DISTRICT OF COLUMBIA

DRAFT
TOTAL MAXIMUM DAILY LOAD

for

BIOCHEMICAL OXYGEN DEMAND
in

FORT DAVIS TRIBUTARY

DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH ADMINISTRATION
BUREAU OF ENVIRONMENTAL QUALITY
WATER QUALITY DIVISION

March 2003

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 1998, the District of Columbia 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 2002. The list of water bodies contains a priority list of those waters that are impaired. This priority listing is used to determine which of those water bodies are in critical need of immediate attention. The list, also known as the 303(d) List, is submitted to the Environmental Protection Agency every two years. 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.

This TMDL is for Biological Oxygen Demand (BOD) in Fort Davis, a tributary of the Anacostia River.

APPLICABLE WATER QUALITY STANDARDS

The District of Columbia Water Quality Standards (WQS), Title 21 of the District of Columbia Municipal Regulations (DCMR) Chapter 11 specifies the categories of beneficial uses as:

1. Class A- primary contact recreation,
2. Class B- secondary contact recreation,
3. Class C- protection and propagation of fish, shellfish, and wildlife,
4. Class D- protection of human health related to consumption of fish and shellfish, and;
5. Class E- navigation.

Fort Davis is not directly classified as a separate waterbody in the DC Water Quality Standards. It is classified on the basis of current use and designated beneficial uses as a tributary of the Anacostia River as follows:

Waterbody	Current Use	Designated Use
Anacostia River Tributaries (except Hickey Run, Watts Branch, And Wetlands)	B,C,D	A,B,C,D

Class C waters must achieve or exceed water quality standard for dissolved oxygen (DO). 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.

Data collected on the Anacostia River demonstrates the relationship between rainfall induced pollution loads on DO and fish mortality. The data from a continuous DO monitoring device is plotted relative to rainfall. A rainfall event of about one-inch in late May, 1999 caused the DO to drop into the potential fish kill range. The water quality remained in violation of the standards until the June 12 rainfall event of 1.3 inches which dropped the DO to near zero and resulted in killing of about 5,000-7,000 fish in the Anacostia River. This particular event is typical of wet weather induced problems in the Anacostia River.

For the most part, DO depends on the quantity of Biochemical Oxygen Demand (BOD) in the waterbody, 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 tributaries.

BACKGROUND

Fort Davis is a remenant of one of the many first order tributaries of the Anacostia River that existed in the 1800s (Figure 1). During the early development of the city, portions or entire streams have been placed in large storm drains ranging from 15 feet to 3 feet in diameter. A number of storm water drains discharging to the Anacostia River continue to carry flowing streams. Yet the head water of several streams in the city originates from storm water drains.

Fort Davis is the remenant (headwater) of an eastern first order tributary of the Anacostia River. Over three quarter of its lower portion of the stream has been enclosed (Figure 2). The lack of direct connection of the downstream portion of the stream and the extent of the enclosure has imposed a constraint on the habitat characteristics. In surveys conducted in recent years, no fish were found in Fort Davis tributary. Fishes living in the stream historically would have been depleted long ago through the stresses of urbanization and inability of migration. Fort Davis has probably been without fish for some time.

