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

Decision Rationale
Total Maximum Daily Loads
Kingman Lake
For Organics and Metals

Approved

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

Date: *10/31/03*

Decision Rationale
Total Maximum Daily Loads
Kingman Lake
For Organics and Metals
Executive Summary
October 31, 2003

I. Introduction

The Clean Water Act 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 (MOS). The TMDL is commonly expressed as:

$$TMDL = WLAs + LAs + MOS$$

This document sets forth the United States Environmental Protection Agency's (EPA) rationale for approving the TMDLs for organics and metals in Kingman Lake.

II. Background

Kingman Lake lies adjacent to the Anacostia River's western edge near the Robert F. Kennedy (RFK) Memorial Stadium and associated parking lots. The 110-acre lake is connected to the Anacostia River by two inlets located at the northern and southern ends of Kingman Island. Its direct drainage is about 16,000,000 square feet, which is confined within an ultra urban commercial and residential setting.

As the Kingman Lake watershed is heavily urbanized, it can be expected to have the water quality problems associated with urban streams. The District is also a signatory to the Chesapeake Bay Agreement, pledging to reduce nutrient loads to the Bay by 40 percent or more by the year 2010. While not specifically addressing these specific organics and metals, the agreement's *Priority Urban Waters* section does call for reducing pollution loads to the Anacostia River in order to eliminate public health concerns.

III. History and use of the Tidal Anacostia Model/Water Quality Simulation Program (TAM/WASP)

The TAM/WASP model simulates the physical, chemical, and biological processes in the river which are believed to have the most significant impact on these organics and metals. TAM/WASP is composed of three sub-models: (1) a hydrodynamic sub-model, which consists

of the hydrodynamic portion of TAM, (2) a sediment exchange sub-model, and (3) a water quality sub-model, which consists of a modified version of the WASP5 TOXI5 sediments and toxics model. It also includes a load estimation component and an additional sub-model designed specifically for PCBs. The hydrodynamic sub-model is used to simulate water flow velocity and depth, which govern the transport of constituents in the water column. The sediment exchange sub-model is used to simulate sediment/water column exchange processes related to sediment flux. The water quality model simulates physical and chemical processes that transport and transform chemical compounds in the river.

ICPRB[1] constructed a simple mass balance model to estimate tributary organic and metal loads. The model treats each tributary as a "bathtub" where the daily base flow and storm water loads are reduced until instream water quality standards are met.

The TMDL table containing the TMDLs and LAs are as follows:

TMDL Summary

Constituent	Total Load (lbs/yr)	% Reduction*	WLA (lbs/yr)	LA (lbs/yr)	1% MOS (lbs/yr)	TMDL (lbs/yr)
Arsenic	4.34E-01	85%	3.97E-02	2.54E-02	6.51E-04	6.44E-02
Copper	1.64E+01	0%	1.00E+01	6.40E+01	1.64E+00	1.62E+01
Lead	7.99E+00	0%	4.87E+00	3.12E+00	7.99E-01	7.91E+00
Zinc	4.88E+01	0%	2.98E+01	1.90E+01	4.88E+00	4.83E+01
Chlordane	2.92E-03	90%	1.78E-04	1.14E-04	2.92E-06	2.89E-04
DDD	2.13E-03	70%	1.30E-04	8.32E-04	2.13E-06	2.11E-04
DDE	4.71E-03	70%	2.87E-04	1.84E-04	4.71E-06	1.27E-05
DDT	1.27E-02	70%	7.77E-03	4.96E-03	4.66E-04	1.26E-03
Dieldrin	2.62E-04	30%	1.12E-04	7.14E-04	1.83E-06	1.82E-04
Heptachlor	4.42E-04	80%	5.39E-05	3.45E-05	8.84E-07	8.75E-05
PAH1	2.01E-01	98%	1.20E-01	7.68E-01	1.97E-03	1.95E-01
PAH2	1.18E+00	98%	7.08E+00	4.52E+00	1.16E-02	1.15E+00
PAH3	7.53E-01	98%	4.50E-01	2.88E-01	7.38E-03	7.31E-01

*See Anacostia Organics and Metals TMDL Section 2.1 for baseline conditions.

