



August 10, 2012

Stephen S. Perkins, Director
Office of Ecosystem Protection
USEPA Region 1
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Boston MA 02109

David Ferris, Director
Mass. Wastewater Management Program
Department of Environmental Protection
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Re: Comments on draft NPDES Permit No. MA0100668 issued to the Town of Concord,
Massachusetts authorizing wastewater discharges into the Concord River

Dear Mr. Perkins and Mr. Ferris,

Thank you for the opportunity to submit the following comments on the above referenced draft 5-year permit for the town of Concord's municipal wastewater treatment plant discharge. The draft permit has several good provisions, while others need to be strengthened. Below we provide some background on our organization and the Concord River. We then provide a detailed discussion of the draft permit's provisions.

OARS is a non-profit watershed organization established in 1986 to protect, preserve, and enhance the natural and recreational features of the Assabet River, its tributaries and watershed. In 2011 the Sudbury and Concord Rivers were added to the mission and the name changed to OARS.¹

OARS has some 900 members and operates a successful EPA-approved volunteer-based water quality and stream flow monitoring program, a biomass monitoring program, a large-scale volunteer annual river clean-up, and a variety of educational workshops, canoe trips and other activities designed to foster enjoyment and good stewardship of the rivers. OARS provides detailed Annual Water Quality Reports to the local municipalities, the public and regulators (see: <http://www.oars3rivers.org/river/waterquality>). The Assabet, Sudbury and Concord Rivers are federally-designated Wild and Scenic Rivers in segments flowing through the town of Concord and upstream and downstream of Concord.

As is discussed in the Comments section below, there are several positive aspects of the draft permit. However, the permit does not prevent the discharge from contributing to an existing impairment of the water quality of the Concord River.

The Concord River

The Concord River originates in Concord at the confluence of the Sudbury and Assabet Rivers and flows north for 15.5 miles through the towns of Concord, Carlisle, Bedford, Billerica, Chelmsford, and Tewksbury before emptying into the Merrimack River in Lowell. The Merrimack River discharges to the Atlantic Ocean in Newburyport, Mass. As shown on the draft permit's Fact Sheet, the Concord River is

¹ Previously, the name was the Organization for the Assabet River.

classified as Class B—Warm Water Fishery, Treated Water Supply. The Concord River is the sole public drinking water source of the Town of Billerica.

The *Massachusetts Year 2010 Integrated List of Waters* (and the proposed *List* for 2012) lists the Concord River under Category 5 (Waters Requiring a TMDL). The segment from the confluence of the Sudbury and Assabet Rivers to the Billerica water supply intake is listed as impaired for total phosphorus, mercury in fish tissue, and fecal coliform. From the Billerica intake to Rogers Street Bridge in Lowell the river is listed for total phosphorus, and mercury in fish tissue. From Rogers Street Bridge to the confluence with the Merrimack River it is listed for total phosphorus, mercury in fish tissue, fecal coliform and excess algal growth. Non-native aquatic plants and Eurasian water milfoil are also listed as impairments throughout its length up to Rogers Street. The Assabet River, where it meets the Concord River, is listed as Category 5 impaired for total phosphorus and fecal coliform; there is a TMDL for phosphorus for the Assabet River.² The Sudbury River, where it meets the Concord River, is also listed under Category 5, impaired for mercury in fish and for non-native aquatic plants. There is a *Draft Pathogen TMDL for the Concord River Watershed*, but there is no indication that it will be approved this year.

There has been a large investment in improving the water quality and reducing the phosphorus pollution of the Assabet River, which contributes about half of the Concord River's flow. This summer all four municipal wastewater treatment plants on the Assabet are meeting lower permit limits for phosphorus (100 µg/L TP seasonal and 1,000 µg/L TP winter) for the first time. Similar investments in tertiary wastewater treatment have been made by the towns of Concord and Billerica.

