D.C. DEPARTMENT OF HEALTH
Environmental Health Administration
Bureau of Environmental Quality
Water Quality Division

DISTRICT OF COLUMBIA FINAL TOTAL MAXIMUM DAILY LOADS FOR TOTAL SUSPENDED SOLIDS OIL AND GREASE BIOCHEMICAL OXYGEN DEMAND IN KINGMAN LAKE

OCTOBER 2003

Government of the
District of Columbia
Anthony A. Williams, Mayor

DISTRICT OF COLUMBIA

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TOTAL MAXIMUM DAILY LOADS
FOR
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OIL AND GREASE
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IN
KINGMAN LAKE

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WATER QUALITY CONTROL BRANCH

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INTRODUCTION

Section 303(d)(1)(A) of the Federal Clean Water Act (CWA) states:

> Each state shall identify those waters within its boundaries for which the effluent limitations required by section 301(b)(1)(A) and section 301(b)(1)(B) are not stringent enough to implement any water quality standards applicable to such waters. The State shall establish a priority ranking for such waters taking into account the severity of the pollution and the uses to be made of such waters.

Further section 303(d)(1)(C) states:

> Each state shall establish for the waters identified in paragraph (1)(A) of this subsection, and in accordance with the priority ranking, the total maximum daily load, for those pollutants which the Administrator identifies under section 304(a)(2) as suitable for such calculations. Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality.

In 1996, the District of Columbia (DC), developed a list of waters that do not or are not expected to meet water quality standards as required by section 303(d)(1)(A). The list was revised in 1998 and again in 2002. The list of water bodies contains a priority list of those waters that are the most polluted. This priority listing is used to determine which of those water bodies are in critical need of immediate attention. This list, submitted to the Environmental Protection Agency every two years, is known as the Section 303(d) list. For each of the listed waters, states are required to develop a Total Maximum Daily Load (TMDL) which calculates the maximum amount of a pollutant that can enter the water without violating water quality standards and allocates that load to all significant sources. Pollutants above the allocated loads must be eliminated.

The District of Columbia's section 303(d) list Kingman Lake for organics (toxics), metals, BOD, TSS, and oil and grease. The Anacostia River TMDLs for organics and metals and bacteria contains Kingman Lake. Previous TMDLs for oil and grease for Hickey Run and for BOD and TSS on the Anacostia River contain information relevant to the TMDL for Kingman Lake for those pollutants.

APPLICABLE WATER QUALITY STANDARDS

{tc \l5 "APPLICABLE WATER QUALITY STANDARDS}Title 21 of the District of Columbia Municipal Regulations (DCMR) Chapter 11 contains the Water Quality Standards (DC WQS, Effective January 24, 2003). As discussed below, Kingman Lake was created in the 1920 to 1940s by the Corps of Engineers' massive dredging operations and straightening of the Anacostia River creating a pseudo oxbow lake area now known as Kingman Lake. The operations, however, maintained the hydraulic connection to the Anacostia River.

Therefore, based on the historical relationship and continued hydraulic connections between the Anacostia River and the waterbody now called Kingman Lake, the criteria applicable to the Anacostia River applies to Kingman Lake. Kingman Lake, therefore, has the designated beneficial uses of:

Class A - primary contact recreation,
Class B - secondary contact recreation and aesthetic enjoyment,
Class C - protection and propagation of fish, shellfish, and wildlife,
Class D - protection of human health related to consumption of fish and shellfish, and
Class E - navigation.

TSS – Secchi Depth Criteria

The Anacostia River/Kingman Lake as Class C waters must achieve or exceed water quality standard for clarity as measured by secchi disc. The water body must meet an average of 0.8 meters secchi disc depth during the period of April through October during an average flow year. The number is derived as a multi-year average with large variations in flow both with years and within the season. Consequently, a design flow of the long term average will include high flow years where clarity is less that 0.8 m and low flow years where clarity is more than 0.8 m. This value is based upon the requirements by submerged aquatic vegetation for an adequate amount of light for photosynthesis.