[1]Interstate Commission on the Potomac River Basin

IV. Discussions of Regulatory Requirements

EPA has determined that these TMDLs are consistent with statutory and regulatory requirements and EPA policy and guidance. 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.

Decision Rationale
District of Columbia
Total Maximum Daily Loads
Kingman Lake
For Organics and Metals
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 *Total Maximum Daily Loads, for Organics and Metals in Kingman Lake* dated September 2003 (TMDL Report), to EPA for final review which was received by EPA on September 18, 2003. The TMDL Report uses as its technical basis the *TAM/WASP Toxics Screening Level Model of the Anacostia River, Final Draft,* dated April 2003[2].

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.

[2]The *Final Draft* report became final without changes.

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

Maryland's 1998 Section 303(d) list of impaired waters included the Anacostia River for nutrients, as included in the Chesapeake Bay Tributary Strategies, and suspended sediment attributed to nonpoint sources and natural conditions. Maryland's 2002 Section 303(d) list of impaired waters adds bacteria, biological, polychlorinated biphenyls (PCBs), and heptachlor epoxide as impairing substances to the Anacostia River[3].

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.

[3]A major source of water to Kingman Lake is the Anacostia River.

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.

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 to achieve and maintain the water quality necessary to support the aquatic living resources of the Bay and its tributaries and to protect human health. While not specifically addressing organics and metals, 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 various organics to the river.[4] 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.

[4]Although sampling for the LTCP was performed, analytical methods' detection levels were not low enough to quantify the organics concentration. (ICPRB, 2003)

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. The LTCP does not address organics or metals. 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

These organics and metals TMDLs were 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 organics and metals TMDLs for the Anacostia were approved on August 29, 2003 and the amended decision rationale was approved on September 29, 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 used the TAM/WASP Toxics Screening Level Model to develop the organics/metals TMDLs for the Upper and Lower Anacostia River mainstem because loading from these segments significantly impacted water quality and the minimum data requirements were generally satisfied. In the TAM/WASP, Kingman Lake was modeled as an embayment to the Anacostia River. Models such as the TAM/WASP Screening Level Model require large amounts of water quality data. Overall, EPA finds that the District's selection of models is reasonable and appropriate as described in the following sections.

History and Use of the Tidal Anacostia Model (TAM/WASP)

The TAM/WASP Toxics Screening Level Model (Toxics Model) simulates the loading, fate, and transport of toxic chemical contaminants, organics and metals, in the tidal Anacostia River and Kingman Lake and can predict the changes over time of concentrations in both the river water and the surfical bed sediments.

The Anacostia River, as one of the most polluted rivers in the nation, has received a lot of attention. Anacostia River modeling has evolved since TAM's development by the Metropolitan Washington Council of Governments (MWCOG) for the District to assess water

quality impacts in the Anacostia River in 1988. Additional improvements were made by MWCOG and Limno-Tech.[5]

In 2000, ICPRB under the direction of the Department of Health (DOH), converted the model to TAM/WASP by adding the EPA-supported Water Quality Analysis Simulation Program (WASP) framework as detailed in *The TAM/WASP Model: A Modeling Framework for the Total Maximum Daily Load Alloction in the Tidal Anacostia River - Final Report,* ICPRB, 2000. DOH used the TAM/WASP model for their Biochemical Oxygen Demand (BOD) TMDL approved by EPA on December 14, 2001.

The model was turned over to WASA and Limno-Tech improved the hydraulic component by increasing from 15 to 35 the number of segments used to represent the Anacostia River from the Potomac River to the Northeast and Northwest Branches, and modified the model to simulate both fecal coliform and *E. coli*. ICPRB adopted the new river geometry and added segment 36 to represent the effect of Kingman Lake on the river. Changes to and uses of the model are detailed in the *LTCP Study Memorandum LTCP-6-4: Anacostia River Model Documentation*, Draft, August 2001.

