UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Decision Rationale
Total Maximum Daily Loads
For Fecal Coliform Bacteria
In Kingman Lake

Jon M. Capacasa
Jon M. Capacasa, Director
Water Protection Division

Date: *10/31/03*

Decision Rationale
District of Columbia
Total Maximum Daily Loads
Kingman Lake
For Fecal Coliform Bacteria
October 31, 2003

I. Introduction

The Clean Water Act (CWA) requires that Total Maximum Daily Loads (TMDLs) be developed for those water bodies that will not attain water quality standards after application of technology-based and other required controls. A TMDL sets the quantity of a pollutant that may be introduced into a waterbody without exceeding the applicable water quality standard. EPA's regulations define a TMDL as the sum of the wasteload allocations (WLAs) assigned to point sources, the load allocations (LAs) assigned to nonpoint sources and natural background, and a margin of safety.

This document sets forth the United States Environmental Protection Agency's (EPA) rationale for approving the TMDLs for organics and metals in Kingman Lake. These TMDLs were established to address impairment of water quality as identified in the District of Columbia's (DC) 1998 Section 303(d) list of impaired waters. The DC Department of Health, Environmental Health Administration, Bureau of Environmental Quality, Water Quality Division, submitted the *Final Total Maximum Daily Load for Fecal Coliform in Kingman Lake* dated October 2003 (TMDL Report) to EPA for final review which was received by EPA on October 28, 2003. Because the District believes that certain nonpoint source loads are not quantifiable, a phased TMDL was specified. The included monitoring requirements will allow the District to quantify the additional nonpoint source loads.

Based on this review, EPA determined that the following eight regulatory requirements have been met:

1. The TMDLs are designed to implement the applicable water quality standards,
2. The TMDLs include a total allowable load as well as individual waste load allocations and load allocations,
3. The TMDLs consider the impacts of background pollutant contributions,
4. The TMDLs consider critical environmental conditions,
5. The TMDLs consider seasonal environmental variations,
6. The TMDLs include a margin of safety,
7. There is reasonable assurance that the proposed TMDLs can be met, and
8. The TMDLs have been subject to public participation.

II. Summary

Table 1 presents the 1998 Section 303(d) listing information for the water quality-limited waters of the Anacostia River and tributaries in effect at the time the consent decree was filed. The District's 2002 Section 303(d) list for Kingman Lake identifies the same pollutants as the 1998 list.

Table 1 - Section 303(d) Listing Information

1998 Section 303(d) List					
Segment No.	Waterbody	Pollutants of Concern	Priority	Ranking	Action Needed
6.	Kingman Lake	BOD, bacteria, organics, metals, total suspended solids, and oil & grease	High	6	Control CSO, Point and Nonpoint Source (NPS) pollution

The TMDL is a written plan and analysis established to ensure that a waterbody will attain and maintain water quality standards. The TMDL is a scientifically-based strategy which considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a margin of safety value. TMDLs may be revised in order to address new water quality data, better understanding of natural processes, refined modeling assumptions or analysis and/or reallocation.

III. Background

Anacostia River Watershed

Kingman Lake lies adjacent to the Anacostia River's western edge near the Robert F. Kennedy (RFK) Memorial Stadium and associated parking lots, a high density residential area, and a golf course. It is not a true lake, but a 110-acre tidal freshwater impoundment created during the 1920s and 1930s to provide a recreational boating area for District of Columbia residents. The 110-acre lake is separated from the river by the 94-acre Kingman Island and is bisected into northern and southern connected parts at the box culvert at Benning Road. It is hydrologically connected to the Anacostia River by two inlets located at the northern and southern ends of the lake, approximately 135 feet and 100 feet wide, respectively.

Kingman Lake direct drainage is approximately 368 acres, composed of about 50 percent parkland/golf course, 25 percent residential and 25 percent RFK stadium and parking lot. The portions of the lake above the Benning Road Bridge are chiefly drainage from a golf course, a high school and about two blocks of residential area (2.3 acres). The portion below Benning Road on the northwestern shore is predominately developed as residential and a stadium and

parking while the southeastern shore is parkland. The stadium parking has a green space buffer along the lake shore. Kingman Lake is hydrologically connected to the Anacostia River by two inlets located at the northern and southern ends of the lake, approximately 135 feet and 100 feet wide, respectively. The upper section of the lake is characterized by a dendritic tidal canal system, and during a low tide is primarily barren mudflats and areas with shallow water. The lower section of the lake has as average depth of 3 feet at low tide, with fewer mudflats and no tidal canal system. During a rising tide, water enters the lake through the inlets. The range between mean low and mean high tide is approximately 2.9 feet. Mean high tide elevation is 2.09 feet National Geodetic Vertical Datum (NGVD). The majority sources of water entering the lake include tidal flow, sheet flow from periods of heavy rain, and stormwater outfalls.

