

Appendix H

Method for Converting Model Facility Pollutant Loads into Effluent Concentrations

H.1 GENERAL EQUATION

Pollutant loads, in units of pounds per year (lb/yr), are calculated by EPA's engineering models (see USEPA, 2002, Chapter 10). These may in turn be converted into effluent concentrations by dividing the annual mass load by the annual flow volume from a particular model facility. Facility flow rates in units of gallons per minute (gal/min) are also available from EPA's engineering analysis (see USEPA, 2002, Chapter 10). That is,

$$[\text{Pollutant } X](\text{mg} / \text{L}) = \frac{\text{Load}_X(\text{lb} / \text{yr}) \times 453,000 \text{mg} / \text{lb}}{\text{Flow}(\text{gal} / \text{min}) \times 3.785 \text{L} / \text{gal} \times 525,600 \text{min} / \text{yr}}$$

where $[\text{Pollutant } X]$ = the concentration of the pollutant of concern (mg/L)

Load_X = the annual mass load of Pollutant X (lb/yr)

Flow = the flow rate of the model facility under consideration (gal/min)

H.2 EXAMPLE CALCULATIONS

The calculation, using the above equation, for the "raw" (i.e., in the absence of treatment) effluent scenario for medium trout stocker flow-through systems is provided as an example below. The BOD₅ load of 108,228 lb/yr for this model facility was calculated by EPA as described in the CAAP Development Document. The effluent flow rate of 2,208.7 gal/min was also determined as described in the CAAP Development Document.

$$[\text{BOD}_5] = \frac{108,228 \text{ lb / yr BOD}_5 * 453,600 \text{ mg / lb}}{2,208.7 \text{ gal / min} * 3.785 \text{ L / gal} * 525,600 \text{ min / yr}}$$

[BOD₅] = 11.172 mg/L for “raw” effluent from a medium trout stocker flow-through system

A second example for the Option 1/Option 2 load for “large” striped bass recirculating systems is provided as an example below.

$$[\text{BOD}_5] = \frac{590,400 \text{ lb / yr BOD} * 453,600 \text{ mg / lb}}{123,000 \text{ gal / day} * 3.785 \text{ L / g} * 365 \text{ day / yr}}$$

[BOD₅] = 1,575.3 mg/L for large striped bass recirculating systems under Option 1/Option 2

H.3 REFERENCE

USEPA (U.S. Environmental Protection Agency). 2002. *Development Document for Proposed Effluent Limitations Guidelines and Standards for the Concentrated Aquatic Animal Production Industry Point Source Category*. U.S. Environmental Protection Agency. EPA-821-R-02-016.