

# TMDLs and Water Quality Trading

## A Watershed Approach to Improving Water Quality on the Truckee River

As water quality planning takes on a holistic perspective, looking at all activities within a watershed, TMDLs have become a valuable tool in translating water quality standards to a combination of point and nonpoint source controls needed to achieve in-stream goals.

The goal of the TMDL program is to identify impaired water bodies and allocate pollution control responsibilities amongst pollution sources in a watershed. The TMDL program encourages the use of a watershed approach to systematically identify, evaluate, and prioritize point and nonpoint sources of pollution for additional controls.

As part of the TMDL program, the EPA is in the process of finalizing its water quality trading program. This includes the trading of nonpoint and point source pollutant loads. This approach realizes that it may be more cost-effective to control nonpoint sources than to impose additional point-source controls. Therefore, there is the opportunity for point-source dischargers to save money through funding nonpoint source reduction activities while improving water quality at the same time.

Carollo Engineers is currently developing a watershed program for the Truckee River Basin, including the cities of Reno, Sparks, and Washoe County, Nevada. This work includes developing models to provide the technical basis for recommendations for water quality trading for nutrients and total dissolved solids (TDS) on the Truckee River.

The State of Nevada's Division of Environmental Protection (NDEP) initially established TMDLs for nitrogen, phosphorus, and TDS for the Nevada side of the Truckee River in 1994. The major point-source discharger to the Truckee River, the Truckee Meadows Water Reclamation Facility (TMWRf), as a result has waste load allocations (WLAs) for total nitrogen, total phosphorus, and TDS in their NPDES discharge permit. Therefore, the Agencies have implemented a multi-year program to develop the tools (i.e., models) needed to provide the technical basis to revise the TMDL. The program involves the implementation of structural and non-structural alternatives, incorporation of a seasonal discharge and development of a phased permitting approach for water quality trading.

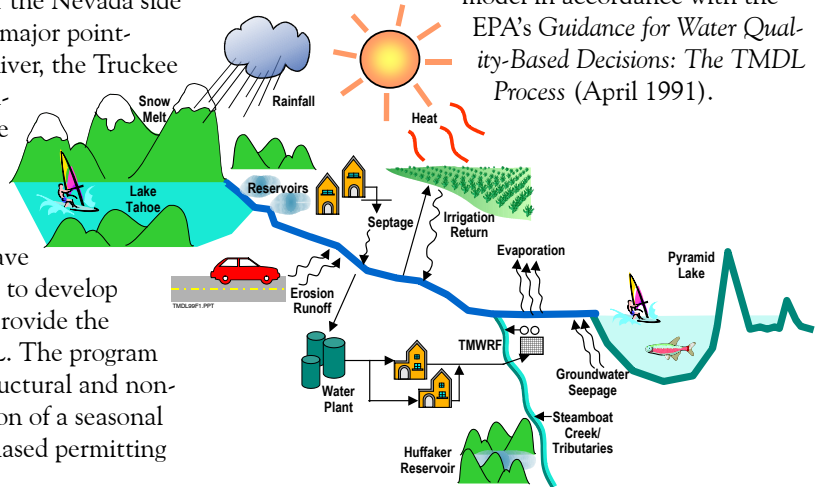


Carollo is assisting with NPDES permitting planning and design for the expansion of the Truckee Meadows Water Reclamation Facility.

The most challenging aspect of the project is to develop revised TMDLs, a water quality trading framework and agreement and associated permit language. This will require the successful development of a system of watershed and water quality models to provide the scientific and engineering basis for increased nutrient assimilative capacity in the river.

### Water Quality/ Watershed Modeling Tools

Many natural and man-made pollutant sources must be assessed through the development of a watershed model, verifying and improving an existing water quality model, and implementing a Regional Coordinated Monitoring Program to obtain the required data. The Carollo team (including subconsultants Systech and Aqua Terra) developed a watershed model in accordance with the EPA's *Guidance for Water Quality-Based Decisions: The TMDL Process* (April 1991).



The Truckee River watershed model must assess the impacts of natural and man-made activities on water quality.