The factors which affect light penetration are particulate matter and color. Particulate matter is referred to as Total Suspended Solids and includes both inert and volatile solids. One of the components of the volatile solids is algae. Color may absorb differentially some components of light and has been shown to be a very minor component in the Chesapeake Bay system of rivers. There are some short periods of time such as immediately following leaf fall that material such as tannic acid may cause a larger effect on clarity, but this is usually at the end of the SAV growing season. Color does not appear to be a significant factor in the Anacostia River. In 1981 the District of Columbia deleted the water quality criteria for total suspended solids from the Water Quality Standards because it was not protective of the Class C uses. A turbidity criteria was added at that time in order to control localized activities such as dredging and point source discharges.

Dissolved Oxygen Criteria

Class C waters must achieve or exceed water quality standard for dissolved oxygen. The WQS for DO are 5.0 milligrams per liter (mg/l) as a daily average and must achieve or exceed a one hour value of 5.0 mg/l for the fish spawning period of March through June and 4.0 mg/l for the remainder of the year. Dissolved oxygen values lower than 4.0 or 5.0 mg/l impair fish growth and reproduction, particularly in the younger fish. Values less than 2.0 mg/l may cause fish mortality. For the most part, DO depends on the quantity of Biochemical Oxygen Demand (BOD) in the water body, but other substances such as ammonia, Total Kjeldahl Nitrogen (TKN) and algae also affect the DO. This TMDL addresses the impairment of the Class C use because of low dissolved oxygen due to excessive BOD. The TMDL provides numeric target reductions that compliment DC's ongoing efforts to protect the Anacostia River and will guide future efforts.

Oil and Grease Criteria

Class C waters must not exceed 10.0 mg/l of oil and grease. This is the approximate amount of oil that will cause a visible sheen on a water surface. This criteria does not apply at flows less than the average seven day low flow which has the probability of occurrence of once in ten years. Kingman Lake was listed for oil and grease because the upper entrance is immediately down steam of Hickey Run and oil from Hickey Run would enter Kingman Lake and cause exceedances of the criteria.

BACKGROUND
{tc \l1 "BACKGROUND}
Around 1800, the Anacostia River was a major thoroughfare for trade in the area now known as the District of Columbia, particularly for Bladensburg, a deep water port in Maryland. By 1850, however, the Anacostia River had developed sedimentation problems due to deforestation and improper farming techniques related to tobacco farms and settlements. Channel volumes were greatly decreased and stream flow patterns were altered. Due to the continuation of the urbanization process, the river was never able to flush out the excessive amount of sediment and nutrients. In the 1920's to 1940's the Corp of Engineers re-configured the Anacostia River with a massive dredging project. As part of a flood control measure the River was straightened and a bend of the river was left as a pseudo oxbow lake. This was named Kingman Lake (Figure 1).

