



## **Charles River Watershed Association**

September 9, 2004

U.S. Environmental Protection Agency  
One Congress Street, Suite 1100  
Boston, MA 02114-2023

*Re: US EPA NPDES Permit No. MA 0004898 –Mirant Kendall Station, Cambridge, MA*

Dear Sir or Madam:

The Charles River Watershed Association (CRWA) has reviewed the draft NPDES permit (no. 0004898) and accompanying documentation for the thermal discharge and cooling water intake at the Mirant Kendall Station in Cambridge, MA. The station is being upgraded to produce up to 283 MW of power, a considerable increase over its previous capacity of 113 MW. Rather than operate as a “peaking” facility as it previously did, the upgraded facility will operate as a year-round “base-load” facility, discharging up to five times the former heat load. CRWA presents the following comments on the draft permit.

### Diffuser

CWRA supports the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP) in their joint decision to exclude the diffuser from the NPDES permit at this time. CRWA originally proposed that Mirant Kendall use a diffuser for its thermal discharge, hoping that it would break up the salt wedge in the bottom layers of the river, allowing the water to become reoxygenated. The salt water, from Boston Harbor, is denser than fresh water and becomes trapped at the bottom of the river where it becomes anoxic. It is not clear that possible benefits associated with the diffuser (such as increased dissolved oxygen concentrations) would out-weigh possible negative impacts (such as increased eutrophication). We feel it is prudent for the regulators to wait until the basin model, being configured by TetraTech for the EPA, can be applied to evaluate use of the diffuser so that EPA can predict impacts related to eutrophication and algal blooms.

### Intake Barriers

EPA and DEP have outlined performance standards for the intake barrier system. CRWA feels that with further modifications, mortality associated with the intake could be drastically reduced. First, the intake barrier system should be constructed outside of Broad Canal to prevent eggs, larvae, and small fish from being pulled into the Canal. It does not make sense to construct in the canal as these organisms are fairly immobile and

would be unable to move out of the canal and back into the Charles, against the force of the plant's intake. Second, a mechanism to dislodge the organisms from the net (with air or water, perhaps) without harming them should be added to the system.

#### Placement of Continuous Monitoring Stations

Accurate, reliable monitoring of the discharge is key to protection of the Charles. With heat inputs from stormwater discharges and combined sewer overflows discharging in warm weather, CRWA feels that temperatures measured at the Background Station (Station 1) will not represent ambient conditions. On page 152 of the Determination Document EPA and DEP acknowledge that MWRA's Cottage Farm CSO Facility "could potentially compromise the objective of Station 1 to ambient river temperatures in the Charles River." EPA and DEP's rationale for not moving the station further upstream is, in part because "there are other CSO discharges further upstream of the Cottage Farm facility, which would likely pose the same potential to effect (sic) the ambient temperature monitoring objective of the background station during storm events." However, according to MWRA's Cottage Farm CSO Facility Assessment Report, dated January 2004, the Cottage Farm CSO facility is expected to activate a total of six times and discharge 23.9 million gallons in a typical year. On the other hand, only 1.78 million gallons of combined sewage are expected discharge upstream of Cottage Farm in a typical year (D. Kubiak, MWRA, presentation entitled Charles River Basin CSO Control April 8, 2004). Upstream CSO discharges will have a negligible effect on temperature, when compared to the Cottage Farm Facility. CRWA recommends that the Background Station be moved upstream to avoid the influence of Cottage Farm.

At least two other monitoring stations are needed to determine the upstream boundary of the thermal plume in the Charles. Station 2, established to monitor the Zone Boundary, was designed to define conditions across the river, between Cambridge and Boston. However, according to Mirant's "Supplemental Surface Water Monitoring Report" dated May 14, 2001, elevated temperatures are predicted to creep upstream of Station 2, along the Cambridge side of the river, during extremely low flows. Therefore, additional monitoring stations are necessary to further define the upstream extent of the Mixing Zone. One station should be located adjacent to Station 2 and closer to Cambridge. The shallow waters along the Cambridge bank are important yellow perch habitat and it is critical that they be preserved.