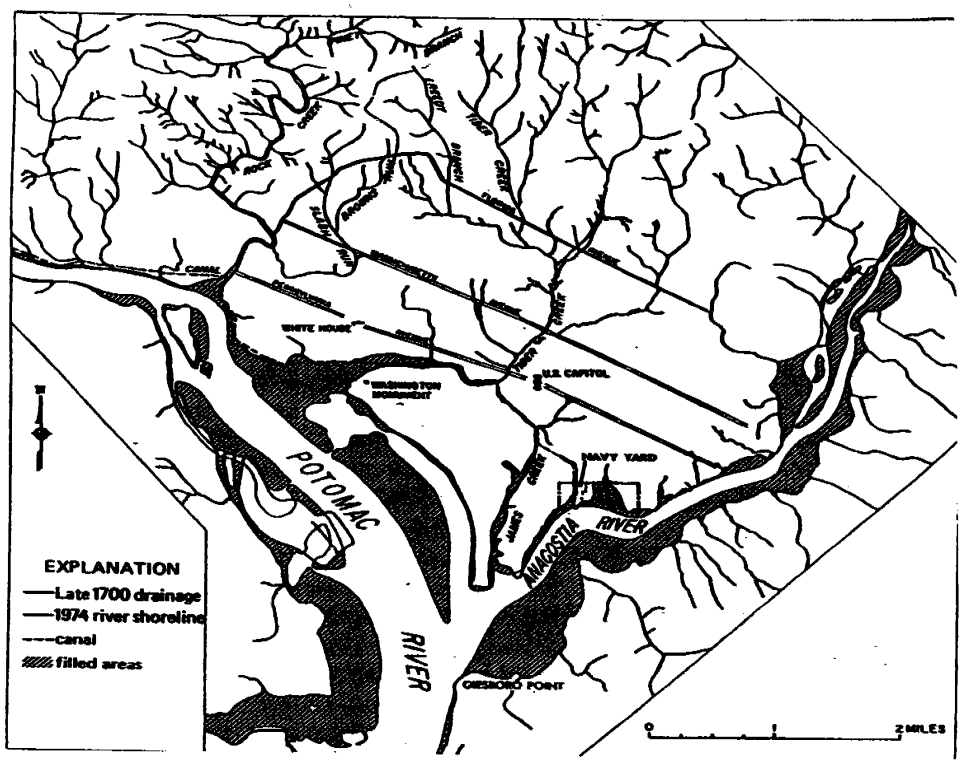
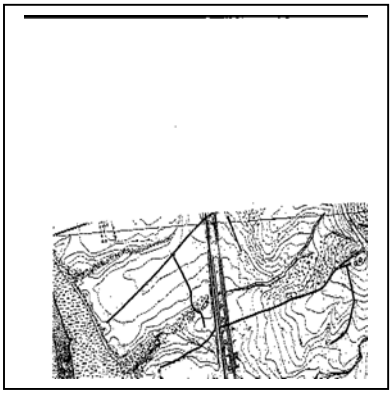


Figure 1. Streams in the District of Columbia in the 1800's



CURRENT LAND USE

The surface stream is approximately 1,700 feet long and is buffered by about 600 feet of forested parkland on the south side. Its northwestern side abuts Pennsylvania Avenue. The stream is now conducted by storm drains from Pennsylvania and Carpenter Street SE to a confluent discharge of several storm drains about 2,000 ft. upstream of the Sousa Bridge. The entire watershed is within the boundaries of the District of Columbia and measures about .11 mi^2 (70 acres). Approximately half of the watershed is forested National Parkland with the other half is urban residential.

STREAM FLOW

The stream receives three small storm drains. It is surrounded but not traversed by several sewer lines (27 inches in diameter or less). The stream gradient was measured at 1% and the flow volume was estimated to be only 0.1 cubic feet per second. The stream bed consists of 40% sand, 40% gravel and 20% silt with occasional additions of mud and debris.

WATER QUALITY STANDARDS AND TARGET VALUES

The tributaries of the Anacostia River, except Hickey Run and Watts Branch, have the same designated uses as the Anacostia River. Under the DC's Water Quality Standards (WQS), Class C waters have a daily average minimum numeric criteria for DO of 5.0 mg/L. When BOD increases in the water body, DO concentrations decrease. Excessive algal growth caused by over enrichment with nitrogen and/or phosphorus contribute to dissolved oxygen violations through the daily photosynthesis cycle and through the decay of dead algal cells. The purpose of the BOD TMDL is to determine the limit to which BOD must be reduced and to achieve and maintain the Water Quality Standards for DO, the DO level that would support the fish population or would not cause fish mortality.

SOURCE ASSESSMENT

Point Sources

There are no known point sources in the Fort Davis tributary watershed.

Nonpoint Sources

There are four storm sewer outfalls discharging to the Fort Davis Tributary. Storm water runoff from a moderate rainfall can contribute a significant amount in excess to the base flow of 0.1 cfs. The drainage area is residential in character, with one school located on the south flank of the stream. Storm water is the only non-point source load.

ALLOCATIONS, REDUCTIONS, MARGIN OF SAFETY

The basis for the listing Fort Davis was the 1998 Water Quality Assessment report (305(b)) report which indicated an 11.1% violation in DO. The result was from data collected for the period of

1993 to 1997. A 10% exceedence in DO causes a waterbody to be included in a 303(d) list of impaired waterbody. Data collected since then show that there are no violations for DO. Each of the years 2000 and 2002 305(b) reports show 0.0% violation for DO.

Since the waterbody is no longer impaired, no allocation is made for BOD. However, the watershed will be covered under all citywide storm water mitigation activities.

Storm Water Load Reductions

The DC Department of Health issued the Nonpoint Source Management Plan II in June, 2000. The plan contains descriptions of the current programs and activities that are performed by DC Government to reduce nonpoint source pollution.

Under the U.S. EPA issued Municipal Separate Storm Sewer Permit there are a number of requirements. The most pertinent of these is the requirement to develop a storm water management plan by April, 2002. The plan should provide additional mechanisms for achieving the load reductions needed.