The Concord River has had a notable history of recreational use, particularly fishing, swimming and boating, stretching back several centuries. Despite the water quality impairments, Recreation, Scenery and Ecology were recognized as Outstandingly Remarkable Values by Congress when it was designated Wild and Scenic in 1999. RiverFest, an annual celebration of the three rivers, held 31 river-based events in 2012, from canoe trips to fishing classes. As the river's popularity as a recreational resource has grown, area residents have become increasingly active in its stewardship. Yet much of the Concord River still suffers each summer and early fall from excessive nuisance plant growth that degrades recreation, aesthetics and wildlife habitat. The Concord River is impounded by the Talbot Dam in Billerica which is said to influence water levels well upstream of its confluence with the Sudbury River.

The Concord River does not meet its designated Class B—Warm Water Fishery, Treated Water Supply water quality standard. The agencies have adopted an “adaptive management” approach in which MassDEP and EPA jointly issue NPDES discharge permits with phosphorus limits on wastewater treatment plant (WWTP) discharges designed as an initial step toward meeting water quality standards. The current permit (2005) has limits of 200 µg/L Total Phosphorus (TP) during the growing season and five times this (1,000 µg/L TP) during the winter. OARS' water quality data show that the in-stream concentrations of phosphorus entering the Concord River from the Assabet River are significantly higher than those from the Sudbury River (see: www.oars3rivers.org/river/waterquality). OARS data from 2009-2011 show summer TP concentrations in the Concord River in Bedford (the sampling site downstream of the Concord WWTP) vary from a high of 160 µg/L TP(6/21/09) to a low of 40 µg/L TP (7/17/11), with 78% of the readings above 50 µg/L TP. TP levels upstream of the Concord WWTP at Lowell Road bridge in Concord are consistently lower than the Bedford readings.³ Excessive aquatic biomass continues to be a problem in the Concord River.

² *Assabet River Total Maximum Daily Load for Phosphorus, Report No: MA82B-01-2004-01*, 2004.

³ Further analysis of the data is required to assess the sources of the TP measured at each site.

OARS' COMMENTS ON THE DRAFT NPDES PERMIT:

1. We support approaching NPDES permitting through the new EPA “Integrated Municipal Stormwater and Wastewater Planning Approach Framework” (May 2012).

An overarching goal in water resources management in the Concord River watershed, supported at the state and federal levels, is to restore the water balance in order to achieve sustainable water use that protects both human uses and ecosystem health. Land development and modern wastewater and stormwater infrastructure have had the unintended effect of draining water out of the headwaters of our streams and rivers and discharging it far downstream into the mainstem rivers. The result is increasingly stressed streams and aquifers, which damages wildlife habitat, drinking water supplies and recreational resources. However, the water balance can be improved significantly by recharging stormwater and wastewater, reducing impervious cover, and minimizing water withdrawals from those subwatersheds that are stressed.

We support the May 2012 “Framework” approach and efforts to optimize the human and environmental health benefits of public investments under the Clean Water Act. Concord has worked hard to properly plan its wastewater management, as shown by the Comprehensive Wastewater Management Plan (2004), the “update” to the CWMP—*The Status of Municipal Wastewater Treatment in Concord, MA* (2007), and the *Wastewater Planning Task Force Summary Report: An integrated Planning Initiative* (2009) which integrates housing and long-range community plans with wastewater plans. This work provides a very solid foundation that could be used to integrate wastewater and stormwater planning. It would make sense to integrate drinking water planning into this process as well. We do not believe that a CWMP that focuses exclusively on wastewater would be as useful.

We support the agencies’ decision to maintain the current discharge flow limits as required under the Framework. No increase in discharge to the surface waters should be considered without the town demonstrating that a proposed increase of the wastewater discharge would be in compliance with applicable water quality requirements for the Concord River, that it would not cause or contribute to a violation of water quality standards, and that no feasible alternatives exist to the proposed wastewater discharge increase. Effluent-dominated river flows continue to be a concern in terms of public health and the health of aquatic life. It is clear from the foregoing reports (see, e.g., Figure 2, 2009 *Summary Report*) that between May 2004 and December 2008 there have been large seasonal variations in the effluent discharged by the Concord WWTP. Flows have often doubled from the low flow (around 0.8 mgd in the summer) to the high (around 1.6 mgd in the spring). For this permit it would be useful to report actual monthly average flows at the WWTP as well. The actual monthly average provides information about the plant that is lost in a rolling average, particularly about seasonal trends which may be associated with infiltration/inflow, tourism, school year, etc. that may be useful for planning purposes.

