RIDEM’s Use of Performance-Based Limits for Nutrients in RIPDES Permits

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Why Limit Nutrients?
(Aesthetic/Habitat Impacts)
Why Limit Nutrients?
(DO Impacts)

Woonasquatucket River Dissolved Oxygen
Samples Collected between 9:30 am and 1:00 pm
August 5, 1998

Distance From the Confluence With the Providence River (km)

Dissolved Oxygen (mg/l)
Freshwater Nutrient WQ Criteria
(Numeric/Narrative)

• **Average Total Phosphorus shall not exceed 0.025 mg/l in any lake, pond, kettlehole or reservoir**, and average Total P in tributaries at the point where they enter such bodies of water shall not cause exceedance of this phosphorus criteria, except as naturally occurs, unless the Director determines, on a site-specific basis, that a different value for phosphorus is necessary to prevent cultural eutrophication.

• **None in such concentration that would impair any usages specifically assigned to said Class**, or cause undesirable or nuisance aquatic species associated with cultural eutrophication, nor cause exceedance of the criterion above in a downstream lake, pond, or reservoir. New discharges of wastes containing phosphates will not be permitted into or immediately upstream of lakes or ponds. **Phosphates shall be removed from existing discharges to the extent that such removal is or may become technically and reasonably feasible.**

• Shall not exceed the following limitations and/or more stringent site-specific limits necessary to prevent or minimize accelerated or cultural eutrophication.
Saltwater Nutrient WQ Criteria
(Numeric/Narrative)

• None in such concentration that would impair any usages specifically assigned to said Class, or cause undesirable or nuisance aquatic species associated with cultural eutrophication. Shall not exceed site-specific limits if deemed necessary by the Director to prevent or minimize accelerated or cultural eutrophication. **Total phosphorus, nitrates and ammonia may be assigned site-specific permit limits based on reasonable Best Available Technologies.** Where waters have low tidal flushing rates, applicable treatment to prevent or minimize accelerated or cultural eutrophication may be required for regulated nonpoint source activities.

• Shall not exceed the following limitations and/or more stringent site-specific limits necessary to prevent or minimize accelerated or cultural eutrophication.
But What’s a “lake, pond, kettlehole or reservoir”

- Riverine impoundments with retention times greater than 14 days.
- RI used 7Q10 flow to calculate retention time
- If greater than 14 days, calculate limits to be protective of the 0.025 mg/L criteria.
What if it’s not a “Lake”? 
What if it’s not a “Lake”

• RI’s Criteria is narrative
  • “None in such concentration that would impair any usages specifically assigned to said Class…”

• However, EPA has published numeric criteria
RI’s Process
(No Downstream “Lakes”)

1. Determine the in-stream concentration that would result using:
   A. Design Flow (Max Monthly Average)
   B. 7Q10 Receiving Water Flow
   C. Various TP Technology concentrations (1.0, 0.2, and 0.1 mg/L)
   D. 80% allocation w/o background data and 90% allocation w/ background data

2. Compare to the Gold Book and Ecoregion Criteria (i.e., 100 and 23.75 ug/L for flowing streams)

3. Select the appropriate Technology-Based limit that results in an:
   Gold Book Criteria < IWC < Ecoregion
RI’s Process
(Downstream “Lakes”)

1. Calculate Water Quality-Based limit that is protective of the downstream impoundment (e.g., 25 ug/L criteria)
2. Determine the in-stream concentration that would result using: Design Flow, 7Q10 Flow, and Limit from Step 1
3. Compare the IWC to the Gold Book and Ecoregion Criteria
   A. If Gold Book < IWC < Ecoregion then assign limit from Step 1.
   B. If not go to Step 4
4. Calculate IWC at various TP Technology concentrations (1.0, 0.2, and 0.1 mg/L)
5. Select the appropriate Technology-Based limit that results in:
   A. An Gold Book Criteria < IWC < Ecoregion AND
   B. Concentration in the downstream impoundment < 25 ug/L
Questions?

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