Under the direction of DOH, ICPRB developed the TAM/WASP Toxics Screening Level Model - Version 2.3 for use in the Anacostia River TMDLs. Version 2.3 used, with only minor changes, the hydrodynamic model and the sediment transport model components of Version 2.1. TAM/WASP is a one-dimensional (1-D) model simulating processes in the river by idealizing the river as a long channel where conditions may vary along the length of the channel but are assumed to be uniform throughout any channel transect (*i.e.,* from left bank to right bank). This assumption is reasonable given the results of the summer 2000 SPAWAR study,[6] which concluded that throughout a channel transect, the water in the river was generally well-mixed, and current velocities were relatively homogenous and primarily directed along the axis of the channel. The conclusions also supported by model simulations carried out subsequent to a dye study conducted in 2000 by Limno Tech, Inc. for EPA.[7] These results showed that a 35 segment 1-D model was capable of simulating fairly well the time evolution of dye concentrations in the tidal river.

Version 2.3, uses 35 model water column segments, extending from the Northeast and Northwest Branches in MD to the Anacostia's confluence with the Potomac and a model segment 36, representing Kingman Lake, adjoins segment 19. (Kingman Lake is represented as a tidal embayment to segment 19 in ICPRB's upgraded version of the TAM hydrodynamic model). Each of these 36 water column segments is underlain by a surficial sediment segment

---

[5]Limno-Tech is currently WASA's consultant for the LTCP.

[6]*Anacostia River Water Quality Assessment - Draft Report to the Anacostia Watershed Toxics Alliance*, December 2000. The Anacostia Watershed Toxics Alliance is a private-public partnership dedicated to characterization and remediation of the Anacostia River contaminated sediments.

[7]*Dye Study for the Tidal Anacostia River - Final Report*, September 30, 2000.

(segments 37 to 72), and each surficial sediment segment is underlain by a segment of the lower sediment layer (segments 73 to 108). Surficial sediment segment 72 and lower sediment segment 108 underlie water column segment 36, representing Kingman Lake. In all but the PCB sub-model, the surficial bed sediment layer is 1 centimeter (cm) in thickness and the lower bed sediment layer is 5 cm in thickness. In the PCB sub-model has four bed sediment layers instead of two. ICPRB details Version 2.3 in *TAM/WASP Toxics Screening Level Model for the Tidal Portion of the Anacostia River* (Technical Report). The hydrodynamic model inputs to TAM/WASP Version 2.3 are identical to those of Version 2.1 with the exception that Version 2.3 includes baseflow or ground water flow from the CSO sub-sheds. This represents the continual improvement in the modeling.

ICPRB's Technical Report describes the remainder of the model's inputs and assumptions while the Long Term Control Plan (LTCP), developed by the District of Columbia's Water and Sewer Authority (WASA), outlines the scenarios and conditions for managing combined sewer overflows (CSOs). The data taken from CSO and Municipal Separate Storm Sewer System (MS4) monitoring are used as baseline values to determine needed reductions in both organics and metals for Kingman Lake.

Kingman Lake's TMDL is a subset of the 36-segment WASP/TAM model for the full Anacostia River model. The TMDL models the lake as segment 36 (a side embayment in the hydrodynamic model which adjoins to segment 19) within the Anacostia model, thereby treating it as a part of the Anacostia River system rather than as an independent lake system. As such, the load reduction values and model run information necessary to achieve compliance for Kingman Lake can be found in the Anacostia River Organics and Metals TMDL report. EPA believes this Screening Level Model produces reasonable results given the available information and finds that all reasonable efforts were made to secure available information.

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 toxics because of data derived for U.S. Fish and Wildlife Service (FWS) analysis of fish tissue and sediment analysis performed by the Patrick Center for Environmental Research, The Academy of Natural Sciences of Philadelphia.