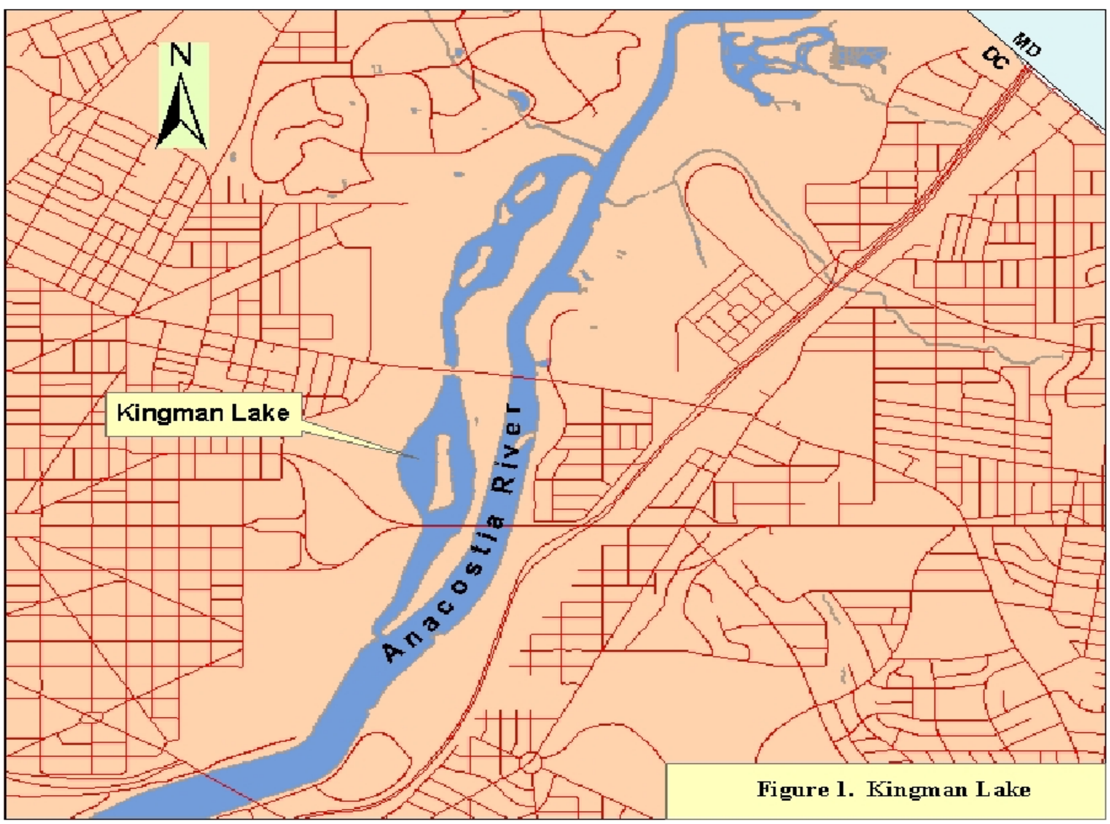

Figure 1. Kingman Lake

The District of Columbia, as many cities in the 19th and early 20th centuries, developed a combined sewer system, which transported both rainfall and sanitary sewage away from the developed areas and discharged it into the rivers. The two major combined sewage outfalls were at the present location of the "O" Street Pump Station and at the Northeast Boundary Sewer just below Kingman Lake. In the 1930s, Blue Plains Wastewater Treatment Plant (WWTP) was constructed and dry weather sewage flows were transported across the Anacostia River to Blue Plains. However, the wet weather flows were and are often greater than the transmission capacity of the pump stations and piping system and resulted in overflows. Later, sewer system construction techniques utilized two pipes so that the storm water could be kept separate from the sanitary sewage. Storm water is transported to the nearest stream channel and discharged while the sanitary sewage is transported to Blue Plains WWTP for treatment.

CURRENT LAND USE
{tc \l1 "CURRENT LAND USE}
Kingman Lake direct drainage is about 16,000,000 square feet, 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 (100,000 ft^2). 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.

HYDRAULIC CHARACTERISTICS

Kingman Lake is tidal with an opening at each end. Tidal amplitude is about 3 feet. The lake was originally about 94 acres. After creation of 44 acres of wetlands there was 50 acres of open lake left. Final design of the wetlands was to create an inundation depth of 0.0 to 2.0 feet at high tide. About 25 acres (1,089,000 square feet) of the wetlands has an inundation depth of one foot at high tide, and 0.0 feet at low tide. 50 acres (2,178,000 square feet and a volume of 5,744,000 ft^3) of the lake has depth of 2.6 feet at low tide and exchange volume of 3 feet; and 25 acres of the wetlands area has an exchange volume of 1 foot.