#### Resident Fish – Breeding

According to the Determination Document (page 68), the literature identified yellow perch adults as the resident adult fish stage most sensitive to elevated water temperatures. The literature cited reports that yellow perch spawning occurs in shallow areas, when temperatures are between 44 and 54 degrees F (page 69). EPA and DEP selected a Habitat Suitability Index of 0.5 (representing habitat suitability between optimal and completely unsuitable), which corresponds with an upper temperature limit of 59 degrees F. There is no justification for adopting the Habitat Suitability Index of 0.5 and the higher temperature limit of 59 degrees F. The range for adult breeding extends only to 54 degrees F. EPA and DEP present no evidence to show that yellow perch adults can spawn at higher temperatures.

Next, EPA and DEP apply the literature's recognition of the need for rising temperatures during spawning to the maximum temperature limits to arrive at a limit of 63 degrees F for the later part of the spawning season. This further exacerbates the deviation from 54 degrees F, the upper temperature limit for adult breeding.

Finally, the draft permit slaps on another 2 degrees F to its temperature limit to account for daily temperature fluctuations. It makes no sense to set the maximum temperature limit 11 degrees F higher than the yellow perch's maximum breeding temperature. EPA and DEP propose to start the breeding season at temperatures higher than the breeding range of 44 to 54 degrees F. High temperature limits and a Habitat Suitability Index of 0.2 fly in the face of EPA's ten-year effort toward a swimmable and fishable Charles River by Earth Day 2005. It would be unacceptable to further impact this already degraded habitat.

#### Resident Fish - Larvae

The Determination Document cites the literature to bracket the temperatures at which yellow perch larvae would likely be present in the Charles. One reference (Koonce, et al. 1977) found that 100% of the larvae die at temperatures higher than 30 degrees C. Between 27 and 30 degrees C (80.6 and 86 degrees F), daily mortality of yellow perch larvae was observed to be very high – between 45 to 100 percent. Despite these high and unacceptable mortality rates, the draft permit go on to refine expected mortality in the range between 27 and 30 degrees C. There does not appear to be any evidence backing the permit's supposition that, because this study was conducted in Michigan where temperatures are 8 degrees F cooler than Boston, the 45% mortality in Michigan at 27 degrees C could have been higher than what might be observed in Boston. The permit refers to a USFWS publication by Krieger et al. (1983) and states the "yellow perch larvae tolerated temperatures up to 28 degrees C." A pivotal question is how well they "tolerated" these temperatures.

Permit limitations would allow temperatures to rise to 75 degrees F between June 8-11 and 83 degrees F between June 12 and October 31. These temperatures approach or are at the temperatures that cause between 45 and 100% daily mortality of the larvae. The larvae are drifting organisms that cannot easily move out of a heated zone. These temperatures are not protective of the larvae nor is there a margin of safety associated with the permit's temperature limitations. Additionally, the "no effect" temperature should be used to set temperature limits outside of the Mixing Zone. EPA and DEP must state what this temperature is and describe how it will be used to set protective limits in the Zone of Passage and Habitat.

#### Anadromous Fish – Breeding

The Determination Document examines protective temperatures for sensitive anadromous fish. Pages 90-93 (including Table 5.7.3c-3) of the Determination Document present data from alewife runs in Massachusetts and New Hampshire. The average avoidance temperature observed for alewife runs ranged from 64.4 to 65.9 degrees F. The highest river temperature reached by the end of the run ranged from 57 to 70 degrees F. This means that all fish had migrated by the time the rivers reached these temperatures. However, within the Zone of Passage and Habitat, proposed temperature limits will go from 66.4 degrees F on May 1 to 72 degrees F on June 1. At the mouth of the river,