The Anacostia River Watershed, which includes Kingman Lake, is heavily urbanized and can be expected to have the water quality problems associated with urban streams. The District has several programs in place to control the effects of storm water runoff and promote nonpoint source pollution prevention and control. Because nonpoint source pollution problems are best addressed on a watershed-wide basis, the District also has joined with the State of Maryland, Prince George's and Montgomery Counties, the Army Corps of Engineers, and other federal agencies to form the Anacostia Watershed Restoration Committee, whose goal is to coordinate efforts to improve water quality in the Anacostia Watershed. The District is also a signatory to the Chesapeake Bay Agreement, pledging to reduce nutrient loads to the Bay by 40 percent by the year 2010. While not specifically addressing bacteria, the agreement's *Priority Urban Waters* section does call for reducing pollutant loads to the Anacostia River in order to eliminate public health concerns.

Because of their proximity to Kingman Lake, combined sewer overflows (CSOs) may impact the waterbody by contributing bacteria to the river. One of the two largest CSO outfalls in the Anacostia watershed is the Northeast Boundary CSO, which drains into the Anacostia near RFK Stadium (East Capital Street), just below Kingman Lake. On the other hand, Kingman Lake does receive storm water discharges, which also contribute pollutants to the impoundment.

The management of CSOs is the responsibility of the Washington Water and Sewer Authority (WASA), an independent agency of the District of Columbia which is responsible for the District's combined sanitary and storm sewers, sanitary sewers, and the waste water treatment plant at Blue Plains. WASA developed a Long-Term Control Plan (LTCP) for the District's CSOs, dated July 2002, and submitted it to EPA for review. WASA's recommended LTCP consolidates CSOs and limits discharges to an annual average of two discharges per year during the representative three years (1988-1990) of modeling described in the LTCP (page 11-36).

Consent Decree

This bacteria TMDL was completed by the District to partially meet the third-year TMDL milestone commitments under the requirements of the 2000 TMDL lawsuit settlement of *Kingman Park Civic Association et al. v. EPA*, Civil Action No. 98-758 (D.D.C.), effective June 13, 2000, as modified March 25, 2003. Third-year milestones include the development of

TMDLs for organics and metals in Kingman Lake. Third-year requirements also include Kingman Lake TMDLs for fecal coliform bacteria, total suspended solids, biochemical oxygen demand, and oil and grease. The bacteria TMDLs for the Anacostia were approved on August 28, 2003 and the amended decision rationale was approved on October 16, 2003.

IV. Technical Approach

When models are used to develop TMDLs, the model selection depends on many factors, including but not limited to, the complexity of the system being modeled, available data, and impact of the pollutant loading. The District's Water and Sewer Authority (WASA) used the TAM/WASP Model to develop the Long Term Control Plan for the combined sewer discharges to the Upper and Lower Anacostia River mainstem dated July 2002 and submitted for EPA for review. The District DOH used that modeling to develop the bacteria TMDLs for the Upper and Lower Anacostia River. This version of the TAM/WASP model does not include model Segment 36 representing Kingman Lake. Therefore, the District used a simplified approach to develop the Kingman Lake bacteria TMDL. Overall, EPA finds that the District's approach is reasonable and appropriate as described in the following sections.

Information from the LTCP and previous TMDLs was combined in a simplified method to estimate the percent reduction necessary to meet water quality standards. The District modified the *TAM/WASP Toxics Screening Level* model source code to obtain storm water flows to Kingman Lake. The storm water fecal coliform bacteria concentration developed by WASA for the LTCP was used, together with the storm water flow, to estimate average monthly loads to Kingman Lake.

The TMDL Report states:

> It is assumed that the Anacostia River water that enters Kingman Lake meets the conditions described under the final allocations, which accordingly meets water quality standards. Therefore, only the contribution of storm water source to Kingman Lake is considered for this TMDL.

