

Charles River Residual Designation

Executive Summary

Introduction

The Clean Water Act authorizes EPA to control stormwater pollution by designating certain categories of stormwater discharges as requiring Clean Water Act permits. For example, EPA may require permits for discharges which contribute to violations of water quality standards, or which are needed to implement a “total maximum daily load” (TMDL) for an impaired water.

This Record of Decision documents a preliminary decision by the Regional Administrator of EPA Region I that storm water permits are needed to address serious water quality problems in the Charles River. The decision addresses facilities in the Charles River watershed which are located within the towns of Milford, Bellingham, and Franklin, Massachusetts. Permits will be required for facilities which discharge stormwater from two or more acres of impervious surfaces, including roofs and paved areas.

Certain categories of facilities are not included in this designation – for example, one- to four-unit residential properties, recreational vehicle parks, manufactured housing communities, and sporting and recreational camps. These categories of facilities match those excluded from a proposed stormwater regulation being considered by the Massachusetts Department of Environmental Protection (DEP).

EPA is seeking comment on this designation, including on the categories of facilities to be excluded. This designation will become effective once EPA has issued a general permit for the affected discharges.

Factual Background

The headwaters of the Charles River are in Hopkinton, Massachusetts. From there, the river flows through the municipalities of Milford, Bellingham, Franklin, and then numerous downstream communities. The river eventually flows between Boston and Cambridge before emptying into Boston Harbor.

The Charles is one of the most historically and culturally significant rivers in the United States. The river and its adjacent parkland are widely used for recreation, including windsurfing, sailing, and rowing. However, the river has a history of severe water quality problems.

In 1995, EPA launched the Clean Charles initiative. At the time, the river suffered from persistent high levels of bacterial pollution. In the last decade, however, the river has

made dramatic progress toward meeting swimming and boating standards for bacteria. For example, the Lower Charles met boating standards only 39% of the time in 1995, but 100% of the time in 2007. This improvement is due to hundreds of millions of dollars in investments in infrastructure by federal, state, and local governments, and the dedication of environmental and community groups to a cleaner river.

While vast strides have been made to reduce bacterial contamination, the Charles continues to be impaired by discharges of polluted stormwater – in particular, by discharges of phosphorus, which have caused dramatic plant and algae growth in the river, including large blooms of toxic algae.

Sources of phosphorus in the Charles include dust and dirt, decaying organic matter, engine exhaust, and pet waste. Phosphorus tends to collect on impervious surfaces, such as pavement and roofs, and is then carried to the river by stormwater runoff. Land uses with a high percentage of impervious surfaces tend to contribute a proportionally high volume of phosphorus to the river. Those same areas also contribute a high volume of other pollutants, such as pathogens and metals. The control technologies that will reduce phosphorus will also reduce loads of these other pollutants.

Legal Background

EPA's regulations addressing the control of storm water discharges are found, generally, at 40 C.F.R. Part 122. EPA's authority to designate storm water discharges for permitting is found at 40 C.F.R. 122.26(a). That section describes when EPA may require National Pollution Discharge Elimination System (NPDES) permits for stormwater:

122.26(a)(9)(i) On and after October 1, 1994, for discharges composed entirely of storm water... operators shall be required to obtain a NPDES permit ... if:

(C) The Director, or in States with approved NPDES programs, either the Director or the EPA Regional Administrator, determines that storm water controls are needed for the discharge based on wasteload allocations that are part of "total maximum daily loads" (TMDLs) that address the pollutant(s) of concern; or

(D) The Director, or in States with approved NPDES programs, either the Director or the EPA Regional Administrator, determines that the discharge, or category of discharges within a geographic area, contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States.

This residual designation is based on 40 C.F.R. §122.26(a) (9)(i)(C) and (D).

Factual Bases for Determination

The designation issued today is based on excessive phosphorus levels in stormwater. However, stormwater also contributes other types of pollutants to the Charles, which will be reduced by the same measures which will control phosphorus.