temperature limits will go from 65 degrees F on May 1 to 70 degrees F on June 1. It makes no sense to start the run with temperature limits associated with the end of the run in other systems. It is unclear how readily the fish will migrate when temperatures at the mouth of the river (the point of entry for the herring run) are at, or exceed by up to 5 degrees F, the average avoidance temperatures cited by the literature. Both CRWA's volunteer fish counting program and observations made by members of the citizen's group, River Watch in Watertown, indicate that the number of river herring present in this year's run may be lower than in past years. Further, the number of herring counted by Mirant Kendall (45,000 in 2002) was far lower than the estimated carrying capacity of the Charles of approximately 400,000 for river herring, as estimated by the Massachusetts Division of Marine Fisheries (Phil Brady, personal communication, July 8, 2004). While volunteer observations certainly are not quantitative, CRWA believes it is unwise to subject the herring to inhospitable conditions that could further reduce their numbers. We are quite concerned that these temperature limits will stop the run during years with high ambient water temperatures.

#### Mixing Zone, Zone of Passage and Habitat, and Variance Determination

The draft permit [Attachment A (Footnote 1)] defines the aerial extent of the Zone of Passage and Habitat (ZPH). The ZPH "includes, at all times, all Monitoring Points at Station 4, with the exception of the 2-foot monitoring point. However, since Station 4 is located 60% of the distance from Cambridge to Boston (draft permit, page 20) and is, therefore only protective of 20% of the surface area, this seems to violate the DEP's requirement that, "The ZPH must make up a minimum of 50% of any cross sectional, bank to bank area of the lower Charles River Basin" (Determination Document, page 149). The permit and supporting documentation should indicate the boundaries of the Mixing Zone and the ZPH under various conditions.

The Determination Document (page 179) also states that, according to Section 316(a) of the Clean Water Act, "thermal discharge effluent limitations in permits may be less stringent than those required by applicable standards and limitations if the discharge demonstrates that such effluent limitations are more stringent than necessary to assure the protection and propagation of a balanced, indigenous population (BIP) of shellfish, fish and wildlife in and on the body of water into which the discharge is made." According to EPA and DEP, the thermal limits were established to protect and allow the propagation of the "balanced indigenous populations of sensitive resident and anadromous species (Determination Document, page 123). As a result, the draft permit grants a variance from the Massachusetts Water Quality Standards temperature limits and the state's Mixing Zone Policy (Determination Document, pages 149 and 179). Documentation supporting the permit states that, "A key aspect of the Massachusetts WQS subject to this variance is the mixing zone policy which calls for no lethal affects (sic) in the Zone of Initial Dilution." The permit appears to waive this requirement. It also appears that the requirement in DEP's Mixing Zone Policy stating that, "to protect swimming and drifting organisms, the in-zone quality must be such that these organisms can pass through the mixing zone without exposure to toxicants (Section IV-b)" has been waived. EPA should explain how adding so much heat to the system is protective. CRWA believes that this permit will violate the anti-degradation provisions of the Massachusetts Surface Water Quality Standards by eliminating or impairing existing uses. CRWA would also like to know what was excluded or changed by the variance.

With respect to a “balanced indigenous population,” CRWA does not agree that these temperatures are protective. CRWA is very concerned that the high temperature limits proposed in this permit will result in death or disruption/prevention of breeding of these organisms. EPA and DEP should explain how the aerial extent and temperatures of the mixing zone/zone of dilution are protective of aquatic life. EPA and DEP should construct a population dynamics model to evaluate Mixing Zone impacts in combination with intake effects and habitat loss due to the high temperatures.

Nor do we feel that the aquatic life in the lower Charles is “balanced.” There is virtually no benthic community, there are blue-green algal blooms, and the system is highly eutrophic. With funding from EPA, CRWA is currently working with state and federal fisheries biologists to determine the “target” fish community for the Charles. As mentioned above, the Massachusetts Division of Marine Fisheries estimated the carrying capacity of the Charles River for river herring is 400,000 fish per year, much lower than the 45,000 (including 8,000 alewife) counted in 2002 by Mirant Kendall.

While we support EPA and DEP in their decision to exclude the diffuser from the current permit and we have offered comments related to positioning of the intake barrier system and continuous monitoring stations that are necessary, CRWA cannot support the proposed temperature discharge limits, which will cause fish mortality or disruption to their reproduction.

Sincerely,

Kathleen M. Baskin, P.E.  
Director of Projects