



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Idaho

## Restoring Streams Decreases Sediment Levels and Improves Fish Habitat in Middle Tepee Creek

### Waterbody Improved

Excessive sedimentation from eroding forest roads impacted cold-water aquatic life in Idaho's Middle Tepee Creek. As a result, the waterbody assessment unit was added to the state's 1994 Clean Water Act (CWA) section 303(d) list of impaired waters for sediment. Since the 1990s, watershed stakeholders, led by the U.S. Forest Service–Idaho Panhandle National Forests (USFS), have removed or repaired failing roads and restored stream habitat. In this section of stream and upstream in the watershed, these activities reduced sediment levels, improved aquatic habitat, and enhanced an important cutthroat trout fishery. As a result, the Idaho Department of Environmental Quality (DEQ) has proposed to remove the Middle Tepee Creek assessment unit from the state's list of impaired waters in 2012 for sediment.

### Problem

The Middle Tepee Creek watershed is in the headwaters of the North Fork Coeur d'Alene River Subbasin in the northern Rocky Mountains of Idaho. Most of the watershed is managed by the Idaho Panhandle National Forests, but some of the land is privately owned. The Middle Tepee Creek assessment unit (ID17010301PN020\_03) includes the main stem of Tepee Creek between Short Creek and Trail Creek (Figure 1). The stream's headwaters and tributaries are designated as a separate assessment unit (Upper Tepee Creek, ID17010301PN020\_02).

Intensive timber harvesting and associated road-building occurred in the watershed from the 1930s to the 1990s. Culvert failures and eroding roads (particularly at stream crossings and in riparian areas) contributed large amounts of sediment to streams. In the early 1990s, riffle stability studies and other habitat data were used to determine that cold-water aquatic life was impaired due to sediment; as a result, the Middle Tepee Creek assessment unit (a total of 4.6 miles) was added to the 1994 CWA section 303(d) list. The suspected source of excess sediment was erosion from forest roads.

In 1996 DEQ conducted biological monitoring under the Beneficial Use Reconnaissance Program (BURP) at two sites in Tepee Creek. BURP results showed that both sites did not qualify as fully supporting the cold-water aquatic life beneficial use, confirming that the creek should remain listed as impaired by sediment. A 2001 subbasin assessment further

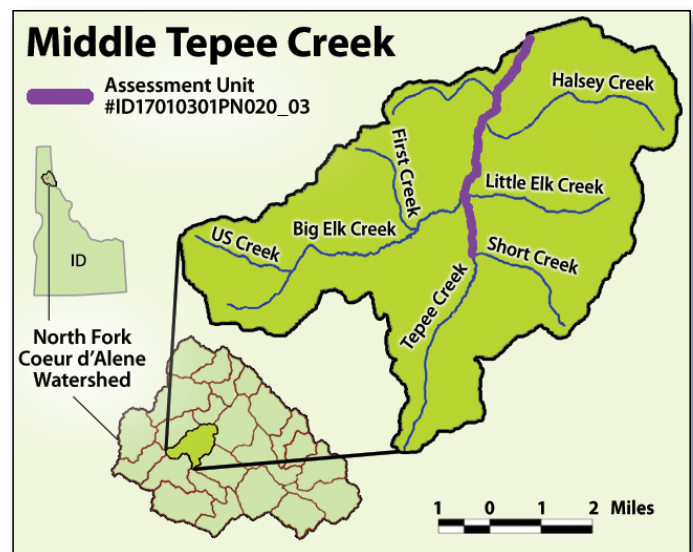


Figure 1. Idaho's Middle Tepee Creek assessment unit includes the mainstem of Tepee Creek.

confirmed the sediment impairment based on available biological data and riffle armor stability index values.

In 2001, DEQ completed sediment total maximum daily loads (TMDLs) for the North Fork Coeur d'Alene River Subbasin, which included the Middle Tepee Creek assessment unit. The TMDL established a sediment reduction target of 1.5 times the natural background annual sediment load to support cold-water aquatic life.