2. We support the inclusion of reporting on Di(2-ethylhexyl)phthalate, a carcinogen and endocrine disruptor.

The reporting requirement for this pollutant is welcome in order to start to better understand the degree of threat to human health and aquatic life that it may pose in this ecosystem.

3. We support an aluminum limit that will protect aquatic life due to the documented high aluminum concentrations in the discharge.

Aluminum can be highly toxic to aquatic life and discharge permits must contain limits that protect aquatic life using established criteria. Massachusetts lacks site-specific criteria so national criteria must be used until such time as state criteria are promulgated. It is important to closely monitor instream and effluent

aluminum concentrations due to possible increases in alum use with the new tertiary treatment systems being used in Concord and upstream. See comment 5(d) below, regarding calculations.

4. More information is needed on efforts to minimize wastewater generation through water conservation, water reuse, and I/I removal.

The 2004 CWMP and the subsequent reports contained very little information on the many ways to minimize water use and wastewater generation. The opportunities and examples of water reuse and conservation, for example, have increased since the CWMP was prepared. These opportunities are unlikely to be adopted by new developments or redevelopment unless there is significant pressure to do so. Package treatment plant technologies have been improved for clustered and other smaller systems. The opportunities for continued I/I removal need to be described fully as groundwater appears to have a significant impact on wet season wastewater flows. Collection system mapping, O&M planning, and annual reporting as required in the draft permit are important and will contribute useful information. There should be a special focus on reducing seasonal high flows.

5. The draft permit does not comply with the federal and Massachusetts Clean Water Acts.

A. The following total phosphorus discharge concentration limits do not ensure the attainment of the water quality standards established for Class B waters, as required by the Clean Water Act:

Total Phosphorus (TP) 200 µg/L average monthly concentration (April 1-Oct. 31); Total Phosphorus (TP) 1,000 µg/L average monthly concentration (Nov. 1-March 31)

There are several problems with the way the phosphorus limits were calculated: the method used to determine the upstream concentration, the standard that was used, and the impacts of winter limits. As a result, the draft permit's TP discharge limits do not ensure the attainment of the Class B water quality standards established for the Concord River, as required by section 301(b)(1)(C) of the Clean Water Act and 40 CFR § 122.4(d).

The method used to calculate the total phosphorus limit is flawed because it uses the median phosphorus concentration at Lowell Road in Concord⁴ (2009 and 2010) at 45 µg/L (Fact Sheet p. 10). However, water quality standard excursions do not occur on the basis of a median concentration. They occur when the concentration reaches its maximum which is during critical low flow conditions, e.g., 7Q10 flows. In September 2010 the TP concentration at Lowell Road (upstream of the Concord WWTP) had reached 80 µg/L, nearly double the 45 µg/L mean used in the calculations. The 45 µg/L concentration is itself nearly double the instream TP concentration characteristic of a healthy, relatively unimpacted river or stream in this ecoregion (see below). The total phosphorus concentration recorded during the lowest flow period or 7Q10 should be used. The 7Q10 must also be correctly calculated based on accurate assessment of flow sources.

The correct criteria must also be selected in order to be protective of designated uses. The EPA has the authority and responsibility to interpret narrative standards (e.g., the Mass. nutrient standard) and establish water quality-based limits in waters where standards are not met but there is no TMDL or site-specific criterion, as is the case for the Concord River.⁵ The most current and site-specific information should be used, as described below.

⁴ Two OARS sampling sites are Lowell Road bridge in Concord (CND-161) and Lowell Street in Billerica (CND-045). The site citation in the Fact Sheet should be corrected to avoid confusion.

⁵ 40CFR § 122.44(d)(1)(vi).

