

# Moving from Impairment to Delisting

## Committed Landowner Implements and Advocates Improved Grazing Practices in Nutrioso Creek, Reducing Turbidity Levels to Attain Water Quality Standards

Since the late 1800s, the Nutrioso Valley experienced heavy grazing that contributed to excessive erosion and elevated turbidity levels. The excessive turbidity resulted in unsuitable stream habitat for Nutrioso Creek’s aquatic communities. As a result, the Arizona Department of Environmental Quality (DEQ) placed a seven mile stretch of Nutrioso Creek on the state’s section 303(d) list of impaired waterbodies and developed a turbidity TMDL approved in 2000. Although historic grazing practices were the

primary cause of impairment in Nutrioso Creek—it was progressive grazing practices implemented by a committed local landowner that led to the restoration of Nutrioso Creek. TMDL effectiveness monitoring data collected from 2004 to 2006 indicated that Nutrioso Creek met the TMDL load allocation and attained water quality standards. In 2009, Nutrioso Creek was the first waterbody removed from the Arizona’s section 303(d) list of impaired waters due to implementation activities.

### TMDL at a Glance: Nutrioso Creek TMDLs— Turbidity

(approved September 2000)

[www.azdeq.gov/environ/water/assessment/download/nutrioso.pdf](http://www.azdeq.gov/environ/water/assessment/download/nutrioso.pdf)

- Factors causing impairment:**  
Elevated turbidity levels for aquatic and wildlife cold water streams
- Sources contributing to impairment:**  
Stream bank and channel erosion induced by livestock grazing practices, livestock and wildlife access to streams, and riparian vegetation loss
- Restoration options:**  
Improve range management practices, exclude livestock and wildlife from streams, re-vegetation of riparian areas, conservation easements, and adopting livestock, nutrient, irrigation, and pest management strategies
- Stakeholder involvement:**  
EC Bar Ranch owner, local watershed residents, Little Colorado River Watershed Partnership, Nutrioso Creek Watershed Partnership, state and federal agencies
- Status of waterbody:**  
Full attainment of water quality standards; removed from 303(d) list in 2009

- Benefits to stakeholders:**  
Water quality, wildlife habitat, education, funding, partnerships

### How are TMDLs at work in Nutrioso Creek?

The ADEQ developed the turbidity TMDL for Nutrioso Creek to protect aquatic wildlife, including the federally endangered Little Colorado spinedace, from excessive sedimentation. Through the TMDL analysis, stakeholders were provided with an understanding of the significant sources and critical flow conditions contributing to the turbidity impairment in Nutrioso Creek. In addition, the TMDL analysis provided a link between turbidity and total suspended solids, providing stakeholders with an understandable and measurable end point for assessing progress toward achieving the turbidity water quality standard. The final TMDL report also provides a description of the effectiveness monitoring planned to determine progress of TMDL implementation, along with a phased TMDL implementation timeline, description of goals, and implementation milestones.

The final TMDL report discusses strategies that could help to reduce sediment loads along the 7 mile impaired stretch of the creek—4 miles flowing through the Apache-Sitgreaves National Forest administered by the U.S. Forest Service (USFS) and 3 miles flowing through the privately-owned lands. The USFS implemented several BMPs to address the sources of sediment from the Apache-Sitgreaves National Forest affecting turbidity levels in Nutrioso Creek. These BMPs included reductions in timber cutting, road closures, and cattle grazing allotment revisions.

### What is a total maximum daily load (TMDL)?

It is a study or analysis that calculates the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. The TMDL establishes a pollutant budget and then allocates portions of the overall budget to the pollutant’s sources. For more information on TMDLs, visit EPA’s website at [www.epa.gov/owow/tmdl](http://www.epa.gov/owow/tmdl).

According to the final TMDL report, the 3-mile stretch of Nutrioso Creek through private lands had the highest turbidity levels based on data collected during the TMDL sampling activities. These privately-owned lands were characterized by historic overgrazing and poor range management practices. TMDL implementation efforts were led by Jim Crosswhite, the owner of the EC Bar Ranch and one of the three landowners in this stretch of Nutrioso Creek. Crosswhite changed his range management practices and used state and federal funding to implement several BMPs suggested in the final TMDL report. BMPs implemented by Crosswhite include fencing out elk from the riparian corridor on his property and limiting cattle grazing to the dormant winter months; revegetating the riparian corridor with willow plantings and grass seeds; and adopting the conservation plan developed by the Natural Resources Conservation Service (NRCS) for Nutrioso Creek. Crosswhite's implementation activities cost approximately \$2 million, with funding from ADEQ, NRCS, wildlife agencies and other key partners. Crosswhite also provided personal resources to fund these implementation efforts by matching 60 percent of the public funding.

## How did local stakeholders benefit from the TMDL process?

The most significant benefit of the TMDL process has been the attainment of the turbidity water quality standard and the removal of Nutrioso Creek from the Arizona section 303(d) list of impaired waters. While attaining water quality standards is the primary goal of the TMDL process, stakeholders benefitted from the efforts in Nutrioso Creek. Benefits from TMDL implementation included the following:

- **Increased wildlife populations and improved wildlife habitat.** Water quality improvements led to significant increases in Little Colorado spinedace populations upstream of the previously impaired Nutrioso Creek segment. Improved riparian vegetation and habitat is anticipated to benefit the Southwest Willow Flycatcher, a federally endangered bird species of Arizona.
- **Increased public education and awareness.** Through Crosswhite's outreach efforts, other local and regional ranch owners have an increased understanding about the benefits of conservation practices to Nutrioso Creek and other waterbodies.

## ■ Stakeholders Say...

*"If other landowners in Nutrioso and elsewhere in Arizona cooperate with governmental agencies to meet public policy goals, they can improve their property and enhance natural resources just like I have. Clearly, conservation pays off."*

—Jim Crosswhite,  
Nutrioso resident, owner of EC Bar Ranch  
(September 2006 press release, E.C. Bar Ranch)

- **Effective local partnerships and leveraged financial resources.** Crosswhite's initiative, coupled with the involvement of the Nutrioso Creek Watershed Partnership, established an effective local partnership with other key partners at the state and federal level. Through these partnerships, Nutrioso Creek benefitted from a \$2 million restoration effort that leveraged private and public financial resources.