Tidal exchange volumes at Low Tide

Lake	50 acres X 2.6 feet =		5,662,800 ft^3
Wetland	25 acres X 0.0 feet =		0.0 ft^3
		Total	5,662,000 ft^3

Tidal exchange volumes at High Tide

Lake	50 acres X 3.0 feet =		6,534,000 ft^3
Wetland	25 acres X 1.0 feet =		1,089,000 ft^3
		Total	7,623,000 ft^3

There are no tributaries that empty directly to Kingman Lake.

Storm water runoff can be estimated based upon land use areas:

Land Use Type	% Impervious	% Area	Total Area ft^2
Residential	72.5	25	4,000,000
RFK	100	25	4,000,000
Park/Golf course (grass)	20	50	8,000,000

WATER QUALITY STANDARDS
{tc \l1 "WATER QUALITY STANDARDS}
The Anacostia River/Kingman Lake have several designated uses as detailed in DC's Water Quality Standards. Class C waters have an associated seasonal segment average minimum numeric criteria for clarity measured as secchi disc depth of 0.8 meters. When TSS increases in the water body, secchi disc depths decrease. Algal growth can contribute to the amount of TSS and is included in the measurement of TSS. The purpose of this TMDL is to determine the limit to which TSS must be reduced to achieve and maintain the Water Quality Standards for clarity. The numerical criteria must be achieved for flows between the 7Q10 and the average seasonal flow. Point source discharges of TSS should be designed for compliance at the average seasonal flow.

The criteria for oil and grease is 10 mg/l maximum.

The criteria for dissolved oxygen is 5.0 mg/l as a daily average and must achieve or exceed a one hour value of 5.0 mg/l for the fish spawning period of March through June and 4.0 mg/l for the remainder of the year.

SOURCE ASSESSMENT

Point Sources

Within the District of Columbia, there are three different networks for conveying waste water. Originally, a combined sewer system was installed which collected sanitary waste and storm water and transported the sanitary flow to the waste water treatment plant. When storm water caused the combined flow to exceed the pipe capacity leading to the treatment plant, the excess flow was discharged, untreated, through the combined sewer overflow to the river.

In the upper two thirds of the drainage area, a separate sanitary sewer system and a storm sewer system were constructed. A separate sanitary sewer line has no storm water inlets to the system and it flows directly to the waste water treatment facility. Storm water pipes collect storm water from the streets and parking lots and are discharged to the rivers.

There are four storm sewers which discharge to Kingman Lake.

The Northeast boundary combined sewer overflow discharges into the Anacostia River about 750 feet below the lower entrance to Kingman Lake.
Non point Sources

Hickey Run enters the Anacostia River about 300 feet above the upper entrance to Kingman Lake and the flow may be carried into the lake. Storm water runoff comes from Kingman and Heritage Island, the golf course and some parts of the RFK stadium parking lot.

Storm water runoff can be estimated based upon land use
Residential 72.5 % imperious and 25 % of the area 4,000,000 ft^2
RFK 100% impervious and 25% of the area 4,000,000 ft^2
Park and golf course (grass) 20% impervious and 50 % of the area 8,000,000 ft^2

DOH collected three storm water samples from the storm sewer collecting runoff from a residential area tributary to Kingman Lake.[1] This monitoring location is required under the MS4 NPDES permit No. DC0000221 and approved by EPA on January 17, 2001[2]. The location was selected to be representative of the commercial, industrial, residential, and recreational land use activities as described in 40 CFR 122.26(d)(2)(iii)(A). Further the sewer shed for this storm line covers 91.83 acres or 25% of the drainage area for Kingman Lake. Finally, as discussed in the DOH Proposed Monitoring Station letter to EPA, dated November 27, 2000[3], this location was selected to characterize the quality of storm water discharges from the MS4 and the data would be collected for use in the preparation of the Anacostia River TMDLs.

Using the average concentrations (shown below) and the minimum detection limit for oil and grease the three storms pollutant loads can be calculated.

