastal waters. Sediments such as rock, sand, clay and silt are constantly being transported along waterways and redistributed. However, when streams and rivers are altered for human use, natural sediment distribution processes are overwhelmed and too much sediment is often allowed to flow through the system, clouding the water and changing water temperature and chemistry. This alteration can damage aquatic life, habitat, and downstream water supplies for humans.

Protection Against Flooding

Stream beds and their surrounding floodplains, when left in their natural state, are capable of absorbing large amounts of precipitation and quickly buffer rising waters. Straightening or deepening stream channels, removing natural obstructions, and building berms or levees often contribute to downstream floods that endanger human lives and property. Human alteration prevents streams from flowing naturally and maintaining themselves.

"Habitat changes almost constantly in most small streams"

Cal Photos Courtesy of John White

Wildlife and Streams

Streams have important biological functions as well. All organisms living in and around streams are dramatically affected by changes in natural channel characteristics, erosion patterns, and flow. While streams function most obviously as habitat for aquatic species such as fish, they are also critical as part of the life cycles of amphibians, insects, birds and mammals. Streams and their flood patterns function to support vegetation and aid in the dispersal of seeds. They are the lifeblood of many ecosystems. In arid environments they are especially crucial to the survival of the larger ecosystem.

Of the 1200 species listed as threatened or endangered in the U.S., 50% depend on rivers and streams.

-The National Park Service

Fish

The most obvious biological function of streams is as habitat for fish. Small streams are the breeding grounds, nurseries and safe havens for countless fish species.

FWS Photo

Many sport fish species, most notably salmon, trout, and bass, rely on the smallest reaches of streams during part of their lifecycles. Headwater streams, which are often dry in hotter months of the year, host young salmon and trout species in the early spring when water is more abundant. These streams provide fish with adequate food sources while they grow, reduce competition with other fish species and shelter them from predators and swift currents of larger rivers. When the fish are large enough and the dry season approaches, they follow the receding waters back to the river only to return to the headwaters again when the heavy rains arrive the following year.

When streams are altered, excess silt can clog fish gills, water temperature can affect breeding, and fluctuating nutrient levels can destroy food sources.

Streams and Wildlife

A rich variety of wildlife utilize streams and the rivers into which they feed for travel, protection from predators and food. Stream banks are ideal travel corridors for larger mammals such as deer, moose and bears and provide a varied foraging area for smaller mammals like raccoons, squirrels and rabbits. Many of America's beloved songbirds rely on small streams for habitat. The low, thick vegetation is ideal for small birds to nest and provides them with plenty of food.

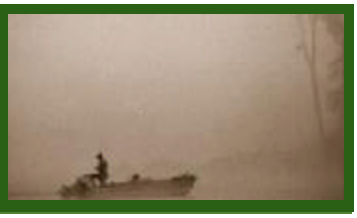
NPS Photo

In drier parts of the nation, riparian zones along the dry washes and underground streams are havens for migrating birds amid the desert landscape.

Reptiles and amphibians rely heavily on intermittent and ephemeral streams for breeding and growth, utilizing the shallow water and calm flow for shelter and protection from predators. In addition, the bulk of benthic macroinvertebrates, a critical food source for most fish, come from intermittent streams and

"If it were a "corporation," sportfishing would rank 13th in the Fortune 500 list of America's largest businesses in terms of revenue, placing fishing just above Texaco and DuPont."

Florida Fish and Wildlife Conservation Commission



Hunting, Angling and Recreation

Fishing is an important industry in the United States with nearly 34.1 million participants contributing $36 billion in revenue. Wildlife-related recreation contributed more than $108 billion to the U.S. economy in 2001.

Hunting, angling and wildlife viewing continue to become increasingly popular activities. America's angling population increased by 130 percent between 1955 and 2001, while comparably the entire U.S. population grew by 71 percent.

Recreational Fishing Facts

- **34.1 million people participated in angling activity in the U.S. in 2001.**
- **There are 16.8 million boats on U.S. waterways.**
- **Recreational fishing contributes $36 billion to the U.S. economy.**
- **Recreational fishing supports 1.2 million jobs in the United States.**
- **Recreational fishing creates salaries and wages totaling about $28 billion, which is roughly equivalent to almost half of United States entire military payroll.**

The economic value of fishing, and connected industries such as boating and tourism, is immense. It needs to be recognized that clean waterways are a critical factor in making this sector of the economy possible. Intact and undisturbed streams are a crucial starting point to maintaining healthy rivers, lakes and coastal waters as well as a healthy fish population.

Photo Courtesy of Mary Brabham of SJRWMD

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Boating and Other Recreation

In addition, recreational boating is growing in popularity. Canoeing, kayaking, rowing and other water sports depend solely on the health of streams and rivers. Approximately 14 million people participated in canoeing and kayaking activities in 1992, with expectations of future growth. In 1996, canoe and kayak sales totaled nearly $100 million. As the enthusiasm grows for outdoor recreation in the U.S., so too will the demand for cleaner streams, rivers and open spaces.

Over 66 million Americans participate in wildlife viewing activities such as bird watching and photography, contributing $38 billion to the U.S. economy. Healthy wildlife habitat is essential to maintaining such activities.

If streams are left unprotected:

- **Fish and other aquatic life will suffer from degraded water quality, loss of habitat, and pollution that will threaten their survival.**
- **Mammals, birds, amphibians and reptiles will lose important habitat.**
- **America's larger water bodies will lose their filtration systems and become polluted, making water unsafe for drinking.**
- **Streams will be unsafe for outdoor recreation.**
- **Groundwater recharge and discharge into larger rivers and lakes will be reduced.**
- **Flooding and erosion in larger rivers and lakes will escalate, leading to increased costs for flood damages and dredging.**