The Concord plant discharges directly into a river that is impounded downstream by the Talbot Dam in Billerica. In the case of impounded water bodies, the EPA's Gold Book standard is that total phosphorus should not exceed 25 µg/L or 50 µg/L, depending whether or not the influence of the impoundment reaches the regulated discharge point.⁶ However the calculations in the Fact Sheet use the 100 µg/L TP criterion for a free-flowing river, which they should not. Regarding the summer ("seasonal") phosphorus limits in the draft permit, the most current and site-specific EPA guidance documents and reports support TP limits in the range of 20 µg/L to 24 µg/L, as follows.

In 2000, EPA issued its recommended nutrient criteria or "reference conditions" for river and streams located in Ecoregion XIV, which includes all of Massachusetts and three Level III sub-ecoregions.⁷ EPA's Level III sub-ecoregion 59, also known as the Northeastern Coastal Zone, includes the Concord River watershed. The recommended TP criterion or reference condition for this sub-ecoregion is 23.75 µg/L (hereafter rounded to 24 µg/L).⁸ This criterion was empirically derived to represent conditions of surface waters that are minimally impacted by human activities and protective of aquatic life and recreational uses.⁹

In 2003, the New England Interstate Water Pollution Control Commission (NEIWPCC) published a study, conducted by ENSR, of instream nutrient concentrations for New England rivers and streams.¹⁰ This EPA-funded report, which included phosphorus concentrations measured in Massachusetts rivers and streams in 1994-1998, confirmed the earlier recommendations of EPA's 2000 guidance document. Specifically, the more comprehensive phosphorus data set analyzed by ENSR for the Northeastern Coastal Zone (EPA sub-region 59) showed that in minimally impacted rivers and streams, the expected total phosphorus concentration would be in the range of 20 µg/L–22 µg/L,¹¹ slightly less than the 24 µg/L total phosphorus criterion recommended in EPA's 2000 guidance document.

A higher winter limit of 1,000 µg/L TP is shown to be insufficiently protective by the US Army Corps of Engineers (ACOE) study of the contribution of sediments impounded by dams on the Assabet River to water quality impairment due to phosphorus recycling by the sediments.¹² The study showed that phosphorus discharged from wastewater treatment plants during the winter was likely to be taken up by sediments and subsequently released to fuel aquatic plant growth in the next growing season. The study recommended reducing winter total phosphorus limits below 1,000 µg/L at the Assabet River municipal WWTPs:

"This study also resulted in significant findings regarding the seasonality of sediment phosphorus flux. An additional consideration to meet the TMDL target of 90% reduction in sediment phosphorus flux is winter phosphorus discharge limits for at [sic] WWTFs. Based on results of this modeling effort, it was concluded that winter limits for the WWTFs, below the current planned limit of 1 mg/L would contribute significantly to the reduction in sediment phosphorus flux."¹³

⁶ Discharges to impounded rivers and lakes require more stringent criteria than discharges to free-flowing rivers. *Quality Criteria for Water 1986*, EPA (EPA "Gold Book").

⁷ *Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria; Rivers and Streams in Nutrient Ecoregion XIV*, US EPA, Office of Water, EPA 822-B-00-022, December 2000, AR Index Reference II.F.4.a.

⁸ *Ibid.*, page 15, Table 3a.

⁹ Based on the 25th percentile of all nutrient data assessed from Level III, sub-ecoregion 59.

¹⁰ *Collection and Evaluation of Ambient Nutrient Data for Rivers and Streams in New England, Data Synthesis Report, Final Report*, NEIWPCC, September 2003, AR Index Reference II.E.7.c.

¹¹ *Ibid.* pages 6-12, Table 6-4.

¹² *Assabet River Massachusetts: Sediment and Dam Removal Feasibility Study*, US Army Corps of Engineers, September 2010.

¹³ The current, Phase 1, permits limits for Total Phosphorus are: 1,000 µg/L (Nov.-March), 100 µg/L (April-Oct).

The study did not specify what the lower winter limits should be. Because the Concord WWTP is discharging to a river with an impoundment downstream created by a dam, similar to the Assabet River, these results would be applicable.