The TMDL Report makes no further mention of the Anacostia River water quality and the District's method of estimating the required reductions assumed the water entering Kingman Lake from the Anacostia River had zero bacteria load. The District estimated the total assimilative capacity of Kingman Lake at low tide and compared that to the storm water load.

V. Discussions of Regulatory Requirements

EPA has determined that these TMDLs are consistent with statutory and regulatory requirements and EPA policy and guidance. EPA's rationale for approval is set forth according to the regulatory requirements listed below.

The TMDL is the sum of the individual waste load allocations (WLAs) for point sources and the load allocations (LAs) for nonpoint sources and natural background and must include a margin of safety (MOS). The TMDL is commonly expressed as:

$$TMDL = \sum WLAs + \sum LAs + MOS$$

where

WLA = waste load allocation
LA = load allocation
MOS = margin of safety

1. The TMDLs are designed to implement the applicable water quality standards.

The TMDL Report states that Kingman Lake is on the District's 1998 Section 303(d) list of impaired waters for fecal coliform bacteria, presumably because the District's ambient monitoring program disclosed exceedances of the water quality standards.

In the TMDL Report, the District recites Kingman Lake's beneficial water uses as well as the general and specific water quality criteria designed to protect those uses. The District identifies the designated uses for Kingman Lake, which are:

A. Primary contact recreation,
B. Secondary contact recreation and aesthetic enjoyment,
C. Protection and propagation of fish, shellfish and wildlife, and
D. Protection of human health related to consumption of fish and shellfish.

Table 2 - Water Quality Standards

Fecal Coliform - No./100 ml		
District of Columbia*		
Class of Use	A	B
Bacteriological		
Fecal coliform - maximum 30-day geometric mean for 5 samples	200	1,000

*49 D.C. REG. 3012; and 49 D.C. REG.4854

The TMDL Report specifically identifies the 200 MPN/100 ml and the water quality criterion to be met. The method of analysis used by the District indicated that a 50 percent reduction in storm water loads to Kingman Lake would meet water quality standards.[1]

While this TMDL has proceeded on the basis of the current water quality criter described above, a review of the designated uses of Kingman Lake is needed in light of f its most recent conversion to a wetland. This review should occur coincident with the monitoring Plan, which is described in the last section of the TMDL.

[1]The Anacostia River mainstem TMDLs approved by EPA for fecal coliform bacteria requires a 90 percent reduction all storm water loads.

2. The TMDLs include a total allowable load as well as individual waste load allocations and load allocations.

The TMDL Report lumps all storm water discharges together regardless of the storm water source. EPA guidance memorandum clarifies existing EPA regulatory requirements for establishing wasteload allocations (WLAs) for storm water discharges in TMDLs approved or established by EPA.[2] Therefore, this document identifies WLAs for storm water discharges.

The key points established in the memorandum are:

- NPDES-regulated storm water discharges must be addressed by the wasteload allocation component of a TMDL.
- NPDES-regulated storm water discharges may not be addressed by the load allocation (LA) component of a TMDL.
- Storm water discharges from sources that are not currently subject to NPDES regulation may be addressed by the load allocation component of a TMDL.
- It may be reasonable to express allocations for NPDES-regulated storm water discharges from multiple point sources as a single categorical wasteload allocation when data and information are insufficient to assign each source or outfall individual WLAs.
- The wasteload allocations for NPDES-regulated municipal storm water discharge effluent limits should be expressed as best management practices.

The existing approved/established Anacostia River TMDLs for biochemical oxygen demand and total suspended solids also assigned all storm water as a load allocation because of the manner in which the input files were generated did not distinguish between storm water discharging from storm sewer outfalls, overland flow adjacent to the river, and tributary (*e.g.*, Watts Branch) flow. The November 2002 memorandum does recognize that WLA/LA allocations may be fairly rudimentary because of data limitations. Therefore, the permitted storm water allocations were made based on the ratio of sewered areas to unsewered areas.

The Anacostia River tributaries' drainage area determined by ICPRB includes the sewershed areas as estimated from sewer maps. EPA divided the Kingman Lake TMDL into wasteload allocations and load allocations based on an estimated ratio of sewered to unsewered areas. In light of this ratio, 61 percent of the storm water flow has been categorized as WLAs and 39 percent as LAs. The specific waste load and load allocations for Kingman Lake are found in Table 4 - TMDL summary, below.