Stormwater discharges from impervious surfaces carry high phosphorus loads. Those discharges contribute to violations of water quality standards, including algae blooms and other noxious aquatic plants, low dissolved oxygen levels, turbidity, odor, and color.

The causal relationship between excessive phosphorus loads and water quality impairments is well understood. Phosphorus is a nutrient which fuels excessive algal and plant growth. Excessive algae results in reduced water quality and a green-brown coloration. Noxious algae species have impaired recreation in the Charles by causing odors and skin irritation. Excessive algae can also cause very high dissolved oxygen levels in the upper layers of the river, and low dissolved oxygen in the lower water column. Both harm fish. Excessive algae also causes fluctuating pH.

During the summers of 2006 and 2007, there were very severe blooms of toxic cyanobacteria (blue-green algae) in the Lower Charles. The World Health Organization (WHO) has provided benchmarks for blue-green algae at the level of 5,000 cells per milliliter of water (adverse health effects can occur at this level with exposure for over an hour) and 20,000 cells per milliliter (skin and eye irritation is likely from contact at this level). The Massachusetts Department of Public Health has developed a protocol that dictates the immediate posting of warning signs at 70,000 cells per milliliter. The 2006 algal bloom in the Charles included cell counts of over one million cells per milliliter.

Algal blooms in the Charles have created mats of floating scum, and thick mats of algae along the bottom of the river. This results in a lack of fish habitat and a loss of diversity in bottom-dwelling species.

Algal blooms have also caused numerous excursions beyond the natural range of pH levels in the Charles, and have regularly caused dissolved oxygen levels to drop far below the Massachusetts water quality criterion of 5 milligrams per liter – often between 0 and 3 mg/l during the summer in the bottom waters of the Charles River Basin.

On October 17, 2007, EPA approved a “total maximum daily load” (TMDL) for phosphorus in the Lower Charles, which was submitted to EPA by the Massachusetts DEP. A TMDL establishes the amount of a pollutant that a water body can assimilate without exceeding water quality standards.

The TMDL set a target to reduce the annual phosphorus load to the Lower Charles by 54%. This reduction target was allocated among the various land uses which contribute phosphorus to the river. Several major land-use categories – including industrial, commercial, and high-density residential uses – need to achieve a 65% reduction in phosphorus discharges, in order to meet the overall TMDL reduction target.

Selection of Designated Discharges

At this time, EPA is focusing on facilities within the three communities of Milford, Franklin, and Bellingham. These municipalities are the first places where the Charles experiences significant water quality problems, including elevated phosphorus and excessive plant growth. By reducing phosphorus discharges in these upstream communities, EPA will be able to assess how quickly and effectively the river responds to stormwater controls. There will also be downstream benefits, as phosphorus can contribute to numerous water quality problems as it makes its way down the river.

Focusing attention on large facilities (those with two acres or more of impervious area) will yield a large reduction in phosphorus while also providing economies of scale. Both construction costs and operation and maintenance costs decrease on an acre-for-acre basis as the size of managed areas increases. Focusing on a relatively small universe of larger facilities also minimizes administrative costs.

The Lower Charles TMDL calls for an “adaptive management” approach, which relies on an iterative process to address water quality problems. By examining the effects of stormwater controls at these facilities, EPA will be able to determine their effectiveness for application elsewhere in the watershed.

Determinations

Each of the following determinations is a separate and independent basis for this preliminary designation:

A) The Massachusetts DEP has found that the Charles River does not meet a number of water quality standards, including dissolved oxygen, pH, solids, color and turbidity, aesthetics, and nutrients. EPA has determined that discharges of stormwater from facilities with two or more acres of impervious area in Milford, Franklin, and Bellingham, excluding certain categories of facilities identified on page 1, are contributing to this failure to meet standards.

B) The Lower Charles TMDL identifies stormwater as a significant source of phosphorus loads, which contribute to water quality impairments in the Charles. EPA has determined that stormwater sources beyond what are currently regulated need to be controlled in order for water quality standards to be attained, including the designated discharges.

In order to ensure effective and enforceable reductions of phosphorus loads from the designated discharges, these sources must be controlled through the issuance of permits under the NPDES program.