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 - District of Columbia Water Quality Standards for Metals

Metals	Criteria for Classes		
	Class C		Class D
	Criteria Maximum Concentration (CCC) Four-Day Average - ug/L	Criteria Continuous Concentration (CMC) One-Hour Average - ug/L	30-Day Average - ug/L (Risk Level 10^{-6})
Arsenic - Dissolved	150.00	340.00	0.14
	Anacostia	Anacostia	Anacostia
Copper - Dissolved	10.31	15.31	NA
Lead - Dissolved	2.23	57.15	NA
Zinc - Dissolved	95.04	104.08	NA

The water quality criteria for copper, lead, and zinc is hardness dependent. The Kingman Lake criteria shown are based on a hardness of 89.4 mg/L as $CaCO_3$ from DC DOH monitoring data. It should be noted that the District's water quality regulations 49 D.C. REG. 3012, and 49 D.C. REG. 4854 require very careful reading and the Federal Register (60 FR 22,231) must be consulted to obtain the correct numerical values and units for hardness dependent criteria. The TMDL Report's Table 2-2: Dissolved Metals Numerical Criteria, and notes provided a complete explanation of the criteria.

The organic pollutant water quality criteria are found in the DC regulations at Section 1104.7, Table 3. Within each PAH group, the most stringent water quality criterion was used as the criteria for each member of the group, each group's constituents are shown in Table 4. For example, the Class D water quality standard for fluoranthene, pyrene, benz[a]anthracene, and chrysene are 370, 11000, 0.031, and 0.031 ug/L, respectively. Therefore the most stringent of

the individual standards, 0.031 ug/L is given in the TMDL Report Table 2-3 and Table 3 above as the Class D standard for PAH2.

Table 3 - District of Columbia Water Quality Standards for Organics

Organics	Criteria for Classes		
	Class C		Class D
	CCC Four-Day Average - ug/L	CMC One-Hour Average - ug/L	30-Day Average - ug/L (Risk Level 10^{-6})
Chlordane	0.004	2.4	0.00059
DDE	0.001	1.1	0.00059
DDD	0.001	1.1	0.00059
DDT	0.001	1.1	0.00059
Dieldrin	.00019	2.5	0.00014
Heptachlor Epoxide	0.0038	0.52	0.00011
PAH1**	50.0	NA	1,4000.0*
PAH2**	400.0	NA	0.031
PAH3**	NA	NA	0.031
Total PCBs	0.014	NA	0.000045

*This criterion is not based on 10^{-6} risk factor.
**See Anacostia Organics and Metals TMDL Section 2.3 for PAH groupings.

PCB Allocation

The TAM/WASP Model not only considers the estimated loads entering the river each day but considers advection and dispersion of the flows/loads entering the river, adsorption to the medium-grained and fine-grained sediment fractions, including resuspension of sediment, and volatilization. Because the surface area of the waterbodies within the Anacostia River Watershed are small with respect to the watershed area, the TAM/WASP Model does not consider air deposition. However, the District estimated air deposition using the *Chesapeake Bay Basin Toxics Loading and Release Inventory*, May 1999, as their reference and their calculations are in the TMDL Report, Appendix A. The TMDL Report allocates 47% percent of the instream PCB load to air without requiring any reduction. The TMDL Report states that an additional source of PCBs causing continued water quality standards violations is the contaminated sediment, which releases PCBs to overlying water through sediment resuspension.

The TMDL Report correctly states that releases from unidentified land sources are accounted for in the model by the CSO and storm water loads from the MS4 storm sewers, but the allocations do not require any reduction in such sources. Although the TAM/WASP Model was run for nine years and achieved water quality standards in the Anacostia River, the scenario reduced stormwater and CSO loads by 99.9% leading DOH to believe that a sediment

management plan will allow water quality standards to be met. However, DOH finds it impractical and unrealistic to achieve a 99.9% reduction of loads to the lake.

Since few PCB sample results were available for the Anacostia River, and some of those were not to the low detection levels, no samples for the tributaries, and little air deposition data was available, together with the District's assertion that a sediment management plan will allow water quality standards to be met, EPA is accepting the PCB TMDL at this time. EPA suggests that the District conduct an intensive search for sources and estimates of the amount of PCBs and revise the TMDL as necessary. In addition, air deposition rates and estimates of the amount of PCBs reaching the surface waters should be revisited.