[2]Memorandum *Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs*, from Robert H. Wayland, III, Director, Office of Wetlands, Oceans and Watersheds, and James A. Hanlon, Director, Office of Wastewater Management, to Water Division Directors, Regions 1 - 10, dated November 22, 2002.

Table 4 - TMDL Summary (Maximum Monthly Loads)

Existing Load MPN/ 100 ml	TMDL MPN/ 100 ml	% Reduction	WLA MPN/ 100 ml)	LA MPN/ 100 ml	10% MOS MPN/ 100 ml)
6.31E+11	3.15E+11	50%	1.72E+11	1.10E+11	3.15E+10

3. The TMDLs consider the impacts of background pollutant contributions.

Kingman Lake's background pollutant loads are made up from inputs from the Anacostia River and separate storm water sewers.

4. The TMDLs consider critical environmental conditions.

The TMDL Report considers critical environmental conditions in Kingman Lake by evaluating average monthly loads for three years. The three years represent average flow, a wetter than average year, and a drier than average year.

At the Ronald Reagan National Airport, the average annual rainfall for the period of record, 1949 to 1998, is 38.95 inches.[3] Yearly totals vary, from 26.94 inches in 1965 to 51.97 inches in 1972. Individual events, often hurricanes, can be significant. Hurricane Agnes in 1972 delivered approximately 10 inches of rain in the Washington, DC area. The District selected 1988 to 1990 as their representative rainfall years as shown:

Table 5 - Rainfall

Year	Annual Rainfall (inches)	Representing
1988	31.74	10 percentile, dry year
1989	50.32	90 percentile, wet year
1990	40.84	median, approx. 38 percentile

(LTCP-3-2, September 1999)

5. The TMDLs consider seasonal environmental variations.

The TMDL Report considers seasonal variations by modeling the watershed evaluating average monthly loads for three years.

6. The TMDLs include a margin of safety.

The Clean Water Act and federal regulations require TMDLs to include a margin of safety (MOS) to take into account any lack of knowledge concerning the relationship between effluent limitations and water quality. EPA guidance suggest two approaches to satisfy the MOS requirement. First, it can be met implicitly by using conservative model assumptions to develop

[3] *Study Memorandum LTCP-3-2: Rainfall Conditions*, Draft, September 1999.

the allocations. Alternately, it can be met explicitly by allocating a portion of the allowable load to the MOS.

The District has chosen to use an explicit margin of safety equal to ten percent of the TMDL load.

7. There is reasonable assurance that the proposed TMDLs can be met.

The MS4 (municipal separate storm sewer system) permit and the NPDES storm water permits both provide regulatory authority to require storm water load reductions, providing reasonable assurance that the TMDLs will be implemented. The TMDL approved in August 2003 for fecal coliform bacteria impairments in the Anacostia River main stem should also serve as a major tool that will assist Kingman Lake in achieving water quality goals.

The Anacostia River has received a lot of attention for the past several years from many groups (*e.g.*, the Anacostia Watershed Society) and federal agencies.

The TMDL Report, *Storm Water Reductions*, lists remediation projects and programs undertaken by the District to improve water quality.

8. The TMDLs have been subject to public participation.

DC public noticed a February 2003 version of these TMDLs with the comment period closed on April 21, 2003. The TMDL report was placed in the Martin Luther King Jr. Library. Although the public notice was published in the D.C. Register, a subscription is required to access the Register on line. In an effort to provide wider distribution of the TMDLs, EPA posted the public notice and TMDL report on the Region III web site. In addition, EPA requested the District to use their e-mail list for the TMDL meetings to notify the interested parties of public comment period extensions and future postings on the Region III web site. EPA believes all interested parties have had adequate time to comment on these TMDLs.

The District and WASA held monthly technical (modeling) meetings where interested parties were briefed on the technical progress toward the District's TMDLs and WASA's LTCP.

As part of DC's TMDL submittal, a response to comments document was submitted to EPA via e-mail. In addition to EPA's comments, comments were received from Earthjustice Legal Defense Fund, Fish and Wildlife Service, Department of the Navy, and the District of Columbia Water and Sewer Authority.

VI. Phased TMDL

The TMDL Report specifies an ongoing Monitoring Plan to determine the extent of the unquantifiable nonpoint source loads. In addition, serious consideration must be given to a review of designated uses and accompanying water quality criteria in Kingman Lake, due to its recent conversion ot a wetland. The primary contact designated use, for instance, needs a full public review in parallel to the Monitoring Plan noted above.