The foregoing point to a course of action supported by the data from the EPA Ecoregion study, the NEIWPCC study and the ACOE study: the agencies need to define and establish more stringent winter and growing season phosphorus limits that will allow the river to meet water quality standards.

B. pH

The pH range limit for the Concord WWTP is the same as the limit in its current permit (6.0-8.3 su). This limit does not conform to the state water quality standard for a Class B waterway, which is 6.5-8.3 su. However the water quality regulations (314 CMR 4.03(2)) allow the Department to “recognize a limited area or volume of a waterbody as a mixing zone for the initial dilution of a discharge. Waters within a mixing zone may fail to meet specific water quality criteria provided the following conditions are met: (a) Mixing zones shall be limited to an area or volume as small as feasible. There shall be no lethality to organisms passing through the mixing zone as determined by the Department...” The Fact Sheet states the deviation from the “customary” limit has not resulted in any observed “adverse effects due to occasional low pH in the discharge.” The Fact Sheet does not provide calculations showing the size of the mixing zone. We are concerned that this approach puts the burden of proof on some party to observe and prove an ill effect, when the research has already been done to set a protective standard. The Fact Sheet does not explain what the “operational considerations” are that should be considered. If the town is interested in having this exceptional limit, then a good case should be made and backed up with data. It should be noted that WWTPs on the Assabet River WWTPs have the 6.5-8.3 su pH range in their permits.

C. 7Q10

Massachusetts Water Quality Standards require the use of the 7Q10 flow in pollutant loading calculations for determining dilution. The 7Q10 calculation is critical to the accurate determination of appropriate discharge limits. The 7Q10 calculation required several adjustments to ascertain the flow at the discharge point. The calculations of 7Q10 in the Fact Sheet are not clear and are difficult to interpret. We request that a clearer calculation of the 7Q10 be provided so that we may properly assess its accuracy.

D. Metals—The method of calculating Aluminum and Copper concentrations is flawed

The Fact Sheet shows that the calculations of metals and phosphorus did include a “background” level in the receiving water, which is an improvement over past permits. However, the dilution calculations were faulty because an annual median value for flow, rather than 7Q10 conditions, was used to calculate the background level of the pollutants in the receiving water. This is not appropriate, as the 7Q10 conditions are the critical conditions when flow from the Assabet River, in particular, can be highly effluent-dominated. By using median background concentrations, EPA has failed to demonstrate that Concord’s aluminum limit is low enough to meet water quality standards, *which apply under 7Q10 conditions*. The draft permit does not contain a copper limit, yet the EPA has failed to demonstrate that Concord does not need a copper limit. Since EPA used a median background concentration for copper to represent a 7Q10 condition, there *is* reasonable potential for Concord’s discharge to violate acute and/or chronic criteria for copper. The permit thus fails to prove that there is no reasonable potential for the discharge to cause or contribute to violation of water quality criteria for metals. In addition, there is no evidence that correct calculations were done for the other priority pollutants. This should be done using the correct background and 7Q10 factors to ensure that there should not be limits included in the permit for these pollutants.

E. Nitrogen—May need to be considered in light of new information

Nitrogen reporting has been eliminated from the draft permit. If nitrogen is found to pose a threat to designated uses in the Concord River, the Merrimack River, or where the Merrimack discharges into the Atlantic Ocean , this should be reassessed.

CONCLUSIONS

The proposed draft permit has several good components and points the way to a much-needed integrated approach to water resources investments and management. However, it does not meet the requirements of the Clean Water Act due to calculations that 1) do not properly reflect the impounded nature of sections of the Concord River, or 2) are either incorrect or unclear relative to instream pollutant concentrations, mixing zones, and dilution flows, particularly during the critical low flow periods. In addition, the growing body of research on the effects of winter-time nutrient loading of sediment on growing season nutrient recycling should be utilized.

We hope that these comments are useful.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'AJ', with a long, sweeping underline that extends to the left and then curves back under the initials.

Alison Field-Juma
Executive Director

CC: Christopher Whelan, Town Manager, Concord