

DEVELOPMENT AND MODEL VALIDATION OF THE NON-TIDAL PASSAIC
RIVER BASIN WATER QUALITY TRADING PROGRAM FOR TOTAL
PHOSPHORUS

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A Total Maximum Daily Load (TMDL) for phosphorus has been developed for the non-tidal Passaic River Basin. The TMDL proposed specific watershed criteria in terms of a seasonal average concentration of the response indicator, chlorophyll-*a*. These criteria required each regulated discharger to achieve a long term average effluent concentration of 0.4 mg/l of total phosphorus. Some of the dischargers in the watershed can easily upgrade to achieve this long-term average effluent concentration while others are expected to require difficult, very costly upgrades. Some of the dischargers can achieve even higher level of phosphorus removal, beyond the required 0.4 mg/l. This wide range of discharger characteristics renders the non-tidal Passaic River Watershed ideal for the implementation of a water quality trading program.

The TMDL model was used to develop trading ratios that would be protective of the two critical locations: the Wanaque Reservoir and Dundee Lake. These trading ratios were used to develop a point-to-point source trading program for the non-tidal Passaic River Basin. Extensive simulations of a variety of trading scenarios were conducted to validate the proposed trading program. In-stream water quality model simulations have verified that the recommended trading ratios will protect water quality at the TMDL critical locations under critical trading conditions (dischargers emitting less than anticipated flow), heavy cross-tributary trading, and critical diversion conditions. Similar trends were predicted to occur at other areas of concern upstream of the TMDL critical locations.

Project website: <http://water.rutgers.edu/Projects/trading/Passaic.htm>