East Capitol Street - 200 Block of Oklahoma Ave & D St., N.E.					
Discharge to Kingman Lake					
Date of Event	**MDL**	**12/17/01 #1**	**4/9/02 #2**	**4/18/02 #3**	**AVG**
Flow Rate (GPM)	**N/A**	3.95	49.79	25	26
Total suspended solids	10 mg/l	9	15	80	34.67
BOD_5	2 mg/l	ND	26	53	27.00
Oil and Grease	5.0 mg/l	ND	ND	ND	5.00

A one-inch rainfall event has a return frequency of about 1-year. A one-inch rainfall event would generate the following volumes and loads:

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1 District of Columbia Stormwater Management Plan, Government of the District of Columbia, Washington, D.C. October 2002. Sampling site number 7 monitors stormwater that discharges directly to Kingman Lake. The sampling site is located at East Capitol Street – 200 Block of Oklahoma Ave. at intersections with D St., NE.
2 Environmental Protection Agency, letter from Rebecca Hammer, EPA to James Collier, DOH, approving monitoring station sites for Anacostia MS4 NPDES permit DC0000221 monitoring, January 17, 2001.
3 Government of the District of Columbia, EHA, letter from James Collier, EHA to Jon Capacasa, EPA, proposing monitoring stations for MS4 NPDES permit DC000221, November 27, 2000.

Residential
Volume = (4,000,000 X 1/ 12) X 72.5 % = 241,666 ft^3
TSS = 34.67 mg/l = 523.01 pounds
BOD_5 = 27 mg/l = 407.34 pounds
Oil and Grease < 5.00 therefore loading < 75.43 pounds

RFK
Volume = (4,000,000 X 1 / 12) X 100% = 333,333 ft^3
TSS = 34.67 mg/l = 721.39 pounds
BOD_5 = 26 mg/l = 561.85 pounds
Oil and Grease < 5.00 therefore loading < 104.05 pounds

Park and Grass
Volume = (8,000,000 X1 /12) 20 % = 133,333 ft^3
TSS = 5.66 mg/l = 46.86 pounds (concentration reduced for grass area[4])
BOD_5 = 4.41 mg/l = 36.50 pounds (concentration reduced for grass area[4])
Oil and Grease < 5.00 therefore loading < 41.62 pounds

Total Estimated Loadings for one inch rainfall event:
TSS = 1,291.26 pounds
BOD_5 = 1005.69 pounds
Oil and grease < 221.10 pounds

TOTAL MAXIMUM DAILY LOADS AND ALLOCATION
{tc \l1 "TOTAL MAXIMUM DAILY LOADS AND ALLOCATION}
{tc \l2 "}**Analysis Framework**

{tc \l2 "Analysis Framework }The analysis is conducted with the underlying assumptions of the previously conducted TMDLs for BOD and TSS on the main stem Anacostia River and the Hickey Run TMDL for oil and grease. It is assumed that the Anacostia water that enters Kingman Lake meets the conditions described under the final allocations, which accordingly meet water quality standards.

Clarity
{tc \l5 "Clarity}
The Anacostia River TMDL provides a seasonal average value for TSS in the segments at the end of Kingman Lake of about 10 mg/l[5]. This value of TSS provides a secchi disk depth of greater than 0.8 meters as a seasonal average with ample amounts of algae. Therefore water entering

[4] Grass areas act as an effective BMP to reduce TSS concentrations by 83.67%, which represents the average sediment load reduction value for various buffer widths. Chesapeake Bay Program, Water Quality Functions of Riparian Forest Buffer Systems in Chesapeake Bay Watershed, EPA 903-R-95-004 Table 6 page 30, August 1995 . OD is associated with TSS and is effectively reduced. Clark, et al., Water supply and Pollution Control, International Textbook Company, 1971.
[5] See TSS Technical Support Document, DOH Water Quality Division, 2001.

Kingman Lake will meet water quality standards for clarity and a simple calculation can be made to determine whether the loads to Kingman Lake deteriorate water quality.