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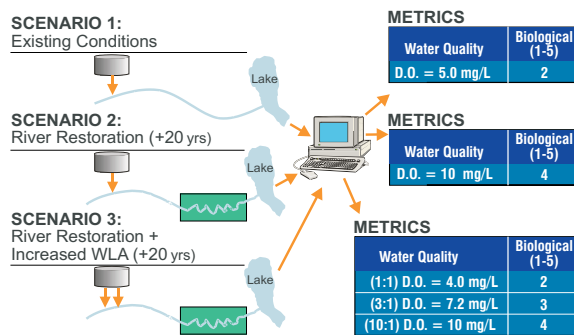


The Carollo team verified and calibrated the DS-SAMt water quality model, as well as led a peer review of the model by an independent modeling consultant. In addition, the Carollo team (including Limnotech and RCR) integrated the DSSAMt algal algorithms into HSPF. The water quality models are being used to evaluate various management alternatives, including non-structural programs and a seasonal discharge, and the associated water quality impacts to the Truckee River.

The Watershed Analysis Risk Management Framework (WARMF) model provides an estimate of the nonpoint source loading contributions from the watershed. The WARMF model is based on the EPA's watershed approach and provides a decision support system for the region's stakeholders with which to make management decisions regarding pollutant reduction measures. The WARMF model, using a daily time step, is driven by meteorology and land-use data, and integrates land, rivers, and reservoirs. It utilizes a "user-friendly" graphical user interface, and integrates four separate but related models.

Carollo identified a number of potential nonstructural alternatives for implementation on the Truckee River with the potential to improve water quality. Alternatives include river and riparian restoration, storm water management practices, water augmentation, septic tank conversion, water reuse and others. Based on a review of the potential alternatives, a list of potential project scenarios including structural and nonstructural alternatives, was developed for modeling evaluation.

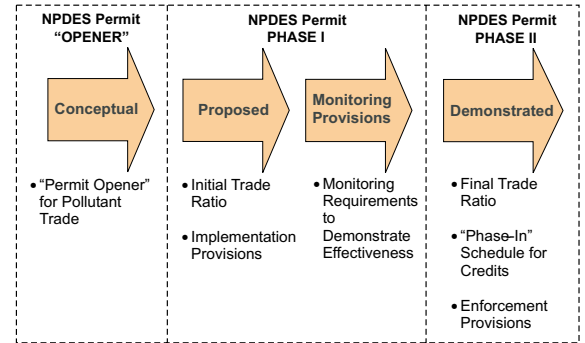
Based on the modeling results, stakeholders will identify potential nonpoint source trades, which will be integral to the success of the TMDL and water



*Our modeling will support the analysis of the trade-offs between non-structural alternatives.*

quality trading program. The watershed model serves as a screening/management tool to manage existing and future point and nonpoint sources of loading, and to better understand the consequences/impacts of various water quality control activities.

In order to implement a water quality trading program, a phased permitting approach has been developed. This three step process includes: inclusion of a permit reopener clause for trades as a minor permit modification; development of proposed trades and a associated provisions and monitoring requirements; and development of the final trade ratio and phase in schedule for credits.



*A phased permit approach is being implemented to incorporate water quality trading on the Truckee River watershed.*

### The Trade-Offs

Through the use of WARMF, DSSAMt and HSPF modeling tools, the Carollo team is assessing various point and nonpoint sources of pollution from Lake Tahoe to Pyramid Lake. By identifying the sources, planners are able to target nonpoint source pollution control measures, prioritize areas by levels of impact, develop land-use policies consistent with the assimilative capacity of the river, and provide a basis for local governments to support developmental policy changes. Through the reduction of nonpoint sources, the region plans to apply the pollutant credits to help TMWRF comply with water quality-based effluent limits established for the Truckee River.

### Monitoring

The Carollo team is also managing a Coordinated Monitoring Program (CMP) to support the watershed/water quality modeling work, assist in developing a revised TMDL, assess compliance with the water quality objectives, and improve data quality. Developing the CMP involves identifying the past and current monitoring activities in the region and evaluating the water quality model, watershed model, NPDES permit, and other agency needs.