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.[8] 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. Although the Anacostia River Fecal Coliform Bacteria TMDL did divide storm water sewer discharge from overland flow, the TAM/WASP version used for these organics and metals TMDLs does not. The November 2002 memorandum does recognize that WLA/LA allocations may be fairly rudimentary because of data limitations. Therefore, the

[8]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.

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 for those values listed in the Total Allocable Stormwater column of the allocation table, found on page 12 of the Kingman Lake Organics and Metals TMDL. The specific waste load and load allocations for Kingman Lake are found in Table 4 - TMDL summary, below.

The TMDL Report presents the TMDLs and the associated required percent reduction from existing loads in order to meet water quality standards, which range from zero percent for copper, lead, and zinc to 98 percent for PAH1, PAH2, and PAH3. The metal concentrations in the TMDL are total metals even though the water quality standards are for the metals addressed by these TMDLs are for the dissolved fraction. To determine attainment of the water quality standards, only the dissolved output concentrations were evaluated. Reducing the dissolved metal reduces the total metal by the same amount.

Because most of the loading to Kingman Lake is precipitation induced, TMDL and LA loads are shown as average annual loads. EPA believes that this representation is appropriate.

Table 4 - TMDL Summary

Constituent	Total Load (lbs/yr)	% Reduction*	WLA (lbs/yr)	LA (lbs/yr)	1% MOS (lbs/yr)	TMDL (lbs/yr)
Arsenic	4.34E-01	85%	3.97E-02	2.54E-02	6.51E-04	6.44E-02
Copper	1.64E+01	0%	1.00E+01	6.40E+01	1.64E+00	1.62E+01
Lead	7.99E+00	0%	4.87E+00	3.12E+00	7.99E-01	7.91E+00
Zinc	4.88E+01	0%	2.98E+01	1.90E+01	4.88E+00	4.83E+01
Chlordane	2.92E-03	90%	1.78E-04	1.14E-04	2.92E-06	2.89E-04
DDD	2.13E-03	70%	1.30E-04	8.32E-04	2.13E-06	2.11E-04
DDE	4.71E-03	70%	2.87E-04	1.84E-04	4.71E-06	1.27E-05
DDT	1.27E-02	70%	7.77E-03	4.96E-03	4.66E-04	1.26E-03
Dieldrin	2.62E-04	30%	1.12E-04	7.14E-04	1.83E-06	1.82E-04
Heptachlor	4.42E-04	80%	5.39E-05	3.45E-05	8.84E-07	8.75E-05
PAH1	2.01E-01	98%	1.20E-01	7.68E-01	1.97E-03	1.95E-01
PAH2	1.18E+00	98%	7.08E+00	4.52E+00	1.16E-02	1.15E+00
PAH3	7.53E-01	98%	4.50E-01	2.88E-01	7.38E-03	7.31E-01

*See Anacostia Organics and Metals TMDL Section 2.1 for baseline conditions.

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. These are both accounted for in the TAM/WASP simulation.

4. The TMDLs consider critical environmental conditions.

The TMDL Report considers critical environmental conditions in Kingman Lake by modeling the watershed using daily simulations 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.[9] 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 using daily simulations for three years with seasonal data as appropriate.

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

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

The District has chosen to use an explicit margin of safety equal to one 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 and reasonably assure that the TMDLs will be implemented. The TMDL approved in August 2003 for organics and metals 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), which, among other things, teach children the value of the river and wetlands. Another group is the Anacostia Watershed Toxics Alliance (AWTA), a public/private partnership. AWTA seeks to draw all interested parties together and has funded intensive investigations of the contaminated sediment. In the fall of 2003, AWTA is funding a pilot project to test covering the contaminated sediments. Four 100-foot by 100-foot sections will be covered and be monitored.

The TMDL Report, Section 7, Reasonable Assurance, lists remediation projects and programs undertaken by the District to improve water quality. While they may not specifically control pollutants addressed in this decision rationale, controlling one pollutant generally helps to control others.

8. The TMDLs have been subject to public participation.

DC public noticed a February 2003 version of these TMDLs March 21, 2003 and the comment period closed on April 1, 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, U.S. Department of the Navy, and the District of Columbia Water and Sewer Authority.