One inch rainfall = 1,291.26 pounds of TSS
Tidal cycle volume = 6,534,000 ft^3 (open water) + 1,089,000 ft^3 (wetland water at 1 foot depth)
= 7,623,000 ft^3

Constant lake volume at low tide = 5,662,800 ft^3 at 2.6 ft depth

Assuming a standard settling velocity from the Anacostia Model = 3 feet per day
Constant lake volume water will have zero suspended solids after one day because the depth of the lake is less than the settling velocity and initial conditions are set to zero.

Wetland water will have reduced suspended solids per tidal cycle as follows:
One third of one cycle there will be an average depth of 0.5 feet.
One third of a cycle is 13 hr/3 = 4.3 hours = 17.9 % of a day.
The percent settled is 3 feet per day times 4.3 divided by 24 = 0.54 feet.
Therefore all solids that are in the water will settle and the water will have a zero concentration.

The tidal cycle open water will contain TSS of 10 mg/l, which is 4079.04 pounds.

Average concentration of the lake is:

(10 mg/l X 6,534,000)/(6,534,000+ 5,662,8,000 + 1,089,000) = 4.92 mg/l

These calculations can then be used to evaluate the effects of a storm load of 1291.26 pounds of TSS.

Assume Kingman Lake is at 4.92 mg/l = 4079.04 pounds (13,285,800 ft^3)
During a one inch storm event add 1289 pounds = 5379 pounds

This then gives a concentration of 6.47 mg/l. Thus, for every increase in TSS of 829.41 pounds the concentration will increase by one mg/l.

Therefore, the solids loadings will only approach 10 mg/l from storms grater than 3.27 inches per tidal cycle. The return period of such a storm is 5 years[6].

No allocation is necessary for Kingman Lake because the main stem Anacostia TMDL governs those sources that would cause a violation of the clarity criteria. The Anacostia TSS TMDL specifies that the wetlands in Kingman Lake are causing a net improvement in Anacostia main stem solids loads. The TMDL verifies those statements.

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[6] Clark, et al., Water supply and Pollution Control, International Textbook Company, 1971.

BOD

A BOD TMDL has been performed for the Anacostia River, which established that the dissolved oxygen in the main stem will meet water quality standards.

The calculation for Kingman Lake is to determine whether or not the sources to Kingman Lake will create a violation of Water Quality Standards. Loadings from one inch rainfall = 1005.69 pounds into a volume of 13,285,800 ft^3. At high tide 829.41 pounds are need to raise the BOD by one mg/ and at low tide 353.52 pounds will raises the BOD by one mg/l. It then is apparent that a one inch rain fall will cause an increase of 1.21 to 2.84 mg/l BOD_5 depending on the tide.

The BOD_5 reaction rate of k = 0.05 (24.77%/day)[7] and k = 0.1 (3029%/day)[8] can be used to look at oxygen consumption. The reaeration rate of 0.25 used in the Anacostia model can be applied because of the very shallow nature of Kingman Lake, which will give an increase of 2.2 mg/l per day at a dissolved oxygen concentration of 5.0 mg/l. Assuming a constant low tide pool for one day, the BOD_5 exerted at low rate[9] would be 2.84 X 0.24 = 0.70 mg/l oxygen consumed and at the high rate 2.84 mg/l X 0.30 = 0.86 mg/l. Both of these values are less than the reaeration of 2.2 mg/l per day.

Neglecting dilution by tidal cycles and wetlands removal of particulate BOD, one can calculate that it would require loading from a storm of three inches to over come the reaeration. As note above this is approximately a five year storm[10].

Storm water BOD load reductions of 50 %, as specified in the mainstem Anacostia TMDL are more than adequate to meet water quality needs in the lake.

