Development and Water Quality Model Validation of a Phosphorus Trading Program for the Non-Tidal Passaic River Basin

Executive Summary

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 (June 15-September 1) 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 endpoints under critical trading conditions (dischargers emitting less than anticipated flow), heavy cross-tributary trading, critical diversion conditions, and scenarios where buyers were concentrated upstream. Similar trends were predicted to occur at other areas of concern upstream of the TMDL endpoints.

Critical items within the report are a) the proposed formula for trading in Section V, b) allocations for trading listed in Table 5-4, c) recommended trading ratios listed in Table 5-7, and d) example trades illustrated in Appendix 2.