Major currently operating programs in DC which reduce loads are as follows:

1. Street sweeping and catch basin cleaning.

2. Requirements for storm water treatment on all new development and earth disturbing activities such as road reconstruction.

3. Regulatory programs restricting illegal discharges to storm sewers.

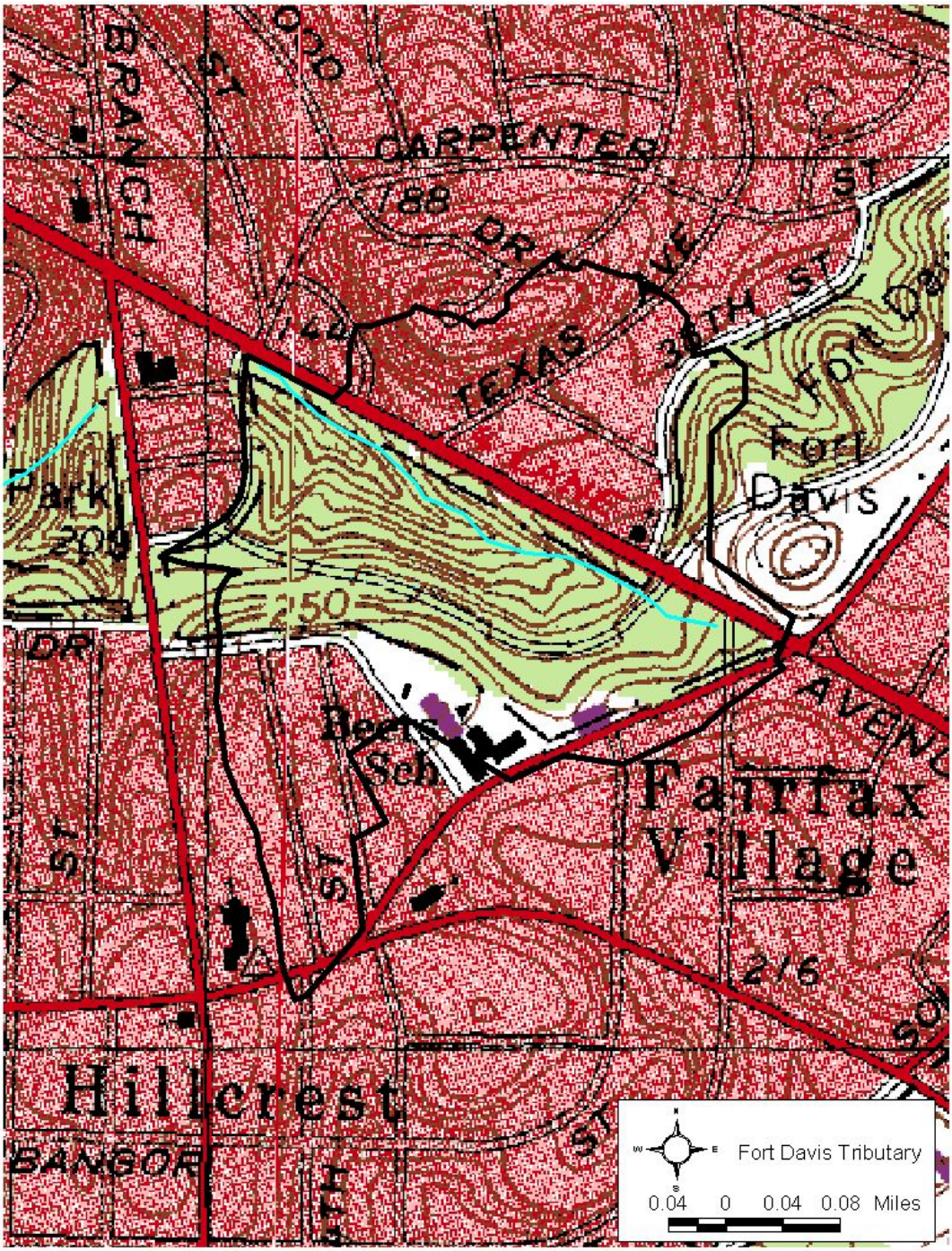
4. Demonstration BMPs, stream bank stabilization, and wetlands construction.

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

6. Federal lands encompass approximately 50 percent of the Fort Davis watershed area that contributes flow to storm water to the stream. DC DOH will work with the National Park Service to reduce any impairment that may develop.

Monitoring

The DC DOH maintains a regular monitoring station on Fort Davis tributary. The DC DOH will continue to monitor the stream.



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