Oil And Grease

The critical criteria for oil and grease is 10 mg/l. The loadings to produce the maximum concentration of 10 mg/l at low tide would be:

$$5.6628\text{M ft}^3 \text{ X } 62.4\text{E-5/ft}^3 \text{ x } 10 \text{ mg/l} = 3535.17 \text{ pounds.}$$

Oil & Grease Calculations

Maximum allowable Load at 10 mg/l load	3535.17	pounds
Current Load	1291.26	pounds
TMDL	1291.26	pounds
1% Margin of Safety	12.91	pounds
Allocable Load to Stormwater	1278.35	pounds

7 Sawyer & McCarty, Chemistry for Sanitary Engineers, page 406, McGraw-Hill, 1967
8 Id.
9 Phelps, E., et al., Public Health Engineering – A Textbook of the Principles of Environmental Sanitation, Vol. 1, John Wiley & Sons, Inc, 1948.
10 Clark, et al., Water supply and Pollution Control, International Textbook Company, 1971..

Storm water monitoring data found no detectable oil and grease in the discharges. The Hickey Run TMDL restrict loadings to levels far below those necessary to cause a violation inside Kingman Lake. The TMDL is thus based on maintaining current loads, which meets the water quality standard of 10 mg/l with a 1% margin of safety.

CRITICAL CONDITIONS AND SEASONAL VARIATIONS

The water quality standards establish the critical conditions as the average clarity at the average flow for the growing season of April through October. Clarity may vary in other seasons and there is no criteria for the other seasons. The criteria of 0.8 meters must be met over a period of years and recognizes that in high flow years the secchi disc depth will be less than 0.8 and that during dry years will be greater than 0.8 meters. The design flow for point sources is the long term season average and compliance must be achieved at flows between the 7Q10 and the long term seasonal average. The criteria does not apply to flows above the seasonal average and below the 7Q10.

Dissolved oxygen and oil and grease do not have any critical conditions or seasonal variations that affect the loadings to Kingman Lake.

ALLOCATIONS, REDUCTIONS, MARGIN OF SAFETY, AND THE TMDL

Once the main stem Anacostia River meets water quality standards for clarity and dissolved oxygen; Kingman Lake will meet water quality standards. In fact Kingman Lake as rehabilitated with wetlands will have better water quality than the Anacostia River until the chief sources to the river are controlled. Calculations show that the current loading to Kingman Lake are within acceptable values and not the cause of violations. Current violations are caused by the tidal influx of main stem water.

Waste Load Allocation

{tc \l1 "Waste Load Allocation}

Current point sources are allocated their current loads or those loads specified in other TMDLs. {tc \l5 "Current point sources are allocated their current loads or those loads specified in other TMDLs.}

Load Allocation

{tc \l1 "Load Allocation}

Current nonpoint sources are allocated their current load or those loads specified in other TMDLs.

Reserve

{tc \l1 "Reserve}

All available loadings are allocated to reserve.

Margin of Safety

{tc \l1 "Margin of Safety}

There is at least a factor of three margin of safety for all three substances under the current loading.

Additional Considerations

Load reductions of the sources to Kingman Lake should continue in order to improve water quality in the main stem Anacostia River**.**

Implementation
{tc \l1 "Implementation}

On May 10, 1999, Mayor Williams signed a new Anacostia Watershed Restoration Agreement with Maryland, Prince George's County, Montgomery County, and U.S. EPA to increase efforts to improve water quality. The Agreement has six major goals. The first one pertains to this TMDL:

> Goal #1: dramatically reduce pollutant loads, such as **SEDIMENT**, toxics, CSOs, other nonpoint inputs and trash, delivered to the tidal river and its tributaries to meet water quality standards and goals.

On June 28, 2000, Mayor Williams, Governor Glendening, U.S. EPA and others signed the new Chesapeake Bay Agreement which states:

> By 2010, the District of Columbia, working with its watershed partners, will reduce pollution loads to the Anacostia River in order to eliminate public health concerns and achieve the living resources, water quality, and habitat goals of this and past agreements.

Thus, an agreement is in place, which clearly demonstrates a commitment to the restoration of the river by the year 2010. This establishes a completion date for implementation of those activities necessary to achieve the load reductions allocated in this TMDL.