Figure 2. The Tepee Creek Meadows Restoration Project included reconstruction of stream meanders (blue) where the stream had been channelized (orange).



Figure 3. Middle Tepee Creek after reconstruction of meanders and revegetation, 2008.

## Project Highlights

Beginning in the mid-1990s, the USFS restored 86 eroding stream crossings and removed 47 miles of eroding forest roads that were impacting the head-water tributaries of Tepee Creek. In the fall of 2000, USFS initiated the Tepee Creek Meadows Restoration Project, a major stream restoration effort along the mainstem of Tepee Creek. The project restored fish habitat and riparian function along a 7,200-foot degraded section of the creek and adjacent meadow complex. Past land management efforts on this portion of Tepee Creek had stripped the vegetation from the floodplain and channelized the stream. The restoration project re-established a natural stream channel and incorporated materials such as boulders, trees and rootwads to stabilize streambanks and improve fish habitat. Eighteen constructed meanders improved fish habitat by increasing pool frequency, depth and volume (Figures 2 and 3).

## Results

In 2008 DEQ worked with the North Fork Coeur d'Alene River Watershed Advisory Group (WAG) and the USFS to review the subbasin's sediment TMDLs. Because stakeholders had performed extensive restoration and TMDL implementation work in Upper Tepee Creek, project partners identified the need for post-project monitoring to assess water quality improvement. DEQ and USFS used modeling and geographic information system analyses to estimate the sediment load reductions achieved since the TMDLs were established. The

model suggested that restoration projects reduced the estimated annual sediment load by 22 percent in the Tepee Creek watershed.

To validate the modeled results, USFS and DEQ conducted biological monitoring on Tepee Creek in 2009. Crews used DEQ's BURP protocols and USFS' PACFISH/INFISH Biological Opinion (PIBO) Effectiveness Monitoring Program protocols to collect information about the biological, chemical and physical condition of the streams. BURP data collected in Tepee Creek just upstream of Big Elk Creek in 2009 showed an average score of 2.7, which meets the minimum average score of 2.0 required to support cold-water aquatic life according to DEQ's *Water Body Assessment Guidance*.

Macroinvertebrate sampling in Tepee Creek showed good diversity and included species associated with cold, clear mountain streams. Fish surveys detected westslope cutthroat trout and sculpin, both native species associated with good water quality. Fish population monitoring conducted by the Idaho Department of Fish and Game in Tepee Creek has shown an increase in cutthroat trout densities in the past 10 years—from almost no fish in 2001 to more than 1.5 fish per 100 square meters in 2011.

Modeling and post-restoration data indicate that the mainstem of Middle Tepee Creek fully supports cold-water aquatic life with respect to sediment. As a result, DEQ has proposed to remove the Middle Tepee Creek assessment unit (4.6 miles) from the state's list of impaired waters in 2012 for sediment. The assessment unit will remain listed for temperature impairment, although the riparian planting projects of the past decade should help to increase shade in the future.

## Partners and Funding

Partners in the TMDL five-year review included the USFS Idaho Panhandle National Forests Coeur d'Alene River Ranger District, the USFS PIBO Effectiveness Monitoring Program, DEQ's Coeur d'Alene Regional Office, the U.S. Environmental Protection Agency and the North Fork Coeur d'Alene River WAG. USFS spent approximately \$350,000 in funding collected from timber sale receipts on restoration projects in the Middle Tepee Creek watershed. The Idaho Department of Transportation contributed \$30,000 in wetland mitigation dollars to support the Tepee Creek Meadows Restoration Project. The North Idaho Fly Casters provided thousands of hours of volunteer service for the Tepee Creek Meadows project.

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U.S. Environmental Protection Agency  
Office of Water  
Washington, DC

EPA 841-F-12-001DD  
August 2012

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