

conservation measures, and groundwater discharge at on-site and/or off-site locations are infeasible.

Subsequent to these meetings, in order to evaluate whether an increased discharge from treatment plant could meet water quality standards, EPA conducted an analysis of the permitted sanitary wastewater discharge volumes in the Sudbury-Assabet-Concord (SuAsCo) watershed. Current permits for nine facilities allow 27.4 MGD (42.4 cfs) of sanitary wastewater to be discharged into this watershed. The 7Q10 flow near the mouth of the SuAsCo watershed, at the confluence of the Concord River and Merrimack River, is 22.4 MGD (34.7 cfs). Therefore, based on the permitted allowance of sanitary wastewater discharges (27.4 MGD), during low flow and 7Q10 conditions, the system is dominated by effluent.

Recent water quality data from the reach of the Sudbury River in the vicinity of Wayland indicate that dissolved oxygen levels range from 2.2 mg/l - 11.09 mg/l (supersaturated dissolved oxygen levels were as high as 145% of saturation) and total phosphorus levels ranging from <0.01 mg/l - 0.09 mg/l. Chlorophyll *a* levels were not measured, but duck weed was reportedly abundant in this stretch of the river this summer and /fall. Therefore, given the over-allocation of nutrients of this watershed, and the existing eutrophic conditions, a flow increase at the Wayland WWTF would not be permitted, unless approved after a rigorous antidegradation review. In fact, as will be seen later in the fact sheet, EPA and MassDEP have determined that even at the current flow limit, more stringent limits for total phosphorus are necessary to achieve water quality standards.

5. Effluent Limits Derivation

Dilution Factor

As discussed above, the permit contains two sets of effluent limitations, one for the existing discharge to the wetland and one for a discharge to the Sudbury River. Water quality-based effluent limits are based on a dilution factor calculated using the permitted flow of the treatment facility and the 7Q10 of the receiving water. The 7Q10 is the lowest observed mean river flow for 7 consecutive days recorded over a 10-year recurrence interval. For rivers and streams, Title 314 CMR 4.03(3)(a) requires that 7Q10 be used to represent the critical hydrologic condition at which water quality criteria must be met. The permitted flow is 52,000 gallons per day [0.052 million gallons per day (MGD)]. The annual average daily flow rate was 10,513 gallons per day (gpd) during 2002-2003 (Town of Wayland 2003).

For the discharge to the wetland, a dilution factor of one was used, given that the 7Q10 of a wetland is zero.

For the discharge to the Sudbury River, a 7Q10 flow of 4.01 million gallons per day (MGD) or 6.2 cfs was estimated for the Sudbury River using the USEPA DFLOW 3 program and data recorded from the Saxonville gage (Socolow *et al.* 2002 in O'Brien-Clayton *et al.* 2005). This 7Q10 and the permitted flow limit of 0.052 MGD is used to calculate the dilution factor, as follows:

$$\frac{\text{River flow (7Q10)} + \text{Plant Design Flow}}{\text{Plant Design Flow}} = \text{Dilution Factor}$$

$$\frac{4.01 \text{ MGD} + 0.052 \text{ MGD}}{0.052 \text{ MGD}} = 78.1$$