

## Stream and Wetlands Restoration

By John Cobourn, Water Resource Specialist, and  
Heather Segale, Environmental Education Coordinator  
University of Nevada Cooperative Extension

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Streams and wetlands have been restored in various parts of the Tahoe Basin for years. To get a good sense of how stream restoration works and what it does for the lake, it is helpful to examine three model projects in South Lake Tahoe. These are the stream and wetland restoration projects on Cold Creek, Trout Creek and the upper Truckee River just east of the Tahoe Keys marina.

For thousands of years since the last ice age, these three streams have drained the magnificent peaks and high forests of the south shore. Especially during floods, they have carried millions of tons of sediment from the high country to the lowlands of present-day South Lake Tahoe and deposited the sand and clay-sized particles there, forming flat wet meadows along their margins. These meadows are hydrologically connected to the stream, since the water table is very shallow, and stream water can flow both into and out of the meadows.

During high springtime water flows, about every year or two, these ancient streams would spill over their banks and flood their floodplain. Prior to urban development, the floodplains in these lowlands were generally wet most of the year, so wetland plants such as sedges, rushes, and willows covered the ground with thick vegetation. Since floodwater generally carries a great deal of sediment, the overbank flooding into the marshy wetlands caused the muddy water to slow down and deposit this sediment on the floodplain before it could reach Lake Tahoe. In addition, the wetland

plants absorbed the plant nutrients in the water before they could pollute the lake. In these ways, wetlands acted as a natural water filtration system for the lake, helping to keep out sediments and nutrients, the two most damaging contaminants to the lake.

When scientists realized that urbanization during the 60s and 70s had altered these natural watershed processes enough to cause a steady decline in Tahoe's water quality, one of the first culprits to be identified was the loss of about 75 percent of Tahoe's marshes and 50 percent of its meadows to urbanization, including new roads and structures. By the late 80s, the Tahoe Regional Planning Agency (TRPA) had formally protected all stream channels, wetlands, and wet meadows in the basin, designating them as Stream Environment Zones (SEZ). Protecting and restoring SEZ remains a top priority of Tahoe's comprehensive restoration plan, the Lake Tahoe Environmental Improvement Program (EIP).

During the growth of South Lake Tahoe and surrounding Eldorado County, much of the upper Truckee watershed was subdivided, the airport was built in its floodplain, and major developments, resorts and roads were built in the Cold Creek and Trout Creek watersheds. At the mouth of these watersheds, 500 acres of the huge Truckee marsh, the largest wetland in the Sierra, was filled and urbanized to form the Tahoe Keys. The river was put into a straight, deep channel, effectively cutting it off from its floodplain.

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# The Lake Tahoe Report

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Similar alterations to the lower Cold Creek and Trout Creek likewise reduced the filtering capacity of the wetlands near their confluence. Thirty years ago, the developers of the Meadow Lake subdivision relocated Cold Creek to a man-made channel with a dike, which effectively cut off the creek from its floodplain. On both Cold Creek and Trout Creek, the channels cut deeper into the ground by a response to disturbance called “incision.” Once that happened, the meadows were literally left high and dry, and many of the wetland plants died and were replaced by upland species.

In Cold Creek and Trout Creek, scientists such as the California Tahoe Conservancy’s (CTC) Steve Goldman have recently designed and built new, more natural channels that are shallow and meander through the wetlands. The filtering function of these floodplains has been restored to a great degree. These projects were funded by the California Tahoe Conservancy, the City of South Lake Tahoe, the TRPA, the Tahoe Keys Mitigation Fund, the Bureau of Reclamation, and other state and federal agencies. At the mouth of the upper Truckee River, the CTC has designed a state of the art EIP project to restore the functionality of the remains of the marsh and wetland system there. This project will also enhance critically important wildlife habitat in the marsh and improve public access to Lake Tahoe at Cove East.

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