Storm Water Load Reductions

Government to reduce nonpoint source pollution. Major currently operating programs in DC which reduce loads are as follows:

1. Street sweeping programs by the Department of Public Works.

2. Requirements for storm water treatment on all new development and earth disturbing activities such as road construction. The BMP and removal efficiencies that have been installed in the Anacostia drainage area in accordance with DC Law 5-188, The Water Pollution Control Act of 1985 are included in the appendix.

3. Regulatory programs restricting illegal discharges to storm sewers and enforcing the erosion control laws.

4. Kingman Lake -The goal of this project is to restore over 40 acres of freshwater tidal wetlands in the Kingman Lake area in order to increase plant and animal diversity. These wetlands will also improve water quality by reducing the amount of sediment in the water by an estimated 1,600,000 pounds per growing season. This project was completed in 2000. Monitoring efforts are continuing in connection with other wetlands that have been restored in Kenilworth Park. Funding for this project was cost shared by the USACE, Maryland and USEPA. The DC Department of Health has issued the Nonpoint Source Management Plan II.

5. River Fringe Wetlands -The goal of this project is to restore 15 acres of tidal wetlands along the shores of the Anacostia River above Kingman Island. As with the Kingman Lake wetlands, these wetlands will increase the number of beneficial plants and fish in the river and will reduce the amount of sediment in the water an estimated 369,000 pounds per growing season. The USACE has completed the design for this project. Construction is scheduled for Spring 02. Funding for this project was cost shared with the USACE and USEPA.

6. Kingman Island- The goal of this project is to restore the southern half of the island as a natural park recreational area. This project is being closely coordinated with Office of Planning and Department of Parks Recreation. The USACE has completed preliminary sampling for contaminants on both Heritage and Kingman Island and is currently completing a feasibility study of the islands. The USACE is also assisting the District in meeting the National Environmental Policy Act, a legal requirement when the land was transferred back to the District. The USACE Aquatic Restoration program is designing the habitat component of this project. Design and implementation is cost shared: 65% federal, 35% District. Habitat restoration efforts on Heritage Island are scheduled for implementation by the USACE in FY02. EHA also funded and facilitated the reconstruction of the pedestrian bridges by the US Navy (completed 04/01).

7. Approximately two thirds of the RFK parking lot drainage is now routed to storm water BMPs installed in 2002 by the Sports and Entertainment Commission.

8. The golf course has planted buffer strips of trees along Kingman Lake.

9. Environmental education and citizen outreach programs to reduce pollution causing activities.

Federal lands encompass approximately 18 percent of the land inside DC that contribute flow to storm water to the Anacostia River. Consequently, load reductions are assigned to the federal government to achieve. The Washington Navy Yard, GSA-Southeast Federal Center, and Anacostia Naval Air Station have or will have storm water permits issued by U.S. EPA and certified by DC DOH. Under these permits, the federal facilities are required to have storm water management plans to control storm water runoff. The remaining federal facilities such as the National Park Service and National Arboretum will need to develop storm water management plans to reduce their loads and implement those plans.

The District of Columbia Water Pollution Control Act (DC Law 5-188) authorizes the establishment of the District's Water Quality Standards (21 DCMR, Chapter 10) and the control of sources of pollution such as storm water management (21 DCMR, Chapter 5). The storm water management regulations require the hydraulic control of the once in 15 years storm and the water quality treatment of the first one half inch of rainfall.

Construction and Dredging

Activities authorized under section 404(e) such as dredging can generate TSS loads, which affect clarity. These activities are normally restricted to periods when fish spawning activities are at a minimum. In addition the criteria for turbidity of less than a 20 NTU increase above ambient applies to these types of activities. The Department of Health will consider the impact of these activities during the water quality certification process.

Monitoring

The Department of Health maintains an ambient monitoring network, which includes Kingman Lake. Data is collected on dissolved oxygen, clarity, TSS and algae at least monthly.